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NAVELEX 0967-384-9010

VOLUME 1 OF 2

TECHNICAL MANUAL

for

RADIO RECEIVING SETS
AN/URR-63 (V) 1
AN/URR-63 (V) 2

VOLUME 1

DEPARTMENT OF THE NAVY
NAVAL ELECTRONIC SYSTEMS COMMAND

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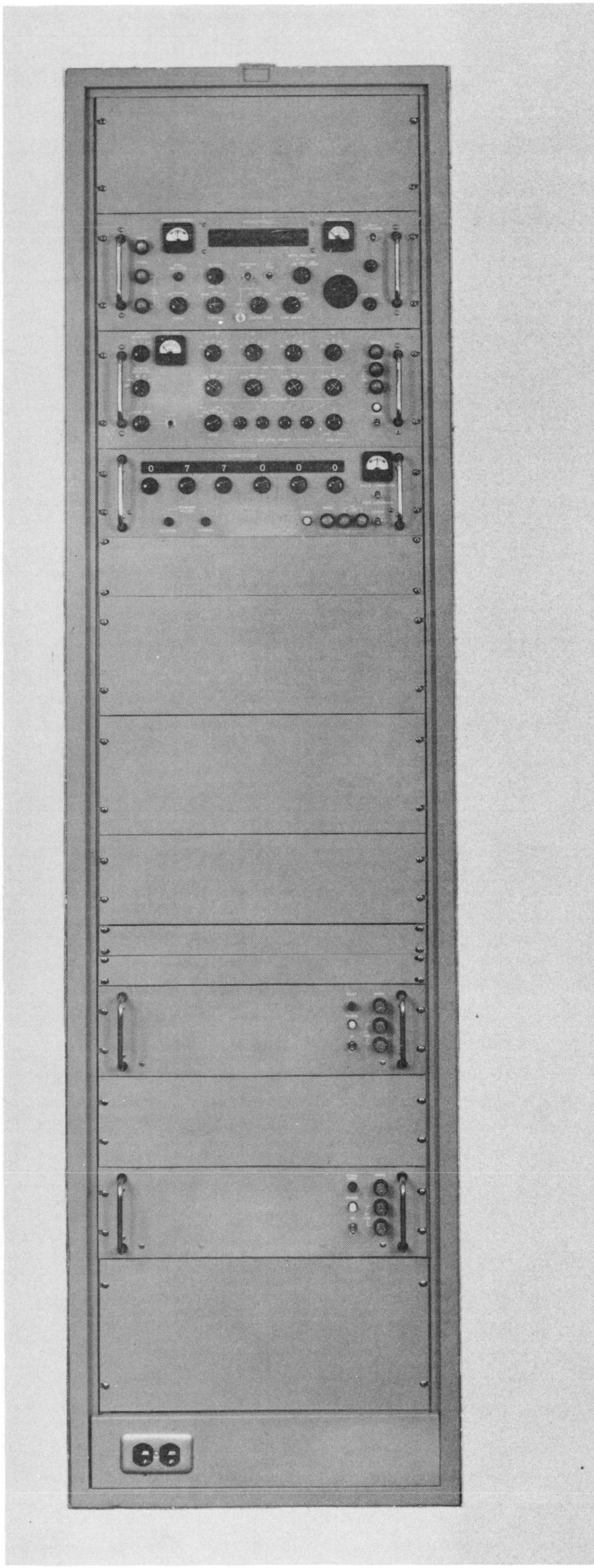

Figure 1-1. Radio Receiving Set
AN/URR-63(V)1

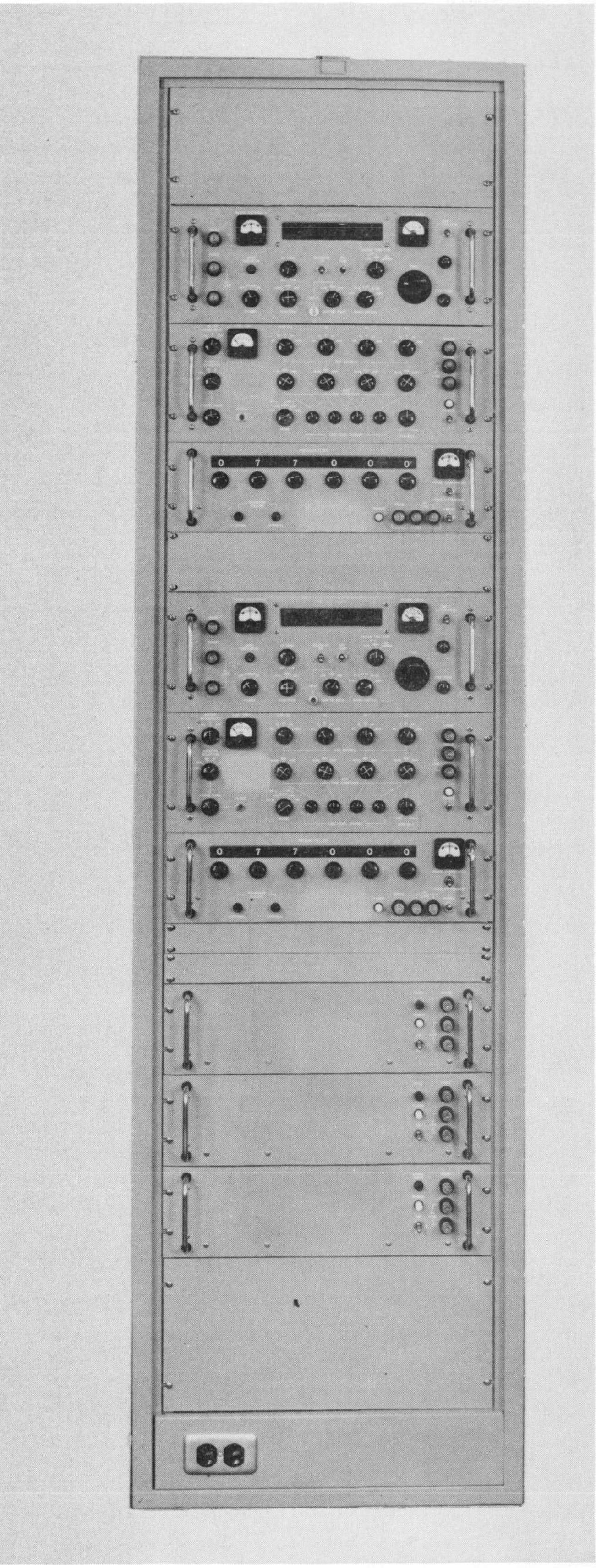

Figure 1-2. Radio Receiving Set
AN/URR-63(V)2

SECTION 1

GENERAL INFORMATION

1-1. SCOPE.

This Technical Manual is in effect upon receipt, and supersedes all information released prior to the issue date indicated on the Title Page. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

The context of this manual covers Radio Receiving Sets AN/URR-63(V)1 and AN/URR-63(V)2. Receiving Set AN/URR-62(V)1 is a single receiver; AN/URR-62(V)2 is a dual diversity receiver essentially employing the circuitry of two AN/URR-62(V)1 single receivers. Except as otherwise indicated, text in this manual refers to the single Receiving Set, AN/URR-63(V)1.

1-2. GENERAL DESCRIPTION (see figures 1-1 and 1-2).

Each Receiving Set is a superheterodyne independent sideband receiver, tunable over a 2 to 32 mc frequency range; each receiver may be tuned manually or automatically by a digital coded signal via conventional teletype linkage from a remote control station. Up to fifty Receiving Sets can be controlled individually from a single teletype channel. Reception is for four 3.0 kc ISB (independent sideband) channels, two direct channels (A1 and B1) and two translated channels (A2 and B2) in the upper and lower sidebands (see figure 1-3). In lieu of sideband reception, the receiver includes a reception channel for a 2.5 or 5.0 kc bandwidth, symmetrical about the carrier, for CW, MCW or AM transmissions (see figure 1-4). Controls for this channel include an adjustable (±3 kc) BFO for CW receptions.

Each of the four ISB channels may contain a voice, a combination of voice frequency tone telegraph channels, FAX (facsimile) channels, data transmission or any type of information that may be contained within 250 to 3,040 cps for direct channels and 350 to 3,040 cps for translated channels.

There are three frequency stabilization modes: (1) LOCAL (local oscillator), (2) SYNthesized and (3) AFC (automatic frequency control). The receiver may be set for any of the three in a manual tuning; in a remote tuning it may be set for SYNthesized or AFC modes. LOCAL oscillator frequency control affords continuous tuning throughout the 2 to 32 mc range with the frequency stability referenced to the local oscillator. In synthesized frequency control, tuning is in 100 cps steps and the stability is maintained by locking to an internal 1 mc frequency standard, stable to within one part in 1×10^8 per day. There is a connection for an external 1 mc standard of higher stability if preferred, with automatic switching between the two. An automatic frequency tuning section, working from digital information, speeds synthesized tuning in either manual or remote control. For relatively unstable transmissions with a full or partial carrier, the AFC circuitry locks to the carrier and corrects injection frequencies for the drifting signal from the transmitter.

Receiver gain may be controlled either manually or by AGC (automatic gain control). In AGC, source and attack-and-decay time may be set individually for each channel. The AGC system maintains a constant audio output level through an antenna input range of 1.0 mv to 1 volt.

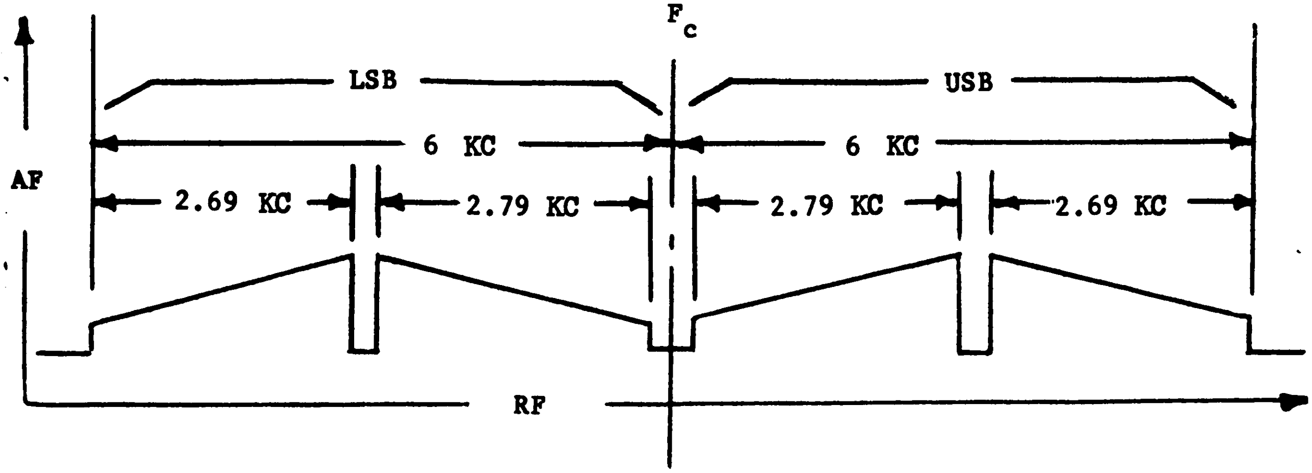

Figure 1-3. Frequency Spectrum, 4 Channel ISB

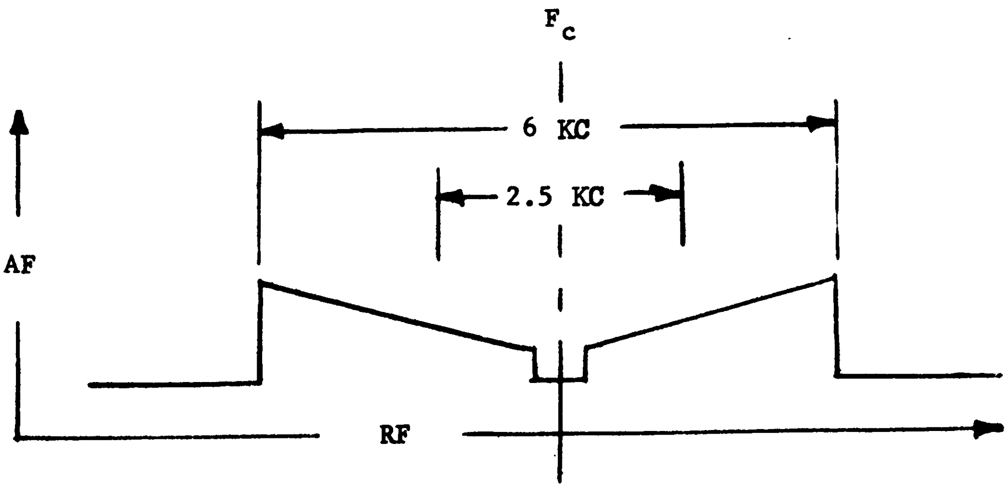

Figure 1-4. Frequency Spectrum, Symmetrical Channel

The megacycle frequency for which the receiver is tuned is displayed on a six-digit (02.0000 to 32.0000) frequency counter on the front panel. This display represents an actual count of the receiver tuned frequency and is also referenced to a 1 mc standard. A front panel jack and switch permits use of the counter for measuring external 0.1 to 35 mc signals. Remote control circuitry includes a teletype readback of pertinent front panel controls and tuning status to the remote operator from each receiver.

In addition, the two receivers in Receiving Set AN/URR-63(V)2 may be operated in either space or frequency diversity by remote or manual tuning.

1-3. DESCRIPTION OF UNITS.

a. GENERAL. - Each Receiving Set comprises modular units and interconnecting cabling, mounted in a single rack as shown in figures 1-1 and 1-2. All unit circuitry is solid state design, with printed circuit plug-in boards throughout. All units are on tilt-lock slides and lock in the up or down position for servicing; each unit contains its own power supply and includes forced air cooling systems, with removabl air filters, where required. Unit panels are finished in light gray enamel. Text in paragraphs 1-3b through 1-3g describe individual units and their functions. Block diagrams (figures 1-5 through 1-7) show unit functioning in the various receiver modes.

b. RADIO FREQUENCY TUNER, TN-511/URR. - The TN-511/URR tunes the 2 to 32 mc input into four bands and displays the tuned frequency on a digital indicator driven by a computer-type decade counter, to the 0.0001 mc increment. The tuner is a superheterodyne type employing a local oscillator and two IF circuits, a 4-band selector switch and a continuous tuning knob. Within the first IF there is a separate if strip for each band to minimize mixer crossings. In all modes of operation (remote or manual) the bands are electrically selected. The AUTO tuning is by servo motor with control from the KY-661/URR. The TN-511/URR includes circuitry for receiver AFC operation.

c. DEMULTIPLEXER, TC-914/URR. The TD-914/URR converts the 250-kc signal from the TN-511/URR into audio in isolated channels. Demultiplexing of the two translated sideband channels occurs within this unit. AGC channel source and attack-and-decay speed are selected by front panel control (the latter may be selected remotely). The TD-914/URR receives the carrier re-supply source frequency from the TN-511/URR for the sideband product detectors.

d. REFERENCE SIGNAL GENERATOR, 0-1510/URR. - The 0-1510/URR provides a 0.2 to 3.2 mc stabilized frequency (referenced to its stable 1 mc standard) to the TN-511/URR in synthesized operation of the receiver. It supplies the 1 mc standard output to the TN-511/URR as reference for synthesized frequencies. The stabilized 0.2 to 3.2 mc is used to lock the TN-511/URR local oscillator. In remote or manual operation, 0-1510/URR information is used to servo-tune the TN-511/URR. The 0-1510/URR includes the 1 mc standard and automatic switching circuitry for internal/external standards. A meter is included to check phase and frequency differences between the two standard sources.

e. SIGNAL DATA CONVERTER-STORER, CV-2520(V)/URC. - The CV-2520(V)/URC (used in Receiving Set AN/URR-63(V)1 receives the coded teletype tuning message from the remote station (Table 1-2), converting the serial teletype pulses into parallel codes for each character and storing them in a memory section. When a "receiver tune" code is received at the end of the message, the CV-2520(V)/URC releases the message, code-by-code, to Command Signal Decoder, KY-661/URR.

f. SIGNAL DATA CONVERTER-STORER, CV-2521(V)/URC. - The CV-2521(V)/URC (used in Receiving Set AN/URR-63(V)2) receives the coded tuning message for both receiver halves (Table 1-2) and stores the codes for each half in a separate memory section. When a "receiver tune" code is received at the end of a message, the CV-2521(V)/URC releases the codes to the KY-661/URR's in both receiver halves at the same time.

g. COMMAND SIGNAL DECODER, KY-661/URR. - The KY-661/URR receives each set of addressal function (control location) and action function (control position) codes (see table 1-2) and routes signals to the controls on the receiver for tuning action. The KY-661/URR also includes the control servo circuitry for tuning the TN-551/URR via the 0-1510/URR setting and includes the readback transmitter for the receiver readback of control positions to the remote operator (table 1-4).

1-4. REFERENCE DATA.

Table 1-1 lists quick-reference technical data on Receiving Set AN/URR-63(V)1 and includes the nominal specification figures defining the receiver (or a receiver half of AN/URR-63(V)2). Table 1-2 lists teletype input codes required to tune a receiver (or receiver half) from a remote site. Table 1-3 lists "equipment selector" codes available for the AN/URR-63(V)1 and AN/URR-63(V)2 Sets; the selector code is individual to each receiver (or receiver half) in order to ensure that the message enters the intended receiver from a common teletype channel. Table 1-4 lists the readback codes issuing from a receiver (or receiver half) and their significance in control positions.

1-5. EQUIPMENT SUPPLIED.

Tables 1-5 and 1-6 list all major components in Receiving Sets AN/URR-63(V)1 and AN/URR-63(V)2 and include accessories, special tools, and technical data supplied with each receiver.

TABLE 1-1. TECHNICAL SPECIFICATIONS, AN/URR-63(V)1

Frequency range:	2 to 32 mc in four bands.
Modes of reception:	SSB (USB, LSB), 2-channel ISB, 4-channel ISB, or symmetrical channel (CW, MCW and AM symmetrical about carrier).
Modes of reception with suitable terminal equipments:	FSK, FAX.
Channel widths (nominal):	CW or AM: 2.5/6.0 kc. Sideband: CH A1, B1, 250 to 3,040 cps at 1 db points. CH A2, B2, 350 to 3,040 cps at 1 db points.
Tuning:	Remote/synthesized or local/synthesized: in 100 cps steps over 4 bands. Local/non-synthesized: continuous over 4 bands.
Band divisions	1st IF Frequency — 2nd IF Frequency Band 1 — 2 to 4 mc — 0.625 mc — 250 kc 2 — 4 to 8 mc — 1.250 mc — 250 kc 3 — 8 to 16 mc — 2.500 mc — 250 kc 4 — 16 to 32 mc — 5.000 mc — 250 kc
250 kc IF Channel Selectivity	Sideband (at 1 dB pts): Direct 2.79 kc ±10% Translated 2.69 kc ±10% CW, MCW (at -3 dB pts): 2.5 kc ±10% AM (at -3 dB pts): 6.0 kc ±10%

TABLE 1-1. (Continued)

AFC:	For non-synthesized reception of signal with full or partial carrier, drift compensator circuit reduces error in audio to within ±1 cps. Operates to maximum drift of ±1, 000 cps and to maximum drift rate of 10 cps per second. Minimum partial carrier in signal to be -30 db below PEP (peak envelope power) with an input carrier signal at the antenna of 1 microvolt above noise.
Antenna input impedance:	50 ohms (nominal), unbalanced.
VSWR:	No greater than 2. 5:1.
Sensitivity vs. noise:	The receiver produces a signal plus noise to average noise ratio at the output of 10 db in a 3 kc bandwidth with a single frequency input signal level of -113 dbm or less.
Intermodulation (in-channel):	Down at least 55 db with 2-tone rf input of 200, 000 uv rms.
Channel cross-talk:	Down at least 60 db from 0 dbm signal in desired channel.
Envelope delay:	The overall envelope delay (from rf input to audio output) of each of the four independent channels does not exceed 500 microseconds between 380 and 2, 920 cps and does not exceed 1, 000 microseconds between 2, 930 and 3, 020 cps.
AGC:	Maintains output within ±1. 5 db with input at antenna varying from 1 uv to 1 volt. Individual control for each channel. Time constants for 63 percent voltage rise or decay at the autio output is as follows ±10%: Function — Attack — Decay Fast — 20 msec — 20 msec Medium — 20 msec — 100 msec Slow — 40 msec — 2. 0 msec
Desensitization:	With an inband signal of 1 microvolt at the antenna, an interferring signal 70 db above 1 microvolt and 1 kc outside the passband will not compress the desired signal by more than 3 db.
Signal-to-hum ratio in output:	At least 40 db.
Unwanted frequencies from conversion oscillators:	Will not create an output greater than that produced by a 0. 2 microvolt input with receiver at maximum rf gain. Up to 10 unwanted frequencies are permissible, if they are at least 12 kc apart, and do not exceed the equivalent of 1 uv in-band signal.
Image rejection:	At least 100 db when referenced to a 1. 0 uv input signal.
IF rejection:	At least 100 db when referenced to a 1. 0 uv input signal.
Translated channel sub-carrier:	250 kc ±6. 29 kc.
Gain control:	Panel control at rf unit provides a variation of 125 db for rf and if stages.
BFO:	BFO adjustment range for CW reception is ±3 kc.

TABLE 1-1. (Continued)

IF monitor outputs:	One -47 dbm 250 kc signal spectrum output for 50 ohm load. Five channel -47 dbm outputs at 250 kc stage for 50 ohm loads. Type BNC connectors.
HFO frequency range:	21 to 37 mc.
Audio outputs:	a. Four audio output channels, giving 4 sidebands or one symmetrical channel. Each channel delivers 0 dbm into a 600 ohm load. MS3102A24-28S connector. Balanced or unbalanced. b. One output for a 4 ohm speaker. MS3102A14S-1S connector. May be switched to monitor any channel. c. One output to a headphone jack mounted on front panel. Suitable for mating with a standard type PJ-055B plug. May be switched to monitor any channel.
Audio level adjustments:	a. Each sideband or symmetrical channel is continuously adjustable between -40 dbm and +12 dbm (0 dbm = 1 mw into a 600 ohm load). b. Speaker and headphone output continuously adjustable by front panel knob. Adjustment over complete range has negligible effect over 4 channel outputs.
Frequency stability:	For synthesized reception, receiver frequency stability is within 1 part in 10^8 for a 15°C change in ambient temperature within the limits of 0° to 50°C over a 24-hour period, 5 parts in 10^8 kw month.
Remote control and readback:	Remote teletype code control (with manual override) is provided for the following receiver controls: a. Frequency tuning, in 100 cps increments (includes band change). b. Synthesized/AFC mode selection. c. 4-channel/Symmetrical mode selection. d. Symmetrical channel mode/bandwidth (CW/AM, 2. 5/6. 0 kc). e. AGC time constant per channel. Readback is provided for all above control positions with receiver status and AFC alarm.
Remote tuning input:	From teletype loop, 60 ma or 20 ma, neutral or polar, 5-level codes (adaptable to 8-level* transmission equipment) with 74. 2-baud transmission speed. Codes per table 1-2 and 1-3.
Control position readback output:	5-bit codes in serial teletype wet (mercury) contact keying from polar relay. 5-level codes (adaptable up to 8-level* transmission equipment) with 74. 2 baud transmission speed. Codes per table 1-4.
Power supply requirements:	115/230 vac, 50/60 cps, single phase. 390 watts maximum consumption. (725 watts for AN/URR-63(V)2.)
Ambient temperature and humidity:	0 to 50°C and up to 95% relative humidity.
Automatic tuning time:	10 seconds (maximum) from receipt of complete message.
Frequency counter input (used as test counter):	0. 1 to 35. 0 mc at 250 mv rms (minimum). Jack on front panel suitable for mating with a standard type BNC plug.

*In 6-, 7- or 8-level pattern, code is in first 5 bits.

TABLE 1-2. REMOTE TUNING INPUT CODES

CHARACTER RECEPTION ORDER*	ADDRESSAL FUNCTION	ACTION FUNCTION	5-BIT CODE BIT 12345	TELETYPE CHARACTERS	
				CCIT	ASCII**
1	Receiver Selector		2 or 3 codes (see table 1-3)		
2	0-1510/URR 10 MC switch		11000	A	C
3		0	01000	Line Feed	B
		1	00100	Space	D
		2	01100	I	F
		3	00010	Carriage Return	H
4	0-1510/URR 1 MC switch		10100	S	E
5		0	01000	Line Feed	B
		1	00100	Space	D
		2	01100	I	F
		3	00010	Carriage Return	H
		4	01010	R	J
		5	00110	N	L
		6	01110	C	N
		7	00001	T	P
		8	01001	L	R
		9	00101	H	T
6	0-1510/URR 100 KC switch		11100	U	G
7		0-9	Same as 5th Character		
8	0-1510/URR 10 KC switch		10010	D	I
9		0-9	Same as 5th Character		
10	0-1510/URR 1 KC switch		11010	J	K
11		0-9	Same as 5th Character		
12	0-1510/URR 0.1 KC		10110	F	M

* Except for the 1st and 26th character, characters may be received in any order, as long as the corresponding action function character follows its addressal function character. However, quickest tuning r sults (about 7 seconds) are obtained by the reception of the characters in the order shown.

**Only the first 5 bits of 7-bit code transmitted are utilized by the receiver.

TABLE 1-2. (Continued)

CHARACTER RECEPTION ORDER	ADDRESSAL FUNCTION	ACTION FUNCTION	5-BIT CODE BIT 12345	TELETYPE CHARACTERS	
				CCIT	ASCII*
13		0-9	Same as 5th Character		
14	TD-914/URR MODE switch		11110	K	O
15		AM 2.5 KC	01000	Line Feed	B
		AM 6 KC	00100	Space	D
		CW 2.5 KC	01100	I	F
		CW 6 KC	00010	Carriage Return	H
		ISB	01010	R	J
16	TD-914/URR AGC TIME CONSTANT switch, channel SYM/B2		10001	Z	Q
17		SLOW	01000	Line Feed	B
		MEDIUM	00100	Space	D
		FAST	01100	I	F
18	TD-914/URR AGC TIME CONSTANT switch, channel B1		11001	W	S
19			Same as 17th character		
20	TD-914/URR AGC TIME CONSTANT switch, channel A1		10101	Y	U
21			Same as 17th character		
22	TD-914/URR AGC TIME CONSTANT switch, channel A2		11101	Q	W
23			Same as 17th character		
24	TN-511/URR FUNCTION switch		10011	B	Y
25		SYNTH	01000	Line Feed	B
		AFC	00100	Space	D
26	Receiver tune		10000	E	A
**	Clear		01111	V	

* Only the first 5 bits of 7-bit code transmitted are utilized by the receiver.

** "Clear" code, received at any time before "Receiver tune," will delete codes from receiver memory.

TABLE 1-3. REMOTE TUNING INPUT CODES, EQUIPMENT SELECTOR

EQUIPMENT SELECTED		5-BIT CODE BITS 12345	TELETYPE CHARACTERS	
			CCIT	ASCII*
Block	A	10101	Y	U
	B	10110	F	M
	C	11010	J	K
	D	11001	W	S
	E	10011	B	Y
Receiver	1	00010	Carriage Return	H
	2	01010	R	J
	3	01100	I	F
	4	01000	Line Feed	B
	5	00100	Space	D
	6	01101	P	V
	7	00101	H	T
	8	00011	O	X
	9	00111	M	
	10	01011	G	Z
Receiver "A" half**		00111	M	
Receiver "B" half**		01011	G	Z

*Only the first 5 bits of 7-bit code transmitted are utilized by the receiver.

**For Receiving Set AN/URR-63(V)2 only.

TABLE 1-4. REMOTE TUNING READBACK OUTPUT CODES

CHARACTER TRANSMISSION ORDER	CONTROL OR CONDITION	POSITION INDICATED	CODE BITS	
			1	2345
1	To reset remote readback indicator panel for new cycle.		1	0000
2	0-1510/URR 10 MC switch	0		1111
		1		0111
		2		1011
		3		0011
	Receiver "tuning/ready/fault" status	see note*		
3	0-1510/URR 1 MC switch	0		1111
		1		0111
		2		1011
		3		0011
		4		1101
		5		0101
		6		1001
		7		0001
		8		1110
		9		0110
	Receiver "tuning/ready/fault" status	see note*		
4	0-1510/URR 100 KC switch	0-9, same as 0-1510/URR 1 MC sw		
	Equipment selected	selected	1	
		not selected	0	
5	0-1510/URR 10 KC switch	0-9, same as 0-1510/URR 1 MC sw		
	CV-2520(V)/URC (or CV-2521(V)/URC) power	off	1	
		on	0	

*Readback of receiver tuning status is contained in bit #1 of characters #2 and #3 combined:

Bit #1		
Character #2	**Character #3**	**Status**
1	0	tuning
0	1	ready
1	1	fault

TABLE 1-4. (Continued)

CHARACTER TRANSMISSION ORDER	CONTROL OR CONDITION	POSITION INDICATED	CODE BITS	
			1	2345
6	0-1510/URR 1 KC switch	0-9, same as 0-1510/URR 1 MC sw		
	automatic tuning set up	no	1	
		yes	0	
7	0-1510/URR 0.1 KC switch	0-9, same as 0-1510/URR 1 MC sw		
		alarm	1	
		no alarm	0	
8	TN-511/URR FUNCTION switch	SYNTH	1	1000
		LOCAL	0	1000
9	TN-511/URR FUNCTION switch	AFC	1	1000
		LOCAL	0	1000
10	NOT USED	NOT USED	0	0000
11	TD-914/URR MODE switch	2.5 KC AM	0	1111
		6 KC AM	0	0111
		2.5 KC CW	0	1011
		6 KC CW	0	0011
		ISB	0	1101
12	TD-914/URR AGC TIME CONSTANT switches, SYM/B2 and B1	SLOW and SLOW	0	1111
		SLOW and MED	0	1101
		SLOW and FAST	0	1110
		MED and SLOW	0	0111
		MED and MED	0	0101
		MED and FAST	0	0110
		FAST and SLOW	0	1011
		FAST and MED	0	1001
		FAST and FAST	0	1010

TABLE 1-4. (Continued)

CHARACTER TRANSMISSION ORDER	CONTROL OR CONDITION	POSITION INDICATED	CODE BITS	
			1	2345
13	TD-914/URR AGC TIME CONSTANT switches, A2 and A1	SLOW and SLOW	0	1111
		SLOW and MED	0	1101
		SLOW and FAST	0	1110
		MED and SLOW	0	0111
		MED and MED	0	0101
		MED and FAST	0	0110
		FAST and SLOW	0	1011
		FAST and MED	0	1001
		FAST and FAST	0	1010
14	NOT USED	NOT USED	0	0000
15	NOT USED	NOT USED	0	0000
16	NOT USED	NOT USED	0	0000
17	Receiver identification*	Rcvr #1	0	1111
		2	0	0111
		3	0	1011
		4	0	0011
		5	0	1101
		6	0	0101
		7	0	1001
		8	0	0001
		9	0	1110
		10	0	0110

*Individual code per receiver.

TABLE 1-5. EQUIPMENT SUPPLIED, AN/URR-63(V)1

QTY PER EQUIP	NOMENCLATURE		UNIT NO.	*OVERALL DIMENSIONS (IN.)			*VOLUME (CU FT)	*WEIGHT (LB)
	NAME	DESIGNATION		HEIGHT	WIDTH	DEPTH		
1	Radio Frequency Tuner	TN-511/URR	1	7	19	19.38	1.43	51
1	Demultiplexer	TD-914/URR	2	7	19	19	1.46	40
1	Reference Signal Generator	0-1510/URR	3	7	19	18.50	1.42	40
1	Command Signal Decoder	KY-661/URR	4	5.25	19	19.88	1.15	40.5
1	Signal Data Converter Storer	CV-2520(V)/URC	5	5.25	19	17	0.98	24.5
1	Interconnecting Cable Harness, and Relay Rack Cabinet**	CY-597A/G	6	84	22.63	24	26.40	
1	Maintenance Standards Book for AN/URR-63 (V)1 & AN/URR-63(V)2	NAVELEX 0967-384-9040	-	11	8.5	-	-	-
1	Operating Instruction Chart for Receiving Set AN/URR-63 (V)1		-	-	-	-	-	-
1	Technical Manual for AN/URR-63 (V) Radio Receiving Set Series (vols. I-II)	NAVELEX 0967-384-9010; 0967-384-9020	-	11	8.5	-	-	-
	Operators Handbook for AN/URR-63(V) Radio Receiving Set	NAVELEX 0967-384-9030	-	-	8.5	-	-	-

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*Includes mounting materials.

**Cabinet is a modified CY-597A/G (GFE).

TABLE 1-6. EQUIPMENT SUPPLIED, AN/URR-63(V)2

QTY PER EQUIP	NOMENCLATURE		UNIT NO.	*OVERALL DIMENSIONS (IN.)			*VOLUME (CU FT)	*WEIGHT (LB)
	NAME	DESIGNATION		HEIGHT	WIDTH	DEPTH		
2	Radio Frequency Tuner	TN-511/URR	1, 5	7	19	19.38	1.43	51
2	Demultiplexer	TD-914/URR	2, 6	7	19	19	1.46	40
2	Reference Signal Generator	0-1510/URR	3, 7	5.25	19	18.50	1.42	40
2	Command Signal Decoder	KY-661/URR	4, 8	5.25	19	19.88	1.15	41
1	Signal Data Converter-Storer	CV-2521(V)/URC	9	5.25	19	17	0.98	25
1	Interconnecting Cable Harness, and Relay Rack Cabinet**	CY-597A/G	10	84	22.63	24	26.40	-
1	Maintenance Standards Book for AN/URR-63(V)1 and AN/URR-63(V)2	NAVELEX 0967-384-9040	-	11	8.5	-	-	-
1	Operating Instruction Chart for Receiving Set AN/URR-63(V)2	NAVELEX 0967-384-9050	-	9	6	-	-	-
2	Technical Manual for AN/URR-63(V) Radio Receiving Set Series (vols. I and II)	NAVELEX 0967-384-9010; 0967-384-9020	-	11	8.5	-	-	-
2	Operators Handbook for AN/URR-63(V) Radio Receiving Set	NAVELEX 0967-384-9030	-	11	8.5	-	-	-

* Includes mounting materials

**Cabinet is a modified CY-597A/G (GFE)

1-6. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED.

Refer to Table 1-7.

1-7. FACTORY OR FIELD CHANGES.

No changes have been made to effect the equipment as of the publication date of this manual. For changes after publication date, refer to NAVSHIPS 0967-000-0010, Electronics Installation and Maintenance Book (EIMB), for complete field change information. Record all changes on Table 1-8.

1-8. EQUIPMENT SIMILARITIES.

Radio Receiving Set AN/URR-63(V)1 is a single receiver controlled by a remote teletype signal via a single memory section in its Signal Data Converter-Storer CV-2520(V)/URC. Radio Receiving Set AN/URR-63(V)2 is a diversity receiver, consisting of two sets of single receiver modules, controlled by a double memory section in its one Signal Data Converter-Storer CV-2521(V)/URC. This manual describes installation, operation and maintenance of the single receiver with particular references to the double receiver where applicable. Note that, with the exception of the remote control feature, these receiving sets are respectively identical to AN/URR-64(V)1, and AN/URR-64(V)2.

1-9. PREPARATION FOR RESHIPMENT.

To prepare the AN/URR-63 series receivers for reshipment, proceed as follows:

a. Ensure that all electronic and mechanical assemblies of each unit are securely fastened and/or inserted fully into their proper sockets; set all switches to the OFF or neutral position. Be certain that all top and bottom covers are properly mounted and securely fastened in place by their Dzus fasteners.

b. If not already removed, disconnect all cables from the rear of each unit (first ensuring that cable markers are still intact), and remove the unit from the rack. Replace and secure cables carefully in rack, avoiding extreme bends or snags.

WARNING

Remove topmost unit first, and work downward in rack. Otherwise rack may topple due to high center of gravity, and may cause extremely serious injury.

c. For reshipment, use individual containers and packing material similar to those used for original shipment of the AN/URR-63. Mark containers "FRAGILE-ELECTRONIC EQUIPMENT."

CAUTION

Do not reship without adequate packing material between unit and container walls, on all sides.

TABLE 1-7. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Electronic Voltmeter	ME-303/U	Troubleshooting and maintenance procedures	DC: Range: ±15 mv to ±1500 v full scale Accuracy: ±2% full scale Input Resistance: 10 megohms or greater AC (rms): Range: 0.5 v to 300 v full scale Frequency: 20 cps to 700 mc Accuracy: ±3% full scale at 400 cps sinusoidal Input Impedance: greater than 10 megohms at low frequencies, shunted by 1.5 pf
1	AC VTVM	AN/USM-106A	Troubleshooting and maintenance procedures	Range: 0.01 v to 1000 v Frequency Response: 10 cps to 6 mc Input Impedance: 2 megohms (no probe); 10 megohms (with probe) Shunt Capacitance: No probe: approx. 25 pf With probe: approx. 75 pf
1	Teletypewriter	TT-176/UG or equivalent	Troubleshooting and maintenance procedures, and to provide remote control capabilities	74.2 baud

Table 1-7. (Continued)

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	DC Loop Supply	Any that will provide necessary characteristics	Troubleshooting and maintenance procedures and to provide a local loop source for remote control functions	Current Capabilities: any of the following - 20 ma, 60 ma
1	Frequency Standard/Comparator	AN/URQ-9	1. Operation 2. Troubleshooting and maintenance procedures 3. External high-stability standard	Frequency: 1 mc Stability: Greater than 1 x 10^{-9} per 24 hr. period, and at least 1 x 10^{-8} per 60 day period Output: 1 v rms
1	Squarewave Generator	SG-299C (HP-211A)	Troubleshooting and maintenance procedures	Frequency Range: 1 cps to 1 mc continuous Output: -3.5 v peak at 75 ohm; -7.0 v peak at open ckt; -27 v peak at 600 ohm; -55 v peak at open ckt Sync Input: Positive going pulse or sinewave, minimum 5 v. Rise Time: 0.02 microsecond Symmetry Control: Allows exact squarewave balance
1	Oscilloscope	AN/USM-281A	Troubleshooting and maintenance procedures	Horizontal Amp: Response: DC to 5 mc Sensitivity: 0.1 v/div Max Input: 600 vdc Input Impedance: 1 megohm, shunted by approx. 30 pf Vertical Amp: Dual Channel; Response: DC: DC-50 mc AC: 2 cps-50 mc Rise Time: Less than 7 nsec Sensitivity: .005 volt/div Max Input: AC: ±600 v DC: at least ±150 v

Table 1-7. (Continued)

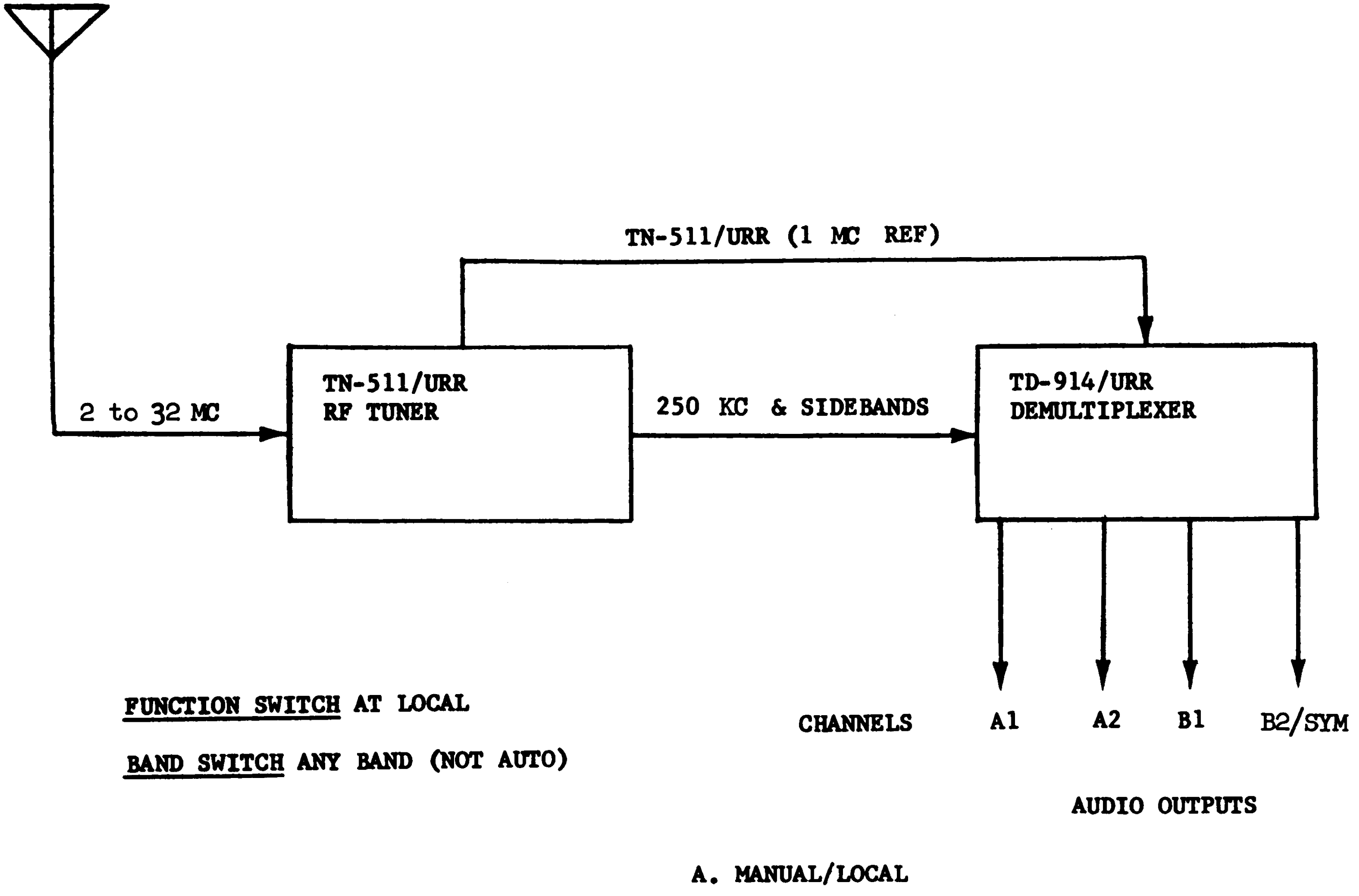
QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
	Oscilloscope (Cont)			Input Impedance: 1 megohm, shunted by approx 25 pf Time Base: Range: 0. 05 us/div-2 sec/div
2	High Frequency Signal Generator	HP-606B	Troubleshooting and maintenance procedures	Frequency Range: 50 kc to 65 mc Accuracy: ±1% Stability: 5 x 10^{-8}/min; 2 x 10^{-7}/10 min; 2 x 10^{-6}/day Resetability: 10 x 10^{6} Output Level: 0. 1 uv to 3. 0 v at 50 ohms in 10 db steps and continuously adjustable by Vernier Control
1	Frequency Counter	AN/USM-207	Troubleshooting and maintenance procedures	Frequency Range: DC to 50 mc Input: 0. 1 v rms, min 120 v rms, max Input Impedance: 1 megohm nominal, shunted by approx 25 pf
1	Multimeter	AN/PSM-4C	Troubleshooting and maintenance procedures	Voltages: 0 - 5000 vdc 0 - 5000 vac Circuit Loading: DC: 20, 000 ohms/volt AC: 5, 000 ohms/volt Resistances: 0 to infinity ohms
1	Audio Generator	AN/URM-127	Troubleshooting and maintenance procedures	Frequency Range: 20 cps to 20 kc Output: +15 dbm at 50, 150, 600 ohms Distortion: Less than 0..1%
1	Attenuator	HP-355 C and D	Troubleshooting and maintenance procedures	Attenuation: 120 db in 1 db steps Frequency Response: DC to 1 gc Overall Accuracy: ±0. 3 db to 120 db at 1000 cps

Table 1-7. (Continued)

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
	Attenuator (Cont)			Input and Output Impedance: 50 ohms Max. Power Dissipation: 0. 5 watt average, 350 volts peak
1	Instruction Book for Oscilloscope AN/USM-281A	NAVSHIPS 0969-125-0110 (Vol I) 0969-125-0120 (Vol II)		
1	Instruction Book for HF Signal Generator HP-606B	Applicable Commercial Manual		
1	Instruction Book for Frequency Counter AN/USM-207	NAVSHIPS 0969-028-4010 (Vol I) 0969-028-4020 (Vol II)		
1	Instruction Book for Multimeter AN/PSM-4C	NAVSHIPS 0280-250-8004		
1	Instruction Book for Electronic Voltmeter ME-303/U	US ARMY MANUAL TM11-6625-1614-15		
1	Instruction Book for AC VTVM AN/USM-106A	NAVSHIPS 0967-905-7010		
1	Instruction Book for Teletypewriter TT-176/UG	NAVSHIPS 0967-284-5010 (formerly NAVSHIPS 92361)		
1	Instructions for DC Loop Supply	Either applicable NAVSHIPS publication, or applicable commercial manual		
1	Instruction Book for Frequency Standard/Comparator AN/URQ-9	NAVSHIPS 0967-077-8010		
1	Instruction Book for Square Wave Generator SG-299C	NAVSHIPS		
1	Instruction Book for Audio Generator AN/URM-127	NAVSHIPS		
1	Instruction Book for Attenuator HP-355C and HP-355D	Applicable Commercial Manual		

TABLE 1-8. FIELD CHANGES

FIELD CHANGE NUMBER	FIELD CHANGE TITLE AND PURPOSE	SERIAL NO. AFFECTED	INDICATION OF ACCOMPLISHMENT

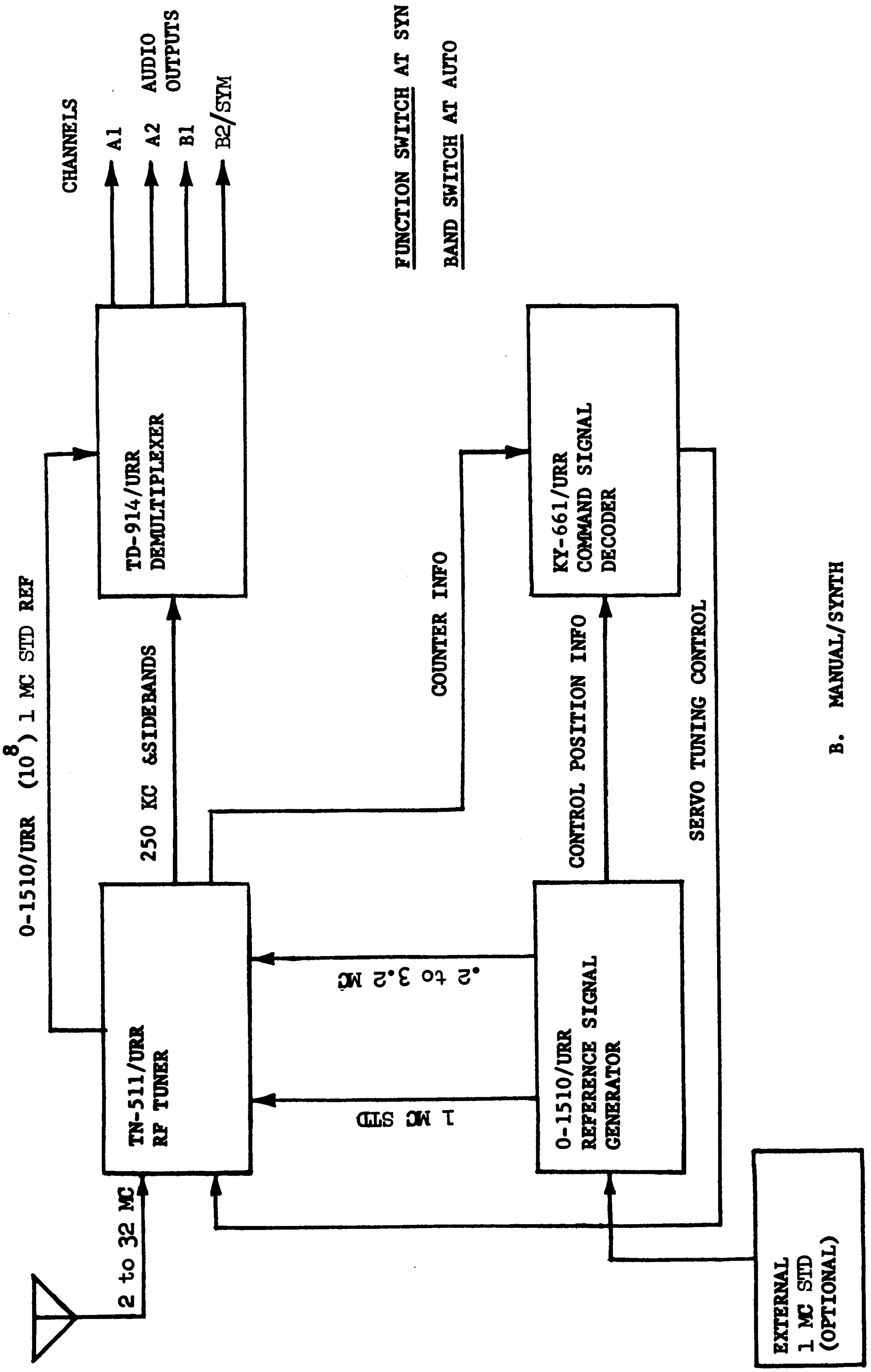


<u>FUNCTION SWITCH</u> AT LOCAL

<u>BAND SWITCH</u> ANY BAND (NOT AUTO)

A. MANUAL/LOCAL

Figure 1-5A. Simplified Block Diagram, Manual Local Tuning, Single Receiver



FUNCTION SWITCH AT SYN

BAND SWITCH AT AUTO

B. MANUAL/SYNTH

Figure 1-5B. Simplified Block Diagram, Manual Synthesized Tuning, Single Receiver

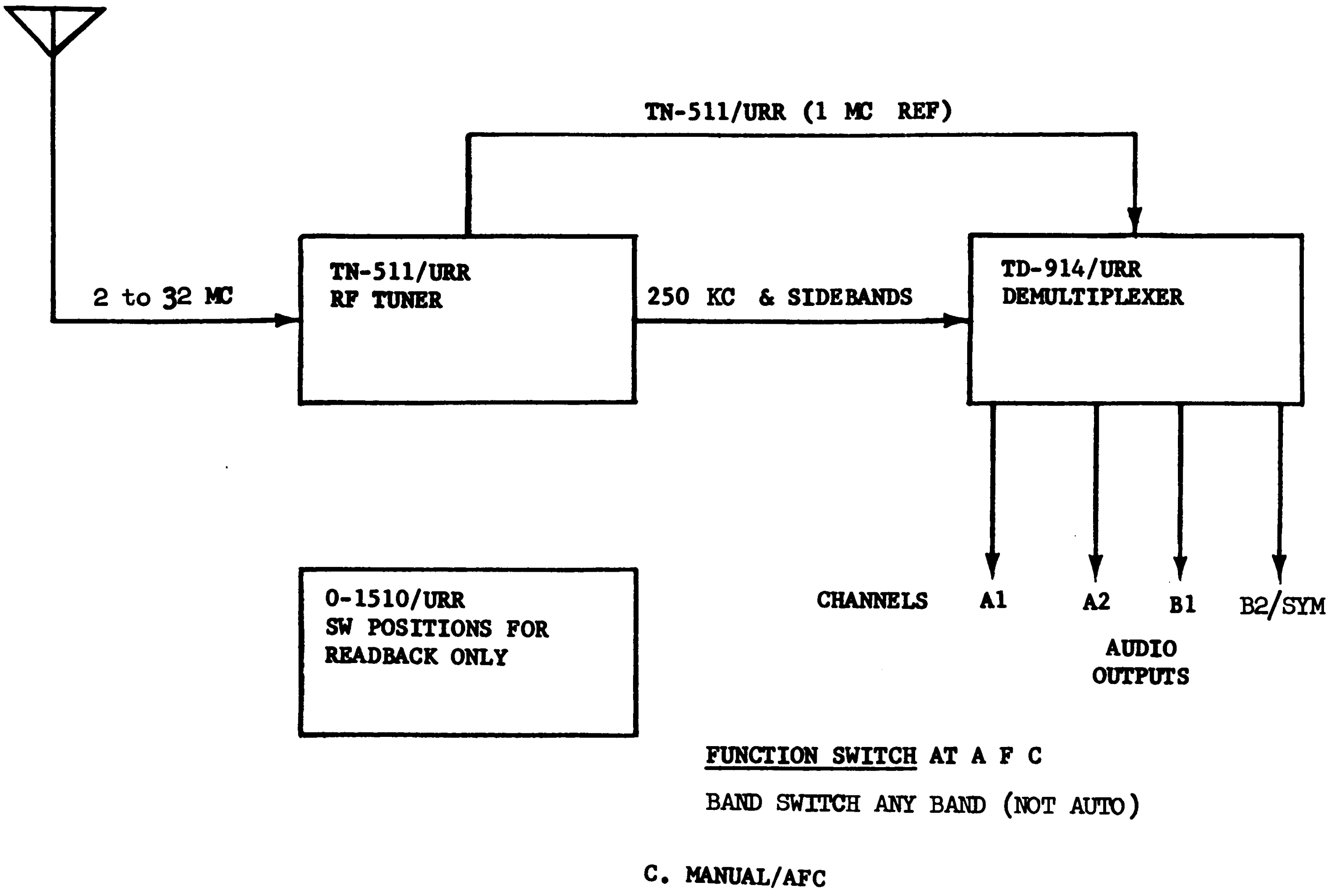


Figure 1-5C. Simplified Block Diagram, Manual AFC Tuning, Single Receiver

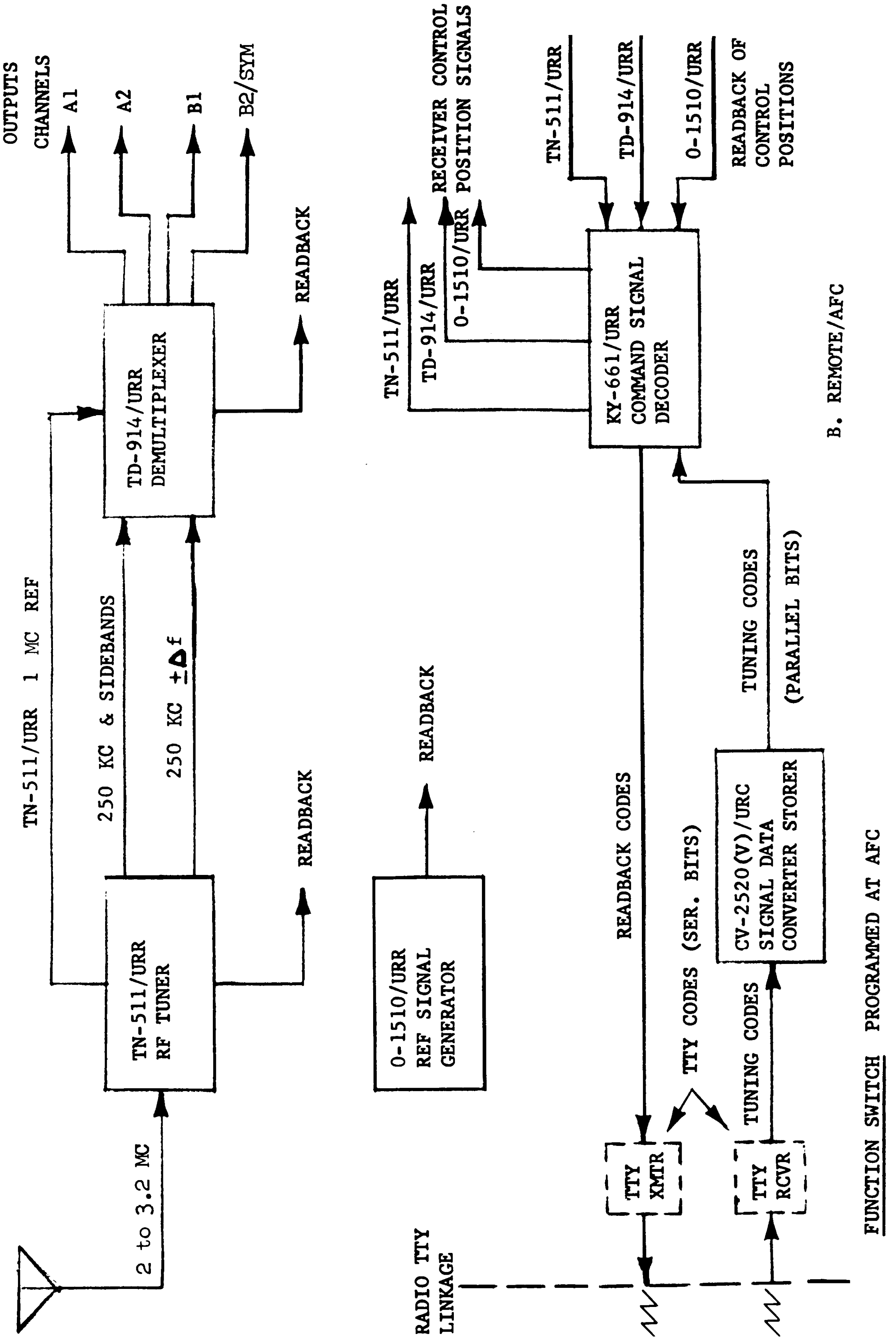


Figure 1-6A. Simplified Block Diagram, Remote Synthesized Tuning, Single Receiver

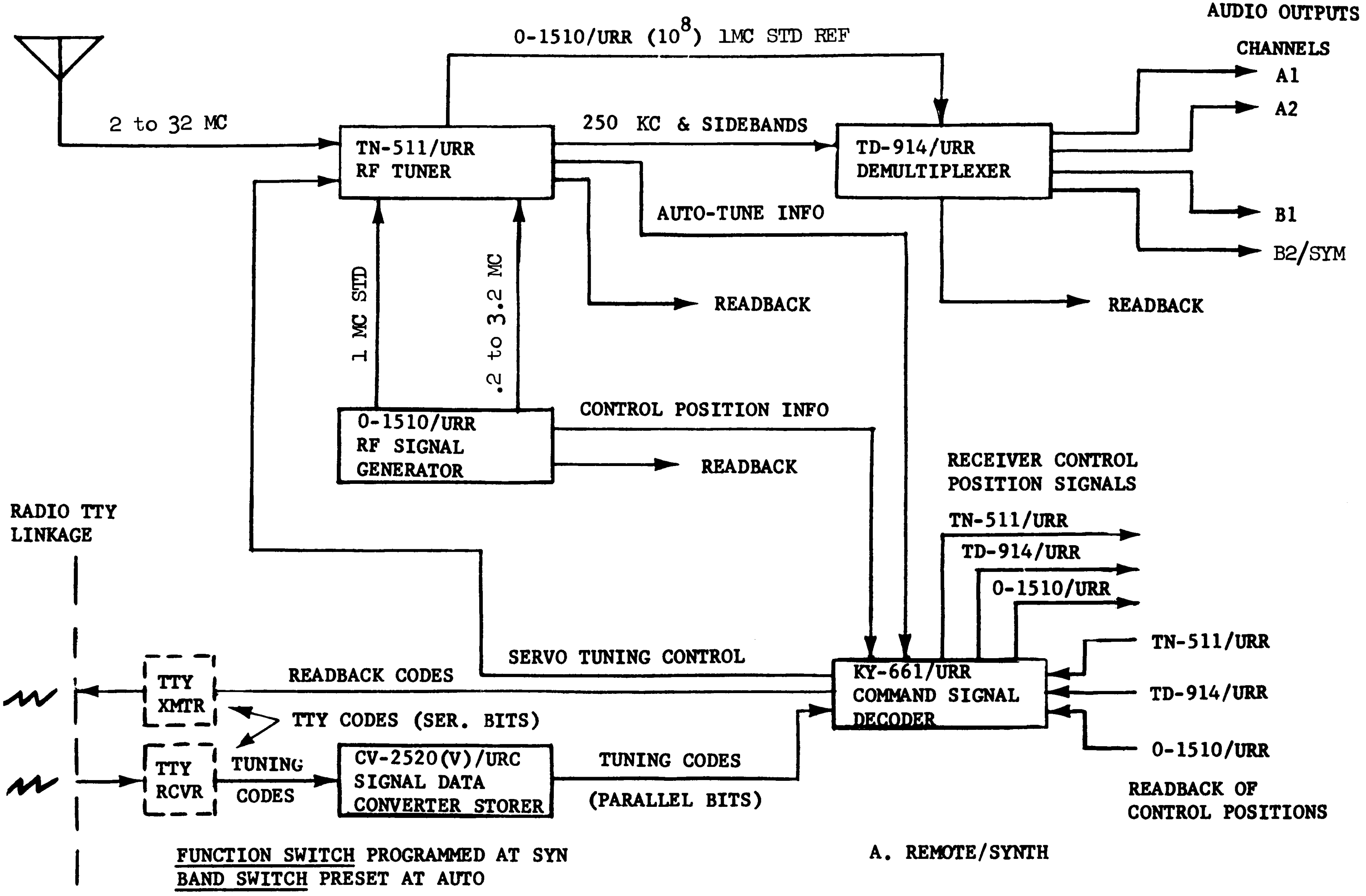


Figure 1-6B. Simplified Block Diagram, Remote AFC Tuning, Single Receiver

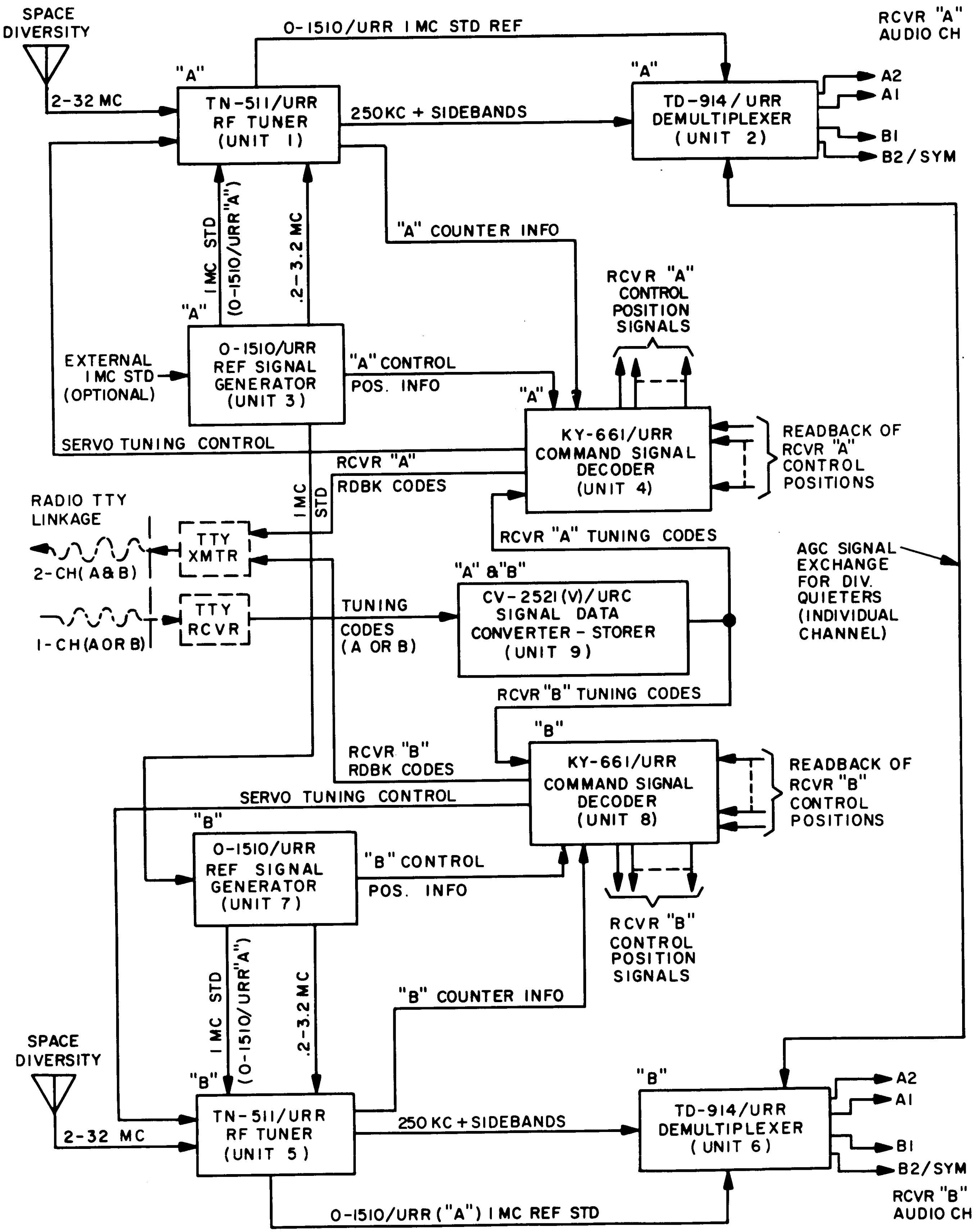


Figure 1-7. Functional Block Diagram, Modular Units, Remote Tuning, Diversity Receiver

SECTION 2

INSTALLATION

2-1. UNPACKING AND HANDLING.

Inspect the AN/URR-63(V) packing cases for possible damage when they arrive at the installation site. With respect to damage to equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

2-2. POWER REQUIREMENTS.

Each Receiving Set leaves the factory wired to operate from a 115 vac 50/60 cps, single phase power source. The receiver can be rewired for operation from a 220 vac 50/60 cps single phase source by changing transformer primary winding jumper leads in each rack modular unit (TN-511/URR, TD-914/URR, etc.). Figures 5-145 and 5-146 are primary power distribution diagrams for Receiving Sets AN/URR-63(V)1 and AN/URR-63(V)2 respectively; these figures may be referred to in planning overall system current-draw and for conversion to a 220 vac line. In units including a blower (or other motor) ensure that the 115 vac is maintained across the motor's input, as shown in figures 5-145 and 5-146.

2-3. SITE SELECTION.

The Receiving Set may be located in any enclosure (room, deck or van) with sufficient clearances (see figures 2-1 and 2-3 or 2-2 and 2-4). Allow a minimum of 2 feet above the rack for adequate heat dissipation and to prevent back pressure in the cooling air exhaust stream. Because the Receiving Set is normally operated from a distant, remote control station (rather than locally), access to front panel controls may be kept at a minimum. The Receiving Set is designed for fixed station, transportable or ship installation. Remote tuning is by means of conventional teletype linkage by a cable from the teletype loop current supply. The connector (MEMORY INPUT) for this cable is located at an interface panel located at the rear of the rack.

2-4. INSTALLATION REQUIREMENTS.

a. ASSEMBLY OF RECEIVING SET. - Install modular units and blank panels into the rack as shown in figure 2-1 (for the AN/URR-63(V)1) or figure 2-2 (for the AN/URR-63(V)2). Connect modular unit interconnecting cabling within the rack as shown in figure 5-1 (for the AN/URR-63(V)1) or figure 5-2 (for the AN/URR-63(V)2). Refer to table 2-1 or 2-2 for summary list of installation materials.

All modular units are slide-mounted on tilt-lock drawer slide. The external part of the slide mount arrives pre-installed in the rack; the internal part arrives pre-installed on the modular unit. To install a unit, refer to figure 2-5 and proceed as follows:

CAUTION

> If rack is not yet bolted to the floor during this phase, start by installing bottom units first in order to avoid rack tipping over from extended center of gravity.

(1) Pull the center section of the rack-mounted (external) portion of the slide-mount out until it locks in an extended position.

(2) Position the unit-mounted (internal) portion of the slide-mount in the tracks of the external portion and ease the modular unit into the rack until the release buttons engage the holes in the track.

(3) Depress the release buttons and slide the modular unit completely into the rack.

(4) Secure the modular unit front panel to the rack flange with machine screws and fiber washers supplied in the shipment.

In the dual diversity receiver (AN/URR-63(V)2) there are duplications of some modular units (see figure 2-2) and these units are interchangeable. Unit numbers (example: 1 or 5 for Radio Frequency Tuner TN-511/URR) are marked on the rack front and rear facings adjacent to the modular unit bay location but are not marked on the modular units themselves. When locating these units, either one may be mounted in either bay.

Unit numbers form the prefixes for receptacle "J" reference symbol numbers as they appear on figures 5-1 and 5-2; these prefixes, however, are not marked on the modular unit chassis. This arrangement is to preserve interchangeability of units. The rack cabling is assigned prefix number "6" in the AN/URR-63(V)1 and "10" in the AN/URR-63(V)2. Plug reference symbol numbers (part of the cabling) contain these prefixes as they appear in figures 5-1 and 5-2 but cable markers (adjacent to the plugs) do not contain them. Cable destination markers, however, do contain the unit prefixes (example: "1J1" for 6W1P1) in the same way as they appear in figures 5-1 and 5-2.

b. EXTERNAL WIRING CONNECTIONS. - All system wiring shall be connected to the Receiving Set at an interface panel (or panels) located at the rear of the rack* (see figures 5-1 and 5-2). Paragraph 2-5, Cable Assemblies, contains wire-run information for constructing individual cables to each

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*Except for the audio monitor PHONE jack, located on the TD-914/URR front panel.

connector on the interface panel. Since the Receiving Sets are designed to function in a variety of systems, however, an analysis should be made as to necessary connections before proceeding to make up the cables. This analysis may be made from information contained in the following sub-paragraphs.

Each Receiving Set may be installed as a single installation or as part of an array, in relation to the remote tuning input and remote readback output lines. In an array, all the Receiving Sets work from a common remote tuning input teletype channel and the individual receiver readback outputs are brought out to individual teletype channels.

(1) AN/URR-63(V)1, SINGLE INSTALLATION. - Necessary connections for a single AN/URR-63(V)1 installation are: antenna input, 4-channel audio output, remote tuning input and readback output. In addition, a monitor speaker output may be used; this is optional, however, since a headset connection (the PHONE jack on the front panel of Demultiplexer TD-914/URR) is available for monitoring the audio output. If it is preferred to use a 1 mc standard of higher stability than the receiver's 1 mc standard (with 1 part in $1x10^8$ stability), a 1 mc external standard connection must be made. In this case, there is an automatic switching feature, built into the receiver, that switches in the alternate standard (internal or external) upon the failure of either one of them.

(2) AN/URR-63(V)1, ARRAY. - Necessary connections for two or more Receiving Sets are: individual antenna inputs, individual 4-channel audio outputs, a common remote tuning input, a remote control interconnect, a remote tuning interconnect, and individual remote readback outputs. Individual monitor speaker outputs may be used; these are optional, however, since they parallel the TD-914/URR front panel headset PHONE jack. If it is preferred to use a 1 mc standard of higher stability than the receiver's 1 mc standard (with 1 part in $1x10^8$ stability) a common 1 mc external standard connection must be used. As in the single receiver installation, the automatic 1 mc switching feature will be in each receiver.

(3) AN/URR-63(V)1, SINGLE OR ARRAY. - Each Receiving Set contains a unique plug-in PC board (in its Converter-Storer); the function of this PC board is to assist a unique "equipment selector" code pair (contained at the beginning of the tuning message) to open that receiver's memory. Codes available are for up to fifty Receiving Sets and are shown in table 1-3. The total complement is for five blocks (A-E) of Receiving Sets with ten (1-10) Receiving Sets in each block. The unique PC board (5A3 in the Converter-Storer) passes an A through E code and is appropriately marked (i. e. "A," "B," "C," "D" or "E"). Code gates built into the Converter-Storer pass the 1 through 10 code, via a "start tune" jumper (see paragraph 2-4b. (8)). In addition, the Command Signal Decoder in each Receiving Set contains a unique plug-in PC board which causes a unique "receiver identification" code to be included in its readback output. This code represents 1 through 10 for a receiver in a block. The PC board (4A2 in the Command Signal Decoder) is appropriately marked (i. e. "1," "2," "3" etc.). A single Receiving Set installation also requires these PC boards and the "start tune" jumper for signal continuity. In all cases, PC boards 5A3 and 4A2 and the "start tune" jumper should be checked for consistency.

An array or receivers from a single remote tuning input requires a current loop adjustment at the teletype keyer; refer to paragraph 2-6, Inspection and Adjustment, for this procedure.

(4) AN/URR-63(V)2, SINGLE INSTALLATION. - There are two interface panels in a diversity AN/URR-63(V)2 rack: an "A" (upper) panel for receiver half "A," and a "B" (lower) panel for receiver half "B." Necessary connections for a single AN/URR-63(V)2 installation are: individual receiver-half antenna inputs, individual receiver-half 4-channel audio outputs, a common remote tuning input, and individual receiver-half remote readback outputs. Individual receiver-half monitor speaker outputs may be used; these are optional, however, since they parallel the two TD-914/URR front panel headset PHONE jacks. If it is preferred to use a 1 mc standard of a higher stability than that in the receiver (with 1 part in $1x10^8$ stability) a 1 mc external standard connection must be used. In this case, the external standard is attached at receiver half "A" and "B" interface panels. Should the external standard fail, the internal "A" half or "B" half standard will switch in automatically. If it is preferred, the standard in (or applied to) receiver "A" may be used for both "A" and "B." A diversity quieting system is built into the receiver by AGC signal exchange between individual channels of each receiver half. If it is preferred to use an audio combiner at the two AUDIO outputs, in lieu of the diversity quieter, remove rack cable 10W19 (see figure 5-2).

(5) AN/URR-63(V)2, ARRAY. - Necessary connections for two or more dual-diversity Receiving Sets are: individual "A" and "B" antenna input pairs, individual "A" and "B" 4-channel audio output pairs, a common remote tuning input, a remote control interconnect, a remote tuning interconnect, and individual "A" and "B" remote readback output pairs. Individual "A" and "B" monitor speaker output pairs may be used in lieu of the TD-914/URR PHONE jacks, if preferred. If an external 1 mc standard is to be used, each standard (or a common standard) shall be attached at the receiver half interface panel. As in the single AN/URR-63(V)2 installation, using an audio combiner requires the removal of cable 10W19.

(6) AN/URR-63(V)2, SINGLE OR ARRAY. - Each Receiving Set on a common remote tuning input line shall contain a unique plug-in PC board (in its single Converter-Storer): the function of this PC board is to assist a unique "equipment selector" triple-code (contained at the beginning of the tuning message) to open that receiver's memory. Each receiver contains a dual ("A" and "B" receiver-half) memory. Codes available are for up to twenty-five Receiving Sets and are shown in table 1-3. The total complement is for five blocks (A-E) of Receiving Sets with five (1-5) Receiving Sets in each block. The unique PC board (9A3 in the Converter-Storer) passes the A-E code and is appropriately marked (i. e. "A," "B," "C," "D" or "E"). Code gates

built into the Converter-Storer pass the 1 through 5 code, via a "start tune" jumper (see paragraph 2-4b.(8)). The third code (representing the receiver "A" or "B" half) is passed by code gates in PC board 9A9. In addition, the Command Signal Decoder in each Receiving Set receiver "A" and "B" half shall contain an individual plug-in PC board that is unique to that Receiving Set; this shall cause a unique "receiver identification" code to be included in either the "A" or "B" half readback output. The code represents 1 through 5 for a receiver in a block. The PC board (4A2 or 8A2 in each Command Signal Decoder) is appropriately marked (i.e. "1," "2," "3" etc.).

A single Receiving Set installation also requires these PC boards and the "start tune" jumper for signal continuity. In all cases, PC boards 9A3, 4A2 and 8A2 and the "start tune" jumper should be checked for consistency (see paragraph 2-4b.(8)).

An array of receivers from a single remote tuning input requires a current loop adjustment for either 60 ma or 20 ma, depending on the station requirements.

(7) VARIATIONS IN TELETYPE LINKAGE EQUIPMENT.

(a) GENERAL. - Although the remote tuning input and remote readback output circuitries in the Receiving Set are designed to operate with 75 baud teletype linkages, these circuits are designed to adapt to a variety of baud ratings, current loops and code levels in the teletype linkage equipment.

(b) BAUD RATING.

Note

> Baud rating capacity of the Receiving Sets is based on the clock timing circuit in the CV-2520, CV-2521 and KY-661. The timing circuit is designed to match pulse widths within each code.

The baud rating at the remote tuning input is determined by plug-in PC board A2 in the Converter-Storer; that of the remote readback output is determined by plug-in PC board A3 in the Command Signal Decoder. In Receiving Sets AN/URR-63(V)1 and 2, these boards are designed for a 75 baud operation; 45 baud PC boards are also available.

(c) CURRENT LOOP. - In the remote tuning input, the teletype equipment output current loop operates through isolation keyer PC board A1 in the Converter-Storer. The keyer will operate from a 20 ma or 60 ma loop. When working from a 60 ma loop, however, bypass resistor R5 on P/C board A1 by adding a strap around it at terminals provided on the board.

(d) CODE LEVELS. - Although the AN/URR-63(V)1 and 2 use a 5-level code, tuning code input and readback code output circuitry contains shift-registers paced for adaptability to up to an 8-level teletype linkage equipment. No adjustments are necessary for the adaptation.

(8) "START TUNE" JUMPER. - The "start tune" jumper shall be located in accordance with the assigned numerical (1 through 10) "equipment selector" code for the Receiving Set. The jumper is to be connected across two terminals of terminal block TB1 located on the interface panel at the rear of the rack. (Use interface panel "A" for AN/URR-63(V)2.)

For each Receiving Set, connect one end of the jumper to terminal #1 and the other end at the terminal indicated:

		Assigned Receiver #	Terminal #
AN/URR-63(V)1	AN/URR-63(V)2	1	2
		2	3
		3	4
		4	5
		5	6
		6	7
		7	8
		8	9
		9	10
		10	11

(9) WIRING OF RECOGNITION CODES. - PC boards A3 in each Converter-Storer and PC board A2 in each Command Signal Decoder are prewired at the factory with recognition code A1 for the AN/URR-63(V)1, and code 1A1 and A1B for the 2 receivers of the AN/URR-63(V)2. The charts in figures 5-99 and 5-133 provide wiring instructions for other recognition codes.

2-5. CABLE ASSEMBLIES.

Wire individual external cables in accordance with wire-run information in table 2-3 or 2-4.

2-6. INSPECTION AND ADJUSTMENT.

a. CHECKOUT PROCEDURE. - Initial checkout will encompass a single receiver section only; merely repeat the procedure for the remaining receiver section.

Checkout will simply ascertain AC power input to each unit by means of visual pilot lamp and readout indications, and will verify signal flow through the receiver.

Refer to figure 3-1, Front Panel Controls, and proceed as follows:

(1) Place all POWER switches on all units to the ON position.

(2) Ascertain that pilot lamps (marked POWER, ON, or similar notation) on all units except the TN-511/URR are lit; the TN-511 unit has no pilot lamp but the frequency readout indicator will illuminate, indicating AC power input.

Note

If no power indicators are lit:
ensure that AC power connections have been made to the entire equipment rack. Check such areas as main wall-mounted power switches, circuit breakers, and/or fuses at the installation site itself. Be certain that power mains into the receiver carry 50/60 cps, at the proper voltage (115/230 vac, dependent upon internal power transformer wiring).

If some power indicators are lit:
the equipment rack itself is receiving supply voltage. If an AC input wiring change was made, ensure that all units have been properly modified to operate on the same ac input, and ensure that such ac input is actually present at all power receptacles at the rear of the rack. Check to see that all units are plugged into the rack's ac power strip, and that all POWER switches are set to ON.

If neither of the above cases:
check all fuse indicators on all units; if an indicator is lit, replace the associated fuse (fuses are located directly behind indicators: twist indicator CCW and pull straight out; replace fuse, reinsert indicator/holder, and twist CW to lock). If fuses continue to open-circuit, stop; a troubleshooting procedure is indicated. Do not replace further, until the trouble has been remedied.
never replace with fuses of a higher current rating than indicated on the open fuse.

(3) Set the 0-1510/URR to 10.0000 mc.

(4) Set TN-511/URR controls as follows:

CONTROL	POSITION
POWER	STANDBY
*FUNCTION	SYN
COUNTER MODE	REC
BANDSWITCH	AUTO
METER FUNCTION	RF - HIGH
SILENCER OFF	down
RF GAIN	AGC
INPUT ATTENUATOR (OUT)	down

(5) Set TD-914/URR controls as follows:

CONTROL	POSITION
METER SENSITIVITY	0
MONITOR SELECTOR	SYM
LOCAL GAIN	full CCW
AGC TIME CONSTANT (SYM-B2)*	FAST
*MODE	AM-6 kc

(6) Set TN-511 POWER switch to ON; TUNE knob should rotate, and frequency readout should change, approaching 10.0000 mc. As the TN-511 nears 10 mc, TUNE knob should slow, then stop. Simultaneously, SYNC INDICATOR lamp should light.

(7) Advance TD-914 LOCAL GAIN control CW to a comfortable listening level; depending upon location, propagation conditions, and time of day, station WWV (U. S. National Bureau of Standards' official station) may be heard; even if WWV is not being received, background noise should be apparent. This will indicate signal flow through the receiver.

(8) If WWV is being received well, an additional (AFC) check may be made: rotate TN-511 FUNCTION switch clockwise to AFC position, and depress AFC TUNE switch; if SYNC INDICATOR lamp does not light hold down AFC TUNE switch, and slowly adjust FINE TUNE control until sync indication is achieved. Immediately release AFC TUNE switch; continued reception of WWV indicates AFC operability. AFC corrective action can be observed on the TN-511 PHASE DIFFERENCE meter.

(9) Remote checkout may be accomplished by presetting receiver controls as per section 3-2(a)2 or 3-2(a)3, and by following section 3-2(a)4. Fastest tuning results by proceeding from left to right on the FUNCTION row of programmer C-7775/UR.

2-7. INTERFERENCE REDUCTION.

Ensure that all chassis are completely within the rack enclosure, and that all chassis fastening screws have been tightened. If any units are extended from the rack, check that their top and bottom covers are fastened; slide these units into the equipment rack, and tighten all rack mounting screws.

The AN/URR-63 should be operated in the most electrically-quiet location possible, consistent with adequate servicing and ventilation space requirements. Particularly to be avoided are such noise-producing equipment as: dc motors or generators, thermostats, flashers, or other intermittent-contact electrical equipment, neon signs, unshielded fluorescent lamps, or other high-voltage discharge gear (arc lamps, arc welders, automotive ignition systems, horizontal sweep oscillators in television receivers or other CRT equipment, X-ray machines). In situations where such noise sources are unavoidable, the TN-511's noise silencer will either effectively eliminate, or greatly reduce, the apparent intensity of many types of impulse noise. Ensure that all rfi cabinet and unit shielding is in place to shield rf from the inside of the cabinet and units. Replace if this comes loose.

*All controls marked above with an asterisk should be rotated in a CW direction ONLY. Controls not listed may be left in any position.

TABLE 2-1. SUMMARY LIST OF INSTALLATION MATERIAL, AN/URR-63(V)1

ITEM NUMBER	QUANTITY		NOMENCLATURE	PART, TYPE OR MODEL NUMBER	REMARKS	SIZE		
	GF	CF				LENGTH	HEIGHT	WIDTH
1		1	Tuner, Radio Frequency	TN-511/URR	Unit 1	19.38	7	19
2		1	Demultiplexer	TD-914/URR	Unit 2	19	7	19
3		1	Generator, Reference Signal	0-1510/URR	Unit 3	18.5	5.25	19
4		1	Decoder, Command Signal	KY-661/URR	Unit 4	19.88	5.25	19
5		1	Converter-Storer, Signal Data	CV-2520(V)/URC	Unit 5	17	5.25	19
6		1	Intra-Unit Cabling	See Fig. 5-1	Unit 6			
7	1		Cabinet, Relay Rack	Modified CY-597A/G	Unit 7	24	87.56	22.38
8	1		Cable, RF Coaxial	RG213/U	Antenna Input			
9	1		Cable	TTRS-4	4-Channel Audio Output			
10	1		Cable	TTRS-2(1)	Remote Tuning Input			
11	1		Cable	TTRS-2(1)	Readback Output			
12	1		Cable, RF Coaxial	RG-58/U	Ext-1 MC Std Input (Optional)			
13	1		Cable	TTRS-2(1)	Monitor Speaker Output (Optional)			
14	1		Cable, AC Power	THFA-3	AC Power Input			
15 (Not Used)								
*16	1		Cable	TTRS-2(1)	P/O Item 10 Remote Tuning Interconnect			
*17	1		Cable	TTRS-2(1)	Remote Control Interconnect			
18	1		Cable	CA409-32-8.00	Start Tune Jumper			

TTY LOOP CHART

TTY LOOP	STRAP USAGE
60 ma	Strap
20 ma	No strap

*Required for a series of Receiving Sets operated from a common remote tuning input TTY channel.

TABLE 2-1. (Continued)

ITEM NUMBER	QUANTITY		NOMENCLATURE	PART, TYPE OR MODEL NUMBER	REMARKS	SIZE		
	GF	CF				LENGTH	HEIGHT	WIDTH
19		1	Blank Panels, Set	P/O Unit 7				
20		1	Grounding Strap	WL101-1 #10 AWG				
21		20	Screw, Machine	SCBP1032BN8	Unit MTG			
22		20	Washer, Fiber	WA101-11	Unit MTG			
23	1		Strap	WL100-7 #22 AWG	Remote Tuning Input (See "TTY LOOP" Chart)			
24		1	Connector, Plug: Coax	UG-536*/U	For Item 8 (Mates with 6W1J8)			
25		1	Connector, Plug	MS3106B24-28P	For Item 9 (Mates with 6W1J7)			
26		1	Connector, Plug	MS3106B14S-2S	For Item 10 (Mates with 6W3J4)			
27		1	Connector, Plug	MS3106B16S-1P	For Item 11 (Mates with 6W4J3)			
28		1	Connector, Plug: Coaxial	UG-88C	For Item 12 (Mates with 6W1J10)			
29		1	Connector, Plug	MS3106B14S-2P	For Item 13 (Mates with 6W1J5)			
30 (Not Used)								
*31		1	Connector, Plug	MS3106B28-21P	For Item 17 (Mates with 6W3J2)			
32		1	Connector, Plug: Telephone	PJ055	For Headset (Optional) Mates with 2J20 "PHONE" JACK			

TTY LOOP CHART

TTY LOOP	STRAP USAGE
60 ma	Strap
20 ma	No strap

*Required for a series of Receiving Sets operated from a common remote tuning input TTY channel.

TABLE 2-2. SUMMARY LIST OF INSTALLATION MATERIAL, AN/URR-63(V)2

ITEM NUMBER	QUANTITY		NOMENCLATURE	PART, TYPE OR MODEL NUMBER	REMARKS	SIZE		
	GF	CF				LENGTH	HEIGHT	WIDTH
1		2	Tuner, Radio Frequency	TN-511/URR	Units 1 and 5	19.38	7	19
2		2	Demultiplexer	TD-914/URR	Units 2 and 6	19	7	19
3		2	Generator, Reference Signal	0-1510/URR	Units 3 and 7	18.5	5.25	19
4		2	Decoder, Command Signal	KY-661/URR	Units 4 and 8	19.88	5.25	19
5		1	Converter-Storer Signal Data	CV-2521(V)/URC	Unit 9	17	5.25	19
6		1	Intra-Unit Cabling	Figure 5-2	Unit 10			
7	1		Cabinet, Relay Rack	Modified CY-597A/G	Unit 11	24	87.56	22.38
8	2		Cable, RF Coaxial	RG-213/U	"A" & "B" Antenna Inputs			
9	2		Cable	TTRS-4	"A" & "B" 4-Channel Audio Outputs			
10	1		Cable	TTRS-2(1)	Remote Tuning Input			
11	2		Cable	TTRS-2(1)	"A" & "B" Readback Outputs			
12	2		Cable, RF Coaxial	RG-58/U	Ext 1 Mc Std Input (Optional)			
13	2		Cable	TTRS-2(1)	"A" & "B" Monitor Speaker Outputs (Optional)			
14	1		Cable, AC Power	THFA-3	AC Power Input			
15		1	Cable		Diversity Interconnect (P/O Item 6)			
16	1	1	Cable, RF Coaxial	RG-58/U	1 Mc Std Interconnect (Optional)			
17 (Not Used)								

*Required for a series of Receiving Sets operated from a common remote tuning input TTY channel.

TTY LOOP CHART

TTY LOOP	STRAP USAGE
60 ma	Strap
20 ma	No Strap

TABLE 2-2. (Continued)

ITEM NUMBER	QUANTITY		NOMENCLATURE	PART, TYPE OR MODEL NUMBER	REMARKS	SIZE		
	GF	CF				LENGTH	HEIGHT	WIDTH
*18	1		Cable	TTRS-2(1)	*P/O Item 10 Remote Tuning Interconnect			
*19	1		Cable	TTRS-2(1)	*Remote Control Interconnect			
*20	1		Cable	CA409-32-8.00	*"Start Tune" Jumper			
21		1	Blank Panels Set	P/O Unit 11				
22		1	Grounding Strap	WL101-1 #10 AWG				
23		36	Screw, Machine	SCBP1032BN8	Unit MTG			
24		36	Washer, Fiber	WA101-11	Unit MTG			
25	1		Strap	WL100-7 #22 AWG	See "TTY LOOP" Chart			
26		2	Connector, Plug Coaxial	UG536*/U	For Item 8 (Mates with 10W1J8 and 10W5J8)			
27		2	Connector, Plug	MS3106B24-28P	For Item 9 (Mates with 10W1J7 and 10W5J7)			
28		1	Connector, Plug	MS3106B14S-2S	For Item 10 (Mates with 10W3J4)			
29		2	Connector, Plug	MS3106B16S-1P	For Item 11 (Mates with 10W4J3 and 10W7J3)			
30		1	Connector, Plug Coaxial	UG-88C	For Item 12 (Mates with 10W1J10)			
31		2	Connector, Plug	MS3106B14S-2P	For Item 13 (Mates with 10W1J5 and 10W3J5)			
32 (Not Used)								
*33		1	Connector, Plug	MS3106B28-21P	For Item 19 (Mates with 10W3J2)			
34		2	Connector, Plug Telephone	PJ055	For Headset (Optional) Mates with 2J20 & 6J20 "PHONE" Jacks			

TTY LOOP CHART

TTY LOOP	STRAP USAGE
60 ma	Strap
20 ma	No Strap

---

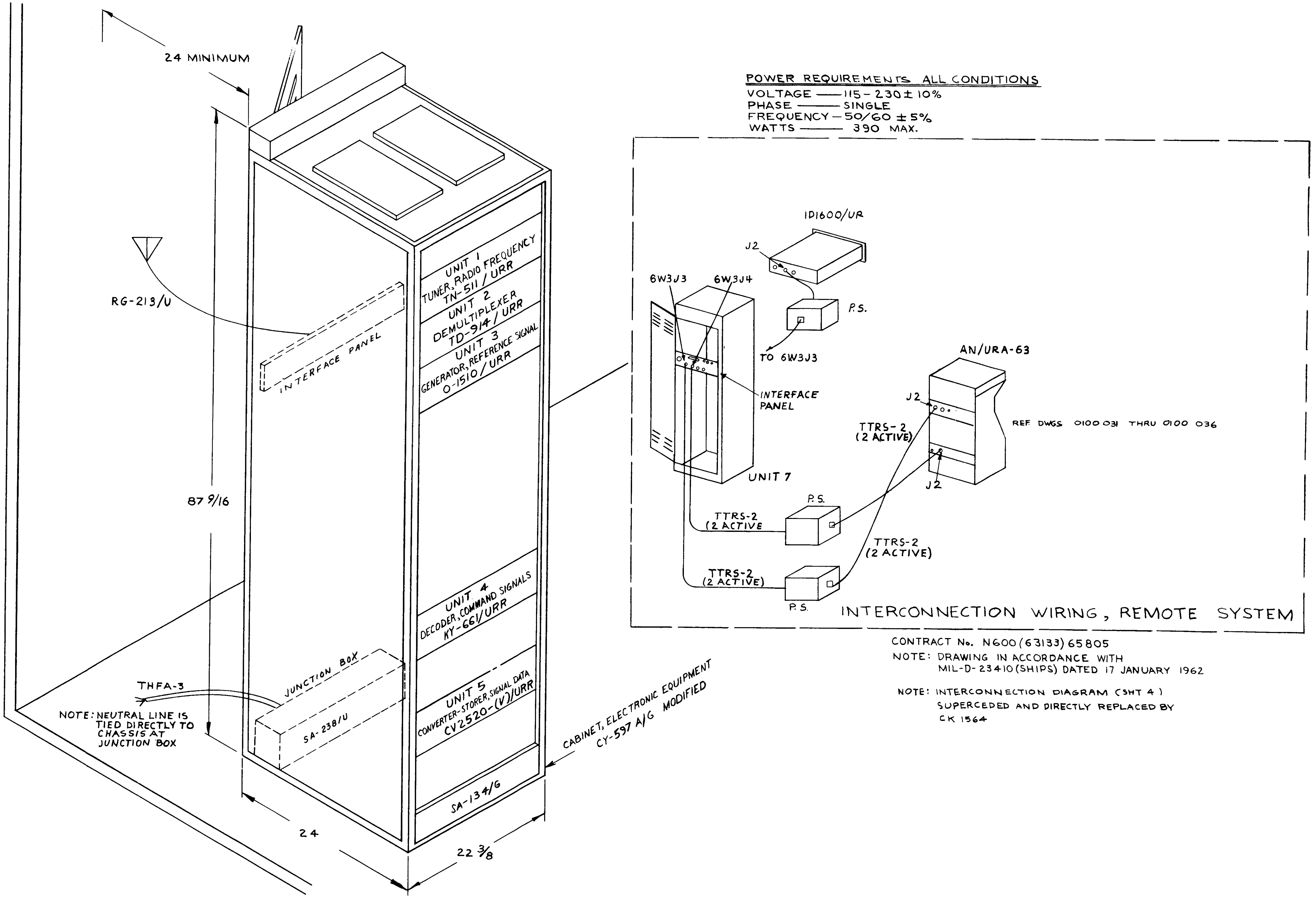
*Required for a series of Receiving Sets operated from a common remote tuning input TTY channel.

TABLE 2-3. WIRE RUN LIST, EXTERNAL CABLING, AN/URR-63(V)1

MFGR CODE	NAVY CABLE DESIGNATION	CABLE TYPE AND SIZE	NO. OF ACTIVE CONDS	FROM	TERMINAL BOARD, PLUG OR JACK	TERMINAL OR PIN DESIGNATION	TO	TERMINAL BOARD, PLUG OR JACK	TERMINAL OR PIN DESIGNATION	FUNCTION	SUPPLIED BY
		RG213/U	1	Interface Panel	6W1J8 "Antenna"		Antenna			Antenna Input	GFM
	TTRS-4		8	Interface Panel	6W1J7 "Audio"	A B C D	SYM B2 Ch Line			4-Channel Audio Output 600 CT SYM/B2 600 GND	GFM
						E F G H	B1 Ch Line			600 CT B1 600 GND	
						J K L M	A1 Ch Line			600 CT A1 600 GND	
						W X Y Z	A2 Ch Line			600 CT A2 600 GND	
	TTRS-2		2	Interface Panel	6W3J4 "Memory Input"	A C B	TTY Rcvr			Remote Tuning Input + (1) - (0) GND	GFM
	TTRS-2		2	Interface Panel	6W4J3 "Readback Output"	A C B	TTY XMTR			Readback Output Hi Level Space (0) Common Hi Level Mark (1)	GFM
		RG58/U	1	Interface Panel	6W1J10 "1 Mc Ext Std"		EXT 1 Mc Std Source			Ext 1 Mc Std Input	GFM
	TTRS-2		2	Interface Panel	6W1J5 "Speaker"	A B C	Speaker			Monitor Speaker Output Audio Pair Shld Gnd	GFM
	TTRS-2		2	Interface Panel	6W3J4 "Memory Input"	A C B	Interface Panel of next Rcvg Set	6W3J4 "Memory Input"	A C B	Remote Tuning Interconnect + (1) - (0) GND	GFM
	TTRS-2		1	Interface Panel	6W3J2 "Memory Output"	f s	Interface Panel of next Rcvg Set	6W3J2 "Memory Output"	f s	Remote Control Interconnect Stunt GND	GFM
CA409-32-8.00			1	Interface Panel	6W3TB1	1	Interface Panel	6W3TB1	**	"Start Tune" Jumper	GFM
	THFA-3		2	Power Source	See Dwg No. Fig. 2-1		Junction Box SA238-G	Wht & Blk Pigtail		Power	GFM

TABLE 2-4. WIRE RUN LIST, EXTERNAL CABLING, AN/URR-63(V)2

MFGR CODE	NAVY CABLE DESIGNATION	CABLE TYPE AND SIZE	NO. OF ACTIVE CONDS	FROM	TERMINAL BOARD, PLUG OR JACK	TERMINAL OR PIN DESIGNATION	TO	TERMINAL BOARD, PLUG OR JACK	TERMINAL OR PIN DESIGNATION	FUNCTION	SUPPLIED BY
		RG213/U	1	Interface Panel, Rcvr "A"	10W1J8 "Antenna"		Antenna Rcvr "A"			Antenna Input Rcvr "A"	GFM
		RG213/U	1	Interface Panel, Rcvr "B"	10W5J8 "Antenna"		Antenna Rcvr "B"			Antenna Input Rcvr "B"	GFM
	TTRS-4		8	Interface Panel, Rcvr "A"	10W1J7 "Audio"	A B C D E F G H K L M N W X Y Z	Audio Lines Rcvr "A" SYM/B2 Ch Line B1 Ch Line A1 Ch Line A2 Ch Line			4-Channel Audio Output, Rcvr "A" 600 CT 600 SYM/B2 GND 600 CT 600 B1 GND 600 CT 600 A1 GND 600 CT 600 A2 GND	
	TTRS-4		8	Interface Panel, Rcvr "B"	10W5J7 "Audio"	A B C D E F G H K L M N W X Y Z	Audio Lines Rcvr "B" SYM/B2 Ch Line B1 Ch Line A1 Ch Line A2 Ch Line			4-Channel Audio Output Rcvr "B" 600 CT 600 SYM/B2 GND 600 CT 600 B1 GND 600 CT 600 A1 GND 600 CT 600 A2 GND	
	TTRS-2		2	Interface Panel, Rcvr "A"	10W3J4 "Memory Input"	A C B	TTY Rcvr			Remote Tuning Input Rcvr "A" & "B" + (1) - (0) GND	GFM
	TTRS-2		2	Interface Panel, Rcvr "A"	10W4J3 "Readback Output"	A C B	TTY XMTR Rcvr "A" CH			Readback Output, Rcvr "A" Hi Level Space (0) Common Hi Level Mark (1)	GFM
	TTRS-2		2	Interface Panel, Rcvr "B"	10W7J3 "Readback Output"	A C B	TTY XMTR Rcvr "B" CH			Readback Output Rcvr "B" Hi Level Space (0) Common Hi Level Mark (1)	GFM
		RG-58/U	1	Interface Panel, Rcvr "A"	10W1J10 1 Mc Ext Std		Ext 1 Mc Std Source			Ext 1 Mc Std Input Rcvr "A"	GFM
	TTRS-2		2	Interface Panel, Rcvr "A"	10W1J5 "Speaker"	A B C	Speaker, Rcvr "A"			Monitor Speaker Output, Rcvr "A" Audio Pair Shld	GFM
	TTRS-2		2	Interface Panel, Rcvr "B"	10W3J5 "Speaker"	A B C	Speaker, Rcvr "B"			Monitor Speaker Output, Rcvr "B" Audio Pair Shld Gnd	GFM
		RG-58/U	1	Interface Panel, Rcvr "B"	10W5J10 "1 Mc Ext Std"		1 Mc Ext Std Source			Ext 1 Mc Std Input Rcvr "B"	GFM
	TTRS-2		2	Interface Panel, Rcvr "A"	10W3J4 "Memory Input"	A C B	Interface Panel, Rcvr "A" of next Receiving Set	10W3J4 "Memory Input"	A C B	Remote Tuning Interconnect + (1) - (0) GND	GFM
	TTRS-2		1	Interface Panel, Rcvr "A"	10W3J2 "Memory Output"	f s	Interface Panel, Rcvr "A" of next Receiving Set	10W3J2 "Memory Output"	f s	Remote Control Interconnect Stunt GND	GFM
CA409-32-8.00			1	Interface Panel, Rcvr "A"	10W3TB1	1	Interface Panel, Rcvr "A"	10W3TB1	**	"Start Tune" Jumper	GFM
	THFA-3		2	Power Source	Figure 2-2		Junction Box SA238G	Wht & Blk Pigtail		Power	GFM
		RG-58 U	1	Interface Panel Rcvr "A"	10W1J9 1 Mc Monitor		Interface Panel, Rcvr "B"	10W5J10 Ext Std		Diversity 1 Mc Interconnect (Optional)	



NOTE: NEUTRAL LINE IS TIED DIRECTLY TO CHASSIS AT JUNCTION BOX

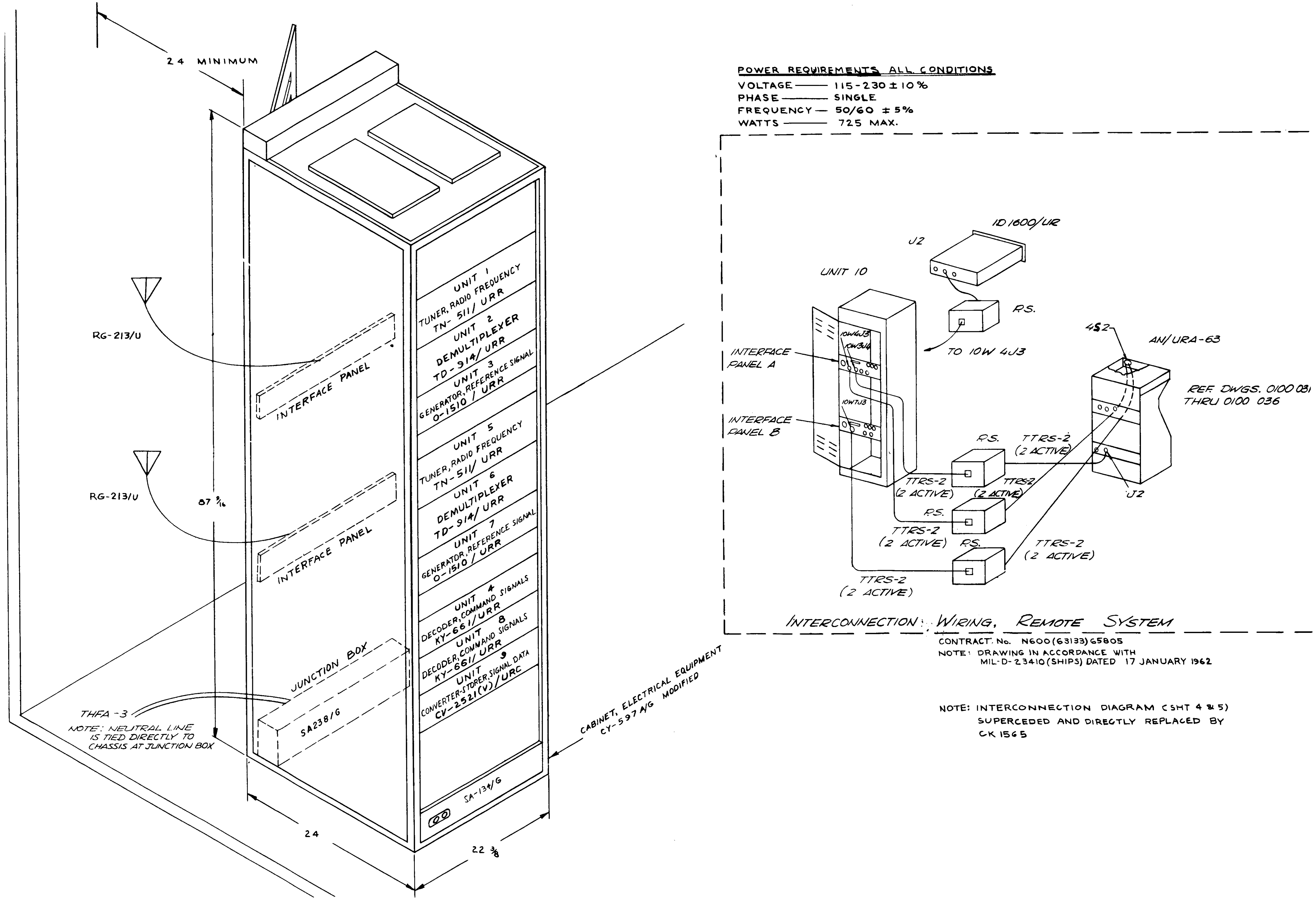
POWER REQUIREMENTS ALL CONDITIONS
VOLTAGE —— 115 - 230 ± 10%
PHASE —— SINGLE
FREQUENCY — 50/60 ± 5%
WATTS —— 390 MAX.

CONTRACT No. N600(63133) 65805
NOTE: DRAWING IN ACCORDANCE WITH MIL-D-23410 (SHIPS) DATED 17 JANUARY 1962
NOTE: INTERCONNECTION DIAGRAM (SHT 4) SUPERCEDED AND DIRECTLY REPLACED BY CK 1564

Figure 2-1. Pictorial System Diagram, AN/URR-63(V)1

POWER REQUIREMENTS ALL CONDITIONS

VOLTAGE	115-230 ± 10%
PHASE	SINGLE
FREQUENCY	50/60 ± 5%
WATTS	725 MAX.

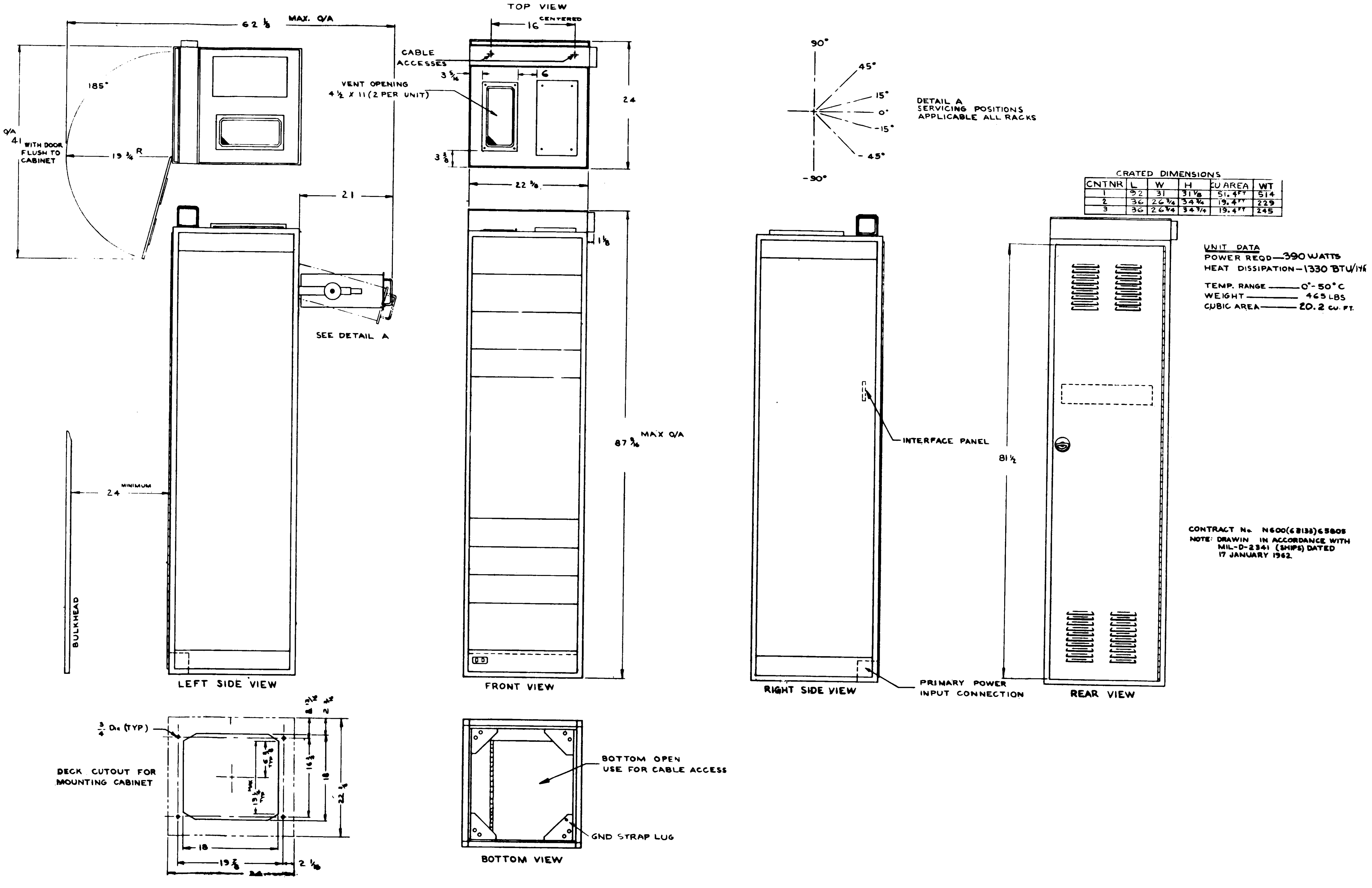


CONTRACT No. N600(63133)65805

NOTE: DRAWING IN ACCORDANCE WITH
MIL-D-23410(SHIPS) DATED 17 JANUARY 1962

NOTE: INTERCONNECTION DIAGRAM (SHT 4 & 5)
SUPERCEDED AND DIRECTLY REPLACED BY
CK 1565

Figure 2-2. Pictorial System Diagram, AN/URR-63(V)2



CRATED DIMENSIONS

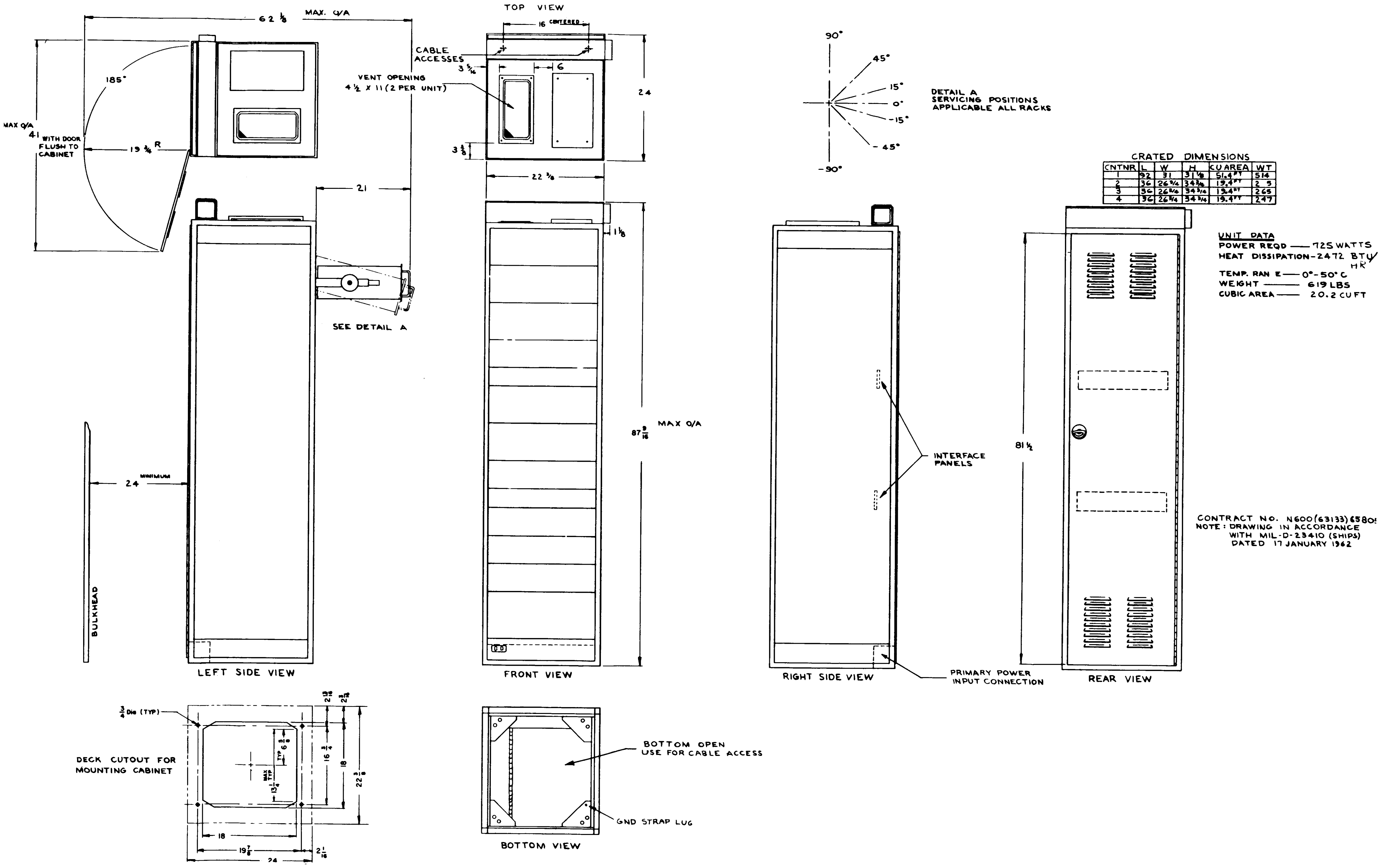
CNTNR	L	W	H	CU AREA	WT
1	92	31	31 1/8	51.4FT	514
2	36	26 3/4	34 3/4	19.4FT	229
3	36	26 3/4	34 3/4	19.4FT	245

UNIT DATA
POWER REQD—390 WATTS
HEAT DISSIPATION—1330 BTU/HR

TEMP. RANGE ——— 0°-50°C
WEIGHT ——— 465 LBS
CUBIC AREA ——— 20.2 CU. FT.

CONTRACT No. N600(63133)65808
NOTE: DRAWIN IN ACCORDANCE WITH
MIL-D-2341 (SHIPS) DATED
17 JANUARY 1962

Figure 2-3. Outline and Dimensions, AN/URR-63(V)1 Rack



CRATED DIMENSIONS

CNTNR	L	W	H	CU AREA	WT
1	92	31	31 1/8	51.4 FT	514
2	36	26 3/4	34 3/4	19.4 FT	2 5
3	36	26 3/4	34 3/4	19.4 FT	265
4	36	26 3/4	34 3/4	19.4 FT	247

UNIT DATA
POWER REQD —— 725 WATTS
HEAT DISSIPATION - 2472 BTU/HR
TEMP. RAN E —— 0°-50° C
WEIGHT —— 619 LBS
CUBIC AREA —— 20.2 CU FT

CONTRACT NO. N600(63133)6580
NOTE: DRAWING IN ACCORDANCE
WITH MIL-D-23410 (SHIPS)
DATED 17 JANUARY 1962

Figure 2-4. Outline and Dimensions,
AN/URR-63(V)2 Rack

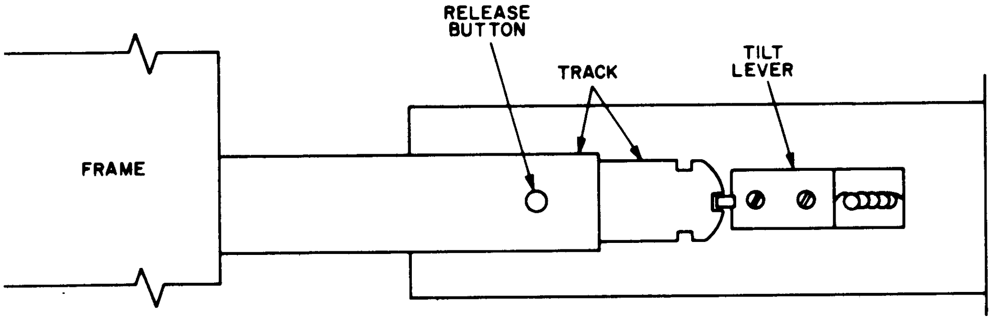


Figure 2-5. Slide Mount Details

SECTION 4

TROUBLE SHOOTING

4-1. LOGICAL TROUBLE SHOOTING PROCEDURE.

a. INTRODUCTION. - The procedure described in this section is aimed at directing the troubleshooter to the faulty component, connection or wire in as few steps as possible. The basis for the steps is the structure of the receiver. Each receiver is divided electrically into functional sections and mechanically into rack mounted modular units. Each modular unit is divided into removable subassemblies and plug-in PC boards. In the trouble shooting procedure, a faulty subassembly can be removed and replaced quickly, placing the Receiving Set back in operation. Trouble shooting (and repair) of the removed subassembly can then be continued at a different time or locality if necessary. When trouble shooting a Receiving Set, there are seven basic steps to be taken. These are:

(1) Symptom recognition.
(2) Symptom elaboration.
(3) Listing probable faulty functional sections.
(4) Localizing the faulty functional section.
(5) Localizing the faulty modular unit within the functional section.
(6) Localizing the faulty subassembly within the modular unit.
(7) Localizing the faulty component within the subassembly.

b. SYMPTOM RECOGNITION. - At the first sign of trouble in the receiver, it is important to determine whether or not it is the Receiving Set that is giving the trouble or some associated equipment (the remote control site, teletype linkages, audio loads, rf transmission lines, etc.).

c. SYMPTOM ELABORATION. - After it has been determined that the Receiving Set is at fault, the symptom should be examined more closely. Use front panel controls and/or the remote control site keyboard to emphasize the trouble. Table 3-2, Control Functions, will be useful in this step. In addition, there are several modes of operation possible (refer to paragraph 3-1) involving tuning, frequency control, channel reception, and diversity/single receiver operation. It is particularly important in this step to note in which operating mode or modes the trouble is encountered.

d. LISTING PROBABLE FAULTY FUNCTIONAL SECTIONS. - Paragraph 4-2, Overall Functional Description, lists and describes the ten functional sections of the receiver (see figure 4-1) and includes table 4-1, Trouble Shooting Chart, Local Tuning and table 4-2, Trouble Shooting Chart, Remote Tuning. These tables list symptoms versus functional sections. On the basis of observations made in the previous step, and referring to paragraph 4-2, it should be possible to pick out two or three of the sections that may be the cause of the trouble.

e. LOCALIZING THE FAULTY FUNCTIONAL SECTION. - To determine more exactly the faulty functional section from the list made in the previous step, refer to paragraph 4-3, Functional Section Descriptions, under the sub-paragraph headings of the sections. Each of these sub-paragraphs are further divided into Overall Functional Section Description (relating to a servicing block diagram of the section) and Overall Functional Section Test Data (relating to test procedure and to waveform/voltage test data found on the servicing block diagram). By using the primary input-vs-output test points on each functional section, the faulty section can be located. Test setups and control positions (for the specific test data given on the servicing block diagram) are included to the left of the diagram.

f. LOCALIZING THE FAULTY MODULAR UNIT WITHIN THE FUNCTIONAL SECTION. - In some cases it may be required to remove the faulty rack modular unit and replace it with an overhauled unit, continuing the faulty unit trouble shooting at a different time or locality such as a bench test operation. For this reason, input-versus-output test points and values for each modular unit within a functional section are included in the servicing block diagram for the section.

g. LOCALIZING THE FAULTY SUBASSEMBLY OR AREA WITHIN THE MODULAR UNIT. - When the modular unit has been discovered, it may be left in the rack for the purposes of system trouble shooting or it may be removed for bench test trouble shooting. In either case, reference to paragraph 4-3 subparagraphs (Overall Functional Section Description and Overall Functional Section Test Data) should reveal the faulty subassembly, PC board, or wiring connection area. Subassemblies may be located by referring to major component location diagrams for each modular unit in Section 5. Note that a quick check can be performed in this step, by using spare plug-in subassemblies for a substitution check to reveal the faulty one.

h. LOCALIZING THE FAULTY COMPONENT WITHIN THE SUBASSEMBLY OR AREA. - When the faulty subassembly has been discovered, it is generally most expeditious to replace it from the spares supply. Further trouble shooting of the subassembly may then be performed in a modular unit at a different site or time. For this latter purpose, the technician may refer to paragraph 4-4, Subassembly Description. The text in sub-paragraphs of 4-4 is divided into subassemblies and these are presented in the reference symbol order of a single receiver. The text refers to subassembly schematics in Section 5 and these also include test points. Test data given is based on the same test setup and control position arrangement given on the functional section diagram.

Before starting subassembly trouble shooting, the technician should check the Notes column opposite its listing in Section 6, Parts List. Some subassemblies have been categorized by the provisioning agency as non-repairable from a practical or cost-wise point of view. In addition, some are recommended to be returned to the factory for repair. In both cases, there should be spare subassemblies available for replacement, eliminating the necessity for any further trouble shooting procedure.

4-2. OVERALL RECEIVER FUNCTIONAL DESCRIPTION.

a. INTRODUCTION. - Radio Receiving Set AN/URR-63(V)1 is made up of ten functional sections (see figure 4-1, Overall Functional Block Diagram). This also represents a single receiver in the double receiver (AN/URR-63(V)2) Receiving Set.

b. SIGNAL DETECTION SECTION. The signal detection section functions as the basic receiver. A 2 to 32 mc rf signal, and associated sidebands, AM or CW transmission, is received at the antenna input. Audio appears at the output in the form of a symmetrical channel for AM or CW or up to four demultiplexed channels (B2, B1, A1 and A2) in a four-channel sideband transmission.

c. GAIN CONTROL SECTION. - The gain control section adjusts amplifier gain at the rf and if stages. It may be set manually, at the front panel, or it may be set for the AGC mode. In AGC mode, a level sensing signal from the 250 kc if stage measures the level of the incoming signal and a corresponding dc voltage is issued to keep the receiver output constant through a wide range of signal input levels.

d. DIVERSITY QUIETER SECTION. - The diversity quieter section may be utilized only in the AN/URR-63(V)2 Receiving Set. In space or frequency diversity mode, the two receivers are tuned and operated to receive the same signal. The diversity quieter in each receiver samples an individual channel AGC output and compares it with like samples from the same channel of the associated receiver. The sample representing the receiver with the weaker signal initiates a quieting signal back to that receiver's channel audio amplifier stage from its own quieter.

e. SYNTHESIZER/PHASE LOCK SECTION. - This section sets the receiver for synthesized operation by locking all receiver frequencies to a 1 mc standard. It has two inputs: (1) a 21 to 37 mc frequency from the receiver's hf oscillator and (2) a signal from the receiver's BAND selector setting. The output is a dc correction voltage to the hf oscillator from a phase locking section that automatically locks the receiver to the standard in the final phase of fine tuning. When phase locking has occurred, it sends a "sync" signal to the Sync Indicator section.

The synthesizer/phase lock section contains its own 1 mc standard, stable to within one part in 10^8 for a 24-hour period. If a higher external 1 mc standard is available, this standard may be used to control the internal one. An electronic automatic switching circuit switches in the external standard in case of the failure of the internal. When an external one mc signal is connected and its amplitude is greater than 0.7 vrms, the PHASE COMPARATOR/FREQ DIFFERENCE switch must be in the PHASE COMPARATOR position. The internal 1 mc will then be phase locked to the external standard. If the external standard fails or falls below 0.7 vrms the external red lamp on the front of the unit will light, indicating loss of the external 1 mc, and the electronic circuit will hold the internal 1 mc to its frequency and phase prior to the loss of the external 1 mc. When the internal 1 mc is lost with an external 1 mc connected, electronic switching will cause the internal red lamp to light on the front panel, indicating loss of internal 1 mc, and the external 1 mc will be used for receiver operation.

f. AUTOMATIC TUNING SECTION. - The automatic tuning section operates with the synthesizer/phase lock section to affect a completely automatic frequency tuning. When the receiver BAND switch is set at AUTO and the digital frequency selection knobs on the Synthesizer/Phase Lock section are set for the desired receiver frequency, BCD (binary coded digit) signals are sent to comparators in the automtic tuning section. These comparators also receive BCDs from the digital counter, representing the present receiver hf oscillator reading. The comparators then issue a correctional signal to the TN-511/URR tuning control via a tuning motor drive gear train in a servo loop; a logic circuit issues a band selection signal to electrically select the receiver's band setting. When the servo loop adjusts the tune control within the phase locking range, this circuit synchronizes the receiver to the 1 mc standard in the same manner as for a manual synthesized tuning. A -30 vdc input, "virtual ground" and "buffered dc loop" signals are programmed from the Synthesizer/Phase Lock section in such a sequence as to start and stop the automatic tuning at the proper times. A time delay in the Automatic Tuning section lights a FAULT lamp is synchronization is not reached within twenty seconds.

g. DIGITAL COUNTER SECTION. - The digital counter section is a lighted numeral display unit, representing the 2 to 32 mc frequency for which the receiver is tuned. It displays the frequency to four places beyond the decimal point and works by an actual cycle count of the receiver's hf (21 to 37 mc) oscillator.

h. AFC SECTION. - The AFC (Automatic Frequency Control) section serves to compensate for signal drift from a relatively unstable (or non-synthesized) transmitter. The AFC section, when properly tuned, locks onto the incoming carrier at the 250 kc intermediate frequency. Any deviation in the carrier frequency alters a 250 kc injection frequency in a control loop and (by dc correction voltage control) alters the rf oscillator frequency in the signal processing section by means of a second control loop to produce fidelity of audio output. When the AFC section has locked to a carrier, it sends a "sync" signal to the sync indicator section. In order to allow the second loop to act first, the first loop is momentarily opened by the AFC TUNE switch.

i. SYNC INDICATOR SECTION. - The Sync Indicator section doubles for AFC or synthesized frequency control mode, since only one mode is employed at a time. The sync indicator section receives dc voltages from the Synthesizer/Phase Lock and AFC sections to indicate, by the use of a meter (1M1) and light (1DS1), the phase lock of the hf oscillator in the synthesize mode and the dc voltage locking of the hf oscillator in the AFC mode. The system is locked up when the meter indicates and the SYNC INDICATOR lamp is on.

j. REMOTE TUNING SECTION. - The remote tuning section receives teletype codes from the remote control site and translates them into the proper form and sequence to tune the receiver. In the frequency tuning phase, the automatic tuning section is energized and employed. The first codes to arrive are a pair of equipment selection codes (A through E and 1 through 10, refer to table 1-3) that open a memory section in a particular receiver. Codes then arrive at the input in pairs, one selecting a receiver control and one positioning it. The memory section stores these codes as they arrive and they remain stored until the receiver tune code arrives at the end of the command message. The code control pairs then act to move stepping-switch drives on the receiver controls one-by-one. As each switch homes, it sends back a "switch stopped" signal, initiating the processing of the next code pair for the next control. In the process, the synthesizer digital frequency controls are moved to the desired frequency figure and automatic tuning ensures as previously described. Other code pairs select frequency control mode (AFC/SYNTH), channel reception mode (AM, CW, ISB) and individual channel AGC feedback time constants (FAST, MEDIUM, SLOW). A time delay reset pulse is created at the beginning of the tuning cycle to reset the automatic tuning section in the event of a previous fault trip.

k. REMOTE READBACK SECTION. - The remote readback section supplies a continuous readback of receiver control positions and tuning status to the remote operator. A series of gating pulses issue from this section, one for each receiver control, initiates readback codes representing the stepped positions of the controls. The codes are translated into series teletype format and appear at a keyer output of the remote readback section for teletype transmission. Included in the readback is a receiver status TUNING/READY/FAULT readback derived from continuous information fed into a logic section: a "sync/no sync" signal, a "tune lockup" signal, a "servo stopped" signal and a "fault" signal. Memory/Decoder power off information is supplied in the readback when the Memory/Decoder power section is switched off locally and a "non-automatic" signal issues when the receiver BAND SWITCH is not set to AUTO. Either of these two conditions indicates to the remote operator that the receiver is not properly set for a remote tuning. An AFC alarm readback is generated when the AFC section loses the transmitted carrier due to excessive transmitter drift. An equipment selected readback is generated from the remote tuning section when the memory input has been opened by the correct equipment selection code pair.

l. TYPICAL SYMPTOMS VERSUS FUNCTIONAL SECTIONS. - Table 4-1 and 4-2 present indicated faulty functional sections from typical symptoms encountered in a local and remote tuning respectively. Local operation performances (table 4-1) should be checked first in order to rule out areas in a remote operation performance check (table 4-2).

TABLE 4-1. TROUBLE SHOOTING CHART, LOCAL TUNING

SYMPTOM	PROBABLE FUNCTIONAL SECTION INDICATED
With signal input indicated on TN-511/URR RF/AFC LEVEL meter, no audio output can be detected.	Signal Detection
With TN-511/URR RF GAIN knob at AGC, variations in signal input strength as indicated by RF/AFC LEVEL meter produce volume variations at audio output.	Gain Control
Varying TN-511/URR RF GAIN knob does not produce audio level variations.	Gain Control
In diversity operation, audio from the identical channels of receivers A and B cut out at the same time.	Diversity Quieter
In manual synthesized tuning (with the TN-511/URR BAND switch manually positioned for the band) the correct figure comes up on the MEGACYCLES display but it is not possible to obtain a sync indication.	Synthesizer/Phase Lock or Sync Indicator
Although a successful manual synthesized tuning has been achieved, in automatic synthesized tuning (with the TN-511/URR BAND switch set at AUTO) the correct figure comes up on the MEGACYCLES display, but it is not possible to obtain a sync indication.	Automatic Tuning
In a manual synthesized tuning a sync indication is reached but the correct figure is not displayed on the TN-511/URR MEGACYCLES display.	Digital Counter

TABLE 4-1. TROUBLE SHOOTING CHART, LOCAL TUNING (Continued)

SYMPTOM	PROBABLE FUNCTIONAL SECTION INDICATED
The receiver has been successfully tuned and synchronized for synthesized tuning. However, repeated subsequent AFC tuning procedures fail to give a sync indication (capture of transmitted carrier).	AFC
After a successful synthesized tuning, monitoring the receiver indicates a loss of sync.	Synthesizer/Phase Lock or Sync Indicator
After a successful AFC tuning, monitoring the receiver indicates a loss of sync.	AFC or Sync Indicator

TABLE 4-2. TROUBLE SHOOTING CHART, REMOTE TUNING

SYMPTOM	PROBABLE FUNCTIONAL SECTION INDICATED
Readback information at the remote control site does not match control positions and status (either totally or partially).	Remote Readback
Although remote readback section is working satisfactorily, remote tuning message fails to produce some or all changes at the receiver.	Remote Tuning
The Equipment Selected readback is not received when the equipment selection code pair is sent.	Remote Tuning or Remote Readback
Although a blinking SIGNAL INPUT lamp on the CV-2521/URC indicates application of teletype codes, there are no changes or incomplete changes in the receiver when the TUNE code is sent.	Remote Tuning

4-3. FUNCTIONAL SECTION DESCRIPTIONS.

a. SERVICING BLOCK DIAGRAMS. - Figures 4-2 through 4-15 are servicing block diagrams for the ten functional sections of a single receiver system, typical for Receiving Set AN/URR-63(V)1 or for one half of the dual receiver AN/URR-63(V)2. The one exception to the latter is in the remote tuning section; there is one CV-2521(V)/URC serving both receivers in Receiving Set AN/URR-63(V)2. The areas affected by this difference are shown in figure 4-14. Included in all diagrams are pertinent front panel controls to relate their effects on each functional section in a trouble shooting study. Test points are symbolized throughout figures 4-2 through 4-15 in accordance with the phase of trouble shooting to be performed. These phases are (1) input/output checks of functional sections, (2) input/output checks of modular units and (3) input/output checks of subassemblies. The test point symbol legend is shown in notes on each diagram.

Test data for the Receiving Set falls into two categories: for binary logic circuitry and for communications circuitry. Test data for the former is in timing chart format and data for the latter is in the form of pertinent waveforms, voltages and frequencies. Waveforms, voltages and frequencies are shown directly on servicing block diagrams; timing charts are shown in separate illustrations, referenced to the test points shown on the servicing block diagrams. Text in the following paragraphs (pertaining to test data) refers specifically to timing charts when these are required. In general, these areas are the Digital Counter, Automatic Tuning, Remote Tuning and Remote Readback sections. In all cases, text in the following paragraphs under the subheadings of test data should be referred to before taking measurements. The text contains specific control positions and test setup requirements to obtain the specific readings.

b. TEST EQUIPMENT REQUIRED. - Refer to table 1-7.

c. USAGE OF TIMING CHARTS. - Timing charts (figures 4-16 and 4-17) are categorized by receiver functional sections involving binary logic and subdivided further into phases and modes of these sections. Each line represents a test point time variance between two voltage values and all lines are plotted against a common time base for comparison. Test points are arranged from top to bottom in normal order of checking (from input to output) of a functional section, or subdivision thereof.

Using time bases A and B of the oscilloscope, check test points in pairs (the test point and the one directly below it on the chart) at coinciding pulse edges (voltage changes). This comparison check will reveal, by reference to the PC board logic/schematic in Section 5, the logic network/component to be replaced. To make a measurement, set the oscilloscope for an external triggering mode, with a negative triggering slope and level for a negative-going change and a positive triggering slope and level for a positive-going change. The exact shape of the pulse edge is not an important factor in trouble shooting the binary logic sections. Very often, different attenuator lines into the oscilloscope will produce pulse shape distortions that are not present in the equipment being tested. The critical fact is whether or not the expected voltage changes occur in the polarities and coincidences as indicated on a common time base.

d. SIGNAL DETECTION SECTION (figure 4-2).

(1) OVERALL FUNCTIONAL SECTION DESCRIPTION. - Heavied lines indicate path of intelligence. RF Tuner TN-511/URR processes the signal from its 2 to 32 mc stage to a 250 KC IF output. The 2 to 32 mc carrier and sidebands from the antenna are directed to four rf amplifier band circuits (1A10A3A1 through 1A10A3A4) in tuner assembly 1A10 via input/attenuator 1A11. Tunable bandpass ranges are in octave steps: 2 to 4 mc, 4 to 8 mc, 8 to 16 mc, and 16 to 32 mc. In local tuning, bands are gang tuned with a 21 to 37 mc local oscillator 1A10A1) for the incoming frequency by means of the front panel TUNE control. Band separation is further accomplished in 1st IF PC board 1A9 by using four separate IF mixers and stages at this point (rather than one mixer and one if). The outputs of the difference mixers (0.625, 1.25, 2.5, and 5.0 mc) are fed to four separate IF stages. Each stage contains amplifiers and a crystal symmetrical bandpass filter; a high degree of selectivity occurs in this area. The front panel BAND SWITCH (in positions 1 through 4) serves to (a) select one of four band paths from input/attenuator assembly 1A11 through tuner assembly 1A10, (b) select the proper division ratio on local oscillator divider PC board 1A8 to produce the appropriate mixer injection frequency and (c) energize subsynthesizer PC board 1A6 to produce an appropriate mixer injection frequency. Second if PC board 1A7 functions to convert the selected band frequencies to the second IF of 250 kc. A further degree of selectivity is gained in a crystal filter (not shown) in the mixer output. Output of the 250 kc carrier and sidebands is then routed to Demultiplexer TD-914/URR.

Demultiplexer TD-914/URR may be operated for ISB (independent sideband) mode (figure 4-2) or for symmetrical channel mode (figure 4-3) by positioning the MODE selector switch. In the AM or CW positions the TD-914/URR will pass the symmetrical channel only; in the ISB position it will pass the four sideband channels only. In the symmetrical mode (figure 4-3) a further selection of audio detection and channel bandwidth may be made by the MODE switch. When the switch is in one of the AM width positions (2.5 kc or 6.0 kc), the carrier and sidebands are processed in an envelope detector to produce audio at the width selected. When the switch is in one of the CW width positions (2.5 kc or 6.0 kc), the tone frequency in a sideband (or the carrier itself) is processed in a product detector, with adjustable BFO injection, to produce audio at the filtered width selected.

In the symmetrical mode, the signal path through the TD-914/URR then, proceeds through symmetrical IF/AGC PC board 2A5, where width is selected (at the IF stage) and over to symmetrical demodulator PC board 2A4, where a detector is selected. The audio derived from the detector is adjusted in level by the SYM/B2 LINE LEVEL ADJUST knob and routed out of the receiver via the B2 audio/demod PC board 2A6. The section of the 2A6 board thus used is made to double for the symmetrical channel and the B2 channel, since only one channel will be coming through at any given time, in accordance with the mode selected by the MODE switch.

In the ISB mode (figure 4-2) the carrier (suppressed or partial) and both sidebands are applied simultaneously to B2, B1, A1, and A2 channel IF/AGC boards (2A7, 2A9, 2A11, and 2A13, respectively). A crystal filter at the input of each board picks out and passes the appropriate band of frequencies on to the appropriate channel audio/demod card opposite it. These boards (2A6, 2A8, 2A10, and 2A12) process the 250 kc sideband channels through product detectors to produce four audio channel outputs from the receiver. Product detectors for the two direct channels (A1 and B1) use a 250 kc injection frequency; detectors for the translated channels (A2 and B2) use 243.71 kc and 256.29 kc injection frequencies to produce the required audio. These four injection frequencies are obtained from subcarrier generator PC board 2A3.

The 2A3 board derives the injection frequencies by using the receiver's basic 1 mc frequency source (from RF Tuner TN-511/URR). The 1 mc is divided by 100 to produce 10 kc into a keyed oscillator. A 6.29 mc harmonic from the oscillator, selected by a crystal filter, is divided by 1000 to produce 6.29 kc. This 6.29 kc is used as a common injection frequency for a difference mixer and a sum mixer. The other common injection frequency is 250 kc, derived by dividing the 1 mc standard by four. The difference mixer then produces 243.71 kc; the sum mixer produces 256.29 kc. The position of the RF Tuner TN-511/URR FUNCTION switch 1A12 acts on a gate in phase detector driver PC board 1A1A2 to select the receiver's 1 mc basic frequency from two possible sources, (a) a highly stable 1 mc standard from Reference Signal Generator 0-1510/URR (refer to paragraph 4-3g., Synthesizer/Phase Lock Section) or (b) a 1 mc standard of lesser stability located in input/standard PC board 1A1A1. The latter source is used in tuning for AFC (see paragraph 4-3j.) and tuning for local frequency control. Tuning circuits for local frequency control are all contained in the basic signal detection section of the receiver. In this mode, the local oscillator (1A10A1) in RF Tuner TN-511/URR is disconnected from any control by the AFC section or the Synthesizer/Phase Lock section.

In IF/AGC PC boards 2A7, 2A9, 2A11, and 2A13 (in Demultiplexer TD-914/URR) there are delay equalizers (not shown) associated with the crystal filters in each board. These equalizers function to cancel out the time delay effect through the input filters for frequencies at the extreme edges of each passband, a point particularly critical in high-speed data transmission. LINE DBM meter 2M1, in Demultiplexer TD-914/URR, together with MONITOR SELECTOR switch 2S2 and METER SENSITIVITY switch 2S8 are used to adjust and monitor the receiver audio output level for each channel. Adjustment is made by LINE LEVEL ADJUST potentiometers 2R2, 2R3, 2R4 and 2R5. A 0 dbm reading on the meter indicates a 1 mw output into a 600 ohm line. The METER SENSITIVITY switch extends the reading range on the meter for low or high outputs.

The front panel PHONE jack (2J2) on Demultiplexer TD-914/URR and LOCAL GAIN potentiometer 2R1 are used for headset or speaker sound monitoring. In this mode, MONITOR SELECTOR switch 2S2 selects the audio channel to the speaker or headset and the LOCAL GAIN knob regulates the volume.

(2) OVERALL FUNCTIONAL SECTION TEST DATA.

(a) TEST EQUIPMENT REQUIRED.
HP-606B Signal Generator
AN/USM-281A Oscilloscope
AN/USM-207 Frequency Counter
AN/PSM-4C VOM
ME-303/U RF VTVM

(b) PROCEDURE. - To test the signal detection section for ISB mode, attach the signal generator to antenna input jack J8 on the rear interface panel, and terminate audio channels A1, A2, B1 and B2 with 600 ohm dummy loads. Set the receiver controls and signal generator frequencies and amplitudes as shown in the table on figure 4-2. Perform tests A, B, C and D at 3, 6, 12 and 24 megacycles respectively, referring to the Signal Frequencies table for points which vary for each test. Use an RF VTVM, sensitive wide band oscilloscope, frequency counter and VOM as required. Since the TN-511/URR COUNTER MODE selector switch is in the REC position, the frequency to which the receiver is tuned will be indicated on the receiver counter. Whenever possible, test points on the servicing block diagrams have been used; when test points are not available, extender card pin numbers have been identified. Readings which depend on AFC action should not be hurried; a finite time is required for voltages to stabilize. In general, internally generated injection frequencies should be exact, while signal frequencies dependent on the external signal generator will depend on the care with which the signal generator is tuned.

To test the signal detection section in the symmetrical mode, first perform the test of the signal detection section ISB mode and then see figure 4-3. For the test of the symmetrical mode, the signal generator at the antenna input is modulated externally by either a 1 kc audio signal or a 2 kc audio signal, depending on the bandpass being tested; or, for the test of the CW function, the signal generator is unmodulated. The carrier frequency is specified as 18 mc, but any other frequency in the range of the receiver may be used. Test A refers to 1 kc modulation, bandwidth 2.5 kc; Test B refers to 2 kc modulation, bandwidth 6 kc. Test C refers to the CW mode; the signal generator is unmodulated and the internal beat frequency oscillator determines the output audio frequency.

e. GAIN CONTROL SECTION (figure 4-4).

(1) OVERALL FUNCTIONAL SECTION DESCRIPTION. - The gain control section encompasses a manually adjusted gain control, an AGC (automatic gain control), and a level meter working from AGC samplings. The AGC system falls into two main sections: a high-level section in RF Tuner TN-511/URR and a low-level section in Demultiplexer TD-914/URR. When used together the two sections keep the output of the receiver constant for a total range of antenna input from 1.0 uv to 1 volt. Attack points are arranged so that for an antenna signal level in the range of 1.0 uv to 500 uv, the TD-914/URR AGC system is active and the TN-511/URR AGC system is inactive. When the antenna signal strength increases above 500 uv, the TN-511/URR AGC system becomes active and joins that of the TD-914/URR in keeping the audio output constant. At 30 mv antenna input, an AGC overload sensing circuit in the second IF PC board (1A7) of TN-511/URR switches in a 20 db attenuator into input attenuator assembly 1A11, thereby placing additional control on the signal. The INPUT ATTENUATOR switch (1S2) controls the attenuator when the signal at the antenna is less than 30 mv. In the up position, the attenuator is switched in; in the down position, automatic switching at 30 mv takes place. The AGC system in RF Tuner TN-511/URR is switched in by setting RF GAIN potentiometer 1R2 to AGC position, actuating a built-in switch. The AGC system in Demultiplexer TD-914/URR is switched in by setting the AGC SOURCE knobs to a position other than MANual. The TD-914/URR AGC circuits are isolated for each channel and AGC SOURCE control switches are arranged to select channel feedback source and AGC attack and decay speeds (AGC TIME CONSTANT switches) individually for each sideband channel. Each sideband channel may receive its feedback from its own output or from one of the three sideband channels. The AGC controls for the symmetrical channel (see figure 4-5) select attack and decay speed only, since this channel can only receive AGC feedback from its own output.

The manually controlled gain for both TN-511/URR and TD-914/URR modular units is adjusted by the TN-511/URR RF GAIN knob, first setting the TD-914/URR AGC SOURCE switches at MANual to substitute the adjustment from RF GAIN potentiometer 1R2 for the AGC inputs into the individual channels.

The RF/AFC LEVEL meter 1M2 in RF Tuner TN-511/URR (with METER FUNCTION switch 1S2 in an RF position) functions to assist the RF GAIN knob adjustment setting by indicating incoming signal strength. In the RF LOW position of the switch, the meter derives the signal level for a relatively weak signal from a summing of AGC levels from the four separate channel AGC feedbacks in the TD-914/URR. In the RF HIGH switch position, a relatively strong signal is measured from the AGC output in the TN-511/URR rf stage. The AGC CARRIER switch position monitors the level of the captured carrier component in AFC operation (refer to paragraph 4-3j, AFC Section).

(2) OVERALL FUNCTIONAL SECTION TEST DATA.

(a) TEST EQUIPMENT REQUIRED.

HP-606B, Signal Generator
ME-303/U, RF VTVM
AN/PSM-4C, VOM
AN/USM-281A, Oscilloscope

(b) PROCEDURE. - To test the gain control section for ISB mode, attach signal generator and loads to rear interconnect panel as shown in Test Setup diagram included in figure 4-4. Set receiver controls as listed in the diagram. Test AGC system by performing tests A, B, and C for the three variations in antenna input signal strength indicated (minimum, maximum, and overload). Test manual gain control system by performing tests D and E (for minimum and maximum gain settings of the TN-511/URR RF GAIN knob); the minimum setting is the extreme counterclockwise position (just short of AGC switch-in) and the maximum is the extreme clockwise position. Refer to Signal Variations Table for points that vary with each test. Use an RF VTVM for rf measurements and a VOM for dc measurements.

The AGC time constant circuits should be tested after the gain control tests have been completed. The procedure for the AGC time constant tests is included in table 4-3. Test setup for the AGC time constant tests and AGC waveforms are included in figure 4-18.

To test the gain control section for symmetrical mode, first perform test for ISB up to the TD-914/URR unit, then see figure 4-5 for the remainder of the test. Attach signal generator and loads as shown in Test Setup diagram included in figure 4-5. Set receiver controls as listed under the diagram. For test of symmetrical AGC, time constant circuits, refer to table 4-3.

TABLE 4-3. TEST OF AGC TIME CONSTANT CIRCUITS

A. TEST EQUIPMENT REQUIRED:

1. Square Wave Generator SG-299L, or equivalent

2. Signal Generator HP-608B, or equivalent

3. Oscilloscope AN/USM-281A

B. PRELIMINARY CONTROL SETTINGS:

1. Square Wave Generator SG-299L

(a) Adjust the square wave generator for an output frequency of 1 cps

(b) Adjust the square wave generator amplitude for approximately 1 volt peak

2. Signal Generator HP-606B

(a) Put RANGE switch in 165 to 560 KC position

(b) Adjust frequency to approximately 250 kc

(c) Place MODULATION SELECTOR control to EXT DC

(d) Place ATTENUATOR control in 0. 03 VOLTS position

(e) Adjust MODULATION AMPLITUDE control and ATTENUATOR VERNIER control until rf output meter swings between 0. 3 and 3. Do not heed the % MODULATION meter.

3. TD-914/URR

(a) Place all AGC TIME CONSTANT switches to FAST.

(b) Place A1 AGC SOURCE switch to A1, B1 AGC SOURCE switch to B1, and so forth.

(c) Place MODE switch to the ISB position.

TABLE 4-3. TEST OF AGC TIME CONSTANT CIRCUITS

C. TEST PROCEDURES:

1. Remove external modulating signal from the MODULATION INPUT/OUTPUT jacks on the signal generator.

2. Tune the signal generator until the output frequency of the card under test, measured with scope and counter, at TP-9 is:

   (a) 252 kc for A1 channel, 2A11 card

   (b) 255 kc for A2 channel, 2A13 card

   (c) 248 kc for B1 channel, 2A9 card

   (d) 245 kc for B2 channel, 2A7 card

   (e) 250 kc for SYM channel, 2A5 card

3. Adjust LINE LEVEL ADJUST control for channel under test until 0 dbm is read on LINE-DBM meter. An audible indication from a monitor speaker may be used.

4. Reconnect modulation to HP-606B signal generator.

5. With scope time base, scope sync (+), and scope vertical attenuator controls properly set; the waveform on figure 4-18 (AGC Attack and Decay Time) should be observed.

6. With scope sync control set at (+), use trigger level, vertical attenuator and vernier, and horizontal time base control so that the waveform of the signal during time period A is expanded (as presented in figure 4-18).

7. Record the attack time, in milliseconds, for signal to fall from initial peak to approximately 63 percent. The attack time, with TIME CONSTANT switches in FAST position, should be 20 milliseconds.

8. With scope sync control set at (-), use trigger level, vertical attenuator and vernier, and horizontal time base control so that the waveform of the signal during time period B is expanded (as presented in figure 4-18).

9. Record the decay time, in milliseconds, for signal to rise from initial value to approximately 63 percent. The time, with TIME CONSTANT switches in FAST position, should be 20 milliseconds.

10. Repeat the tests for MEDIUM and SLOW TIME CONSTANT switch positions.

    (a) MEDIUM: attack time 20 ms; decay time 100 ms

    (b) SLOW: attack time 40 ms; decay time 2 seconds

    Note

    The square wave generator frequency may be varied between 1 and 5 cycles, as necessary, for waveform displays.

11. Repeat the tests for all channels, changing the HP-606B signal generator frequency as required.

f. DIVERSITY QUIETER SECTION (figure 4-6).

(1) OVERALL FUNCTIONAL SECTION DESCRIPTION. - The diversity quieter section may be used in diversity operation of two receivers (AN/URR-63(V)2 Receiving Set only). All circuitry is located in the Demultiplexer TD-914/URR. Inputs to the diversity quieter system are the five individual channel AGC signals described in paragraph 4-3e. These signals are fed from each channel's AGC TIME CONSTANT switch to monitor/diversity PC board 2A2. Similarly, AGC signals are fed from each channel's AGC TIME CONSTANT switch to monitor/diversity PC board in the second Demultiplexer TD-914/URR of the diversity receiver. The dc outputs of both monitor/diversity PC boards (representing the signal strength of each receiver) are directly

connected and form a comparator circuit. If, for example, channel B1 in reciver A is receiving a stronger signal than channel B1 receives in receiver B, the dc output voltage from 2A2 will be fed to both receiver halves A and B as the AGC source for the gain control section.

The diversity quieting feature is not required when the AN/URR-63(V)2 is operated in diversity with an external combiner at the audio output. The exchange of AGC signals between receivers is through an interconnecting cable running between the two DIVERSITY connectors on the upper and lower interface panels at the rear of the rack (see figure 5-2); this cable is removed when the AN/URR-63(V)2 is operated with a combiner. When the receiver is operated in diversity using AGC comparisons, however, the TD-914/URR AGC SOURCE switches (refer to paragraph 4-3e, Gain Control Section) must be positioned so that each channel receives its own AGC feedback.

(2) OVERALL FUNCTIONAL SECTION TEST DATA.

(a) TEST EQUIPMENT REQUIRED.
AN/PSM-4C VOM
AN/USM-106A VTVM
Two HP-606B Signal Generators

(b) PROCEDURE. - To test the diversity quieter section, attach a signal generator and loads to receiver A and B (upper and lower) rear interface panels as shown in the Test Setup diagram included in figure 4-6. Set receiver controls as listed under the diagram. Test system by performing A and B tests (for the two combinations of receiver A and B relative input strength) as indicated. Refer to Signal Variations table for points that vary with each test. Use a VOM to measure vdc points.

g. SYNTHESIZER/PHASE LOCK SECTION (figure 4-7).

(1) OVERALL FUNCTIONAL SECTION DESCRIPTION.

(a) RECEIVING SET AN/URR-63(V)1. - The synthesizer/phase lock section involves RF Tuner TN-511/URR and Reference Signal Generator 0-1510/URR. This section is defined only as that portion involved in a manual tuning (adjustment of the TN-511/URR TUNE and FINE TUNE knobs and BAND SWITCH) as opposed to the automatic tuning section described in paragraph 4-3h. Although automatic tuning for synthesized frequency control is always used (for its greater convenience) the manual tuning method is described here in order to subdivide this area from automatic tuning section for trouble shooting purposes. In manual tuning, the operator sets the TN-511/URR FUNCTION switch at SYN position and the BAND SWITCH at the appropriate band. He then sets the six 0-1510/URR digital frequency switches (10, 1, 0. 1, 0. 01, 0. 001 and 0. 0001 MEGACYCLES) for the desired 2 to 32 mc frequency. (The example shown in figure 4-7 is for 13, 4567 mc; frequencies obtained throughout are shown in parentheses). The tuning is then completed by adjusting the TN-511/URR TUNE and FINE TUNE knobs until the 21 to 37 mc frequency of the local oscillator 1A10A1 is correct for the desired 2 to 32 mc frequency as displayed on the digital counter (refer to paragraph 4-3i). Illumination of the SYNC INDICATOR lamp on TN-511/URR indicates synchronization.

In the final stages of tuning a phase locking circuit takes over to automatically capture and lock oscillator 1A10A1 frequency to the stability of the 1 mc standard in Reference Signal Generator 0-1510/URR. A monitor/logic circuit (included in 1 mc distributor PC board 3A3) functions to supply the 1 mc reference frequency, derived either from the internal 1 mc standard (fi) in the 0-1510/URR or an external standard (fe). The 1 mc is applied at three points: (1) phase detector driver PC board 1A1A2, (2) 100 kc selector PC board 3A5 and (3) 1 mc selector PC board 3A4. In 3A5 the 1 mc is divided by ten to produce 100 kc and its harmonics. A harmonic selector in 3A5 selects nine of these harmonics, 16. 1 mc through 16. 9 mc, separated by 0. 1 mc steps. 16. 0 and 17. 0 mc are selected in 3A4 from the harmonics present in the 1 mc input. These 16. 0 to 17. 0 (eleven) frequencies (from 3A4 and 3A9) are routed to five matrix distributors (contained in 3A6, 3A7, and 3A8) each controlled by one of the front panel MEGACYCLES switches (1, 0. 1, 0. 01, 0. 001 and 0. 0001 mc; 3A14S1 through 3A18S1). Positioning each switch in a 0 through 9 position has selected (by binary code input) one frequency as indicated by a test notation (see switch 3A14) on the diagram. Meanwhile, 1 mc and its harmonics are applied to a 3 to 6 mc selector in PC board 3A4. The selector output is controlled by the 10 MEGACYCLES switch (3A19S1) by means of a binary code input. Positioning this switch in a 0, 1, 2, or 3 position selects a 3, 4, 5, or 6 mc output, respectively, from the selector. 1. 4 mc and 11 mc are also derived from the 1 mc frequency in 3A4 to serve as additional injection frequencies for four mixer/amplifier stages (3A9, 3A10, 3A11 and 3A12). The output from the four stages (14. 0456 mc in this example) is brought into a sum mixer on 3A13 along with the output from the 3A4 (4 mc in this example). The sum (18. 04567 mc) is combined in a difference/mixer with the output (16. 7 mc) from 3A8 1 mc matrix distributor and the difference frequency (1. 34567 mc) is routed to phase detector driver PC board 1A1A2 in the TN-511/URR. (In this manner, the 0-1510/URR may be tuned to put out a 0 to 3. 99999 mc range; however, due to the TN-511/URR 2 to 32 mc tuning range, it is only used here to put out 0. 20000 to 3. 20000 mc). In addition to this, phase detector driver PC board 1A1A2 also receives the basic 1 mc standard reference from the 0-1510/URR, as previously mentioned. With the TN-511/URR FUNCTION switch in SYN position, this 1 mc passes through a gate in phase detector driver PC board 1A1A2 and over to a frequency divider in phase detector PC board 1A5, converting this reference frequency into 1 mc/16, or 62. 5 kc. Meanwhile, the 21 to 37 mc frequency from local oscillator divider 1A8 and input/std 1A1A1, besides going to the digital counter also gets divided by 80 producing a 262. 5 to 462. 5 kc frequency in phase detector driver PC board 1A1A2 and this frequency serves to represent the oscillator setting when fed to the phase detector PC board 1A5. At the same time, the previously mentioned 0. 2 to 3. 2 mc frequency, which serves to represent switch settings in the 0-1510/URR is divided into a 200 to 400 kc frequency in

1A1A2 and this is routed to a difference mixer which also receives the oscillator-representative 262.5 to 462.5 kc. The output of the difference mixer, 62.5 kc (representative of the 0-1510/URR frequency switch settings) and the 62.5 kc (representative of the local oscillator) are compared in two phase detectors, #1 and #2. Phase detector #1 produces a small dc output as long as there is a phase difference. When the phase difference is exactly 90° (produced by a 90° shifter), the detector output goes to zero volts. This 0 to dc volts (a) corrects local oscillator 1A10A1 in an electrical correction loop, and (b) brings PHASE DIFFERENCE meter 1M1 (in Sync Indicator Section, refer to paragraph 4-3k) to a zero center scale reading. The 90° phase shifter acts on phase detector #2 to cause its output to go to a maximum voltage when a null (0 volts) is issuing from phase detector #1. When phase detector #2's output voltage is maximum, the relay driver will cause 1A5K1 to de-energize, lighting SYNC INDICATOR lamp 1DS1. (1A5K1 is initially energized when there is a depleted voltage being fed to the relay driver; the relay driver then causes 1A5K1 to be energized in a no sync condition.)

A frequency comparator and a gate in phase detector driver card 1A1A2 prevent a false lock. Due to the wide tuning range on each band there are instances in which the local oscillator, moving towards the correct frequency, can issue a frequency 62.5 kc below the 200 to 400 kc derived from the synthesizer; this would also produce a 62.5 kc output to the phase detectors in phase detector board 1A5. The frequency comparator, therefore, compares the 200 to 400 kc (synthesizer) frequency (f2) and the 262.5 to 462.5 kc (oscillator) frequency (f1) and closes the gate when f2 is greater than f1.

In Reference Signal Generator 0-1510/URR, 1 mc distributor board 3A3 contains circuitry for automatic alternating of 1 mc standard sources (external and internal) in the event of the failure of one of them. When the external standard is used, it is connected at rear interface panel jack and the initial effect is that the output of the internal standard (6W1J10) is phase locked to the external standard. Phase locking occurs as the 1 mc (fe) from the external standard is brought to a phase detector for comparison with the 1 mc (fi) from the internal standard. The dc error from the detector is brought to the internal 1 mc oscillator circuit to correct it (via a temporary memory section, functioning in an external standard failure). The corrected output of the internal standard is then routed to a 1 mc switching logic section. This section is a level sensing and logic system that ensures a 1 mc output through two basic conditions: (1) failure of internal standard and (2) failure of external standard or no external standard used. Working with the 1 mc switching circuitry is a front panel alarm: the STANDARD FAILURE lamps (3DS1 and 3DS2). A signal from the fi or fe level detector lights the INTERNAL or EXTERNAL lamp, respectively, when failure occurs.

The FREQ DIFFERENCE/PHASE COMPARATOR meter 3M1 and switch 3S1 are for checking the internal standard against the external standard. With the switch in the PHASE COMPARATOR position, the dc (representing difference in phase) registers on the meter. With the switch in the FREQ DIFFERENCE position, the dc correction voltage is disconnected from the internal standard and replaced by a fixed reference voltage, thereby freezing the standard. The difference between the two standards is then read as the frequency difference on the meter.

(b) RECEIVING SET AN/URR-63(V)2. - In the space or frequency diversity operation of two synthesized frequency control receivers (AN/URR-63(V)2 Receiving Set) it is necessary to have a common 1 mc standard for stability reference; however, in frequency diversity, two separate (and different) 0.2 to 3.2 mc frequencies are utilized from separate reference signal generators. By attaching at the interface panel, the 1 mc MON output (J9) of receiver A to the 1 MC EXT (J10) of receiver B (see figure 5-2, Rack Cabling Diagram) a common standard is obtained from receiver A with a spare (in receiver B) that will be switched in automatically in the event of the A standard failure. If an external standard is then attached at jack J10 on the interface panel of receiver A, the external standard becomes the common standard with two spares.

(2) OVERALL FUNCTIONAL SECTION TEST DATA (figure 4-7).

(a) TEST EQUIPMENT REQUIRED:
HP-606B, Signal Generator
AN/USM-281A, Oscilloscope
AN/USM-207, Frequency Counter
AN/PSM-4C VOM

(b) PROCEDURE. - To test the synthesizer/phase lock section, ensure that loads are attached at J7 and J6 on the rear interface panel as shown in the Test Setup diagram included in figure 4-7. Set receiver controls as listed under the diagram. Perform test A using the internal 1 mc standard and with no input connection at J10 on the rear interface panel. Test B checks the functioning of the 1 mc switching logic and meter 3M1. Attach the signal generator to J10 on the rear interface panel and set it for 1.000005 mc. Set the PHASE COMPARATOR/FREQ DIFFERENCE switch at FREQ DIFFERENCE and measure test points 3, 3A and 3B. Set the switch at PHASE COMPARATOR and slowly bring the signal generator frequency to 1.0000 mc. The meter needle should return to the center of the dial. Attach the oscilloscope at J9 on the rear interface panel and, observing the EXTERNAL and INTERNAL STANDARD FAILURE lamps, remove the signal generator; the EXTERNAL lamp should light and there should be no interruption of the 1 mc output as indicated on the oscilloscope. Test C checks the pull-in functioning of the phase detector.

An external frequency counter should be used to measure all frequencies presented with figures beyond the decimal point. Measure amplitudes and waveforms of these frequencies with the oscilloscope. Other frequencies may be checked only with the oscilloscope; use the VTVM to measure vdc points.

h. AUTOMATIC TUNING SECTION (figure 4-8).

(1) OVERALL FUNCTIONAL SECTION DESCRIPTION. - Modular units involved in the automatic tuning section are RF Tuner TN-511/URR, Reference Signal Generator 0-1510/URR, and Command Signal Decoder KY-661/URR. The phase

detector 1A5 is the triggering input to the automatic tuning system. Automatic tuning is energized by setting the TN-511/URR BAND SWITCH (1S4) at AUTO, the FUNCTION switch (1A12S1) at SYN and the 0-1510/URR MEGACYCLES switches to the new desired frequency. The last adjustment sets up a mismatch between the 0-1510/URR frequency and the current tuned frequency of the TN-511/URR (as represented on its counter MEGACYCLES display). If the resulting mismatch is within ±1 kc, the phase lock section will correct the local oscillator to this figure without action from the automatic tuning section. However, if the resulting mismatch is more than one kc, detector #2, in phase detector 1A5, (a) disconnects a "virtual ground" signal to motor direction control 4A10 and (b) energizes sync relay 1A5K1 (refer to paragraph 4-3g, Synthesizer/Phase Lock Section). The energized 1A5K1 then completes a path for a -30 vdc supply to the coil of servo control relay 4K4. The energized 4K4 (a) connects a +28 vdc supply to servo loop control 4A11, (b) connects the +28 vdc as a reference to the center tap of a direction control coil of the motor for the TUNE control in motor/generator 1A10A4B1, (c) connects a 115 vac fixed phase supply to a power coil of the motor and (d) connects a 26 vac reference across a servo feedback generator in 1A10A4B1. The motor control signals (the remaining requirement for the motor action) originates from a digital tuning section. The digital tuning section (consisting of boards 4A6 through 4A11 in the KY-661/URR) functions to (a) electrically select a band in the TN-511/URR and (b) supply the motor direction (cw or ccw) and speed controls to bring the TN-511/URR frequency within the capture range of phase detector 1A5. Fine tuning is then accomplished electrically by the phase lock section.

Band selection is derived by the settings of the 0-1510/URR 10 and 1 MEGACYCLES switches represented in BCD's (binary coded digits). From readout wafers on these switches, bits 2 and 1 of the 10 mc code and bits 8, 4 and 2 of the 1 mc code are routed to a band select logic circuit in 4A9. This circuit produces a four bit code for each band and the code produces (via band select relays 4K2 and 4K3) a ground signal (derived from the TN-511/URR BAND SWITCH in AUTO) at the appropriate band select input pin (A, B, C or D) at receptacle 1J4 in the TN-511/URR. This ground, it will be noticed, parallels the ground derived by manually positioning the BAND SWITCH in one of the four band positions in a manual tuning (see figure 4-2).

Motor direction and control is derived from comparing the mismatch of five of six digits (10 mc, 1 mc, 100 kc, 10 kc and 1 kc) between the 0-1510/URR and the TN-511/URR, in BCD form. For the 10 mc digit, a two bit (2 and 1) readout (representing positions 0 to 3) from a wafer on switch 3A19S1 and a similar readout from the 10 mc digit counter in the digital counter section (refer to paragraph 4-3i) are introduced to a digital comparator in 4A6. The error output of the comparator is either an L (tune lower) or an H (tune higher) signal. Likewise for the 1 mc, 100 kc, 10 kc and 1 kc digits, four bit codes (representing positions 0 to 9) are separately compared, resulting with L or H signals. All the L and H signals are brought to an error polarity logic circuit in 4A9. The output of this circuit (the tune direction output) is either an H (tuner high) +2. 5 vdc signal or an L (tuner low) +2. 5 vdc signal to a search generator in motor direction/control board 4A10. The result from the generator is a 60 cps "search" signal with a phase and amplitude proportional to direction and amount of error, respectively, into an operational amplifier in servo loop control board 4A11. The "search" signal is triggered by the previously mentioned "virtual ground" signal from 1A5 via a one-shot circuit in 4A10. The operational amplifier (triggered by gating signal which, in turn, has been generated by the "virtual ground" signal) then puts out a motor control signal with a phase and amplitude proportional to direction and amount of error. This ac signal is connected to a motor control unit in 4A11, via coupling transformer 4T1, and the resulting signal from the motor control unit to the motor in motor/generator 1A10A4B1 causes the motor to move in the prescribed direction at a set speed. The speed is controlled by a "tach feedback" signal from a motor-driven generator in 1A10A4B1. A continuous comparison is made with the amplitude of the "search" signal and a correction is made in the operational amplifier output. When the digital comparator L and H outputs in 4A6, 4A7 and 4A8 reflect no error, both L and H outputs from 4A9 into 4A10 go to +2. 5 vdc; the TN-511/URR is, at this point, digitally tuned to match the 0-1510/URR settings down through the 1 kc component. Before this point is reached, however, the phase locking section (with its capture range of ±1. 0 kc) joins in to complete the fine tuning phase (down through the 0. 1 kc component).

When the phase lock capture range is entered, sync relay 1A5K1 in phase detector 1A5 de-energizes and the virtual ground signal appears. The de-energized relay cuts off the -30 vdc supply to the coil of servo control relay 4K4. Capacitor 4C7 (across the coil), however, holds this relay energized for two seconds before it drops out, maintaining the voltage supplies to drive motor assembly 1A10A4 during this interval. Meanwhile, the arrival of the virtual ground to the search generator in 4A10 results in a stepped decrease in amplitude in the search signal. This amplitude decrease slows the motor speed for the fine-tuning stage. As in the higher speed, the "tach feedback" holds the motor to the lower speed. In addition, the virtual ground signal is also fed to the output gates of the 4A9 tune direction section, thereby closing the gates and shutting off the tune direction signals.

As phase locking continues, a buffered dc loop signal, connected to 4A10 from phase detector 1A5, decreases towards zero volts. At about the ±2-volt point (phase lock) a chopper signal is generated from 4A10, sending the signal to the operational amplifier and the motor movement. Shortly afterwards, the servo control relay drops out, cutting off the motor and generator power supplies. Phase locking of the local oscillator then continues electrically (as described in paragraph 4-3g). When this has been accomplished, the receiver is tuned and locked to the 0-1510/URR frequency settings down through the 0. 1 kc component.

During the 2 second delay interval in which servo control relay 4K4 is held energized (see figure 4-7), an ac filter in the dc loop correction line to the local oscillator is used. This is done in order that the correcting action may take place without nullification by any ac, in the final tuning stage. When sync relay 1A5K1 goes into sync position, +24 vdc triggers the 2 second time delay circuit in AC filter subassembly 1A13. The time delay energizes a relay (1A13K1) which routes the dc correction signal through the filter. When the 2 seconds have elapsed, the relay de-energizes and the ac filter is by-passed. A reverse direction signal is generated when, in rare instances, phase locking does not occur on the first sweep of the tuning mechanism. When the tuning assembly, driven by the motor, encounters the end of its linear travel (at either end), a limit switch (either 1A10A4S1 or 1A10A4S2) alternates its position, sending a signal to the high/low tune direction section in 4A9 and reversing its current direction output.

In order to prevent a continuous searching in the event of a real fault, a time delay circuit in the KY-661/URR shuts down the automatic tuning after twenty seconds. (Sync normally occurs within ten seconds.) A time delay relay (4K1) is normally in its no fault position, furnishing the ground return for the previously mentioned -30 vdc through servo control relay (4K4) coil. At the beginning of the tuning cycle (when sync relay 1A5K1 and servo control relay 4K4 become energized), the latter relay extends a ground signal, setting a 20 second time delay circuit located in stepping switch gating PC board 4A5. Normally, when no fault occurs, a sync condition is reached within ten seconds and the ground is removed by the de-energized 4K4, disabling the time delay. In the event of a fault, however, the twenty seconds run out and the time delay circuit trips relay 4K1 into its fault position. The tripped 4K1 then (a) cuts off the ground return for the -30 vdc going to the 4K4 coil, (b) connects a ground to the -30 vdc power supply PC board 4A12, disabling its output, and (c) connects a ground return for +12 vdc into front panel FAULT lamp 4DS1, lighting the lamp. The de-energized 4K4 disconnects the fixed phase ac voltages to the tuning motor, stopping its movement. However, sync relay 1A5K1 remains in its energized no sync position. Recycling of the automatic tuning may then be accomplished by pushing a reset button (built into the FAULT light). This results in resetting relay 4K1 into its no fault position and 4K1 then reconnects the -30 vdc to the 4K4 coil, re-energizing this relay and reconnecting the motor fixed phase supplies. The motor then resumes movement, guided by the direction signal from the errors sensed in the digital tuning section.

(2) OVERALL FUNCTIONAL SECTION TEST DATA.

(a) TEST EQUIPMENT REQUIRED:
AN/PSM-4C,VOM
AN/USM-281A, Oscilloscope
ME-303/U, VTVM

(b) PROCEDURE - To test the automatic tuning section refer to figure 4-8, Servicing Block Diagram, and figure 4-16, Timing Chart. Set receiver controls as listed under Control Positions for Test in figure 4-8. This arrangement sets up a mismatch, with the TN-511/URR set for 31.9768 mc and the 0-1510/URR set for 06.6897 mc. Automatic tuning of the TN-511/URR to 06.6897 mc starts when the KY-661/URR POWER switch is set to ON. Refer to paragraph 4-3c for usage of timing chart. It is necessary to reset the KY-611/URR POWER switch to OFF and reset the mismatch for each new pair of measurements. Use VTVM to measure vac values. Test A tests all points while the TN-511/URR is being retuned from 31.9768 mc to 06.6897 mc (high-to-low). Test B tests only points 20, 22, 24, 26 and 28 while the receiver is retuned from 06.6897 mc to 31.9768 mc (low-to-high). The fault section may be tested by removing the phase detector PC board 1A5 while tuning is in progress.

i. DIGITAL COUNTER SECTION (figure 4-9).

(1) OVERALL FUNCTIONAL DESCRIPTION. - The digital counter section is entirely contained as a part of frequency readout assembly 1A1 of RF Tuner TN-511/URR. The counter section involves part of input/standard PC board 1A1A1, offset PC board 1A1A3, gate generator/counter pc board 1A1A4, BCD decoders 1A1A5Z1 through 1A1A5Z6 and front panel digital display tubes 1A1DS1 through 1A1DS6. There are two basic modes for operating the counter: (1) the receiver count mode, in which the counter is used to read out the receiver's tuned frequency as an aid in tuning and (2) the external count mode, an auxiliary usage in which the counter will read out a direct count of some external frequency. In the first mode, the counter output also acts as an input for the automatic tuning system.

(a) RECEIVER COUNT MODE. - Figure 4-9 represents subassembly functioning in the receiver count mode; this results from setting the COUNTER MODE switch (not shown) at REC position. The input to this section is the 21 to 37 mc (Fo) from the local oscillator divider 1A8. The 21 to 37 mc range is repeated for each of the four bands. This frequency (representing the frequency for which the receiver is tuned) becomes divided by two and by ten in input/standard 1A1A1 to produce a 1.05 to 1.85 mc frequency (or fo/20) at the input of a gate (Z15B) in offset 1A1A3. The control for gate Z15B originates from inverted gate pulses from a gate generator in PC board 1A1A4; timing from the generator opens the gate (Z15B) for a period of 200 milliseconds (one fifth of a second) and closes it for a period of 20 milliseconds. This results in a gate (Z15B) output consisting of 200 ms bursts of pulses (or the 1.05 to 1.85 million pulses divided by five) alternating with 20 ms intervals of no pulses. This division by five produces a gated output of Fo/100 pulses, which then goes: (a) to the second gate (Z15C) and (b) to an offset network. Control of the second gate (Z15C) is from the offset network. After the first 50,000 pulses pass, the offset network disables gate (Z15C) and the next 50,000 pulses are cut off. The output from the second gate goes to a series of band dividers and gates (controlled by the BAND SWITCH) and through a nandgate to a decade counter in 1A1A4.

The arrangement of the offset network and band dividers in 1A1A3 results in a 20,000 to 320,000 pulse count representing the 2 to 32 mc frequency to which the receiver is tuned. The offset network counts off the first 50,000 pulses of FO/100 pulses and then its output cuts off gate (Z15C) for the next 50,000 pulses. The closing of the second gate (Z15C) results in a total pulse output from this gate of FO/100 pulses minus 50,000 pulses. Time durations for opening and closing the second gate vary with the incoming 1.05 to 1.85 mc frequency; the higher frequencies result in shorter time durations. The resulting pulse count output is passed on to the band dividers and their output gates every 220 milliseconds. Outputs from the dividers are controlled by the setting of the BAND SWITCH (a ground enables the divider output gate). A 2-4 setting results in pulses divided by eight, a 4-8 setting divides them by four; an 8-16 setting divides by two; a 16-32 setting bypasses the dividers entirely.

The decade counter in gate generator/counter 1A1A4 transforms the 20,000 to 320,000 pulses into individual BCD outputs representing the six component digits in the receiver's 02.0000 to 32.0000 mc frequency. The counter is made up of six DCUs (decade counter units) and six BCD storage units. Each DCU counts pulses 1 through 9 issuing a BCD (binary coded digit) code (for 1 through 9) at each pulse to a BCD storage unit. At the tenth count it issues a 0 BCD to its storage unit and a carry pulse to the next DCU; that DCU then issues the BCD for 1 to its BCD storage unit. When the second DCU counts ten, carry pulse results in a 0 BCD to its storage unit and a carry pulse to the third BCD. This is repeated until all of the 20,000 to 320,000 pulses are counted and stored.

The gate generator in 1A1A4 transfers readouts, at intervals, to the six digital readout tubes. The generator, referenced to the 1 mc standard from phase detector driver 1A1A2 (refer to paragraph 4-3d, Signal Detection Section) paces off one count/read cycle with each inverted gate signal. This 220 ms signal (consisting of the 200 ms count pulse and the 20 ms off pulse) is the duration of one count/read cycle. During the 20 ms pulse, two more pulses issue from the gate generator; a read pulse and a reset pulse. The read pulse instantly transfers all the BCD codes in the six storage units over to the six BCD decoders. Each decoder then issues a ground signal to an appropriate pin on its associated digital readout tube and a 0 through 9 digit lights up, heated by the current drawn through it from a +200 vdc supply. The reset pulse resets the offset in 1A1A3 and the six DCUs in 1A1A4 for a new count/read cycle. The BCD code is held on each of the BCD decoders (and the 0 through 9 digit remains lighted in the tube) until the next read pulse in the next count/read cycle. Because the number of pulses entering 1A1A4 are equal to the cps count in the receiver tuned frequency (FX) divided by one hundred the resulting display represents FX down through the 0.1 kc (100 cps) component.

In automatic tuning (refer to paragraph 4-3h), five of the same BCD codes transferred to the decoders (on the read pulse) are also transferred to the digital comparators in Command Signal Decoder KY-661/URR. In automatic tuning, the ground applied to 1A1A3 from the BAND SWITCH is replaced by the ground signal contained in the KY-661/URR band select logic signal.

(b) EXTERNAL COUNT MODE. - Figure 4-10 represents subassembly functioning in the external count mode; this results from setting the COUNTER MODE switch at one of the external count positions (HIGH or LOW). The HIGH position presents the count on the digital display to four places beyond the decimal point; the LOW position shifts the entire display to the left, revealing the fifth digit beyond the decimal point.

In the normal external count mode (HIGH), the frequency takes the same path as does the frequency in the receiver count mode, with two exceptions: the offset and band dividers in 1A1A3 are disabled, and the external frequency (FX) to be measured is connected at TN-511/URR front panel COUNTER MODE INPUT jack 1J13, becomes divided by twenty in 1A1A1 and divided by five by the 200 ms pulse coming into 1A1A3. The frequency (now divided by one hundred) is counted in 1A1A4 in the same manner as is the receiver count mode frequency. It represents the count down through the 0.1 kc component. In either external count mode (HIGH or LOW), a ground is extended from COUNTER MODE switch 1S3 to 1A1A1 and 1A1A3, blocking the receiver count signal, disabling the offset,and disabling the band dividers.

When the COUNTER MODE switch is set at LOW, the frequency into 1A1A4 becomes FX divided by ten rather than FX divided by one hundred. This is accomplished by extending a ground connection at pin 22 of 1A1A1, thereby bypassing the divide-by-ten circuit. The switch in LOW also transfers a ground connection from the decimal point light in the 10 mc digital readout tube to a decimal point light in the 1 mc tube. This causes the decimal point indication to shift one place to the left in the display. Because the number of pulses entering 1A1A4 are equal to the cps count in the input frequency (FX) divided by ten, the resulting display represents FX down through the 0.01 kc (or 10 cps) component. Since there are only six counting and display units, however, the extreme left hand digit (representing the seventh digit) does not become counted or displayed.

(2) OVERALL FUNCTIONAL SECTION TEST DATA.

(a) TEST EQUIPMENT REQUIRED:
AN/PSM-4C, VOM
AN/USM-281A, Oscilloscope
AN/USM-207, Frequency Counter
HP-606B, Signal Generator

(b) PROCEDURE - To test the digital counter section for receiver count mode, see figure 4-9, Servicing Block Diagram. Set receiver controls as listed under Control Positions for Test in figure 4-9. Tests A, B, C and D test the counter for each of the four bands. Use the oscilloscope to measure frequency amplitudes, the digital counter to read frequency and pulse counts, and a VOM to read ground and open points. To test for external count mode, see figure 4-10, Servicing Block Diagram. Set receiver controls as listed under control positions for test in figure 4-10. Tests A and B test the counter for HIGH and LOW modes.

j. AFC SECTION (figure 4-11).

(1) OVERALL FUNCTIONAL SECTION DESCRIPTION. - The AFC section functions in two stages: tuning and operating. In the tuning stage, the operator, having previously tuned and locked the receiver to a specified frequency in synthesized mode (if a synthesizer is not available, tune the TN-511/URR to the frequency to be locked by AFC), switches to AFC and allows the AFC circuit to lock onto the carrier component in the signal. If the transmitted signal is outside the AFC capture range, it may be necessary to de-tune the receiver for capture. In the operating stage, the AFC circuit, having been tuned, commences to track any subsequent drifts in the transmitted signal.

In the tuning stage, the input to the AFC section is the incoming intelligence signal, consisting of a partial or complete carrier component accompanied by upper and lower sidebands. Each sideband contains intelligence. (Refer to Signal Detection Section, paragraph 4-3d.) This signal is sampled at AFC PC board 1A3 by analyzing the carrier component; the sidebands are stripped off by a narrow bandpass filter (the filter passes 249. 925 to 250. 075 kc) and the 250 kc carrier component is applied to two phase detectors The output of a 250 kc variable oscillator is also applied to the detectors via ±45° phase shift circuits; the phase shift creates a phase difference of 90° between the oscillator frequency applied to phase detector #1 and that applied to phase detector #2. When there is a frequency error in the 250 kc from the narrow bandpass filter, as compared to the 250 kc from the oscillator, phase detector #1 issues a dc voltage (dc correction loop). This voltage contains amplitude and polarity representing the amount and direction of the error, respectively, and this is read on PHASE DIFFERENCE meter 1M1. As the receiver is retuned (by tuning the local oscillator), the error becomes progressively smaller until it reaches zero volts and this is indicated by a zero center scale reading on the meter (or sync). The 90° phase difference in phase detector #2, meanwhile, causes its dc output to increase as the output of phase detector #1 decreases. When a null is reached in phase detector #1, phase detector #2 is putting out its maximum voltage and this voltage is sufficient to energize lockup relay 1A3K1. The energized 1A3K1 (a) energizes and locks up sync relay 1A3K3, which, in turn, lights SYNC INDICATOR lamp 1DS1 and (b) completes a correction loop (fast dc loop) back to the 250 kc oscillator and a correction loop via a delay circuit (slow dc loop) back to the local oscillator via ac filter 1A13 (refer to paragraph 4-3d, Signal Detection Section). Thereafter, any frequency deviations in the incoming carrier will be copied by the oscillator, and the AFC circuit is said to be tuned or in sync. During the tuning, front panel AFC TUNE switch is held down, momentarily grounding out the slow dc loop back to the local oscillator in order to prevent counteraction by that loop while tuning the local oscillator. When sync has occurred, the switch is released, so that both loops may act.

In the operating stage, the 250 kc from the oscillator (containing the same frequency deviations as that of the incoming carrier) is applied to subcarrier generator 2A3, to be used as the reference frequency for generating the 250 kc, 243. 71 kc, and 256. 29 kc injection frequencies to the product detectors (refer to paragraph 4-3d, Signal Detection Section). The AFC position of the FUNCTION switch, by means of gate control, blocks the 250 kc derived from the 1 mc source and a divide-by-four circuit. As the injection frequency deviations track with the sidebands entering the product detectors, the resulting audio remains undistorted through transmitter drifts. The fast and slow dc loops work together to keep the incoming carrier within the limits of the AFC hold-in range (±1 kc). The slow dc loop functions to minimize the excursions of the local oscillator in order that the carrier component entering 1A3 may pass through the narrow bandpass filter (or ±75 cps pull-in range). Attack times for the fast and slow dc loops are designed to keep AFC tracking up to a maximum transmitter drift rate of 10 cps.

(2) OVERALL FUNCTIONAL SECTION TEST DATA (figure 4-11).

(a) TEST EQUIPMENT REQUIRED:
HP-606B, Signal Generator
AN/USM-281A Oscilloscope
AN/PSM-4C, VOM

(b) PROCEDURE. - To test the AFC section, see figure 4-11, Servicing Block Diagram. The signal generator, unmodulated, is connected at the antenna input to represent an incoming carrier. Test A checks the overall operation of the AFC. With the AFC lock up as indicated in **Test A, Figure 4-11**, various measurements are taken. Test B checks the range over which the AFC will remain locked in.

k. SYNC INDICATOR SECTION (figure 4-12).

(1) OVERALL FUNCTIONAL SECTION DESCRIPTION. - The sync indicator section is made up of TN-511/URR PHASE DIFFERENCE meter 1M1 and SYNC INDICATOR lamp 1DS1. The meter and lamp are shared by the synthesizer/phase lock section (paragraph 4-3g) and the AFC section (paragraph 4-3j). Only one of these sections are operative at a given time; the FUNCTION switch in SYN or AFC position supplies the +24 vdc power to phase detector 1A5 or AFC 1A3, respectively.

The signals to the meter and to the light are similar for SYN or AFC modes. The signal to the meter is an isolated sample of the polarized dc correction loop going to the local oscillator, and at zero volts when synchronization has been obtained, reads center scale. The triggering signal to the lamp is +24 vdc and appears when the capture range has been entered (just before synchronization).

Meter dial calibrations are in colors to indicate status of synchronization. A reading in the green (center) zone indicates synchronization within the hold-in range. A yellow range reading is a warning that the phase-locking hold-in range is about to be exceeded. A red range indicates loss of phase lock and, in operating conditions, the phase detector dc output disappears, the meter needle returns to zero center scale and the SYNC INDICATOR lamp loses the +24 vdc and extinguishes.

(2) OVERALL FUNCTIONAL SECTION TEST DATA (figure 4-12).

(a) TEST EQUIPMENT REQUIRED:
HP-606B, Signal Generator
ME-303/U VTVM

(b) PROCEDURE. - This section prescribes two separate tests: one for SYN (synthesized) mode and one for AFC mode. Complete directions for the tests are given on figure 4-12.

l. REMOTE TUNING SECTION (figures 4-13 and 4-14).

(1) INTRODUCTION. - The remote tuning section for a single receiver involves Signal Data Converter-Storer CV-2520(V)/URC, Command Signal Decoder KY-661/URR, and stepping switches located on front panel controls in modular units 0-1510/URR, TD-914/URR and TN-511/URR. A teletype message containing tuning information codes is stored and processed through the CV-2520(V)/URC and decoded in the KY-661/URR. Drive signals are then issued, one by one, to each of the stepping switches and the controls are moved to their positions. For the diversity receiver (AN/URR-63(V)2), there are two separate remote tuning sections, one for each half of the receiver; however, one Signal Data Converter-Storer (CV-2521(V)/URC) serves for both receiver halves. The following description is, therefore, divided into that for the AN/URR-63(V)1 and AN/URR-63(V)2 Receiving Sets.

(2) OVERALL FUNCTIONAL SECTION DESCRIPTION OF RECEIVING SET AN/URR-63(V)1 (figure 4-13).

(a) CODE STORAGE. - The Signal Data Converter-Storer CV-2520(V)/URC functions to: (1) convert the teletype serial pulses in each code into parallel pulses (along a time base) and (2) store them, as they arrive, in preparation for command signals from the Command Signal Decoder KY-661/URR. Tuning codes enter the receiver via MEMORY INPUT receptacle 6W3J4 on the rear interface panel. Heavy lines in figure 4-13 represent the path of the code. The five bit codes are made up of pulses of current from a standard keyed teletype loop and include a start pulse at the beginning and a stop pulse at the end. Isolation keyer PC board 5A1 keys a logic voltage in the input of clock timing PC board 5A2 and also serves to isolate the code inputs of an array of AN/URR-63(V)1 Receiving Sets working from a common teletype loop. (Up to fifty receiving sets may be operated from a common loop.) Clock timing PC board 5A2 contains a decade counter circuit that functions as a shift register with ten shifts per character. The start pulse triggers a clock (not shown) in the register. The next five shifts move the first five bits of the character over to parallel shift register 5A3. The next three shifts give the converter-storer the ability to accept transmission of the 6, 7, or 8 level characters. The final shift is generated from pin E of 5A3 from a flip-flop (part of the decade counter register in 5A2) and this serves to stop the clock in 5A2. The first five bits of the code become stored momentarily in the 5A3 register and then move, in parallel pulses, to the five bit memory sections in integrated shift register 5A7. The codes cannot become stored in 5A7, however, until 5A7 receives a gate control signal from shift timing circuit 5A6 (pin T).

The gate control signal is generated by the equipment selector codes (refer to table 1-3) contained in the first two characters of the tuning message. These first two characters are used for selecting one of a possible fifty receivers working from a common teletype loop input (A-1, B-3, E-9, D-2, etc). In each signal data converter-storer, an X-Y matrix in 5A3 is wired so that it will recognize a letter (A, B, C, D, or E). Bits #1 through #5 of the first correct (or incorrect) character then opens (or does not open) the A-E gate. The opening of the A-E gate with the first character and the accompanying common reset pulse (pin U of 5A3) cause a gate in Z10 of 5A3 to open and a "letters clear" signal to be sent to pin 7 of 5A6. The opening of the A-E gate also sets flip-flop Z1 on 5A3. With Z1 set and with the common reset pulse (pin U of 5A3) accompanying the second character (signifying the selection of one receiver in a group of 10) a second gate in Z10 will reset the flip-flop Z1 and will send a "2nd character enable" signal to pin W of 5A4 and 5A5, gating circuits. Additionally, the code of the second character will cause one or the other of two gates in Z11 of 5A3 to operate, generating either a "1-5 select" signal (to pin X of 5A4) or a "6-10 select" signal (to pin X of 5A5).

The #2 to #5 bits of each character are also sent to both gating circuits, 5A4 and 5A5. The operation of both gating circuits is similar, but only one operates for a particular program in accordance with "1-5 select" and "6-10 select" signals. The receiver selection signal and the "2nd character enable" signal will cause Z7 on 5A4 or 5A5 to open. The opening of gate Z7 and the #2 to #5 bits in the second character will cause a "start tune" signal to be sent to one of the start tune gates. However, the start tune gates will be inhibited until an "E" signal (signifying start tune) arrives at pin K of 5A4 or 5A5. The opening of gate Z7 and the #2 to #5 bits of the second character also generate a "letters gate inhibit" signal which is sent to the A-E gate via pin Y of 5A3, inhibiting the gate for the completion of the tuning message. The "letters gate inhibit" signal is also sent to 5A6, shift timing circuit (pin D). The timer then releases the "memory input gate control" signal to pin V of 5A7, opening the gates to the bit memory for the completion of the message (those characters following the first two equipment select characters). The "memory input gate control" signal is also sent to pin N of 5A3 and operates a gate which allows the #1 bits of characters in the rest of the message to be sent to the bit memory on 5A7. At the same time, 5A6 releases an "equipment selected" signal to stunt relay 5K1, energizing it into its correct position. This extends a ground (or "stunt" signal) to each of the other receivers on the common teletype line at pin 3 of 5A2, closing their respective code input gates. 5K1 also generates an "equipment selected" readback signal for that receiver (4A4 pin H).

With the bit memory gates set open, the next code to arrive (the first tuning instructions code) becomes stored. The shift timing circuit 5A6 receives clock pulses on pin W and single shift pulses on pin X for each incoming character. These signals are sent to a gate in Z11 which generates a "single shift" signal for each character. This signal causes the Timer to send a shift pulse to pin 6 of 5A7. The shift pulse moves the bits of the character in parallel by one position towards the Bit Memory output on 5A7. Each successive code is moved into the memory in this manner, moving towards the output to make room for the next code in the input. Maximum capacity of the bit memories is for 32 codes. This continues in this manner until the arrival of the E (or receiver tune) code, at the end of the message. The E code causes a "tune" signal to appear at pin 17 of 5A3. This signal is carried to pin 19 of 5A6, and 5A6 produces an E (1-5) signal at pin S and an E (1-6) at pin 5, which sets a monitor gate in 5A7 and opens a start tune gate in 5A4 or 5A5. A "start tune" signal is then issued to the Decoder. At the same time, the E causes a series of fast shift pulses from pin V of 5A6 to the bit memory sections in 5A7. This moves all the codes toward the output of the sections. When the first bit #1 arrives at its output, a monitor pulse is generated and travels through the monitor gate to pin J of 5A6, stopping the fast shift pulses. It is at this point that the code storage phase is over; the arrival of the "start tune" signal at the decoder and the five code bits at its input precipitate the next phase: the code transfer phase.

(b) CODE TRANSFER. - The "start tune" signal, into the Decoder, serves to ensure that time delay relay 4K1 is in its no fault position, in the event that it has been tripped previously into its fault position. This, in turn, ensures that there is continuity for the ground return of the energizing -30 V to servo control relay 4K4 in the automatic tuning section. 4K1 also supplies continuity for a tune lockup circuit, necessary for the code transfer phase. Referring to table 1-2, Remote Tuning Input Codes, addressal function codes (intended to select a receiver control) start with a 1 as bit #1 and action function codes (intended to position the control) start with a 0. The remote operator, therefore, programs his message in a series of code pairs, each pair consisting of an addressal function code followed by an action function code. Bit #1 in the code is therefore used for furnishing continuity for bits #2 to #5 to the correct portion of the remote tuning section. Bits #2 to #5, in effect a 4-bit code, position the stepping switches.

The stepping switches fall into two main categories: the master stepping switch (4A15S1) and the receiver control stepping switches. An addressal function code moves the master stepping switch to an appropriate position to supply continuity to a selected receiver control for the consequent action function code. The action function code then moves the receiver control stepping switch to it appointed position. A reciprocating action between the decoder and the converter-storer commences with the first code, drawing each code out of memory, positioning a stepping switch, and drawing the next code out, etc. In the first addressal code, the 1 polarity of bit #1 supplies a ground to the drive wafer A pin 3 of 4A15S1, via control gate G1 in 4A5Z2 and SCR (silicone rectifier) diode 4CR3. Bits #2 to #5 of the code are brought to drive input gating pc board 4A4 where there are sixteen four bit code gates representing sixteen function positions for all of the remote tuning stepping switches. The appointed code gate then opens and through wafer A, a notch-homing wafer, supplies a negative pulse to Z2 (G1). When the notch lines up with the code gate, G1 closes, the continuity is interrupted and the rotation stops. The polarity at pin 8 of 4A15 then reverses and (via control gate G1 in 4A5Z2) cuts off 4CR3. The reversed polarity from control gate G1 also causes a "memory advance" signal to be sent back to pin U of shift timing circuit 5A6. 5A6 responds by sending out a single shift pulse from pin V to the 5A7 bit-memories and this shifts the next code to the decoder. The next code, the action function code, contains 0 for bit #1. This causes another control gate (G2 in 4A5Z2) to present receiver stepping switch ground at the anode of SCR 4CR2. This ground is immediately routed (via wafer C of 4A15) to the selected receiver stepping switch actuator coil (shown in figure 4-13 as Reference Signal Generator 0-1510/URR 10 MEGACYCLES switch 3A19). At the same time, the four bit code at the 4A4 code gates has opened a gate and is supplying a negative pulse through the notch homing wafer in the receiver stepping switch to 4A15S1 wafer B. When that switch has homed, its wafer sends back a "receiver switch homed" signal to G2 in 4A5Z2, cutting off 4CR2 and sending the next memory advance pulse back to 5A6. The reciprocating action continues until all character pairs are drawn out of memory and the E code, stored last in the memory, arrives at the decoder. The E code brings the remote tuning cycle to a halt by breaking continuities and shutting off the reciprocating signals. Bit #1 of the E code (10000) is a 1 and ground is again supplied to 4CR3 and the master stepping switch drive. Bits #2 to #5 (0000) open the 4A4 code gate for function position 16 (the 18th consecutive position for 4A15S1) and this homes 4A15S1 to its position 18. In position 18, continuity for a tune lockup circuit furnishing operating voltages to 4A5 gate Z5 is cut off; the continuity had been held by 4A15S1 wafer G through function positions 1 to 15. As a consequence the next memory advance pulse is not sent and no more action occurs.

During the code transfer cycle, at each code transfer, a "decoder inhibit" signal is sent from the converter-storer to the decoder, in order to prevent a "memory advance" signal from issuing from the decoder during a code shift in the memory. The decoder inhibit pulse is generated by the single shift pulse in 5A6. At the beginning of the code transfer cycle, a "memory inhibit" signal is sent from the decoder back to the converter-storer teletype code input to prevent more code storage from a successive message while the code transfer is taking place. The "memory inhibit" signal is generated at the setting of the time delay circuit in 4A5. In remote tuning, this time delay circuit is set at the beginning of the code transfer when wafer C of master stepping switch 4A15S1 goes into its tune lockup positions (1 to 15) from its normal position, 18. When the tune lockup interval is finished, the memory inhibit signal is removed.

Automatic tuning is precipitated by a remote-controlled changing of any of the 0-1510/URR MEGACYCLES switches. This produces the same change at phase detector 1A5 output as locally moving a

MEGACYCLE switch. If the 20-second interval in the 4A5 time delay circuit runs out, either due to a tuning fault or due to the master stepping switch sticking, the time delay circuit (a) trips relay 4K1 into a fault condition and (b) removes the "memory inhibit" signal from the code input gate in 5A2, so that a new message may be sent. In this case, a recycling may be had by sending the two equipment selector codes and another E code. The E code precipitates another "start tune" signal, resetting tripped relay 4K1 back into its no fault condition and reconnecting the -30 vdc path to the tuning servo section.

All of the receiver stepping switch drive wafers are the notch-homing type. Some, however, contain more than one notch. These switches are divided into sections, each section containing identical function positions and time is therefore saved by repeating the notches through one complete revolution, eliminating the need for the switch to perform one complete revolution when going from one setting to another.

(c) CLEAR CODE. - In the event of a realized error by the remote operator during his message transmission, he may send a clear code (before the E is sent); this code erases all previously stored codes in the 5A7 bit memory sections. The clear code (11111) produces a "clear" signal from pin 8 of 5A3 to pin 6 of 5A6. 5A6 then emits a series of fast shift pulses to the memory, moving the codes out of 5A7. Since no E has been sent, pin E of 5A7 does not produce the monitor signal back to 5A6 to shut off the shift pulses. However, when the next code is sent, the removal of the clear signal at pin 6 of 5A6 stops the pulses. Although the dumped codes move into the decoder, there is no code transfer action since there is no "start tune" signal and, consequently, no tune lockup continuity established.

(d) BLANK CODE. - In some types of teletype transmitting equipment,it is possible for the operator to inadvertently send a blank code. This is a start pulse, followed by five 0 bits (or absence of code). A blank (00000) code gate in 5A3, in this case, prevents this code from becoming stored in the memory. A "blank" signal output from pin 18 of 5A3 works through an inverter in 5A6 to inhibit the usual shift triggering pulse from pin V of 5A2 to pin X of 5A6. Since the preceding code into the memory has not been shifted, the blank code does not become stored.

(3) OVERALL FUNCTIONAL SECTION DESCRIPTION OF RECEIVING SET AN/URR-63(V)2 (figure 4-14)

(a) CODE STORAGE. - Teletype code storage occurs in Signal Data Converter-Storer CV-2521(V)/URC (unit 9) in much the same manner as it does for the single receiver unit (CV-2520(V)/URC). The main difference is that there are two integrated shift registers (A and B), each with a separate bit memory section; the bit memories then supply the separate decoders of receivers A and B. An additional PC board, memory half selector 9A9, enables this double functioning. Codes proceed to the input of 9A3 in the same manner as that for the single receiver; however, the equipment selector characters (consisting of the first three characters instead of two) produce a slightly different routing procedure from there on. The third character represents an A or B receiver half (refer to table 1-3); it will be noticed that only bits #2, #3, and #4 of this code contains the significant A or B information. These three bits are analyzed in 9A9 by the A or B select. When A selection is determined by the incoming bits of the third character, "shift pulse gate control" signals are sent to pins 7 and 8 of both 9A7 and 9A8. These signals will inhibit the gate in Z8 of 9A8 (B half) and will open the gate in Z8 of 9A7 (A half). When B is selected,the reverse action will occur. With A selected,the "dual control A" signal from pin 9 of 9A9 will allow the gate in Z11 of 9A6 to open and to send shift pulses to the timer. The timer on 9A6 will operate in the same manner as for a single memory unit. It will generate a "mem A input gate control" signal (to pin V of 9A7) and single shift pulses for each character in the remainder of the incoming message. The incoming bits of each character are shifted in parallel toward the bit memory output of 9A7. The "mem A input gate control" signal is also routed to pin N of 9A3. This signal will allow the Z10 gate of 9A3 to route #1 bit information into the bit memory on 9A7.

With B selected,the "dual control B" signal (to pin M of 9A6) causes the timer on 9A6 to generate a "mem B input gate control" signal on pin N. This signal is sent to pin W of 9A3 where it opens a gate in Z10 allowing #1 bits to be routed to the bit memory on 9A8. The "mem B input gate control" signal is also sent to pin V of 9A8, where it opens up the bit memory for storage of the remainder of the incoming characters. Parallel shifting of bits into memory on 9A8 is identical to that of 9A7; however, with B selected it is the timer on 9A9 that generates the shift pulses (pin X of 9A9) for the B memory half at pin 6 of 9A8.

(b) CODE TRANSFER. - The "tune" signal at pin 17 of 9A3 travels to pin 19 of 9A6 and to pin 2 of 9A9. The results are a monitor gate set in 9A7 and 9A8 and a "start tune" signal to both decoders from 9A4. This enables the remote operator to tune both receivers simultaneously by the same message as well as by two separate messages. Separate routing of the resulting bit 1 monitor (A and B) pulses allow these pulses to occur at different times, precipitating code transfers at different times in the event that one tuning instruction is longer than the other in a common message. Likewise, separate paths for the A and B "memory advance" and "decoder inhibit" signals enable simultaneous tuning. The memory inhibit line is a common one. The first receiver half to undergo code transfer sends back the first "memory inhibit" signal and this acts on 9A2 to block code entry; when both code transfers have concluded, the "memory inhibit" signal at 9A2 is removed.

(4) OVERALL FUNCTIONAL SECTION TEST DATA.

(a) TEST EQUIPMENT REQUIRED:
TT-176,Teleprinter/Keyboard
AN/USM-281A,Oscilloscope
AN/PSM-4C,VOM
DC Loop Supply

(b) PROCEDURE. - To test the remote tuning section in Receiving Set AN/URR-63(V)1, refer to figure 4-13, Servicing Block Diagram, and figures 4-16 and 4-17, Timing Charts. Test input for this section is a teletype code generator attached at pins of the MEMORY INPUT receptacle on the rack rear interconnect panel. The code generator may be either the normal input from the remote operating station or a test teletype code generator. Code inputs for the results shown on the timing chart are stated on the timing chart. The chart is divided into the normal phases encountered in remote tuning with input codes selected to produce the critical voltage changes at each point. Set receiver controls for this test as shown in table 3-3. Refer to paragraph 4-3c for usage of timing chart.

To test the remote tuning section in Receiving Set AN/URR-63(V)2, refer to figure 4-14, Servicing Block Diagram, for the code storage check and the decoder section of figure 4-13 for the code transfer check for a typical receiver half. Use figure 4-17, Timing Chart, for the code storage check.

m. REMOTE READBACK SECTION (figure 4-15).

(1) OVERALL FUNCTIONAL SECTION DESCRIPTION. - The remote readback section for Receiving Set AN/URR-63(V)1 consists of a readback transmitter section in Command Signal Decoder KY-661/URR fed by coded information from readback wafers on the various stepping switches involved in the automatic tuning section (refer to paragraph 4-3m). Besides readback wafer data, the transmitter receives other information regarding receiver status from relays and switches involved in a remote tuning. In Receiving Set AN/URR-63(V)2, the remote readback section for each receiver half is identical to the one in the AN/URR-63(V)1 and each section operates independently, transmitting on a separate channel. The following description is for the AN/URR-63(V)1 with reference to servicing block diagram, figure 4-15.

Readback transmission is in the form of a continuous cycling of teletype codes representing receiver control positions and receiver tuning status. One cycle of the characters is shown in table 1-4; character transmission order is the order in which the codes leave the receiver readback transmitter. The transmission is in readback bit shift register 4A3. When power is applied to the KY-661/URR, 4A3 commences and continues to send out a series of code shift pulses to readback code shift register 4A2 after each character is sent. Upon receopt of each pulse, 4A2 sends out a gating pulse to a source of readback information, generating a code from that source. The character bits travel through common lines to bit shift register 4A3 where the bits are shifted out in serial pulse teletype form (preceded by a start pulse and followed by a stop pulse), to output keyer 4A1.

Referring to table 1-4, it may be seen that character bits representing receiver controls positions are contained in bits #2 to #5 of each character transmission. Characters two through seven also contain additional information, from other sources, in bit #1. In some cases, the information is contained in the bit #1 polarity appearing in the two successive characters. In the case of the 10 mc and 1 mc characters, for example, the gating pulse for 10 mc is routed in two directions: to the 10 mc readback wafer (3A19S1-C) for the four bit readout and an inverted pulse to a tuning/ready/fault logic section in drive input gating PC board 4A4. Four sources of tuning status information are connected to the logic section (in tune process, fault/no fault, sync/no sync, and tune lockup continuity). The resulting bit #1 polarity (1 or 0) appears at pin 16 of 4A4 and becomes transmitted with bits #2 to #5 issuing from 3A19S1-C. The 1 mc gating pulse that follows also splits two ways: to the 1 mc readback wafer and to the tuning/ready/fault logic section. The four sources of information again present bit #1 information. The polarity relationship of bit #1 in the first character compared with that of the second character contains the significant information of the three receiver tuning conditions: tuning, ready, or fault. Characters 8 and 9 contain information only in bit #1. In these two codes, bit #2 is always a 1 in order to prevent the creation of an E code (10000). Character 10 is not used, therefore a blank is sent (00000). This is done to maintain the correct readback order to the remote control station (AN/URA-63). Character 11 contains information only in bits #2 and #3 for mode switch (2A14S1) position information. Characters 12 and 13 each readout the combined positions of two controls each, in the group of four AGC TIME CONSTANT switches. The two bit code from each switch is directed to the four bit common transmission line to be transmitted in one character. Characters 14, 15 and 16 are not used, therefore, blanks (00000) are sent as for character 10. The 17th character in the cycle is a four bit code from a wired matrix located in 4A2. This code represents the receiver's identification in a line of ten possible receivers. The matrix is wired individually for each receiver. The first code to be transmitted, in a cycle, is the E code (10000). This serves to reset and synchronize the readback indicator circuit, at the remote operator's control station, for each cycle. The E code is generated from pin M of 4A2 (in its first shift) as a single bit #1.

(2) OVERALL FUNCTIONAL SECTION TEST DATA.

(a) TEST EQUIPMENT REQUIRED:
TT-176,Teleprinter/Keyboard
DC Loop Supply
AN/PSM-4C,VOM
AN/USM-281A,Oscilloscope

(b) PROCEDURE. - To test the remote readback section, refer to figure 4-15, Servicing Block Diagram, and figure 4-16, Timing Chart. Test input for this section is the specific setting of receiver controls designed to test the readback section, in its various modes, and these settings are included on the timing chart. Reading at the output of the section (the READBACK SIGNAL receptacle on the rack rear interface panel) may be via the normal readback indicator at the remote control site or by using a standard teletype receiver. For this purpose, specific teletype characters that should appear at the output are entered on the timing chart. Refer to paragraph 4-3c for usage of timing charts.

4-4. INTRODUCTION TO SUBASSEMBLY DESCRIPTIONS.

The following information in paragraphs 4-5 through 4-9 is to be used in trouble shooting to locate the faulty component or area within a subassembly. Those subassemblies categorized as non-repairable or factory repairable in the parts list (Section 6) are not described. Generally, a subassembly functions in one specific receiver functional section and the description is in terms of that functional section. Sometimes, however, a subassembly becomes involved in more than one receiver functional section. In this case, the description is divided into sections.

4-5. UNIT 1 SUBASSEMBLY DESCRIPTIONS.

a. 1A1A1 INPUT/STANDARD.

(1) CIRCUIT DESCRIPTION (figure 5-11).

(a) SIGNAL DETECTION SECTION. - The 1 mc standard Z6 is used as the receiver's basic 1 mc source when the receiver is operated in a local frequency control mode (see figure 4-2 and paragraph 4-3d). In this mode, a ground is presented to pin 15, allowing Q6 to conduct and thus apply B+ to Z6. Amplifier Q7 presents the 1 mc (stable to within 1 x 10^6) at pin 14.

(b) SYNTHESIZER/PHASE LOCK SECTION. - Shaping amplifier Q5 and inverter Z1A function to clip the local oscillator 21 to 37 mc frequency (fed in at pin 17) in preparation for introduction to an external frequency comparator circuit. The output appears at pin 21.

(c) DIGITAL COUNTER. - The greater portion of the circuitry appearing on this PC board is utilized by the receiver's digital counter section (see figure 4-9 and paragraph 4-3i). The digital counter is operable in three modes: receiver, external high and external low. In the receiver mode, the same 21 to 37 mc appearing at the output of Z1A (in the synthesizer/phase lock section) is routed through a gated amplifier Z1B, amplified through NOR gates Z2A and Z2B and open nandgate Z2D to become divided by two (Z3) and then by ten (Z4). The output (21 to 37 mc divided by twenty) is routed through gates Z5D and Z5C and appears at pin D. In the external high mode, an external .1 to 35 mc frequency (to be counted) is introduced at pin 25, amplified through Q1, Q2, Q3 and Q4 and appears at the input of gated amplifier Z2C. In the external high mode, a ground is presented at pin 18 and a high at pin 22; this causes the output of Z1C to go high, opening the gated amplifier Z2C,and closing gated amplifier Z1B, thereby blocking the local oscillator 21 to 37 mc. The . 1 to 35 mc then progresses via a nandgate Z2D to the same divide-by-20 route used by the 21 to 37 mc, in the receiver mode. In the external low mode, the . 1 to 35 mc is routed in the same manner as in external high, except that the divide-by-10 circuit Z4 is bypassed. In this mode,a ground appears at pin 22 blocking gated amplifier Z5D and opening the gated amplifier Z5B,bypassing the divider.

(2) TEST DATA. - Test data is given for inputs and outputs of each of the described receiver functional sections in servicing block diagrams 4-2, 4-7 and 4-9. Pertinent tests and measurements are presented in paragraph 5-7.

b. 1A1A2 PHASE DETECTOR DRIVER.

(1) CIRCUIT DESCRIPTION (figure 5-13).

(a) SIGNAL DETECTION SECTION. - The receiver's basic 1 mc source is introducted at pin J, amplified through Q6, Q7, and Q8, and the output appears at pins 10, F and P.

(b) SYNTHESIZER/PHASE LOCK. - The greater portion of the circuitry appearing on this PC board is utilized by the receiver's synthesizer/ phase lock section (see figure 4-7 and paragraph 4-3g). This falls into four categories: a 1 mc selection, a local oscillator divider, a . 2 to 3. 2 mc divider and a frequency comparator.

In the 1 mc selection, two 1 mc sources (external and internal) are introduced at pins 5 and J, respectively: ground extensions from an external switch make the selection. When the receiver is in a synthesized frequency control mode, a ground is presented at pin S, enabling Q3; Q3 applies B+ to Q4 and Q5, allowing the 1 mc from pin 5, Q4 and Q5 to proceed to Q6, Q7, and Q8. (When the receiver is in a local frequency control mode, the ground is removed from pin S blocking this passage and allowing the 1 mc appearing at pin J to proceed through Q6, Q7 and Q8). The selected external 1 mc then issues from pins P, F, and 10. The local oscillator divider consists essentially of Z1, Z2 and Z3; these integrated circuits divide the receiver's 21 to 37 mc local oscillator frequency by 80 and pass it on to an external phase detector via pin W.

The . 2 to 3. 2 mc divider consists essentially of transistor Q9 and integrated circuits Z7, Z8, Z9, Z10 and Z11; this section divides a reference . 2 to 3. 2 mc (appearing at pin 2) into an appropriate frequency within the 200 to 400 kc range for use in the external phase detector. Each sequential divider (one in Z9 and two in Z10) divides by two. The final division is selected by the position of the receiver band selector switch; this 4-position switch presents a ground at one of the band selection pins (A, B, C or D). The ground works through system of inverters and gated amplifiers to disable the output of one divider, for bands 2, 3 or 4. For band 1, all the dividers are disabled and the frequency remains undivided. The resulting frequency travels through three gated amplifiers and a filter network to pin 3.

The frequency comparator consists mainly of Q1, Z4, Z5, Z6 and Q2. There are two inputs to the comparator; f1 and f2. Frequency f1 is the 21 to 37 mc ÷ 80 (or 262. 5 to 462. 5 kc) frequency from the local oscillator divider section and appears at pin 9 of Z3 and the base of Q1; f2 is the 200 to 400 kc frequency from the . 2 to 3. 2 mc divider section and appears at pin 14 of Z11 and the base of Q2. A logic system of inverters in Z4 and nandgates in Z6 controls the polarity of the pin 8 output of Z5 to pin 1 of the gated amplifier (200 to 400 kc control gate) in Z11. If f1> f2, this output goes positive, opening the control gate and allowing the 200 to 400 kc to proceed to the phase detector; if f1 < f2, the output goes negative and the 200 to 400 kc is blocked.

(2) TEST DATA. - Test data is given for inputs and outputs of each of the described receiver functional sections in servicing block diagrams: figures 4-2, 4-7 and 4-9. Pertiment tests and measurements are presented in paragraph 5-8.

c. 1A1A3 OFFSET.

(1) CIRCUIT DESCRIPTION (figure 5-15). - The entire offset circuit functions only in the receiver's digital counter section (see figure 4-9 and paragraph 4-3i). It should be noted that the fast count in function (input on pin 8) is not used in RF Tuner TN-511/URR. The purpose of the offset circuit (in the receiver mode of operation) is to convert the Fo/20 input into an output of Fr/100 pulses, where Fo is the 21 to 37 mc of the local oscillator and Fr is the 2 to 32 mc of the receiver. The relationship of Fo to Fr is dependent upon the receiver's 4-position band switch and the formulae are shown in figure 4-9. The Fo/20 (a 1. 05 to 1. 85 mc frequency) is introduced at pin D and pin 5 of Z15B, a gated amplifier. Controlling the gate is an inverted gate positive logic-level pulse lasting for 200 ms (or 1/5 second). During this pulse, pulses that number 1/5 of the normal cps are allowed through the gate and this, in effect, divides the Fo/20 by five. The result, F0/100 pulses is counted by an offset circuit, consisting of dividers Z16, Z17, Z8, Z7 and Z6, which are arranged in series as to present one pulse at the end of a count of 50, 000 pulses. The pulse, issuing from Z6, works through Z14, Z13 and Z5 to control a gated amplifier (Z15C) at the output of the first gated amplifier (Z15B). This results in an output from Z15C which is equal to Fo/100 pulses minus 50, 000 pulses. This is introduced to a section composed of nandgates, inverters and divide-by-two circuits in Z10, 11, 12, Z2 and 3 integrated circuits. Depending on the position of a 4-position bandswitch in the receiver, a ground is presented at pin P, 13, p12 or 11. This closes the paths of all but one of the four to a nandgate in Z4. For band 4, for Fo/100 pulses minus 50, 000 pulses are divided by eight; for band 3 they are divided by four; for band 2 they are divided by two; and for band 1, the dividers are bypassed and there is no division. The resulting output appears at pin N. At the end of each count cycle, a negative pulse, appearing at pin M, resets the offset via Z13D.

For the external high count mode, the input at pin D is Fx/20, where Fx equals the external frequency being measured. The interted gate pulse succeeds in dividing the Fx/20 by five, making it Fx/100 at pin 6 of Z15. In the external count mode (high or low), a ground is presented at pin 9, disabling the offset section and the band divider section. The disabled offset section holds the second gated amplifier (Z15C) continually open and the Fx/100 proceeds through output nandgate Z4. In the external low count mode, the path of the signal is the same as that of the external high mode, except that the input frequency at pin D is Fx/2. This results in an Fx/10 at the output of the first gated amplifier and it is this frequency that appears at pin N.

(2) TEST DATA. - Test data is given for inputs and outputs of the offset circuitry in servicing block diagram figure 4-9. Pertinent tests and measurements are presented in paragraph 5-10.

d. 1A1A4 GATE GENERATOR AND COUNTING REGISTER.

(1) CIRCUIT DESCRIPTION (figure 5-17). - The entire gate generator and counting register circuit functions only in the receiver's digital counter section (see figure 4-9 and paragraph 4-3i). It is composed of a gate generator and a decade counter (paced by the gate generator). It should be noted that the Fast Count Input function (on pin J) is not used in this RF Tuner, TN-511/URR. The gate generator, using a 1 mc standard frequency as a reference, generates an inverted gate pulse, a reset pulse, and a read pulse at different intervals during one count cycle; it consists of shaping amplifier Q2 and integrated circuits Z1 through Z6, Z19 through Z22 and shaping transistor Q1. The 1 mc reference is brought in at pin 3. The inverted gate pulse appears at pin 9, the reset pulse at pin 3 of Z20A and pin 11, the read pulse at the collector output of Q1.

The decade counter consists of six divide-by-ten circuits (or decade counter units) Z7 through Z12, and six BCD storage units (latching memories) Z13 through Z18. In the receiver count mode, the function of the counter is to translate the 20, 000 to 320, 000 pulse input at pin N (representing the receiver's 2 to 32 mc frequency) into BCD codes for the six digital components in the 02. 0000 to 32. 0000 mc figure. This is accomplished during one count cycle. The pulses from pin N enter the row of series-connected dividers and, at the end of the count cycle, each divider presents the 0-9 count, in BCD code, to the latching memories. The memories immediately present the same BCD codes at their outputs, and these outputs are maintained until the end of the next count cycle. In the external count modes, the incoming pulses (1, 000 to 350, 000, representing the external 0. 1 to 35 mc frequency) take the same course as that of the receiver count mode.

(2) TEST DATA. - Test data is given for inputs and outputs of the gate generator and the decade counter in servicing block diagram figure 4-9. Pertinent tests and measurements are presented in paragraph 5-9.

e. 1A1A5 FREQUENCY READOUT ASSEMBLY.

(1) CIRCUIT DESCRIPTION (figure 5-8). - Figure 5-8 depicts the entire frequency readout assembly (1A1) and shows the schematic wiring of 1A1A5. 1A1A5 is a pc (printed circuit) board assembly supplying printed connections between pc boards 1A1A1, 1A1A2, 1A1A3 and 1A1A4 and providing pc receptacles (1A1A5) XA1, (1A1A5) XA2, (1A1A5) XA3 and (1A1A5) XA4 for the four bands. Also included in the 1A1A5 assembly are (1A1A5) J1 and (1A1A5) J2 receptacles, (1A1A5) Z1 through (1A1A5) Z6 BCD decoders and (1A1A5) XDS1 through (1A1A5) XDS6 sockets for digital indicators (1A1) DS1 through (1A1) DS6. (1A1) A5J1 and (1A1) A5J2 are receptacles for connections external to frequency readout assembly 1A1. 1A1A5 is of a universal design for compatibility with different requirements, including a receiver (GPR-10) containing two extra lower bands: 0. 5 to 1 mc and 1 to 2 mc. Notations "used on GPR-10 only" are for card pin numbers and conductors not used on RF Tuner TN-511/URR. It should be noted that the Fast Count In function (notations appearing on figure 5-8) is not used in the RF Tuner TN-511/URR.

Each BCD decoder takes the BCD code output for a digit of the count from 1A1A4 and transforms it into a ground signal for one of the 0 to 9 pins on a digital indicator, lighting that numeral for the period of one count cycle. In 1A1DS1 and 1A1DS2 indicators, there is a decimal point light, to the right of the numeral display. Normally the point in DS2 is lit, from a ground presented at pin 25 of 1A1A5J1; however, in the external low count mode,the ground is transferred over to pin 50, lighting the DS1 point.

(2) TEST DATA. - Test data is given for inputs and outputs of 1A1A5 for each of the receiver functional sections involved in servicing block diagrams,figures 4-2, 4-7 and 4-9.

f. 1A2 POWER SUPPLY.

(1) CIRCUIT DESCRIPTION (figure 5-19). - Power supply 1A2 converts 35 vac, 13.5 vac, 26 vac and 220 vac into +24 vdc, +5 vdc, -24 vdc and +200 vdc, respectively. The dc output voltages are used to supply several of the receiver's functional sections (in part and in whole) as checked:

		Supply		
Functional Section	+24 vdc	+5 vdc	-24 vdc	+200 vdc
Signal Detection	X		X	
Gain Control	X		X	
Synthesizer/Phase Lock	X	X	X	
Automatic Tuning	X			
Digital Counter (Rec & Ext)		X		X
Digital Counter (Ext only)	X			
Diversity Quieter			X	

In the +24 vdc supply, the 35 vac is rectified through full wave bridge rectifier CR1. This is followed by a series voltage regulator section and a current limiter section. The voltage regulator consists of transistors Q1 and Q2 followed by an externally mounted transistor 1Q3, transistor Q4, VR3 and resistors R7, R8 and R9. The output voltage is sampled in the network formed by R7, R8 and R9 and fed to the base of amplifier Q4. This is amplified in Q4. A reference voltage is developed across VR3. The output from Q4 is a correction voltage and this is fed to the base of 1Q3 via Q2. Q1 is a voltage amplifier and is used to correct for a change in the ac input voltage after it is rectified. This change is amplified and dc coupled to the base of Q2 which controls the series regulator 1Q3, keeping the voltage at +24 vdc. The current limiter consists of transistor 1Q3, resistors R4 and R5, and transistor Q3. The current limiter (or short-proof feature) is in the common current line, in such a way that 1Q3 can only draw a certain amount of current. When the +24 vdc output is shorted, the voltage drop across R4 and R5 turns on switching transistor Q3. Q3 then draws current off the common line, this being the current limiting action. The maximum current may be set by potentiometer R4.

The +5 vdc and -24 vdc supplies are essentially of the same circuit design, with a voltage regulator and a current limiter in each. The -24 vdc supply has a half-wave rectifier (CR7) in the input, in place of the full-wave type. The +200 vdc supply only consists of a half-wave rectifier (CR10) in the input, followed by a ripple filter (C19, R28 and R29).

(2) TEST DATA. - Test data for the 1A2 assembly is included in paragraph 5-4.

g. 1A3 AFC.

(1) CIRCUIT DESCRIPTION (figure 5-21). - The greater part of the receiver's AFC section is housed in PC board 1A3 (see figure 4-11 and paragraph 4-3j). The 250 kc carrier and sidebands enter at pin 4 and narrow bandpass filter FL1. Transistors Q1 through Q6 form a limiter amplifier chain for the 250 kc carrier from the filter to the two phase detectors. Phase detector #1 is composed of transformer T1, diodes CR9 and CR10, capacitors C36 and C40, and potentiometer R44; phase detector #2 consists of transformer T2, diodes CR11 and CR12, capacitors C44, C62 and C46, and potentiometer R57. The 250 kc oscillator is completely contained in assembly Z4; voltage regulators VR1 and VR2, temperature-stabilizing diodes CR16 and CR17, potentiometer R34 and capacitor C26 form its fine tuner. The 250 kc output goes to the external demultiplexer via amplifier Q7, and it is also coupled to the two phase detectors via +45° phase shifters, to produce the 90° phase difference required. The +45° phase shifter is made up of capacitors C37 and C38 and resistors R43 and R45; the -45° shifter is made up of capacitors C41 and C42 and resistors R50 and R52. The limiter amplifier input to each phase detector is at the potentiometer wiper. The output of phase detector #1 appears at TP9 and is brought over to a normally open contact of AFC tune relay K2, via differential amplifier Z2. The output of phase detector #2 appears at TP11; during sync, this maximum voltage output triggers differential amplifier Z1, and Z1's output appears at the base of relay driver Q10. Q10 provides a ground for the coil of lockup relay K1, causing it to energize. The energized K1 then supplies a ground to the coil of sync relay K3; K3 then connects +24 vdc to the external SYNC INDICATOR lamp. Closed contacts on the energized K1 also supply continuity for the dc correction loop back to 250 kc oscillator Z4 (E MOD input) via source follower Q12 and, eventually, to the receiver's local oscillator via an R-C time constant network. When the external AFC TUNE switch is used, the ground appearing at pin 7 of 1A3 causes relay driver transistor Q11 to conduct, energizing tune relay K2. During this interval, the closed contacts of K2 ground out the dc correction loop towards the local oscillator. The time delay circuit for this slow loop is composed of capacitors C52, C53 and C54 and resistors R54 and R69. When AFC is lost, relays K1 and K3 deenergize; K3 then extinguishes the SYNC INDICATOR, and its alarm contacts go into alarm position.

(2) TEST DATA. - Test data is given for inputs and outputs of 1A3 circuitry in servicing block diagram figure 4-11. Pertinent tests and measurements are presented in paragraph 5-15.

h. 1A5 PHASE DETECTOR.

(1) CIRCUIT DESCRIPTION (figure 5-23).

(a) SYNTHESIZER/PHASE LOCK SECTION. - The greater part of circuitry appearing in 1A5 is utilized by the receiver's synthesizer/phase lock section (see figure 4-7 and paragraph 4-3g).

The receiver's 1 mc reference enters at pin B, is amplified through transistors Q8 and Q9 and divided by 16 through integrated circuit Z2. The resulting 62.5 kc is brought over to the two phase detectors via driver Q7 and via a 90° phase shifter section. This 90° section is composed of ±45° phase shifters. The +45° shifter is made up of capacitors C31 and C32 and resistors R38 and R40; the -45° shifter is made up of capacitors C29 and C30 and resistors R35 and R36. The two 62.5 kc signals, now 90° apart in phase, drive phase detectors #1 and #2 via Q6 and Q5, respectively.

Phase detector #2 is composed of transformer T4, diodes CR5 and CR6, capacitors C34 and C60, resistor R43 and potentiometer R61. Phase detector #1 is composed of transformer T3, diodes CR1 and CR2, capacitors C27 and C59, resistor R32 and potentiometer R20. The 62.5 kc input from the difference mixer into each of the phase detectors is at the potentiometer wiper. The difference mixer is made up of transistors Q2 and Q18, transformer T2, resistors R4, R5, R6 and R8, potentiometer R7 and capacitors C61 and C8. The 0.2 to 0.4 mc input to the mixer enters at pin 10 and is brought over to the bases of Q2 and Q18. The 0.2625 to 0.4625 mc input enters the mixer via pin 12, driver Q1 and coupling transformer T1. The output is amplified through transistor Q3 and brought to the potentiometer-wiper inputs of the two phase detectors via rf amplifiers Q4 and Q10. The dc correction output from phase detector #1 is brought out to pins J and M via a low-pass filter consisting of capacitors C17, C18, C19 and C20 and resistors R21 and R22. The output from phase detector #2 (appearing across potentiometer R61) is brought through a high gain dc amplifier consisting of Q11, Q12, Q13 and Q14 to drive sync relay K1 via relay driver Q17. At the sync point, the maximum voltage across R61 causes Q17 to provide a return for +24 vdc through K1, thereby energizing K1. K1 then connects +24 vdc to the external SYNC INDICATOR lamp via pin 3.

(b) AUTOMATIC TUNING SECTION. - The output of phase detector #1 (at pins M and N) is utilized in the receiver's automatic tuning section. This diminishing dc voltage is connected to differential amplifier Z1. Z1, in this case, functions as a buffered connection of the dc loop to the automatic tuning section via pin 4. A virtual ground signal from phase detector #2 is also used. This is taken from the collector of Q13 and routed through Q15 and Q16. At the point of sync, the maximum voltage (appearing across potentiometer R61) causes the output of Q16 (pin 8) to go to ground. During the automatic tuning interval (before sync has been reached) sync relay K1 remains deenergized, supplying a switch closure at pins 1 and 2 of 1A5; this furnishes continuity for the -30 vdc required for automatic tuning. Upon sync, K1 energizes and the -30 vdc supply is cut off, halting the tuning process.

(2) TEST DATA. - Test data is given for inputs and outputs of the 1A5 circuitry in servicing block diagrams figures 4-7 and 4-8. Pertinent tests and measurements are presented in paragraph 5-16.

i. 1A6 SUBSYNTHESIZER.

(1) CIRCUIT DESCRIPTION (figure 5-25). - The subsynthesizer functions only in the receiver's signal detection section (see figure 4-2 and paragraph 4-3d). The receiver's 1 mc enters at pin R of 1A6 and becomes amplified through Q13 and Q14. Integrated circuit Z1 divides the 1 mc in half and the resulting 500 kc (and harmonics) are routed to four band divider sections. Each section has a fine tune circuit to select a harmonic, a divider, and a band logic signal input. The receiver's BAND SWITCH provides a ground (for the band selected) at one of the band logic inputs (a switching transistor) enabling that band-divider section and disabling the other three. In the band 1 section, the harmonic selected is 7 mc. Z6 divides the signal by four (into 1.75 mc) and Z5 divides the 1.75 mc by two (or into 0.875 mc). In band 2, the harmonic is 3 mc, the division (through Z4) is by two and the result is 1.5 mc. In band 3, the harmonic is 5.5 mc, the division (through Z3) is by two and the result is 2.75 mc. In band 4, the harmonic is 10.5 mc, the division (through Z2) is by two and the result is 5.25 mc. The common output from 1A6 appears at pin 10, via emitter follower Q27.

(2) TEST DATA. - Test data is given for inputs and outputs of the 1A6 circuitry in servicing block diagram figure 4-2. Pertinent tests and measurements are presented in paragraph 5-11.

j. 1A7 SECOND IF.

(1) CIRCUIT DESCRIPTION (figure 5-27).

(a) SIGNAL DETECTION SECTION. - The upper portion of figure 5-27 is used in the receiver's signal detection section (see figure 4-2 and paragraph 4-3d). The balanced difference mixer is made up of field effect transistors Q1 and Q2, resistors R3, R5 and potentiometer R4. The input from the subsynthesizer at pin 12 is coupled to the mixer via transformer T1, resistors R1 and R2 and capacitors C2 and C3. The input from the first if amplifier at pin 14 is coupled via capacitor C1. The mixer output is the difference frequency of 250kc and sidebands. This is routed through band-pass filter FL1 to an amplifier chain composed of transistors Q3, Q4, Q7, Q9, Q10 and Q11 and out of 1A7 at pin J. The middle row of transistors works for noise suppression. When an external switch is set for noise suppression, the +24 vdc is connected to pin 15 of 1A7; this activates a noise detector circuit. The circuit, composed of transistors Q12, Q13, Q14, Q15, Q16 and Q17, samples the mixer output via resistor R8 and capacitor C30. The output is coupled through transformer T4 to the noise gate section. This section is composed of transistors Q18, Q19, Q21, Q23 and Q24. The gating output (TP14) is fed to the center tap of T2, in such a way as to cut out the signal during the brief interval of a noise spike. The noise detector gage triggering level is adjustable to various conditions that may exist in an environment. A sample of the detector output is taken from the emitter of Q17 and brought, through potentiometer R74 to dc amplifiers Q20 and Q22. The output of Q22 is fed back to the input of the noise detector transistor bases. This furnishes an adjustment at R74 for the operating level of the detector.

(b) GAIN CONTROL SECTION. - The bottom row of transistors on figure 5-27 functions as a major part of the receiver's high level automatic gain control section (see figure 4-3 and paragraph 4-3e). The AGC detector is composed of transistors Q32, Q33, Q34, Q35 and Q36. The signal sampling is brought into the base of Q32 from the signal detection section output via buffer amplifiers Q29 and Q30. The detector feedback output is switched into the system via the receiver's AGC switch which closes pins C and N on 1A7. With this closure, the feedback is connected (a) to the IF amplifier chain via Q8 and (b) to the external rf amplifier section through pin H of 1A7.

The AGC attenuator sensing section is composed of transistors Q41, Q38, Q39 and Q40. Its input is from the AGC detector output and its output is to the receiver's attenuator insertion relay in the rf section, via pin E of 1A7. When triggered at its input (at the base of Q41) the output goes to ground energizing the external relay located in 1A11. The AGC detector also furnishes the input for the receiver's RF/AFC LEVEL meter (for a RF HIGH level signal). This is taken off the detector output and routed to the external meter via transistor Q37 and pin B of 1A7.

Manual gain control of the receiver is accomplished by a front panel adjustment of a potentiometer external to 1A7. This is a 3-section potentiometer connected to 1A7 in such a way as to adjust the gain setting of two points in the signal detection section amplifier chain and to adjust the gain setting of the external demultiplexer. The positive dc voltage at pin 10 of 1A7 is adjusted through the first section of the potentiometer and brought back through pin M to regulate the amplifier chain via emitter bypass attenuator Q5. The positive and negative voltages at pins 3 and 2, respectively, are brought out to the third section of the potentiometer and the wiper is connected to pin N. This manually adjusted gain voltage input then takes the same path as the aforementioned AGC detector output (to the amplifier chain via Q8). The positive voltage at pin 4 is brought out to the second section of the potentiometer and brought back in at pin F and then to dc amplifier Q31 to furnish the manually adjusted gain for the demultiplexer, via pin 6 of 1A7.

(c) AFC SECTION. - A sample of the output of the signal detection section's 250 kc amplifier chain is brought out for the AFC section of the receiver. This output is buffered through transistors Q27 and Q28.

(2) TEST DATA. - Test data is given for inputs and outputs of 1A7 in servicing block diagrams figures 4-2, 4-4 and 4-11. Pertinent tests and measurements are presented in paragraph 5-14.

k. 1A8 LOCAL OSCILLATOR DIVIDER.

(1) CIRCUIT DESCRIPTION (figure 5-29).

(a) SIGNAL DETECTION SECTION. - The circuitry in 1A8 functions primarily in the receiver's signal detection section (see figure 4-2 and paragraph 4-3d). The 21 to 37 mc signal input from the receiver's local oscillator enters at pin 4 of 1A8. Amplification takes place through transistors Q1, Q2 and Q3. The signal then proceeds through a nandgate combination in Z1 that functions as a distribution amplifier. From there it is routed to four band divider sections, each with its own output. Each section has a band logic signal input. The receiver's BAND SWITCH provides a ground (for the band selected) at one of the band logic inputs enabling that band divider section and disabling the other three. Z2, Z3 and Z4 are divide-by-two integrated circuits. Z4 is in the input of band 1, Z3 is in the input of band 2, and Z2 is for band 3. Z1 is in the input of band 4 and used for coupling. When, for example, band 1 is selected by the BAND SWITCH, the 21 to 37 mc is divided through all three dividers (or divided by 8) to become a frequency in the 2.625 to 4.625 mc range. The inputs to the output band sections for bands 2, 3 and 4 are blocked and all three dividers are enabled. If band 2 is selected, the ground signal at pin M of 1A8 disables divider Z4 so that only Z2 and Z3 dividers are operating; the same signal enables the band 2 output circuitry only. The 21 to 37 mc is divided by four to become a frequency in the 5.25 to 9.25 mc range. For band 3, in the same manner, the 21 to 37 mc is divided by two to become a frequency in the 10.5 to 18.5 mc range. When band 4 is selected, all 3 dividers are disabled and there is no division of the 21 to 37 mc at the band 4 output.

(b) DIGITAL COUNTER SECTION. - The amplified 21 to 37 mc from transistor Q3 is also utilized by the receiver's digital counter section. This output appears at pin 2 via distribution amplifier Z1.

(2) TEST DATA. - Test data is given for inputs and outputs of 1A8 in servicing block diagram figures 4-2 and 4-7. Pertinent tests and measurements are presented in paragraph 5-12.

l. 1A9 FIRST IF AMPLIFIER.

(1) CIRCUIT DESCRIPTION (figure 5-31). - The entire circuitry of 1A9 is used only in the receiver's signal detection section (see figure 4-2 and paragraph 4-3d). There is separate circuitry for each of the receiver's four bands; however, only one band circuitry is enabled at one time. This is dependent upon the position of the receiver's BAND SWITCH. A selected band places a ground on one of the band logic input pins (P, N, E or J); this enables that band circuitry. All bands share a common output path at pin 5 of 1A9.

Taking band 1 as a typical example, the frequency in the 2 to 4 mc range from 1A10A3A1 comes into the balanced difference mixer at pin 15 of 1A9; the injection frequency from the local oscillator divider 1A8 comes in at pin 14. The difference mixer consists of transformer T1, transistors Q3 and Q4, resistors R4, R5, R6, R7, R8 and R10, potentiometer R9, and capacitors C6 and C7. The difference output, always 0.625 mc, is passed through a highly selective crystal-centered bandpass filter FL1, with a width of approximately 12 kc. The 0.625 mc signal is then amplified through transistors Q5 and Q6.

(2) TEST DATA. - Test data is given for inputs and outputs of 1A9 in servicing block diagram figure 4-2. Pertinent tests and measurements are presented in paragraph 5-13.

m. 1A13, AD FILTER

(1) CIRCUIT DESCRIPTION (figure 5-45). - AC filter card 1A13 improves reliability of the dc loop produced in the synthesizer/phase lock section, by eliminating the possibility of oscillator instability due to stray ac pickup. 1A13 has four inputs: (1) +24 vdc (terminal E1) sync trigger signal which is applied upon successful phase lock; (2) +24 vdc B+ (terminal E4); (3) dc loop input (terminal E5); (4) dc loop common (terminal E2). Inputs (3) and (4) are also the

only outputs of 1A13, appearing at terminals E6 and E3, respectively.

Consider the conditions before and after achievement of phase lock: Before phase lock is achieved, the following inputs are presented to 1A13: E1, no input; E2, common side of dc loop; E4, +24 vdc B+; E5, a positive or negative correction voltage of variable amplitude, depending upon direction and magnitude of frequency error. With no input at terminal E1, transistor Q1 is biased off; consequently, there is no path to ground for +24 vdc on the coil of relay K1, and the relay is de-energized. In the de-energized state, K1 does the following: (1) places a short circuit across the RC filter network consisting of C2, C3 and R3; (2) places a short circuit across loop series resistor R4. The filter network is not enabled at this time, because to do so would significantly impair loop response speed. Upon achieving phase lock, however, +24 vdc sync trigger appears at terminal E1; simultaneously, loop voltage (terminal E5) goes to zero. All other inputs remain as they were before phase lock. The application of +24 vdc to terminal E1 begins charging capacitor C1 through resistor R1, the time constant of this RC pair is approximately two seconds. After two seconds, the voltage across C1 is sufficient to saturate transistor Q1, thereby providing a path to ground for the coil of relay K1, allowing it to energize. When K1 energizes, it: (1) removes the short circuit from resistor R4, placing it in series with the dc loop, between terminals E5 and E6; (2) removes the short circuit from the RC filter network of C2, C3, and R3, placing this filter network across the dc loop, immediately after series resistor R4. R4 raises the loop impedance to a value suitable for use by the filter network.

Note

> Once the filter is connected to the loop, response speed of the loop drops somewhat. Although response speed was critical during the automatic tuning process, once the tuner has achieved and maintained phase lock such speed is no longer necessary.

Should phase lock be lost, the +24 vdc sync trigger will disappear from terminal E1, and diode CR1 will effectively short circuit timing resistor R1, allowing timing capacitor C1 to discharge almost immediately. Transistor Q1 will quickly cease conduction, de-energizing relay K1, removing the filter network from the loop, and returning the loop to full response speed. The purpose of the two second time delay in relay activation is to prevent relay chattering under marginal phase lock conditions.

(2) TEST DATA. - Test data for 1A13 is contained on figure 4-7.

4-6. UNIT 2 SUBASSEMBLY DESCRIPTIONS.

a. 2A1 POWER SUPPLY.

(1) CIRCUIT DESCRIPTION (figure 5-52). - Power supply 2A1 converts 35 vac, 21 vac, 13. 5 vac and 26 vac into +24 vdc, +15 vdc, +5 vdc and -24 vdc, respectively. In the +24 vdc supply, the 35 vac is rectified through full wave bridge rectifier CR1. This is followed by a series voltage regulator section and a current limiter section. The voltage regulator consists of transistor Q2 followed by externally mounted transistor 2Q1, transistor Q4, diode CR3 and resistors R7, R8 and R9. The output of transistor 2Q1 is sampled in the network formed by R7, R8 and R9 and fed to the base of Q4. A reference voltage is developed across diode CR3. The output from Q4 is a correction voltage and is fed to the base of Q2. By adjusting potentiometer R8, the dc output voltage may be set. The current limiter consists of resistors R4 and R5 and transistor Q3. The current limiter (or short-proof feature) is in the common current line, in such a way that the base of 2Q1 can only draw a certain amount of current. When the +24 vdc output is shorted, the voltage drop across R4 and R5 turns on switching transistor Q3. Q3 then draws current off the common line, this being the current limiting action. By adjusting potentiometer R4, the maximum current may be set; here it is shown for a 600 ma output. The +15 vdc, +5 vdc and -24 vdc supplies are essentially of the same circuit design, with a voltage regulator and a current limiter in each.

(2) TEST DATA. - Test data for the 2A1 assembly is included in figure 5-52 and paragraph 5-18.

b. 2A2 MONITOR/DIVERSITY.

(1) CIRCUIT DESCRIPTION (figure 5-54).

(a) SIGNAL DETECTION SECTION. - The amplifier section for receiver audio monitoring is included in the 2A2 circuitry (see figure 4-2 and paragraph 4-2d). This section is isolated from the receiver audio line output so that the monitoring will have no effect on the signal output. The audio is brought in at pin 14 to amplifier circuitry consisting of Q1 through Q6. The output at pins 12 and 13 drives the speaker.

(b) GAIN CONTROL SECTION. - Signals from the receiver's low-level AGC system are used to obtain the receiver's low level signal strength reading (see figure 4-4 and paragraph 4-3e). Samples of AGC feedback from if channels SYM, B2, B1, A1 and A2 are brought into a level summing network at pins 3, 4, 5, 6 and 7, respectively. The summing network consists of transistors Q12, Q13, Q14, Q15 and Q16. The output, through diodes CR19 and CR20, is amplified through operational amplifier integrated circuit Z5 and appears at pin S of 2A2.

(c) DIVERSITY QUIETER SECTION. - The AGC comparison circuitry for the receiver's diversity quieter section are included in PC boards 2A2 (see figure 4-6 and paragraph 4-3f). AGC feedback samples from each of the receiver's five IF channels (SYM, B2, B1, A1 and A2) are brought into 2A2 at pins B, C, D, E and F and routed through emitter followers Q7, Q8, Q9, Q10 and Q11. These signals are then fed to five steering diodes, CR5, CR8, CR11, CR14 and CR117 and brought out at pins 8, M, 9, 10 and 11. These five AGC signals (at pins 8, M, 9, 10 and 11) are for the associated receiver's comparison. If, in any one of the comparisons, a receiver's channel IF level (as indicated by the AGC level) is greater than that of the associated receiver, the comparator (which is made up of both receiver's **steering diodes) will send out a quieting signal to the IF** channel in the associated receiver, and the IF channel in the associated receiver will remain inoperative.

(2) TEST DATA. - Test data is given for inputs and outputs of 2A2 in servicing block diagrams figures 4-2, 4-4 and 4-6. Pertinent tests and measurements are presented in paragraph 5-24.

c. 2A3 SUBCARRIER GENERATOR.

(1) CIRCUIT DESCRIPTION (figure 5-56).

(a) SIGNAL DETECTION SECTION. - The greater part of the circuitry in 2A3 is utilized in the receiver's signal detection section (see figure 4-2 and paragraph 4-3d). The basic 1 mc reference signal enters at pin 4 and is amplified through transistors Q1 and Q2. The divide-by-100 section is made up of two decade counters, Z1 and Z2, each one dividing the frequency by 10. The resulting 10 kc is then brought over to the base of Q3. The output of Q2 is also brought to a divide-by-4 circuit Z6, which divides the signal by 2, twice. The resulting 250 kc is amplified separately through Q9 and Q10 and brought out at pins L and 8 of 2A3 to be used in the receiver's A1 and B1 product detectors. The 250 kc signal is also applied via Q11 and Q12 to the emitters of Q13 and Q14.

The 10 kc and the 250 kc are used to produce the 243.71 kc and 256.29 kc required for the receiver's B2 and A2 product detectors. The 10 kc applied to the base of Q3 (a keyed oscillator) causes Q3 to produce harmonics and these, amplified through Q4, are brought to a narrow bandpass filter FL1. FL1 is centered at 6.29 mc. The 6.29 mc output is applied via Q5 and Q6 to a divide-by-1000 section, consisting of decade counters Z3, Z4, and Z5, each of which divides the signal by ten. The resulting 6.29 kc is passed through a low-pass filter consisting of capacitors C24 and C25 and coil L7 and then applied to the bases of Q13 and Q14. This causes Q13 and Q14 to act as mixers, producing sum and difference frequencies from the 6.29 kc and the 250 kc. At the output of Q13 a filter, FL2, passes the sum frequency, 256.29 kc; at the output of Q14 FL3 passes the difference frequency, 243.71 kc. These two frequencies are brought out (the 256.29 kc via Q15 and Q17 and the 243.71 kc via Q16 and Q18) to pins S and P, respectively, to be used in the receiver's A2 and B2 product detectors.

(b) AFC SECTION. - Transistors Q7 and Q8 are used in the receiver's AFC section (see figure 4-11 and paragraph 4-3j). When the receiver's controls are set for AFC mode, a ground appears at pin A and the 250 kc drift-tracking signal appears at pin 6. The ground signal acts through diode CR3 to disable divider Z6, thereby blocking the 1 mc derived, 250 kc; the same ground signal acts through diode CR4 and switching transistor Q7 to enable amplifier Q8. The drift-tracking 250 kc is then substituted for the stable 1 mc derived, 250 kc, as the basis for the product detector injection frequencies.

(2) TEST DATA. - Test data is given for inputs and outputs of 2A3 in servicing block diagrams figures 4-2 and 4-11. Pertinent tests and measurements are presented in paragraph 5-19.

d. 2A4 SYMMETRICAL DEMODULATOR.

(1) CIRCUIT DESCRIPTION (figure 5-58).

(a) SIGNAL DETECTION SECTION, SYMMETRICAL CHANNEL. - The greater part of 2A4 circuitry is involved in the receiver's symmetrical channel signal detection (see figure 4-3 and paragraph 4-3d). The 250 kc signal enters at pin 10 and then through a low-pass filter consisting of coils L1, L2, and L3 and capacitors C1, C2 and C3. From there it divides in two directions: to the envelope detector via Q1 and Q2 and to the product detector via Q4. The envelope detector consists of diode CR1 and its associated components. The product detector consists of transformers T1 and T2, diodes CR2, CR3, CR4 and CR5, and their associated components. Both detectors share a common audio output amplifier chain, consisting of transistors Q9, Q10, Q11, Q12 and Q13 and their associated components. Only one detector is operative at a time and this depends on the position of the demultiplexer's MODE switch, which controls AM/CW selection. A ground from this selector at pin N enables the envelope detector in the AM mode; a ground at pin L enables the product detector in the CW mode.

The 247 to 253 kc BFO (beat frequency oscillator) for the product detector is made up of transistor Q5, diodes CR6, CR7, CR8, CR9 and CR10, capacitors C15, C16, C17, C18, C19, and C20, coil L4, resistors R25, R26, R27, R28, and R29, potentiometers R23 and R24 and an external associated potentiometer (SYM BFO) on the front panel of the demultiplexer. The latter is connected across pins F and J with the wiper connected to pin 6. Varying this potentiometer adjusts the BFO through its frequency range. BFO output is at the emitter of Q8 and is coupled to the product detector via transformer T2.

(b) SIGNAL DETECTION SECTION, METER AMPLIFIER. - The signal for the receiver's output level meter, for all modes, is included in 2A4 (see figure 4-2 and paragraph 4-3d). The audio signal comes in at pin 14, becomes amplified through transistors Q14, Q15 and Q16 and rectified into a dc value by diodes CR11 and CR12. The dc value is brought to pins 12 and 13 for the external meter (LINE DEM METER, 2 M1).

(2) TEST DATA. - Test data is given for inputs and outputs of 2A4 in servicing block diagrams figures 4-2 and 4-3. Pertinent tests and measurements are presented in paragraph 5-23.

e. 2A5 SYMMETRICAL IF/AGC.

(1) CIRCUIT DESCRIPTION (figure 5-60).

(a) SIGNAL DETECTION SECTION. - The larger portion of 2A5 circuitry is involved in the receiver's symmetrical signal detection section (see figure 4-3 and paragraph 4-3d). The 250 kc IF signal enters 2A5 at pin 14 and splits in two directions to a 6 kc band-pass filter FL2, and to a 2.5 kc band-pass filter FL1. The 6 kc filter is driven by Q1 and drives Q3; the 2.5 kc filter is driven by Q2 and drives Q4. Only one filter circuit is operative at a time, and this dependes on the position of the demultiplexer's MODE switch, which controls 6 kc/2.5 kc selection. When the control is in a 6 kc position, a ground at pin 13 enables Q1 and Q3; when the control is in a 2.5 kc position, a ground at pin 12 enables Q2 and Q4. The two filter outputs share a common IF amplifier chain consisting of transistors Q5, Q6, Q7, Q8, Q10, Q11, Q12 and Q13. The signal output to the associated demodulator is via pin 6. A monitor IF is taken out at pin 4.

(b) GAIN CONTROL SECTION. - Gain control for the symmetrical channel is included in

2A5 (see figure 4-5 and paragraph 4-3e). A sample of the signal level is taken at Q12 and routed to the IF amplifiers. The sample is amplified by Q15 and Q16. Rectification to a dc voltage occurs at diodes CR2 and CR3. The dc voltage is then amplified by Q17 and Q18. The receiver's SLOW/MEDIUM/FAST, AGC TIME CONSTANT selector switch selects an output from pin 10, 9, or 8, respectively. The slow time constant circuit is determined by resistors R97 and R98, capacitor C62 and diode CR6; the medium by R95, R96, C61 and CR5; the fast by R93, R94, C60 and CR4. After the selection has been made, the AGC is fed back to the amplifier chain via pin 11, Q14, Q9 and CR1. Instead of AGC, a manually adjusted gain may be brought in at pin 11. Q19, Q20 and Q21 are temperature compensating devices for Q5, Q6 and Q9, respectively. CR7, +12 volt zener diode, regulates the collector voltage of Q15, Q16, Q17, and Q18.

(2) TEST DATA. - Test data is given for inputs and outputs of 2A5 in servicing block diagrams figures 4-3 and 4-5. Pertinent tests and measurements are included in paragraph 5-21.

f. 2A6, 8, 10, 12 AUDIO/DEMODULATOR, ISB.

(1) CIRCUIT DESCRIPTION (figure 5-62).

(a) SIGNAL DETECTION SECTION. - The greater part of this circuitry is used in the receiver's signal detection section (see figure 4-2 and paragraph 4-3d). The 250 kc IF signal enters the PC board at pin 12 and passes through a low-pass filter; the filter consists of coils L1, L2 and L3 and capacitors C1, C2 and C3. From there the signal goes via emitter follower Q1 to the product detector. The product detector consists of transformers T1 and T2, diodes CR1, CR2, CR3 and CR4, and their associated components. The injection frequency is brought in at pin 15; the frequency of this input varies. For 2A6 it is 243.71 kc; for 2A8 and 10 it is 250 kc; for 2A12 it is 256.29 kc. The injection frequency is amplified through Q2 and Q3 and brought into the product detector at transformer T2. The audio output from the product detector is fed through a low-pass filter (C13, C14, C15 and L5) and is amplified through Q4, Q5, Q6, Q7 and Q8. The audio signal is brought out to an audio monitoring line via pin M and to the demultiplexer's LINE LEVEL ADJUST via pin R. After the level control, the audio signal re-enters the PC board at pin 9. Further amplification occurs through Q9, Q10, Q11, Q12 and Q13. The signal is then coupled to the audio output via transformer T3 to pins 6, 7 and 8. A sample of audio is taken before the coupling transformer (T3) and isolated through Q15 for the demultiplexer's LINE-DBM meter (pins 4 and 5). The squelch input on pin B is not used in the Demultiplexer, TD-914/URR.

(2) TEST DATA. - Test data is given for inputs and outputs of 2A6, 8, 10 and 12 in servicing block diagram, figure 4-2. Pertinent tests and measurements are presented in paragraph 5-22.

g. 2A7, 9, 11, 13 IF/AGC, ISB.

(1) CIRCUIT DESCRIPTION (figure 5-64).

(a) SIGNAL DETECTION SECTION. - The greater part of the circuitry is used in the receiver's signal detection section (see figure 4-2 and paragraph 4-3d). The 250 kc carrier and sidebands enter at pin 14 and are amplified through Q1. FL1 is a crystal sideband 3 kc channel filter and differs in the center frequency in 2A7, 9, 11 and 13. The band for 2A7 is centered at 245.405 kc, for 2A9 at 248.355 kc, 2A11 at 251.645 kc, and for 2A13 at 752.595 kc. The selected channel frequencies are amplified through Q2 and delay equalizer FL2. The output of FL2 is then coupled to the IF amplifier chain, consisting of Q3, Q4, Q5, Q6, Q8, Q9, Q10 and Q11. Output is at pin 6. A monitor output is taken out at pin 4.

(b) GAIN CONTROL SECTION. - Gain control for the ISB channel is included in the circuitry (see figure 4-4 and paragraph 4-3e). A sample of signal level is taken at Q10 and routed to an AGC detector. The detector consists of amplifiers Q13, Q14, Q15 and Q16, whose collector voltages are regulated by VR1. Rectification to a dc voltage occurs at diodes CR2 and CR3. The receiver's SLOW/MED/FAST AGC TIME CONSTANT selector switch selects an output from pin 10, 9 or 8, respectively. The slow time constant circuit is determined by resistors R84 and R85, diode CR6 and capacitor C52, the medium by R82, R83, CR5 and C51, the fast by R86, R81, CR4, and C50. After the selection has been made, the AGC is fed back to the amplifier chain via pin 11, Q12, Q7 and CR1. Instead of AGC, a manually adjusted gain may be brought in at pin 11. Q17, Q18, and Q19 act as temperature compensating devices for Q3, Q4 and Q7.

(2) TEST DATA. - Test data is given for inputs and outputs of 2A7, 9, 11, and 13 in servicing block diagrams, figures 4-2 and 4-4. Pertinent tests and measurements are presented in paragraph 5-20.

4-7. UNIT 3 SUBASSEMBLY DESCRIPTIONS.

a. 3A2 POWER SUPPLY.

(1) CIRCUIT DESCRIPTION (figure 5-73). - Power supply 3A2 converts 15 vac, and 35 vac into +5.4 vdc, +16 vdc and +25 vdc, respectively. The dc output voltages are used to supply the receiver's synthesizer/phase lock section. In the +5.4 vdc supply, the 15 vac is rectified through full wave bridge rectifier CR3. This is followed by a series voltage regulator section and a current limiter section. The voltage regulator consists of transistor Q9 followed by an externally mounted transistor 3Q3, transistor Q12, diode VR6 and resistors R24, R25 and R26. The output of transistor 3A3 is sampled in the network formed by R24, R25 and R26 and fed to the base of comparator Q12. A reference voltage developed is across diode VR6. The output from Q12 is a correction voltage and is fed to the base of series regulator Q10. Q9 is a voltage amplifier and is used to correct for a change in the ac input voltage after it is rectified. This change is amplified and dc coupled to the base of Q10 controls the series regulator 3Q3, keeping the voltage at +5.4 vdc. The current limiter consists of resistors R21 and R22 and transistor Q11. The current limiter (or short-proof feature) is in the common current line, in such a way that the base of 3Q3 can only draw a certain amount of current. When the +5.4 vdc output is shorted, the voltage drop across R21 and R22 turns on switching transistor Q11. Q11 then draws current off the common line, this being the current limiting action. By adjusting potentiometer R22, the maximum current

may be set; here it is shown for a 1. 3 amp output. The +16 vdc and +25 vdc supplies are essentially of the same circuit design, with a voltage regulator and a current limiter in each.

(2) TEST DATA. - Pertinent test and measurements for 3A2 are presented in paragraph 5-26.

b. 3A3 1 MC DISTRIBUTOR.

(1) CIRCUIT DESCRIPTION (figure 5-75). - Circuitry in 3A3 is used in the receiver's synthesizer/phase lock section only (see figure 4-7 and paragraph 4-3g). When using a 1 mc standard source external to the receiver, the internal 1 mc standard in the 0-1510/URR becomes phaselocked to the external standard. The external standard (fe) comes in at pin 21; the internal standard (fi) enters at pin 2. Amplification takes place for fe through Q1, Q2 and Q3 and for fi through Q4, Q5 and Q6. Nandgates Z1D and Z2D, function as clippers. The 1 mc fe and fi are each divided by two through the two halves of Z6; the two resulting 500 kc signals are then brought over to nandgate Z5A. The output of Z5A is 500 kc exactly with a maximum voltage amplitude, when the two inputs are exactly in phase. When the inputs are out of phase, the output amplitude diminishes. This is changed into a dc voltage through a filter, consisting of coil L5 and capacitors C12 and C13, and brought over to pin 3 of offset amplifier Z8. The pin 2 input of Z8 receives a positive dc voltage. Z8 functions as a differential amplifier, providing an offset of the error voltage produced by the filter (C12, C13 and L5) to a value suitable for use by 1 mc std 3A1.

The output of Z8, an offset dc voltage, is brought over to Q8 and Q27. Q8 functions as a switch and Q27 is a high impedance source follower and memory, when input from Q8 is absent. From Q27, the dc output is brought out to pin 17 of 3A3 and used to correct the 1 mc standard (fi) in 3A1. The corrected 1 mc then enters at pin 2 of 3A3 to close the correction loop. The dc error output from the junction of L5 and C13 is brought over to pin 3 of meter amplifier Z7. Pin 2 of Z7 receives a positive dc voltage. Z7 compares the error output of the filter (C12, C13 and L5) with a reference voltage, and functions as a differential amplifier, whose output is the difference between the reference signals. The output of Z7 is brought out to pin M of 3A3 to operate an external meter, the dial of which is used to indicate phase differences between fi and fe.

A steady positive voltage of approximately +4 vdc is brought out at pin 15. A frequency difference reading (between fi and fe) will be indicated on the same meter. The PHASE COMPARATOR/FREQ DIFFERENCE switch on the front panel of the 0-1510/URR is set to the FREQ DIFFERENCE position for this reading. This switch disconnects the correction voltage to the 3A1 1 mc standard and replaces it with a steady voltage. The 1 mc (fi), now entering pin 2 of 3A3, will not be corrected, since the phase-lock loop is disabled. The frequency difference voltage appears at the same spot as does the phase difference voltage (at the output of Z5A). The resulting dc voltage from the filter then takes the same path to the external meter; the meter includes calibration markings for both frequency difference and phase difference.

Level sensing circuits are used for warning signals of EXTERNAL/INTERNAL STANDARD FAILURE. A sample of fe is taken from the output of Q1 and fi from the output of Q4; these samples are fed into two separate level sensing circuits. The fe circuit consists of Q9, Q10, Q11, Q12, Q13, Z1A, Q14 and Q15; the fi circuit consists of Q16, Q17, Q18, Q19, Q20, Z2A, Q21 and Q22. Failure of fe causes the collectors of Q14 and Q15 to switch to ground and this warning signal is brought out at pin 20 of 3A3; when fi fails, Q21 and Q22 collectors and pin 4 switch to ground. Information from the level sensing circuits is also used in the 1 mc switching logic output. Level sensing signals for fe are brought through Z1B to Z1C gate. Level sensing signals for fi are brought through Z2B to Z2C gate.

Fe is applied to pin 10 of Z1C gate and fi is applied to pin 10 of Z2C gate. If fe fails or if its amplitude at input pin 21 falls below 0. 7 volts rms, Z1C gate will close and fe will not appear at pin 8 of Z1C. The failure of fe also causes Z3C to go high, opening Z3D and allowing fi to proceed through Z3D. If the output of fi fails or if its amplitude decreases below 0. 7 volts rms, the fi level sensing signal at Z2C will block fi from proceeding. The failure of fi also causes a high logic level at pin 13 of Z3D, which will allow fe to proceed to the output.

In the event of either fe or fi failure, the phase-lock loop is disabled. When failure occurs, either Z1B or Z2B causes output of Z3A to go high, cutting off the operation of Q8 and Q27 via Z5D and Z7. The following truth table illustrates various gate actions under conditions of internal standard operation, external standard operation, and operation when both standards are functioning:

Output of	Internal Std. Operation	External Std. Operation	Internal and External Std. Operation
Z1C	H (high logic level)	fe	fe
Z1B	L (low logic level)	H	H
Z2B	H	L	H
Z3A	H	H	L

Output of	Internal Std. Operation	External Std. Operation	Internal and External Std. Operation
Z3B	L	fe	H
Z3C	H	fe	H
Z3D	fi	fe	fi
Z2C and Z4	fi	H	fi

The 1 mc output from the 1 mc logic switching circuits is applied to Q23 via potentiometer R89. The emitter output of Q23 feeds three separate 1 mc stages: Q24, Q25 and Q26. The output of Q25, at pin 9, is applied to card 1A1A2 in the counter section of the TN-511/URR via 3J6, 1 MC OUT jack. The output of Q24, at pin 7, is applied to MONITOR jack 3J7. The output of Q26, at pin 12, is applied to 3A4 pin 12 and 3A5 pin 13.

(2) TEST DATA. - Test data is given for inputs and outputs of 3A3 in servicing block diagram figure 4-7. Pertinent tests and measurements are presented in paragraph 5-27.

c. 3A4 1 MC SELECTOR.

(1) CIRCUIT DESCRIPTION (figure 5-77). - The circuitry of 3A4 is used only in the receiver's synthesizer/phase lock section (see figure 4-7 and paragraph 4-3g). A 1 mc signal is introduced at pin 12 and is applied to three stages: Q1, Q2 and Q3. The signal appearing at the emitter of Q3 has been purposely distorted to provide an output rich in harmonics of the one megacycle input. This output is applied simultaneously to six crystal-amplifier circuits: Y1 at 11 mc; Y3 at 14 mc; Y5 at 10 mc; Y7 at 12 mc; Y9 at 16 mc; and Y11 at 17 mc. The crystals act as high Q bandpass filters, allowing only the desired harmonics of 1 mc to be amplified. Y1 frequency, 11 mc, utilizes tuned amplifiers Q4, Q5, Q6 and Q7. Crystal Y2 is used to insure a clean 11 mc output at pin 19. Y3 frequency, 14 mc, utilizes tuned amplifiers Q8, Q9, Q10, Q11 and Q12. Y4 is used to insure a clean 14 mc output to Z2. The 14 mc is then divided by ten, through decade counter Z2, becoming 1.4 mc, and this frequency is brought out at pin 17 via emitter follower Q13. Y9 frequency, 16 mc, utilizes tuned amplifiers Q24, Q25, Q26, Q27 and Q28. Crystal Y10 is used to insure a clean 16 mc output at pin 5. Y11 frequency, 17 mc, utilizes tuned amplifiers Q29, Q30, Q31 and Q32. Crystal Y12 is used to insure a clean 17 mc output at pin 21.

The 16 mc from Q28, together with similarly generated 10 mc and 12 mc serve to produce the 3, 4, 5 or 6 mc as selected by a two bit code from the 10 MEGACYCLES switch on the front panel of the 0-1510/URR. The 10 mc from crystals Y5 and Y6 and tuned amplifiers Q14, Q15, Q16, Q17 and Q18 is fed via Z3 to Z5, where it is divided by two (to become 5 mc). If the 0-1510/URR's 10 MEGACYCLES switch is set at 2, the two bit code at pins A and B of 3A4 will be 0 and 1 (or ground and open), respectively. These pins lead to binary decoder Z1. Outputs from Z1 lead to the two quadruple nandgate circuits, Z3 and Z4. The code for 2 will then produce the proper signal to the nandgates, from Z1, to cause 5 mc to be issued from 3A4 pin 2; the code for 3 will cause 12 mc to become divided by 2 in Z5, causing 6 mc to be issued from 3A4 pin 2. In like manner, the 16 mc from Q28 is brought over to Z6 via Z4. Z6 may divide its input signal by 4. The input signal to Z6 is controlled by Z3 and Z4. The 4 mc is derived at pin 2 by the appropriate code at pins A and B, working through Z1 to control Z3 and Z4 and allowing Z6 to divide the 16 mc by four. The 3 mc is likewise derived from 12 mc.

(2) TEST DATA. - Test data is given for inputs and outputs of 3A4 in servicing block diagram figure 4-7. Pertinent tests and measurements are presented in paragraph 5-28.

d. 3A5 100 KC SELECTOR.

(1) CIRCUIT DESCRIPTION (figure 5-79). - Circuitry in 3A5 is used in the receiver's synthesizer/phase lock section only (see figure 4-7 and paragraph 4-3g). The 1 mc, used to derive the 16.1 through 16.9 mc frequencies, enters 3A5 at pin 13 and is amplified by Q1 and Q2. The 1 mc is then divided by ten through decade counter Z1, and the resulting 100 kc is distributed through emitter-follower Q3 to the nine tuned amplifier chains. The 100 kc output of Q3 is rich in harmonics; the resonant frequency of the crystal at the input of each chain selects its harmonic. For instance, in the case of the 16.1 mc chain, 16.1 mc crystal Y9, in the input of tuned amplifier Q20, selects that frequency. Further products are eliminated by additional tuned stages in Q21, Q22 and Q23 and 16.1 mc crystal Y10. The output appears at pin 10 of 3A5.

(2) TEST DATA. - Test data is given for inputs and outputs of 3A5 in servicing block diagram figure 4-7. Pertinent tests and measurements are presented in paragraph 5-29.

e. 3A6, 7 MATRIX DISTRIBUTOR.

(1) CIRCUIT DESCRIPTION (figure 5-81). - Circuitry in 3A6 and 3A7 is used in the receiver's synthesizer/phase lock section only (see figure 4-7 and paragraph 4-3g). From the input signals (16.0 mc through 16.9 mc) two frequency outputs are selected. The outputs appear at pins B and Z. The frequencies selected at each output is controlled by a separate four bit code input from the 0-1510/URR's MEGACYCLES selector switches (pins C, D, E and F and pins U, V, W and X).

A typical selection is described for the 16.1 mc frequency with a code input at pins C, D, E and F. The 16.1 mc frequency, appearing at pin 4, becomes amplified through Q3 and Q4 and brought to pin 9 of positive nangate Z5C and pin 5 of positive nangate Z6A.

gate is positive at this time, the gate will open and the 16.1 mc will pass through. Assuming that the code is correct at pins C, D, E and F, binary decoder Z1 will send a positive charge to pin 10 of Z5C opening the gate. The frequency then passes through another gate Z5B (with its input wired to function as an amplifier) and similarly through an amplifier Z15B. Q21 is an additional amplifier and Q22 functions as an emitter-follower to drive the next stage. The selection of the two output frequencies from 3A6 (pins Z and B) is controlled by the four bit code inputs from the 00.0001 and 00.0010 MEGACYCLES selector switches, respectively. The selection of the two output frequencies from 3A7 (pins B and Z) is controlled by the four bit code inputs from the 00.0100 and 00.0010 MEGACYCLES selector switches, respectively.

(2) TEST DATA. - Test data is given for inputs and outputs of 3A6 and 3A7 in servicing block diagram figure 4-7. Pertinent tests and measurements are presented in paragraphs 5-30 (3A6) and 5-31 (3A7).

f. 3A8 MATRIX DISTRIBUTOR.

(1) CIRCUIT DESCRIPTION (figure 5-83). - Circuitry in 3A8 is used in the receiver's synthesizer/phase lock section only (see figure 4-7 and paragraph 4-3g). From the input signals (16.1 mc through 17.0 mc) a single output frequency is selected for the common output pin M. The frequency selected is controlled by a four bit code input from the 1.0 MEGACYCLES selector switch (pins F, H, L and K).

A typical selection is described for the 16.1 mc frequency. The 16.1 mc, appearing at pin 16, becomes amplified through Q21 and Q20 and brought over to pin 12 of a positive nandgate Z4D. If the code at pins F, H, L and K is correct for 16.1 mc, binary decoder Z12 will place a positive charge at pin 13 of Z4D and the gate will open, allowing the 16.1 mc to pass through. The two inputs to gate Z4A (pins 1 and 2) are wired together and Z4A then performs as an amplifier. This is followed by a 16.1 mc crystal, Y7, and amplifier Q19. Here the 16.1 mc signal comes out on a common line to emitter follower Q31 and then to pin M.

(2) TEST DATA. - Test data is given for inputs and outputs of 3A8 in servicing block diagram figure 4-7. Pertinent tests and measurements are presented in paragraph 5-32.

g. 3A9, 10, 11 MIXER/AMPLIFIER.

(1) CIRCUIT DESCRIPTION (figure 5-85). - Circuitry in 3A9, 3A10 and 3A11 is used in the receiver's synthesizer/phase lock section (see figure 4-7 and paragraph 4-3g). The 11 mc enters the sum mixer via pin 3 and amplifiers Q8 and Q9; the injection frequency enters the sum mixer via pin 2 and amplifiers Q1 and Q2. The injection frequency for 3A9 is 1.4 mc, for 3A10 1.400 to 1.409 mc and for 3A11 1.4000 to 1.4099 mc. The mixer consists of field-effect transistors Q3 and Q4 with tuned transformer T1 in the output to select the sum frequency. Additional tuned circuits follow with amplifiers Q5, Q6 and Q7, and the signal is applied to a second sum mixer. This mixer is made up of Q10, Q11 and transformer T2. The injection frequency for the second mixer (16.0 mc through 16.9 mc) is selected by a MEGACYCLES switch. This frequency is brought in at pin 7, amplified through Q18 and Q19, divided by 10 through decade counter Z1 and applied to the mixer via emitter follower Q20. The sum frequency appearing at the output of T2 becomes amplified through Q12, Q13, Q14, Q15 and Q16, divided by ten through decade counter Z2 and leaves the circuit at output pin 18 via emitter follower Q17. The output frequency ranges will be: for 3A9 1.400 to 1.409, for 3A10 1.4000 to 1.4099, for 3A11 1.40000 to 1.40999.

(2) TEST DATA. - Test data is given for inputs and outputs of 3A9, 3A10 and 3A11 in servicing block diagram figure 4-7. Pertinent tests and measurements are presented in paragraphs 5-33 (3A9), 5-34 (3A10), and 5-35 (3A11).

h. 3A12 MIXER/AMPLIFIER.

(1) CIRCUIT DESCRIPTION (figure 5-87). - Circuitry in 3A12 is used in the receiver's synthesizer/phase lock section only (see figure 4-7 and paragraph 4-3g). The 11 mc enters the sum mixer via pin 3 and amplifiers Q8 and Q9; the injection frequency (1.40000 to 1.4099 mc) enters the sum mixer via pin 2 and amplifiers Q1 and Q2. The mixer consists of field-effect transistors Q3 and Q4 with tuned transformer T1 in the output to select the sum frequency. Additional tuned circuits follow with amplifiers Q5, Q6 and Q7 and the signal is applied to second sum mixer. This mixer is made up of Q10, Q11 and transformer T2. The injection frequency (16.0 through 16.9 mc) is selected by a MEGACYCLES switch. This frequency is brought in at pin 7, amplified through Q18 and Q19, divided by ten through decade counter Z1 and applied to the mixer via emitter follower Q20. The sum frequency appearing at the output of T2 becomes amplified through Q12, Q13, Q14, Q15 and Q16, and applied to positive nandgate assembly Z2. Z2 standardizes and limits the output. The signal is then brought over to 3A12 output pin 18, via emitter follower Q17. The output frequency range will be 14.00000 to 14.09999 mc.

(2) TEST DATA. - Test data is given for inputs and outputs of 3A12 in servicing block diagram figure 4-7. Pertinent tests and measurements are presented in paragraph 5-36.

i. 3A13 FINAL MIXER/OUTPUT.

(1) CIRCUIT DESCRIPTION (figure 5-89). - Circuitry in 3A13 is used in the receiver's synthesizer/phase lock section only (see figure 4-7 and paragraph 4-3g). The 3, 4, 5 or 6 mc from 3A4 enters the sum mixer via pin 3 and amplifiers Q1 and Q2; the injection frequency (14.00000 to 14.09999 mc) enters the sum mixer via pin 7 and amplifiers Q5 and Q6. The mixer consists of field-effect transistors Q3 and Q4 with tuned transformer T1 in the output to select the sum frequency. In the output of T1 is a tuned circuit composed of capacitors C14, C15, C16, C17, C18 and C19, coil L3, diodes VC1 and VC2, and resistors R14 and R15.

The voltage tuned circuit is tuned for four possible frequency ranges, by a two bit code entering at pins 15 and 16 of 3A13. The four ranges are (1) 17.00000 to 17.09999 mc, (2) 18.00000 to 18.09999 mc, (3) 19.00000 to 19.09999 mc and (4) 20.00000 to 20.09999 mc; the four two bit codes are selected by the 10 MEGACYCLES switch. A code is applied to binary decoders Z1 and Z2. The Z1 output is applied to positive nandgate assembly Z3. The output of Z3 works through switching transistors Q24 and Q25, and the output of Z2 works through switching transistor Q26. The switching transistors (Q24, Q25 and Q26) control the selection of VC bias being fed to the voltage tuned circuits. A 25 vdc centers 3A13 at pin 2, and is routed via series regulator Q22 to two voltage divider circuits. The output of Q22 is sampled in the network formed by R79, R80 and R81, and this sample is fed to the base of Q23. Q23 senses any output voltage change and acts to correct for it by controlling the conduction of Q22. Q21 senses a change in the input voltage and acts to correct for it by controlling the conduction of Q22. The four voltages (VC bias) change the voltage tuned circuit's capacitance value and frequency range. The resulting frequency is then amplified through Q7, Q8 and Q9 and brought to the difference mixer Q10. The other input into Q10 (16. 1 to 17. 0 mc) is selected by the 1. 0 MEGACYCLES switch. This frequency is brought in via pin 17 and amplifiers Q27 and Q28. The 0. 20000 to 3. 20000 mc difference frequency is then amplified through Q11, Q12, Q13, Q14, Q15 and Q16 and is brought to output pin 21. A second output is brought out via amplifiers Q17 and Q18 to pin 19. A sample of the signal is taken from the base of Q18, amplified by Q19, rectified by CR1, and fed to the dc emitter follower Q20. The output of Q20 (AGC) controls the gain of Q27, keeping the output of 3A13 at a constant amplitude.

(2) TEST DATA. - Test data is given for inputs and outputs of 3A13 in servicing block diagram figure 4-7. Pertinent tests and measurements are presented in paragraph 5-37.

4-8. UNIT 4 SUBASSEMBLY DESCRIPTIONS.

a. 4A1 OUTPUT KEYER.

(1) CIRCUIT DESCRIPTION (figure 5-97). - Circuitry in 4A1 is used in the receiver's remote readback section only (see figure 4-15 and paragraph 4-3m). Codes in serial pulse teletype form are received at pin V: a mark as a 1, and a space as a 0. During a space interval, pin V is connected to an external ground; during a mark interval the ground is disconnected. Relay K1 is a voltage operated polar relay, connected to an external -12 volts, in such a way as to bias it in the mark position. When a space ground pulse arrives at pin V, the relay is drawn into its space position. High and low level output pins are available for the two types of teletype loop operated sending equipment: 60 ma (high level) and 20 ma (low level) current loops.

(2) TEST DATA. - Test data for the 4A1 assembly is included in timing chart figure 4-16.

b. 4A2 CODE SHIFT REGISTER.

(1) CIRCUIT DESCRIPTION (figure 5-99). - Circuitry in 4A2 is used in the receiver's remote readback section only (see figure 4-15 and paragraph 4-3m). Remote readback timing chart figure 4-16 best describes the operation of this circuit. Pin 2 is the input through which code shift pulses are received. Flip-flops Z1 through Z5 function as a shift register. Each gate, in negative quadruple andgates Z6 through Z9, is connected to the shift register so as to open (from four negative inputs) in the following order:

Order	Assembly	Output Pin
1	Z6	10
2	Z6	11
3	Z6	12
4	Z6	1
5	Z7	10
6	Z7	11
7	Z7	12
8	Z7	1
9	Z8	10
10	Z8	11
11	Z8	12
12	Z8	1
13	Z9	10
14	Z9	11
15	Z9	12
16	Z9	1

It may be seen, by referring to the timing chart, that bit #1 of the E code is produced at the beginning of the readback cycle when Z5 goes from set to reset (or when pin 11 of Z5 goes from positive to negative). This charge travels through diode CR3 and, becoming inverted through quadruple inverter Z10, leaves 4A2 via pin M as a positive charge.

A diode group, consisting of CR4, CR5, CR6 and CR7 forms the four bit receiver identification (1 through 10) code as the last code in the readback cycle. Each bit line contains a diode and terminates at an output pin of 4A2. Pins B, C, 3 and D are bits #2, #3, #4 and #5 of the five bit code to be transmitted. Diode arrangement is different for each of the ten receivers. The presence of a diode creates a 1 logic; absence of a diode creates a 0 logic. This code is transmitted when pin 11 of Z5 goes to ground. Pin E is not used in receiver operation.

(2) TEST DATA. - Test data for the 4A2 assembly is included in timing chart figure 4-16.

c. 4A3 BIT SHIFT REGISTER.

(1) CIRCUIT DESCRIPTION (figure 5-101).- Circuitry in 4A3 is used in the receiver's remote readback section only (see figure 4-15 and paragraph 4-3m). Remote readback timing chart figure 4-16 best describes the operation of this circuit. When +12 vdc and -12 vdc are applied (from the KY-661/URR's power supply) to pin 20 and 4, respectively, timing generator Z1 commences to issue a series of regularly timed pulses. Flip-flops Z2 through Z5 function as a shift register. The six gates in negative dual andgates Z6, A7 and Z8 are connected to the shift register so as to place three negative charges on each gate one-by-one at alternate pulses from Z1; the order of this occurrence is from top to bottom. The first gate (asZ5 pin 11 goes negative) produces the start pulse; the output of each of the next five gates is dependent on the polarity of the #1 through #5 bit information sitting on the bit input pin (B, H, 8, 12 or 13). If negative, all four n gative inputs into the gate cause its output to go negative; if positive, the output remains positive. The pulses travel one by one through norgate Z9 to pin V of 4A3.

(2) TEST DATA. - Test data for the 4A3 assembly is included in timing chart figure 4-16. Pertinent test and measurements are presented in in paragraph 5-41.

d. 4A4 DRIVE INPUT GATING CIRCUIT.

(1) CIRCUIT DESCRIPTION (figure 5-103).

(a) REMOTE TUNING SECTION. - The larger part of circuitry in 4A4 is used in the receiver's remote tuning section (see figure 4-13 and paragraph 4-31). Remote tuning timing chart, figure 4-16, illustrates the operation of logic components. The fout bit code input is at pins R, 2, J and B for bits #2, #3, #4 and #5, respectively. Each bit passes through an amplifier in Z1 or Z2 and an inverter in Z7. The sixteen negative andgates in Z8 through Z11 are connected to the bit-lines so as to function as code gates (see figure 4-13 for codes). The correct code at a gate causes all four inputs to go negative, causing the normally positive output to go negative. One inverter, in quadruple inverter Z3, is used to invert the polarity of the "tune lockup" signal. This signal enters at pin S of 4A4 and exits at pin U. The "decoder inhibit" signal utilizes another inverter, appearing at pin X and exiting at pin T.

(b) REMOTE READBACK SECTION. - Receiver status logic is read out of gates in 4A4 (refer to timing chart, figure 4-16). The first four gating pulses of the 10 mc, 1 mc, 100 kc and 10 kc readback arrive one-by-one at pins P, M, D and C, respectively. The other inputs come from information on the receiver status (see figure 4-13) and are fed to pins V, K, H, E, Y and 21. The polarity appearing at pin 16 of 4A4 for each gate represents bit #1 of that code. This is issued via norgate Z6 and diode CR8.

(2) TEST DATA. - Test data for the 4A4 assembly is included in timing chart figure 4-16.

e. 4A5 STEPPING SWITCH GATING CIRCUIT.

(1) CIRCUIT DESCRIPTION (figure 5-105).

(a) AUTOMATIC TUNING SECTION. - The time delay circuitry, involved in an automatic tuning fault, is contained in 4A5 (see figure 4-8 and paragraph 4-3h). Refer to automatic tuning timing chart, figure 4-16. At the start of the automatic tuning cycle, a ground is placed at pin Y, triggering a time delay circuit consisting of driver Q2, inverter Q3, and switching transistor Q4. This sets the time delay and causes pin X of 4A5 to go negative (approximately -8 vdc) in relation to pin V (positive with respect to pin X). If, after 20 seconds, the ground is not removed from pin Y, the time delay trips and the voltage at pin X becomes approximately +6 vdc, and pin V becomes slightly positive, with respect to pin X. This trips an external time delay relay into its fault position. In this case, a local operator may reset the relay by pressing a reset button; this places a ground on pin K. The ground acts on the base of switching transistor Q1 to cause pin 12 of 4A4 to go to ground.

(b) REMOTE TUNING SECTION. - The greater part of 4A5 circuitry is used in the receiver's remote tuning section (see figure 4-13 and paragraph 4-31). Timing chart, figure 4-16, illustrates logic component operation. Mainly, bit #1 routing and the signal interchange between the decoder and the memory unit is accomplished here. Dual andgate assembly Z2 contains the two control gates; gate #1 has pin 6 as an output and gate #2 has pin 11. Pin 21 of 4A5 is the bit #1 input. From here it passes through a low pass filter and diode CR6, through Z7 and exits at pin U to the external reset button, then back to pin 14. (The other buffer in Z7 is not used.) The control output to the master stepping switch is at pin B; the output for the receiver stepping switches is at pin E. A gate in Z5 (pin 6 output) and gates in Z6 (pin 6 output) function in part of the tune lockup circuit. The other gate in Z5 (pin 11 output) creates the "memory advance" signal issuing at pin H. The "memory inhibit" signal, issuing at pin 11, is generated at a gate formed by diodes CR11 and CR12. The "start tune" signal, coming in at pin T, parallels that of the locally operated fault reset button ground at pin K (in the automatic tuning section) and accomplishes the same effect (i. e. to reset the time delay relay in the event of a previous fault).

(c) REMOTE READBACK SECTION. - The origin of the tuning/ready information (routed to the tuning/ready/fault logic section in 4A4) is a signal issuing from pin W. This is derived from the incoming signals (at pin Y) at the start and at the end of the automatic tuning cycle.

(2) TEST DATA. - Test data for the 4A4 assembly is included in timing charts, figure 4-16. Pertinent tests and measurements are presented in paragraph 5-40.

f. 4A6, 7, 8 DIGITAL COMPARATOR.

(1) CIRCUIT DESCRIPTION (figure 5-107).- The digital comparators are used in the receiver's automatic tuning section only (see figure 4-8 and paragraph 4-3h). There are two isolated comparator circuits contained in each PC board; the circuits are identical in design. Each one has two 4-contact BCD inputs and one 2-contact (L, low and H, high) output. The comparisons are made by means of a series of cascaded dual-input nandgates. The outputs of gate assemblies Z9 and Z3, pins D and H of the PC boards, go to ground when both BCD inputs become equal.

The operation of the comparator circuit is best explained by following an actual comparison. The 10 mc comparison is made on 4A6 by nandgates Z2, 3, 4, 9, 10, 11, 12, 16, 17, 18 and 19, which all function in accordance with the following truth table:

Inputs		Outputs
0	0	1
0	1	1
1	0	1
1	1	0

With the TN-511/URR tuned to 08.0000 mc, BCD1 is 0 at pin L of 4A6, and BCD2 is 0 at pin J of 4A6. If the MEGACYCLES selector switches on the 0-1510/URR are set to 08.0000, BCD1 is 0 at pin N of 4A6, and BCD2 is 0 at pin K of 4A6. Pins B, C, E and F are at ground and considered as 0 inputs. With all 0 inputs to 4A6, the nandgates will function as follows:

	Z16	Z17	Z18	Z9	Z10	Z11	Z19	Z12	Z4	Z3	Z2
Input Pins											
1	0	0	0	1	1	1	0	1	1	0	1
2	1	1	1	1	0	1	1	0	1	1	0
4	0	0	0	1	1	1	0	1	0	0	0
5	1	1	1	0	1	0	0	1	1	1	1
9	1	1	1	0	0	0	0	1	1	1	1
10	1	0	1	1	0	1	1	0	1	1	0
12	0	0	0	1	1	1	0	1	1	NU	1
13	0	1	0	0	1	0	1	1	0	NU	1
Output Pins											
3	1	1	1	0	1	0	1	1	0	1	1
6	1	1	1	1	0	1	1	0	1	1	1
8	0	1	0	1	1	1	1	1	0	0	1
11	1	1	1	1	0	1	1	0	1	NU	0

A 0 output (ground will be delivered at both pins H and D. A 1 output will be delivered at pin 2. The pin 2 output is not used in the receiver operation, but may be used in testing the comparator. If the MEGACYCLES selector switches on the 0-1510/URR are now set to 10. 0000 mc, inputs to 4A6 will remain the same except for the BCD's from the 0-1510/URR. BCD1 at pin N is 1, and BCD2 at pin K is 0. With these inputs, the nandgates will function as follows:

	Z16	Z17	Z18	Z9	Z10	Z11	Z19	Z12	Z4	Z3	Z2
Input Pins											
1	0	0	0	0	1	0	0	1	1	1	1
2	1	1	1	1	0	1	1	1	1	1	0
4	0	0	0	1	1	1	1	1	1	0	1
5	1	1	1	0	1	0	1	0	1	1	1
9	1	1	1	0	0	0	1	1	1	1	1
10	1	0	1	1	0	1	1	0	1	1	1
12	0	0	0	1	0	1	0	1	1	NU	0
13	0	1	0	0	1	0	0	1	0	NU	0
Output Pins											
3	1	1	1	1	1	1	1	0	0	0	1
6	1	1	1	1	0	1	0	1	0	1	0
8	0	1	0	1	1	1	0	1	0	0	0
11	1	1	1	1	1	1	1	0	1	NU	1

A 1 output will be delivered at pin D and a 0 output at pin H. The pin 2 output will be 0.

(2) TEST DATA. - Test data for the comparators is included in servicing block diagram figure 4-8.

g. 4A9 BAND SELECT/ERROR POLARITY LOGIC.

(1) CIRCUIT DESCRIPTION (figure 5-109).- The 4A9 assembly is used in the receiver's automatic tuning section only (see figure 4-8 and paragraph 4-3h). This PC board contains two separately operating circuits: the band select logic and the error polarity logic. Automatic tuning servicing block figure 4-8, more specifically shows the operation of the logic components.

The band select logic section (sheet 2 of figure 5-109) operates from two BCD inputs. The first BCD input represents the 10 mc switch position (0, 1, 2 or 3) presented as the 1 and 2 digits in its BCD code, at pins L and K, respectively. The second BCD input represents the 1 mc switch position (0 through 9) presented as the 2, 4 and 8 digits in its BCD code, at pins B, C and P, respectively. From here, cascaded nandgates in assemblies Z1 through Z5 and andgates composed of diodes CR1 through CR8 determine (from the 10 mc and 1 mc information) in which of the four bands, 2-4 mc, 4-8 mc, 8-16 mc or 16-32 mc) these two components fall. The result is a four bit code signal appearing at pins S, X, Y and R. This code is made up of 1's and 0's; 1 is +12 vdc, and 0 is ground.

The error polarity logic section (sheet 1 of figure 5-109) operates from five 2-contact (L and H) inputs, representing the "tuner low" or "tuner high" signals. The output is a single 2-contact signal representing a "tuner high" signal (pin W) or a "tuner low" signal (pin 19). Pins 18 and 20 are for the end of band "stop" signal input. Normally, pins 18 and 20 are both left open; when a "stop" signal comes through, either pin 18 "hi-stop" or pin 20 "lo-stop" goes low, essentially freezing the tuner drive motion, by removing control phase from the drive motor. The "virtual ground" signal comes in on pin 17 as sync is achieved (or passed through) and blocks the signals through the gates of Z12.

(2) TEST DATA. - Test data for the 4A9 assembly is included in servicing block figure 4-8.

h. 4A10 MOTOR DIRECT CONTROL.

(1) CIRCUIT DESCRIPTION (figure 5-111).- The 4A10 assembly is used in the receiver's automatic tuning section only (see figure 4-8 and paragraph 4-3h). The automatic tuning timing chart, figure 4-16, more specifically shows the sequencing of signals through this PC board. The search generator, with its "tuner low" and "tuner high" inputs at pins 15 and B, respectively, is made up of switching transistors Q4 and Q5, powered by an external 24 vac across pins U and S, with the "search" signal output at pin W. The "virtual ground" signal, coming in at pin L, triggers a one-shot circuit consisting of Q3, Q9, CR8 and Q1 and this produces a pulse at TP-3, the search output at pin W. The same virtual ground acts through CR6 and pin J to block the signal from the error polarity logic (in 4A9) from coming in at pins B and 15. The virtual ground also acts (through CR9) to create the operational amplifier gating output at pin 21 via switching transistors Q8 and Q2. The "buffered dc loop" signal, coming in at pin M, is the output control for the chopper, composed of Q6 and Q7. Power for the chopper is an external 1. 1 vac across pins E and K. Diodes CR2 through CR5 form part of the band select logic circuit of 4A9.

(2) TEST DATA. - Test data for the 4A10 assembly is included in the timing chart, figure 4-16 and servicing block diagram figure 4-8.

i. 4A11 SERVO LOOP CONTROL.

(1) CIRCUIT DESCRIPTION (figure 5-113).- The 4A11 assembly is used in the receiver's automatic tuning section only (see figure 4-8 and paragraph 4-3h). The operational amplifier made up of Z1, Q3, Q4 and their associated components, receives its "search" signal input, a signal composed of variable-amplitude ac. This signal is translated into an ac output, across pins 21 and 1, to an external coupling transformer 4T1. The secondary of this transformer is connected at pins X, 14 and L and this forms the signal input to the motor control section, composed of switching transistors Q1 and Q2. The output, at pins J and V, is the ac drive power to the external motor. Q1 and Q2 act as switching devices for the 180° phase shift in the ac. The "chopper" signal, entering at pin C, works through operational amplifier Z2, to control Z1. A more concise picture of the normal signals occurring throughout 4A11 in an automatic tuning may be seen in timing chart, figure 4-16.

(2) TEST DATA. - Test data for the 4A11 assembly is included in timing chart figure 4-16.

j. 4A12 -30V POWER SUPPLY.

(1) CIRCUIT DESCRIPTION (figures 5-92 and 5-115). - Power supply card A12 receives 38 vac at its input, and converts this to -30 vdc regulated, for use as energizing voltage for the ledex stepping switches. A 38 ac voltage enters A12 at pins 7 and 8 (common to each other) and pins 11 and 12 (also common). Rectification takes place through CR4 (a full-wave bridge rectifier); the resultant pulsating dc is passed through a surge limiting network composed of R7 and R8, and continues out of A12 (at pin 21) to an externally-mounted electronic filter/regulator consisting of series-pass transistor 4Q2 and zener regulator 4CR1, working in conjunction with board-mounted capacitors C1 and C3, in the base circuit of 4Q2. Filter/regulator operation is as follows: 4Q2 acts as a series voltage regulator (essentially a variable series resistance). By the zener action of 4CR1, a constant voltage is maintained in 4Q2's base circuit, and, therefore, a constant voltage output results. At the same time, the effective shunt capacitance of C1 and C3 across the -30 volt line, has a much greater filtering effect than normal. Large filter capacitors 4C3 and 4C4 also provide a high degree of passive filtering.

Card A12 incorporates a short-proof current-limiting feature, consisting of diodes CR2 and CR3, and resistor network R2, R3 and R4. In the event of a short circuit across the -30 volt output, voltage drop across the resistor network would be greater than that across the diodes, thereby reducing 4Q2's forward bias and, consequently, reducing output current. Circuit valu s are such that the short-circuit equilibrium point falls well with the safe dissipation range of 4Q2 and all affected circuit components. On A12, resistors R5 and R6 form part of 4Q2's bias circuit; resistor R1 is a bleeder resistor, and capacitor C2 is a bypass for rf and switching transients. Board output appears between pins 5, 6, H and J (hot), and pins 1, 22, A and Z (ground). Diode CR5 isolates the -30 volt output at pins H and J from that at pins 5 and 6.

Board pins B and D extend CR1, CR6, and R9 connections to external FAULT indicator circuitry; pin D receives one side of FAULT indicator 4DS1, inserted in series with the -12 volt output of 4A13. This is routed through diode CR6 on 4A12, and is brought directly back to pin B, which is externally connected to the FAULT relay 4K1. During a FAULT condition, relay 4K1 extends a ground to pin B of A12, causing the following conditions on 4A12: Ground return is provided through CR6 causing externally-mounted FAULT indicator 4DS1 to illuminate. One side of resistor R9 is grounded through diode CR1; the other side of R9 remains effectively connected to -30 vdc board output. The heavy current through R9 cuts off 4Q2, and causes output voltage and current to drop to a very low value, thereby stopping the ledex stepping switches.

(2) TEST DATA. - Pertinent test data for power supply 4A12 may be found by referring to figures, 4-13, 4-14, 4-15 and 4-8.

k. 4A13, +12 VDC, -12 VDC POWER SUPPLY.

(1) CIRCUIT DESCRIPTION (figure 5-117).- Power supply board 4A13 contains two sections: one section produces +12 vdc regulated, and the other section produces -12 vdc regulated. Input to each section is 18 vac from one of the secondary wingings of power transformer 4T2. Because both sections are quite similar in operation, only the +12 vdc section need be fully explained; the differences between the +12 vdc and -12 vdc will also be noted. Incoming ac (pins B and 2) is rectified by full-wave bridge rectifier CR1, and passes through a surge limiter of R7 and R8. The resultant pulsating dc is applied to pin 3 of Z1: Z1 is an integrated voltage regulator, incorporating current limiting and short-circuit overload protection. Essentially, Z1 functions as an operational amplifier with heavy feedback.

An output of Z1 is applied to the base of driver Q2; Q2, along with R1, forms a divider-bias network for series-pass transistor Q1, which performs the actual regulation: Q1's collector-emitter path falls in series with the filtered output of CR1 (filtering is accomplished external to 4A13 by capacitor 4C5, connected between board pin D and ground). Q1 thus acts as a series resistance, varied by Z1, via Q2. Therefore, voltage output is ultimately regulated by Z1. In order to regulate properly, however, Z1 must have an error input: this input is obtained by sampling the output voltage at the junction of the voltage divider formed by R4 and R5. The error sample is applied as feedback input to terminal 6 of Z1. Within Z1, the error input is compared with an internal voltage reference standard in a differential amplifier; output of this amplifier is applied to the base of Q2. Capacitor C4, connected between terminals 6 and y of Z1 is part of an internal frequency compensation network, to prevent oscillation at high frequencies and/or transient ringing, due to the high gain through Z1. Capacitor C1 bypasses the +12 vdc regulated output to prevent oscillation and stray pickup, and resistor R9 is an output bleeder. Resistor R10 and capacitor C3 are not used in this application.

Current limiting is accomplished by Z1, in conjunction with resistors R6, R2, and R3; limiting is of the switchback type, i. e. when a heavy current overload occurs, instead of simply limiting current flow to the maximum design, the switchback type limiter reduces current flow to a relatively small fraction of maximum output value, until such time as the overload is removed. This is done in order to ensure continued maximum component reliability within the power supply itself, as well as to prevent possible damage to external components, since a current overload usually indicates a malfunction, in which case no purpose would be served by continuing maximum-current operation. Limiter operation is as follows: Output current creates a voltage drop across R6, which would appear between Z1 terminals 1 and 8; however, the divider composed of R2 and R3 causes another voltage drop; this drop bucks out the drop across R6. It is this bucking action which allows the output current increase (in this case, maximum load current is on the order of 2. 0 amperes). However, consider the case of a short circuit at the output: R2 and R3 are effectively in parallel across the output; therefore, the voltage across the combination approaches zero, and the bucking voltage is no longer generated. The heavy current through R6 causes a relatively large drop to appear between Z1 terminals 1 and 8; these become the current-limiting input terminals. Z1 immediately reacts by reducing forward bias on Q1 until output current returns to a safe predetermined value (in this case, about 0. 5 amperes). The combination of R2 and R3 also provides a pre-load on the output of about 20 ma, so the regulator will always operate into a load of some sort.

Terminal 4 on Z1 is ground input for the IC; terminal 5 of Z1 is connected to ground through by-pass capacitor C7. C7 reduces noise in the internal voltage reference source by the usual bypass action.

The -12 volt section of 4A13 functions in an identical manner to the +12 volt section, with the following exceptions: the -12 vdc series-pass transistor (4Q1) is mounted external to the board at pins 12 (emitter), 14 (collector), and 21 (base); the surge limiter consists of resistors R19, R20, R21 and R22. Due to the polarity inversion, the current limiter bucking divider is connected between the surge limiter network and the junction of R14 and R15. Resistor R11 is not used in this application.

(2) TEST DATA. - Pertinent test data for power supply 4A13 may be found by referring to figures 4-13, 4-14 and 4-15. Pertinent measurements are presented in paragraph 5-39.

l. 4A14, +5 VDC/+28 VDC POWER SUPPLY.

(1) CIRCUIT DESCRIPTION (figure 5-119).- Power supply board 4A14 produces +5 vdc and +28 vdc from 12 vac and 30 vac inputs, respectively, from

two secondary windings of power transformer 4T2. Operation and circuitry of both sections of 4A14 is identical to that of the +12 vdc section of power supply 4A13, immediately preceding this text; therefore, the reader is referred to paragraph 4-8k, for a detailed explanation of power supply operation. The only component value changes between boards occur in the two voltage dividers (error feedback, and current limiter bucking divider), in the voltage rating of C2, and in the value of the output bleeders. Also, note that no voltage reference bypass is incorporated in the +5 VDC section of the board; pin 5 of Z1 is left open. All other component values remain identical to 4A13, as does theory of operation.

(2) TEST DATA. - Pertinent test data for power supply 4A14 may be found by referring to figures 4-13, 4-14 and 4-15.

4-9. UNIT 5 SUBASSEMBLY DESCRIPTIONS.

a. 5A1 ISOLATION KEYER.

(1) CIRCUIT DESCRIPTION (figure 5-129).- The 5A1 assembly is used in the receiver's remote tuning section only (see figures 4-13, 4-14 and paragraph 4-31). Pulses of current entering through code input pin 12 (and returning through pin 15) cause a voltage keying output from relay K1, across pins 4 and B. The 20 vac applied from an external source across pins X and W is rectified across diode CR4 to bias relay K1 in its normally closed position. During the interval of a current pulse, however, transistor Q1 conducts and applies the proper voltage across the alternate coil of K1 to close pins 4 and B. The -12 vdc, applied externally, at pin 4 then gets routed to pin B output.

(2) TEST DATA. - Test data for the 5A1 assembly is included in timing chart, figure 4-17. Pertinent tests and measurements are included in paragraph 5-44.

b. 5A2 CLOCK TIMING CIRCUIT.

(1) CIRCUIT DESCRIPTION (figure 5-131).-

(a) REMOTE TUNING SECTION. - The greater part of the circuitry in the clock timing circuit is used in the receiver's remote tuning section (see figures 4-13, 4-14 and paragraph 4-31). Timing chart, figure 4-17, illustrates the operation of the logic components on the PC board. The -12 volt pulses of each code enter at pin E, become amplified through Z8 and routed to an andgate (with output pin 10) in Z4. The other input to the gate is the stunt line control. The output of the gate, upon arrival of the start pulse, sets flip-flop Z1 and Z1 starts timing generator Z2. Z2 then commences to issue a series of regular pulses at pin 6 and at pin 11. The pulses from pin 6 pace the decade counter shift-register (composed of flip-flops Z9 and Z10 and an additional external flip flop A3Z8); the pulses from pin 11 work through single-shot Z3 to pace the code pulses from pin 11 of a Z4 andgate. These code pulses are connected to the inputs of andgates in assemblies Z5, Z6 and Z7, and the other inputs of these gates are connected to the shift registers in such a way as to be set, one-by-one, for each cod bit. Bits #1, #2 and #3 andgates are in Z5 assembly with output pins 10, 1 and 12, respectively; bit #4 andgate is in Z6 with output pin 12. Bit #5 andgates involve Z6 (output pin 1) and an andgate in Z7, with output pin 5. The first five pulses from timing generator Z2 cause the decade counter to shift five times and each code bit polarity appears one-by-one at 5A2 pins K, N, J, S and T, in that order. Pulses from the timing generator Z2 exit via inverter Z12 at pin P for use as bit-shifting pulses in the external memory register. After the next five shifts (to complete the cycle of ten) the external flip-flop sends a positive-going voltage to flip-flop Z1, via pin 2, resetting it and stopping the output of timing generator Z2.

Three more andgates in assembly Z7 are used for separate operations, also paced by the shift register. The andgate with output pin 10 (working with Z6 andgate, output pin 10) furnishes a reset pulse to external associated circuits, on the sixth shift. Also, at this time, the Z7 andgate, with output pin 11, issues a triggering pulse to the associated timer. On the 5th shift, the 27 andgate with output pin 6 issues a voltage change when a "blank" signal comes in at pin Y.

(b) REMOTE READBACK SECTION. - Inverters in assembly Z8 (with input and output pins 8 and 9, 12 and 11) form part of the signal path for the memory power off readback.

(2) TEST DATA. - Test data for the 5A2 assembly is included in timing chart, figure 4-17. Pertinent tests and measurements are included in paragraph 5-45.

c. 5A3 PARALLEL SHIFT REGISTER.

(1) CIRCUIT DESCRIPTION (figure 5-133).- This parallel shift register is used in the receiver's remote tuning section only (see figure 4-13, 4-14 and paragraph 4-31). Timing Chart, figure 4-17, illustrates the operation of the logic components. Coded bits #1 through #5 enter, one-by-one, at pins M, V, F, K and 21, in that order. Depending upon polarity, they either set or leave reset flip-flops Z2 through Z6. This leaves charges sitting on (a) PC board pins X, B, J, C, 7, 16, L, H, 10 and 15 and (b) andgates in Z7, Z9, Z10 and Z11. The coded charges on the PC board pins are the parallel pulse outputs of the code. The andgate functions in various ways to decode particular codes that may be encountered in a message. Andgate Z7, together with a specially wired X/Y matrix opens to the correct A through E selector code (see table in figure 5-123) for equipment selection jumper guide and the signal on pin Y from external circuitry which inhibits or opens the Z7 gate. After this, andgates in Z10 with output pins 5 and 6 and flip-flop Z1 function to present outputs to associated circuitry at pins S and P. When the receiver's 1 through 10 code follows, Z11 andgates with output pins 5 and 6 issue signals. Gates in Z10 with output pins 11 and 10 are for passing the bit #1 information to memories A and B in the AN/URR-63(V)2; in the AN/URR-63(V)1, only the output at pin 11 is used. Input signals on pins W and N open or inhibit the andgates in Z10 with output pins 11 and 10 at the proper time. The gate in Z11 with output pin 11 responds to the tune code at the end of the message If a clear code is sent the gate in Z9 with output pin 11 issues a signal. If a blank code comes through, the gate in Z11 with output pin 10 issues a signal. Flip-flop Z8 forms the final unit of a shift register in associated circuitry on 5A2.

(2) TEST DATA. - Test data for the 5A3 assembly is included in timing chart, figure 4-17.

d. 5A4 GATING CIRCUIT.

(1) CIRCUIT DESCRIPTION (figure 5-135).- This gating circuit is used in the receiver's remote tuning section only (see figures 4-13, 4-14 and paragraph 4-31). Timing Chart, figure 4-17, illustrates the operation of the logic components. Bits #2, #3 and #4 of the receiver selection code (1 through 5 for 5A4 and 1 through 5 for 9A4) enter at pins P, U, R, M, N and T. Polarities and inverted polarities represent each of the three bits. This information is placed at the inputs of five gates, each representing a receiver, in assemblies Z10 and Z11. At the same time a signal entering at pin X (indication that bits #1 and #5 are correct for the 1 through 5 or 6 through 10 code) and another signal entering at pin W (the "2nd character enable" signal) open a gate (with output pin 6) in Z7. This signal travels, via two inverters in assembly Z6, to act as a release pulse for the Z10 and Z11 gates. According to the code, one of the Z10 or Z11 gates opens. The gate that opens then sets a flip-flop in the group of Z1 through Z5. The set flip-flop then places a charge on one input of one of the five gates, formed by the four in assembly Z9 and the one made of diodes CR7 and 8. The flip-flop remains set and the charge remains at the gate throughout the tuning message. Upon the arrival of the tune code, a signal at pin K releases the gate and the output, the receiver "start tune" signal, leaves at the appropriate pin (12, B, 7, 6 or C). At this time, a flip-flop reset signal enters at pin S, resetting all five flip-flops. This places similar charges on all four inputs to a gate (with output pin 11) in Z7. This gate then sends a signal, via pin Y, to the external A through E gate on 5A3, resetting it for the next message. Diodes CR1 through CR5 and output pins J, H, 5, 3 and 2 are not used in this receiver.

(2) TEST DATA. - Test data for the 5A4 assembly is included in timing chart, figure 4-17.

e. 5A6 SHIFT TIMING CIRCUIT.

(1) CIRCUIT DESCRIPTION (figure 5-137).- The circuitry in 5A6 assembly is used in the receiver's remote tuning section only (see figures 4-13, 4-14 and paragraph 4-31). Timing Chart, figure 4-17 illustrates the operation of the logic components. Mainly, 5A6 controls the sequencing through the rest of the remote tuning circuit. Timing generator Z1 is for pacing fast shift pulses in the memory section; this occurs after the "tune" signal has been received and the code bits in the associated memory storage are being shifted towards the output. Timing generator Z2 generates the shift pulses into the memory in the reciprocating signals that occur during code transfer into the associated decoder. Both timing generators work (Z2 works via Z2 inverter output pin 9) through an andgate (with output pin 11) in Z5 and an inverter in Z3 (output pin 11) to fire single-shot Z7, producing the negative 2 microsecond shift pulses required. In the initial phase in which the codes are becoming stored in the memory, pulses from an external timing generator, entering at pin W, and a "single shift pulses" signal via pin X, travel through an andgate in Z11 (with output pin 6) and an inverter in Z9 (output pin 7) and serve as the memory single shift pulses. These also take the common path through Z5 andgate, Z3 inverter, and single-shot Z7. Enabling timing generator Z2 are two signals: (1) the "tune" signal working through an andgate (with output pin 11) in Z11 and the set for that gate at pin 21 and flip-flop Z8 to diode CR4 and (2) the "memory advance" signal entering via pin U and brought to diode CR3. Diodes CR3 and CR4 form an andgate in such a way that the signal entering via pin U will pass through the gate and to Z3 inverter (output pin 7) except during the time that the gate is inhibited by the "tune" signal (pin 19, via Z11 output pin 11 and Z8). The signal on pin 7 of Z3 will trigger the timing generator Z2 to produce a single pulse. There are three signals enabling timing generator Z1: (1) "letters clear" signal which occurs during the first character of a program (pin 7 via Z9 inverter output pin 11), (2) "bit #1 A monitor" signal via pin J and (3) a "clear" signal which occurs only during the program input of a clear character (pin 6 via Z9 inverter, output pin 6, and Z10 amplifier, output pin 11). Either the "letters clear" or the "clear" signal will trigger the timing generator Z1 via Z4 inverter (output pin 7) to produce a series of fast shift pulses (30 kc). The "bit #1 A monitor" signal (pin J) will inhibit andgate Z5 (output pin 6) during the tuning process as soon as the first bit #1 comes out of memory.

Two andgates in Z6 assembly (with output pins 10 and 11) act as tune and clear code reset gates for the receiver selector section. The two other andgates Z6 (with output pins 5 and 6) serve as input controls for the associated memory sections. In Receiving Set AN/URR-63(V)1 only the gate with output pin 6 is used; in the AN/URR-63(V)2 this gate is used for the A memory and the other (output pin 5) is used for the B memory. Z9 (output pin 9) inverts the incoming signal on pin L to produce the "blank reject" signal at pin K. Z4 (output pin 11) inverter is not used in the AN/URR-63(V)1 or AN/URR-63(V)2. Z3 inverter (output pin 6) produces the "decoder inhibit" signal at pin P. A "letters gate inhibit" signal enters on pin D and is inverted by Z4 (output pin 6). This inverted output leaves the card on pin 2; however, this signal is used only in the AN/URR-63(V)2 as the "dual select control" signal. The signal at Z4 (pin 6) is also routed to a second inverter (Z4 output pin 9) and to CR2. The inverted signal at pin E is routed externally to stunt relay 5K1 and acts as an "equipment select" control signal. CR2 functions as a part of andgate Z6 (output pin 10).

(2) TEST DATA. - Test data for the 5A6 assembly is included in timing chart, figure 4-17.

f. 5A7 (9A8) INTEGRATED SHIFT REGISTER.

(1) CIRCUIT DESCRIPTION (figure 5-139).- The circuitry in 5A7, 9A7 and 9A8 assemblies is used in the receiver's remote tuning section only (see figures 4-13, 4-14 and paragraph 4-31). Timing Chart, figure 4-17, illustrates the operation of the logic components. Z1 through Z5 are integrated shift registers for storage of code bits #1 through #5. Bit #1 input enters at pin 2 of the PC board and goes directly to shift register Z4. Bits #2 through #5 come in at pins U, X, Y and W, respectively, and when the memory input gate is received via pin V, travel through the four andgates in Z11. As each shift pulse arrives at pin 6, the normally open gate transmits the pulse to the five shift-registers; this moves the five bits of the code by one place in the

memory storage. This last statement is true for Receiving Set AN/URR-63(V)1. In the AN/URR-63(V)2, however, Z6 is controlled by an input at pins 7 and 8 of the PC board. In this case, the shift pulses entering pin 6 of 9A8 (the B memory) is the opposite polarity of that entering pin 6 of 9A7 (the A memory). Z6 gate will open only if a release charge of similar polarity has been presented at pin 7 or 8. For the A memory (9A7) it is pin 7; for the B memory (9A8) it is pin 8. Each bit output leaves its shift-register to travel through two successive inverters located in inverter assemblies Z7 through Z10. There are two parallel isolated outputs for each bit. Bit outputs appear on pins D, 9, 11, 10 and J. Bit outputs also appear (but are not used) on pins 3, 14 T, S, 13. The "bit #1 monitor" pulse from Z4 output is applied (after inversion in Z8) to an andgate (with output pin 6) in Z6. When a charge arrives via pin 5 of the PC board (as a result of the tune code) this monitor pulse is released via an inverter in Z8 at pin E.

(2) TEST DATA. Test data for the 5A7, 9A7 and 9A8 assemblies is included in timing chart, figure 4-17.

g. 9A9 MEMORY HALF SELECTOR.

(1) CIRCUIT DESCRIPTION (figure 5-143).- This memory half selector is used only in the receiver's remote tuning section and only in the AN/URR-63(V)2 (see figure 4-14 and paragraph 4-31). Timing Chart, figure 4-17 illustrates the operation of logic components. The #2 through #4 bits enter via pins 19, 18, P, S, and N and are applied to andgates in Z11. A "6 through 10 select" signal enters via pin R and is applied to both Z11 andgates. Andgates in Z11 are wired so that they will operate for only one code, the code being used to select A or B receiver half. When the code is correct for A memory and when a gating signal appears on pin R, Z11 will route a signal to andgate in Z7 (output pin 10) and to Z10 inverter (output pin 9). The output of the inverter leaves via pin J as a "shift pulse gate control" signal. "Dual select control" signal enters at pin T, allowing Z7 andgate (output pin 10) to generate a set signal for flip-flop Z8. The output of Z8 is fed to Z7 andgate (output pin 5) along with the input on pin M (tune/clear reset). The presence of either input to the andgate will cause it to generate a reset signal for flip-flop Z12. Inputs to Z6 andgate (output pin 11) from Z7 pin 5 and from pin 2 (signal generated by E "tune" signal) via inverter in Z5 (output pin 6), allow the Z6 andgate to produce a "dual control A" signal on pin 9 (via Z10 inverter, output pin 11). With the correct code for B memory selection the operation is similar. Z11 andgate provides input signal to andgate in Z7 (output pin 11) which will provide the set signal for flip-flop Z12. The flip-flop Z12 output is fed to Z7 andgate (output pin 6) which provides a reset signal for flip-flop Z8. Input signals to Z6 andgate (output pin 10) provide a "dual control B" signal via inverter Z10 (output pin 7) to pin F.

The signal on pin 7 of Z10, dual control B is also routed as an input to Z6 andgate (output pin 5). The remainder of the circuitry on 9A9 is used as shift timing circuitry for the B memory, when B is selected. It is similar to the circuitry on 5A6. Single shift pulses are generated by Z6 (output pin 5) andgate which receives single shift pulses for each character via pin H. Clock pulses enter 9A9 at pin K and are routed to CR1 which functions as a part of the Z6 andgate circuit. Single shift pulses are routed via Z3 inverter (output pin 6) to Z9 andgate (output pin 6). Outputs of both timing generators Z1 and Z2 are also routed to the same Z9 andgate. The presence of any of these inputs will cause, via inverter Z5 (output pin 9), the single shot Z4 to fire, producing the negative 2 microsecond pulses for the B memory via pin X. Timing generator Z1 is enabled by any one of three input signals: (1) letters mem B clear input at pin D, (2) memory B clear input at pin C, or (3) bit 1 B monitor input at pin B. These signals work through Z9 andgate (output pin 11) via Z5 inverter (output pin 7) to enable Z1 which then produces a series of fast shift pulses (30 kc). Timing generator Z2 is enabled by "memory advance B" signals entering via pin V. These signals will work through the andgate consisting of CR2 and CR3 except during the time that the andgate is inhibited by the tune signal input on pin W. The andgate will direct the memory advance signals via Z3 inverter (output pin 11) to enable Z2 to produce single shift pulses. These shift pulses are routed via Z3 inverter (output pin 7) to Z9 andgate and to Z3 inverter (output pin 9). The signal at Z3 (pin 9) is routed out on pin U, "decoder inhibit B" signal. Z5 inverter (output pin 11) is not used in this unit.

(2) TEST DATA. - Test data for the 9A9 assembly is included in timing chart, figure 4-17.

h. 5A10 POWER SUPPLY.

(1) CIRCUIT DESCRIPTION (figure 5-141).- Power supply 5A10 contains three separate, but nearly identical, sections, producing various regulated voltages for use by the memory section. As operation of this board is nearly identical to that of 4A13, the reader is referred to paragraph 4-8k for a detailed explanation of circuit theory.

The only differences in configuration of 5A10 occurs in actual component values of the error feedback divider (R5 and R17, R23 and R25, R10 and R18), current limiter bucking divider (R4 and R16, R7 and R8, R12 and R13), the current limiter series resistors (R2, R24, R27), and the voltage rating of output by-pass capacitor C1. The particular values used on this board differ from those of 4A13 due to the different output voltage requirements. Also, note that both the rectifier and the series-pass transistor associated with regulator Z2 are mounted external to the board.

(2) TEST DATA. - Pertinent test data for power supply 5A10 may be found by referring to servicing block diagrams, figures 4-13 and 4-14. Pertinent measurements are included in paragraph 5-43.

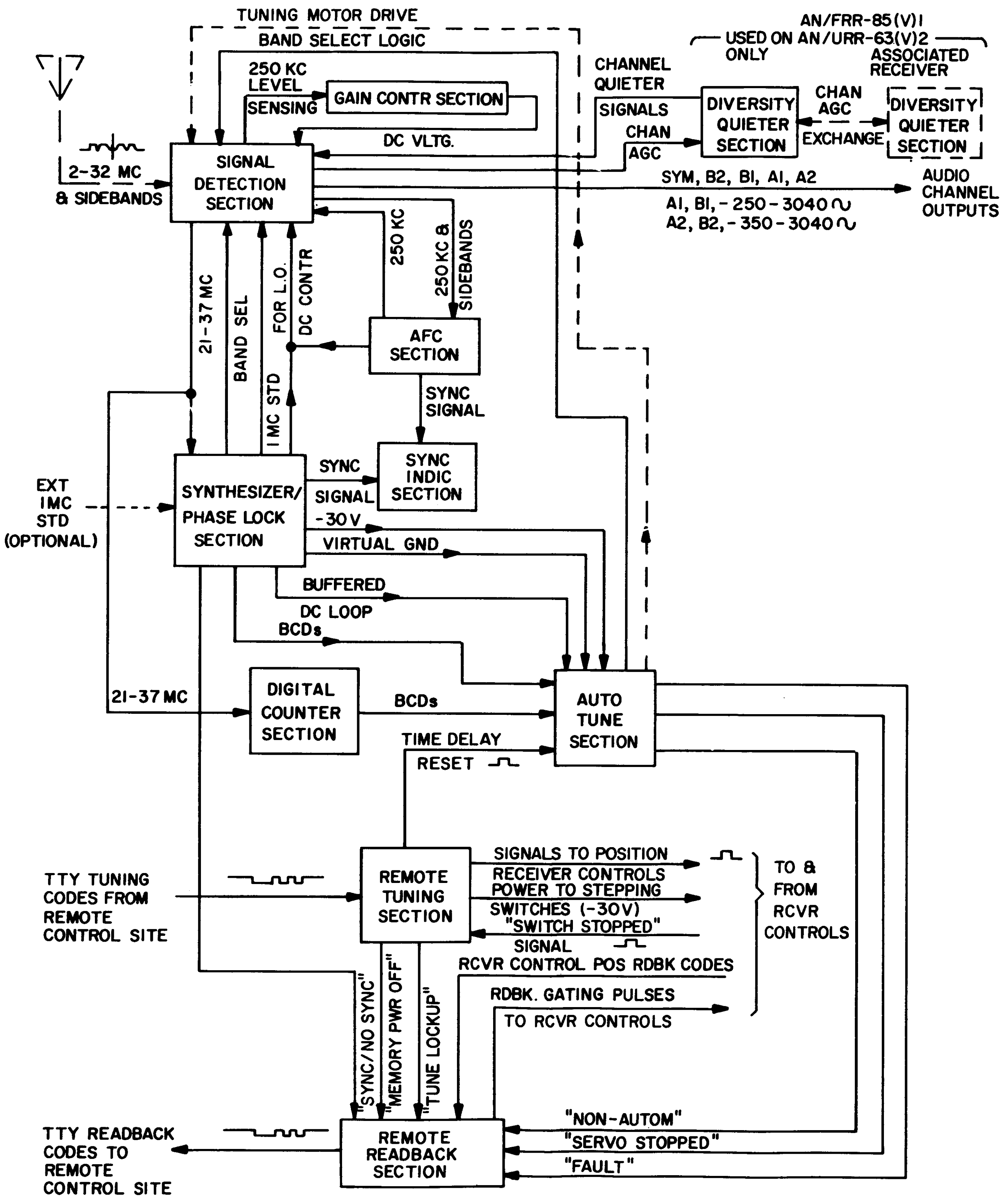
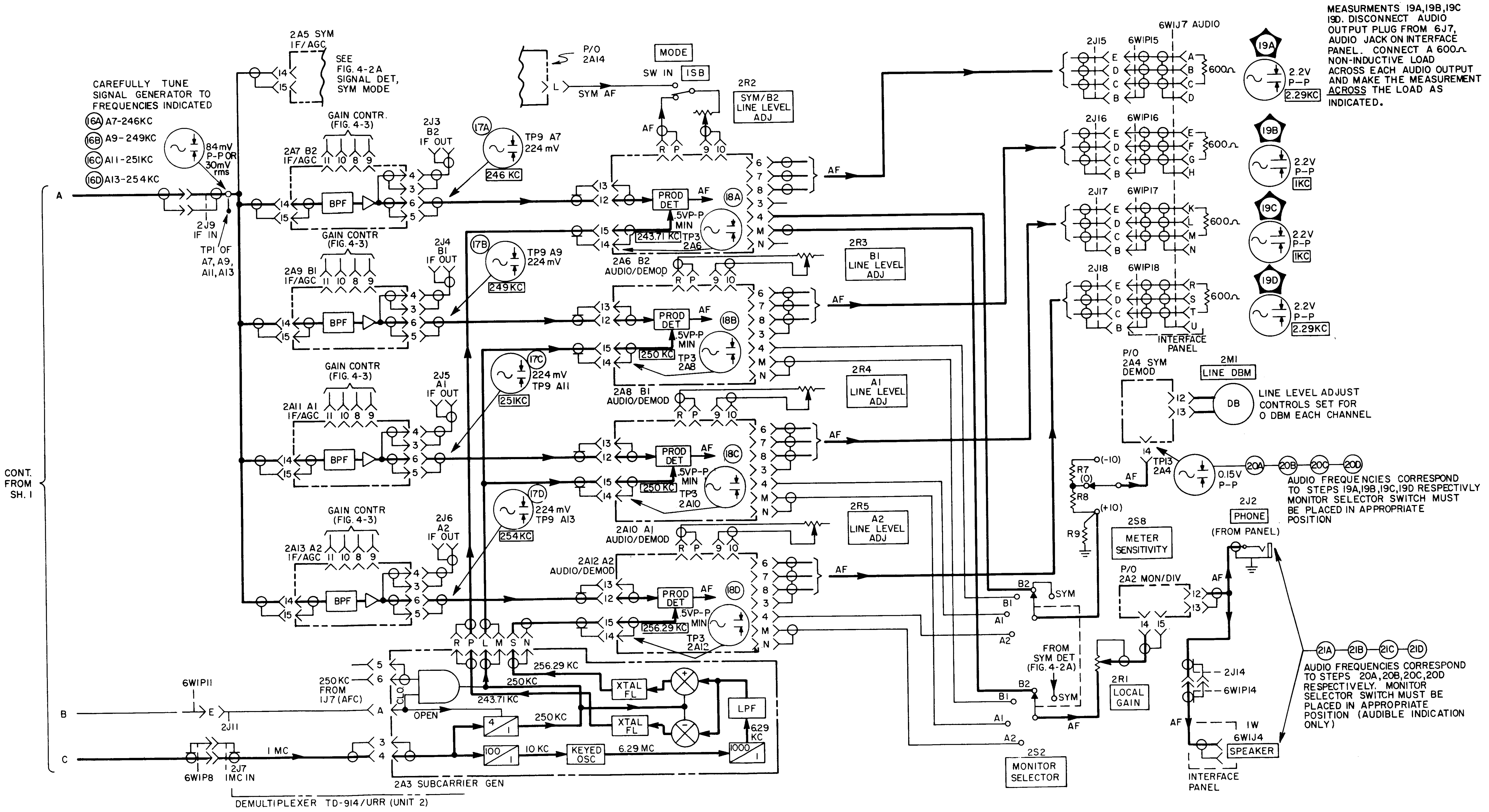


Figure 4-1. Overall Functional Block Diagram, Single Receiver



CAREFULLY TUNE SIGNAL GENERATOR TO FREQUENCIES INDICATED
(16A) A7-246KC
(16B) A9-249KC
(16C) A11-251KC
(16D) A13-254KC

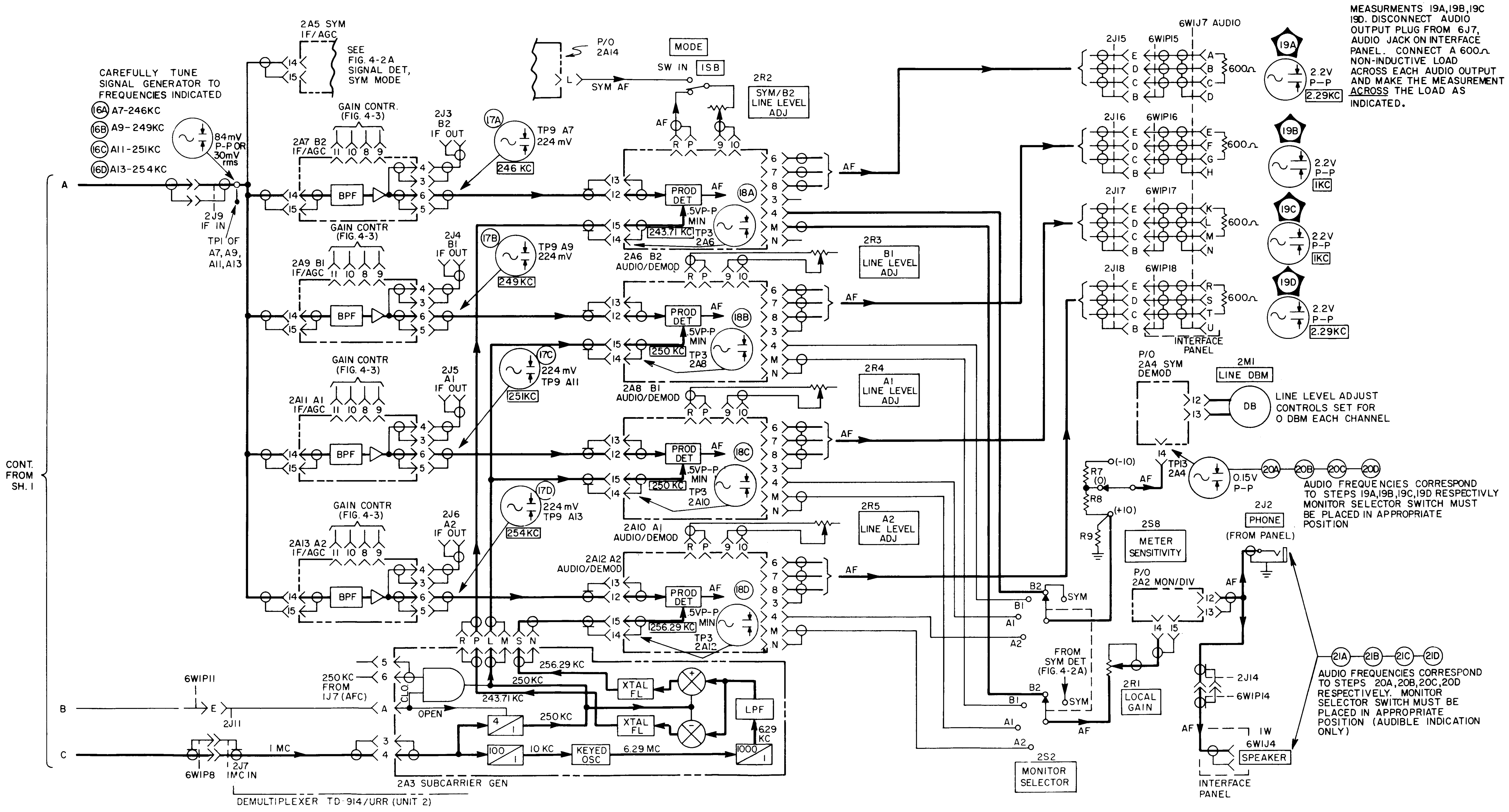
MEASUREMENTS 19A, 19B, 19C 19D. DISCONNECT AUDIO OUTPUT PLUG FROM 6J7, AUDIO JACK ON INTERFACE PANEL. CONNECT A 600Ω NON-INDUCTIVE LOAD ACROSS EACH AUDIO OUTPUT AND MAKE THE MEASUREMENT ACROSS THE LOAD AS INDICATED.

LINE LEVEL ADJUST CONTROLS SET FOR 0 DBM EACH CHANNEL

AUDIO FREQUENCIES CORRESPOND TO STEPS 19A, 19B, 19C, 19D RESPECTIVLY MONITOR SELECTOR SWITCH MUST BE PLACED IN APPROPRIATE POSITION

AUDIO FREQUENCIES CORRESPOND TO STEPS 20A, 20B, 20C, 20D RESPECTIVELY. MONITOR SELECTOR SWITCH MUST BE PLACED IN APPROPRIATE POSITION (AUDIBLE INDICATION ONLY)

Figure 4-2. ISB Signal Detection Servicing Block Diagram (Sheet 1 of 2)



CAREFULLY TUNE SIGNAL GENERATOR TO FREQUENCIES INDICATED

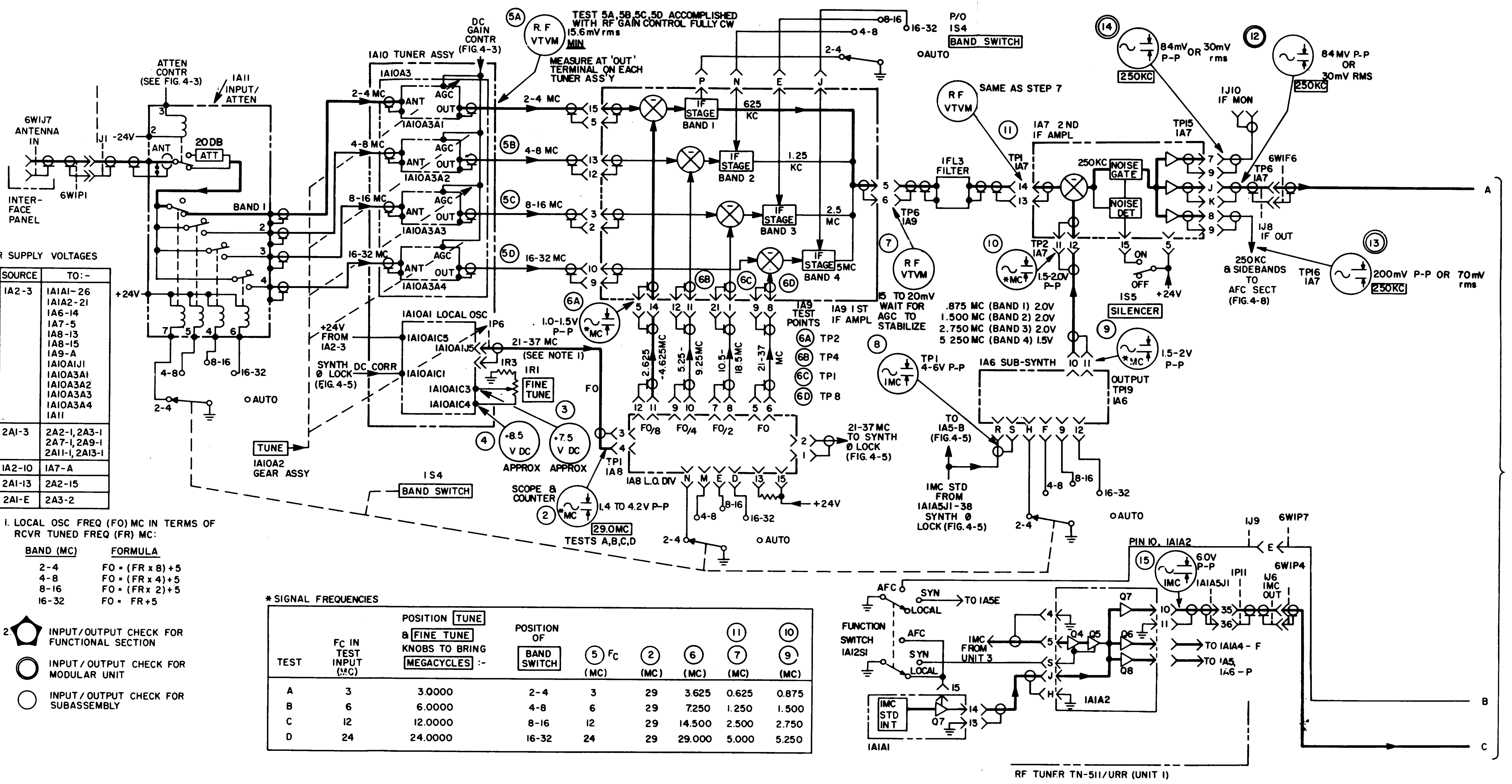
MEASUREMENTS 19A,19B,19C 19D. DISCONNECT AUDIO OUTPUT PLUG FROM 6J7, AUDIO JACK ON INTERFACE PANEL. CONNECT A 600Ω NON-INDUCTIVE LOAD ACROSS EACH AUDIO OUTPUT AND MAKE THE MEASUREMENT ACROSS THE LOAD AS INDICATED.

LINE LEVEL ADJUST CONTROLS SET FOR 0 DBM EACH CHANNEL

AUDIO FREQUENCIES CORRESPOND TO STEPS 19A,19B,19C,19D RESPECTIVLY MONITOR SELECTOR SWITCH MUST BE PLACED IN APPROPRIATE POSITION

AUDIO FREQUENCIES CORRESPOND TO STEPS 20A,20B,20C,20D RESPECTIVELY. MONITOR SELECTOR SWITCH MUST BE PLACED IN APPROPRIATE POSITION (AUDIBLE INDICATION ONLY)

Figure 4-2. ISB Signal Detection Servicing Block Diagram (Sheet 1 of 2)



VER SUPPLY VOLTAGES

TS	SOURCE	TO:-
	1A2-3	1A1A1-26 1A1A2-21 1A6-14 1A7-5 1A8-13 1A8-15 1A9-A 1A10A1J1 1A10A3A1 1A10A3A2 1A10A3A3 1A10A3A4 1A11
	2A1-3	2A2-1, 2A3-1 2A7-1, 2A9-1 2A11-1, 2A13-1
	1A2-10	1A7-A
	2A1-13	2A2-15
	2A1-E	2A3-2

ES: 1. LOCAL OSC FREQ (FO) MC IN TERMS OF RCVR TUNED FREQ (FR) MC:

BAND (MC)	FORMULA
2-4	FO = (FR x 8) + 5
4-8	FO = (FR x 4) + 5
8-16	FO = (FR x 2) + 5
16-32	FO = FR + 5

2. ⬠ INPUT/OUTPUT CHECK FOR FUNCTIONAL SECTION

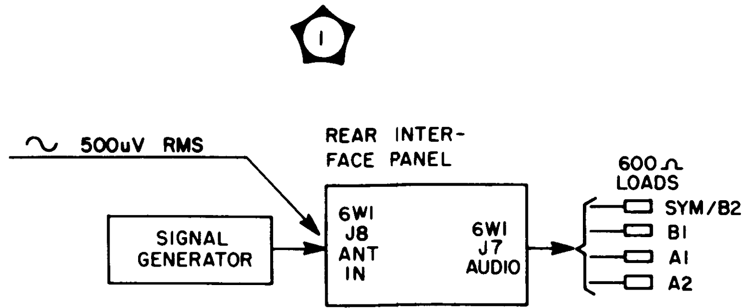
◎ INPUT/OUTPUT CHECK FOR MODULAR UNIT

○ INPUT/OUTPUT CHECK FOR SUBASSEMBLY

* SIGNAL FREQUENCIES

TEST	Fc IN TEST INPUT (MC)	POSITION TUNE & FINE TUNE KNOBS TO BRING MEGACYCLES :-	POSITION OF BAND SWITCH	⑤ Fc (MC)	② (MC)	⑥ (MC)	⑪ ⑦ (MC)	⑩ ⑨ (MC)
A	3	3.0000	2-4	3	29	3.625	0.625	0.875
B	6	6.0000	4-8	6	29	7.250	1.250	1.500
C	12	12.0000	8-16	12	29	14.500	2.500	2.750
D	24	24.0000	16-32	24	29	29.000	5.000	5.250

Figure 4-2. ISB Signal Detection Servicing Block Diagram (Sheet 2 of 2)



SET AT F_C AS INDICATED BY * SIGNAL FREQUENCIES IN TESTS A,B,C,D

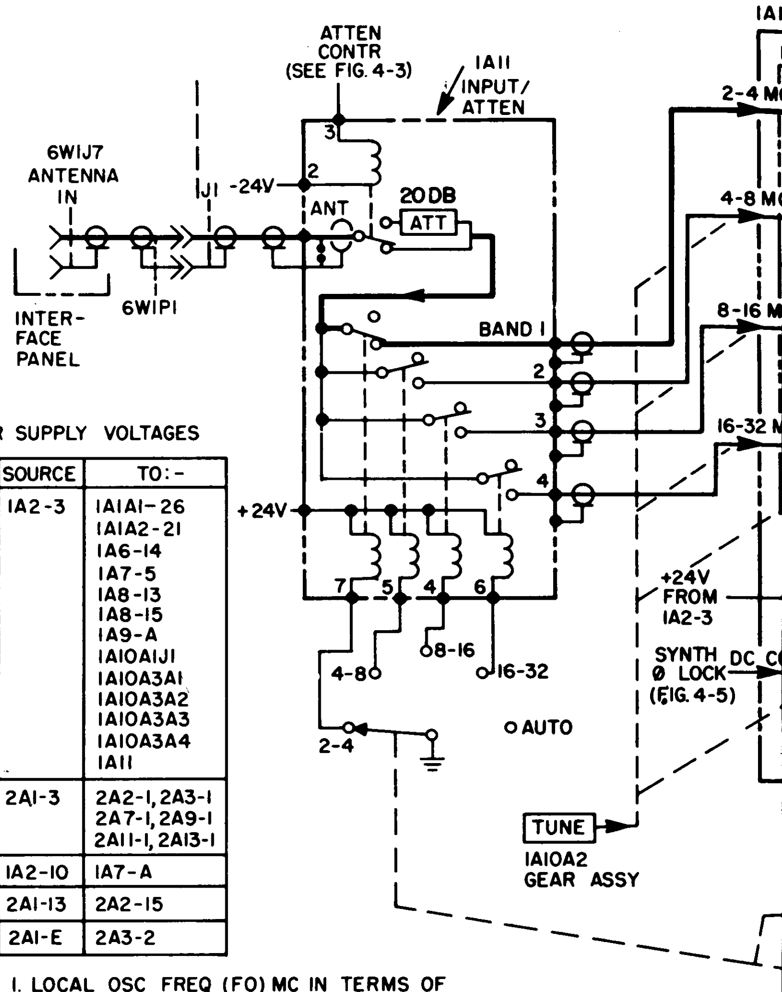
TEST SETUP - SIGNAL DETECTION

CONTROL POSITIONS FOR TEST

MODULAR UNIT	CONTROL	POSITION
KY-661/URR	POWER SWITCH	OFF
CV-2520(V)/URC (OR CV-2521( )/URC)	POWER SWITCH	OFF
TN-511/URR (OR TN-525/FRR)	ATTENUATOR SWITCH	DOWN
.	RF GAIN KNOB	# AGC
.	SILENCER SWITCH	DOWN
.	POWER SWITCH	ON
.	FUNCTION SWITCH	LOCAL
.	COUNTER MODE SWITCH	REC
.	BAND SWITCH	AS SHOWN IN TEST
.	TUNE KNOB	.
.	FINE TUNE KNOB	MAX CCW
TD-914/URR (OR TD-969/FRR)	METER SENSITIVITY SWITCH	0
.	SYM/B2 AGC SOURCE	B2
.	B1	B1
.	A1	A1
.	A2	A2
.	AGC TIME CONSTANT SWITCHES (2II)	MED
.	MODE SWITCH	ISB
.	POWER SWITCH	ON
.	LINE LEVEL ADJ KNOBS	**
O-1510/URR	POWER SWITCH	OFF

** ADJUST EACH KNOB FOR "O DBM" ON LINE-DBM METER USING MONITOR SELECTOR SWITCH

EXCEPT FULLY CW FOR TEST 5 ONLY



POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:-
+24	1A2-3	1A1A1-26 1A1A2-21 1A6-14 1A7-5 1A8-13 1A8-15 1A9-A 1A10A1J1 1A10A3A1 1A10A3A2 1A10A3A3 1A10A3A4 1A11
+24	2A1-3	2A2-1, 2A3-1 2A7-1, 2A9-1 2A11-1, 2A13-1
-24	1A2-10	1A7-A
+15	2A1-13	2A2-15
+5	2A1-E	2A3-2

NOTES: 1. LOCAL OSC FREQ (FO) MC IN TERMS OF RCVR TUNED FREQ (FR) MC:

BAND (MC)	FORMULA
2-4	FO = (FR x 8) + 5
4-8	FO = (FR x 4) + 5
8-16	FO = (FR x 2) + 5
16-32	FO = FR + 5

2 ⬠ INPUT/OUTPUT CHECK FOR FUNCTIONAL SECTION

◎ INPUT/OUTPUT CHECK FOR MODULAR UNIT

○ INPUT/OUTPUT CHECK FOR SUBASSEMBLY

* SIGNAL FREQUENCIES

TEST	F_C IN TEST INPUT (MC)
A	3
B	6
C	12
D	24

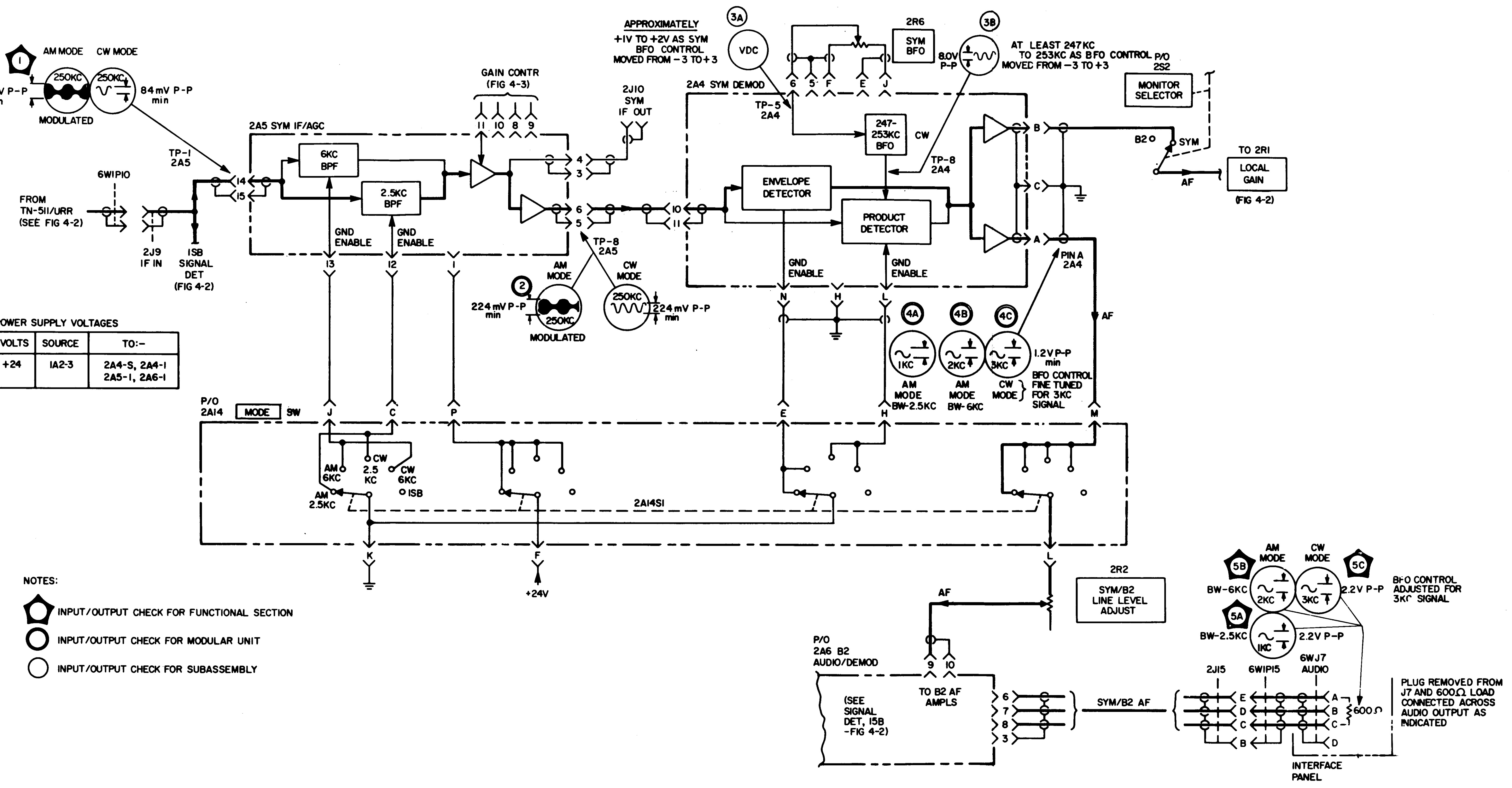
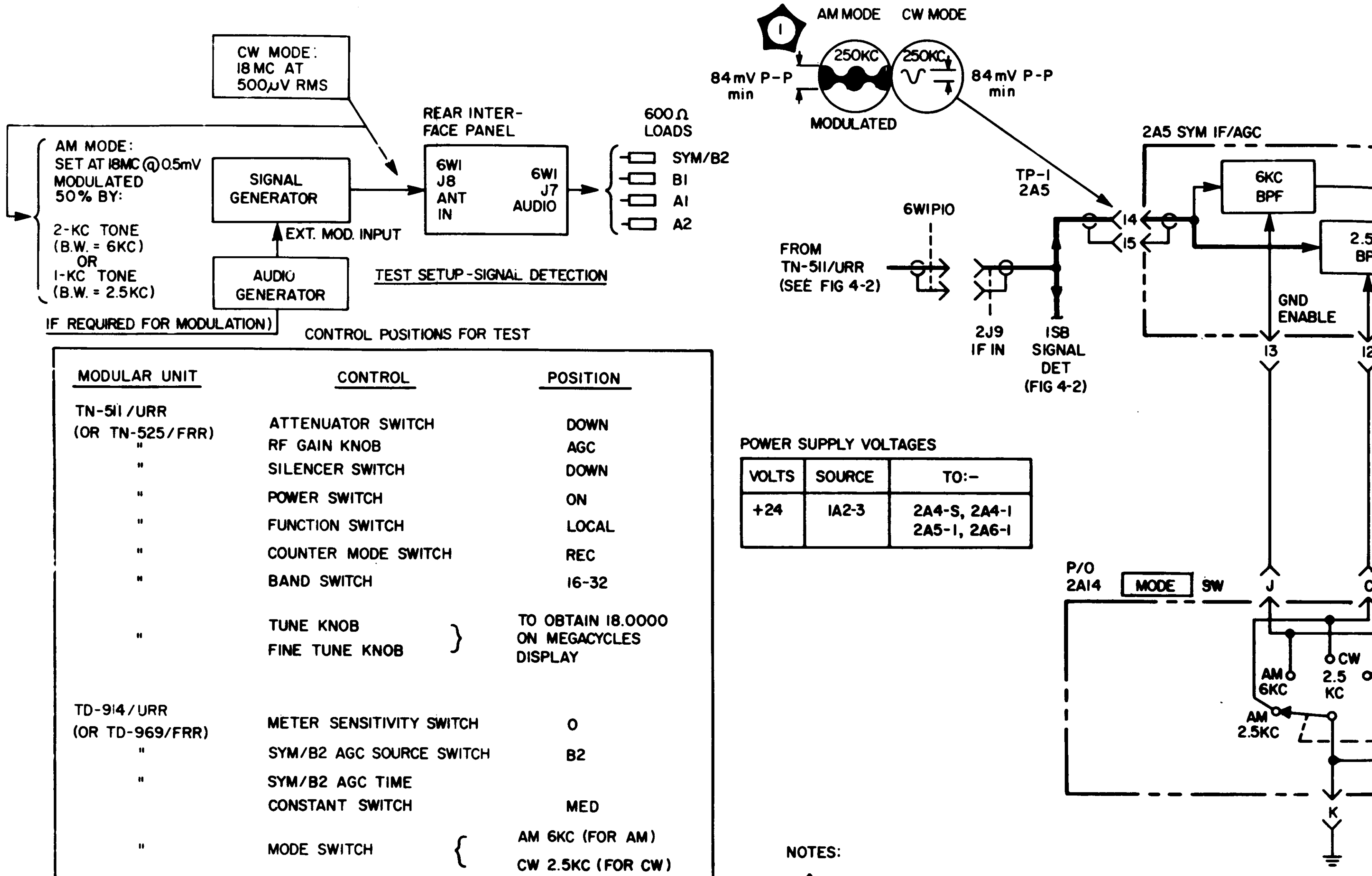


Figure 4-3. Signal Detection Section AM, Servicing Block Diagram CW Mode (Symmetrical)



TEST SETUP-SIGNAL DETECTION

CONTROL POSITIONS FOR TEST

MODULAR UNIT	CONTROL	POSITION
TN-511/URR (OR TN-525/FRR)	ATTENUATOR SWITCH	DOWN
"	RF GAIN KNOB	AGC
"	SILENCER SWITCH	DOWN
"	POWER SWITCH	ON
"	FUNCTION SWITCH	LOCAL
"	COUNTER MODE SWITCH	REC
"	BAND SWITCH	16-32
"	TUNE KNOB FINE TUNE KNOB	TO OBTAIN 18.0000 ON MEGACYCLES DISPLAY
TD-914/URR (OR TD-969/FRR)	METER SENSITIVITY SWITCH	0
"	SYM/B2 AGC SOURCE SWITCH	B2
"	SYM/B2 AGC TIME CONSTANT SWITCH	MED
"	MODE SWITCH	AM 6KC (FOR AM) CW 2.5KC (FOR CW)
"	POWER SWITCH	ON
"	SYM/B2 LINE LEVEL ADJ KNOB	*
"	SYM BFO KNOB	+3KC
O-1510 /URR	POWER SWITCH	OFF
KY-661/URR	POWER SWITCH	OFF
CV-2520(V)/ORC OR CV-2521(V)/ORC	POWER SWITCH	OFF

* ADJUST THIS KNOB FOR "ODBM" ON LINE-DBM METER, WITH MONITOR SELECTOR SWITCH AT SYM POSITION

POWER SUPPLY VOLTAGES

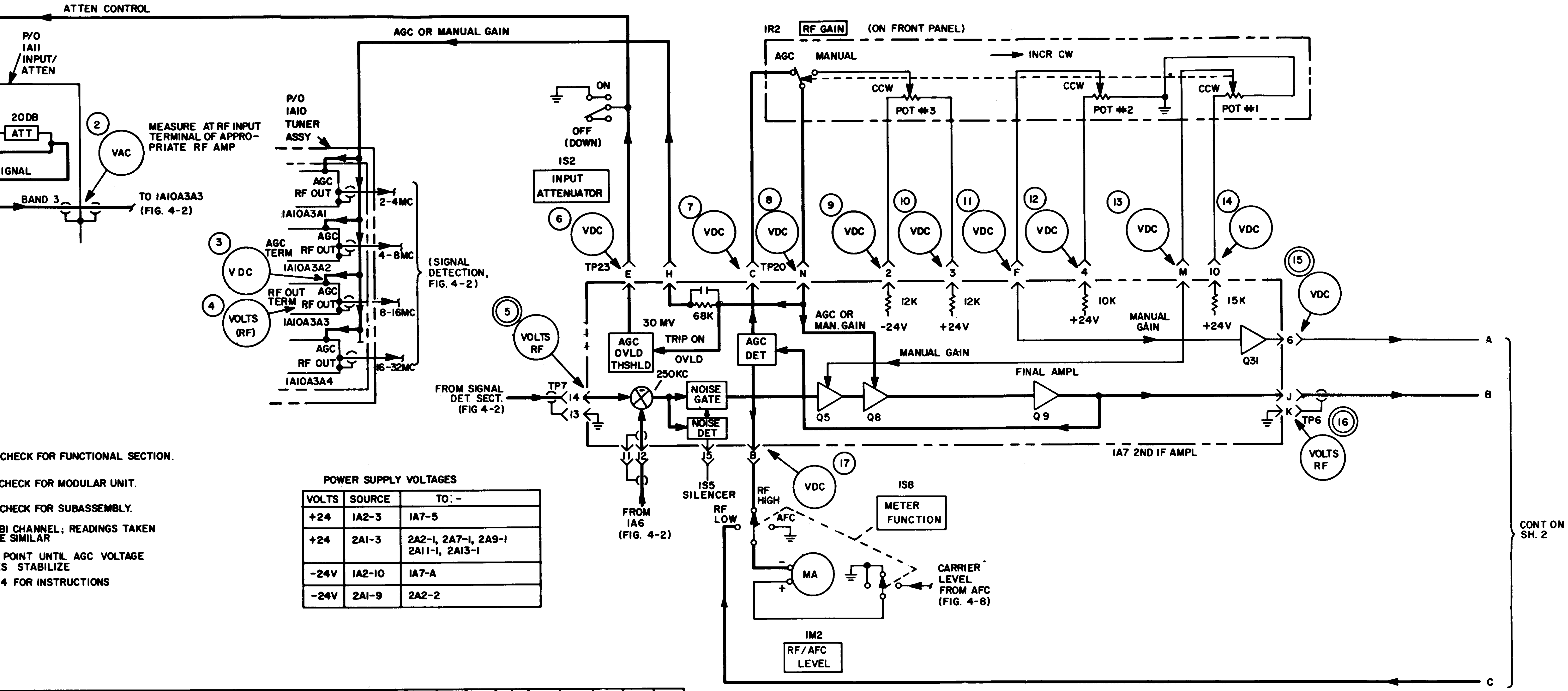
VOLTS	SOURCE	TO:-
+24	1A2-3	2A4-S, 2A4-1 2A5-1, 2A6-1

NOTES:

⬠ INPUT/OUTPUT CHECK FOR FUNCTIONAL SECTION

◯ INPUT/OUTPUT CHECK FOR MODULAR UNIT

○ INPUT/OUTPUT CHECK FOR SUBASSEMBLY



CHECK FOR FUNCTIONAL SECTION.

CHECK FOR MODULAR UNIT.

CHECK FOR SUBASSEMBLY.

BI CHANNEL; READINGS TAKEN
E SIMILAR

POINT UNTIL AGC VOLTAGE
S STABILIZE

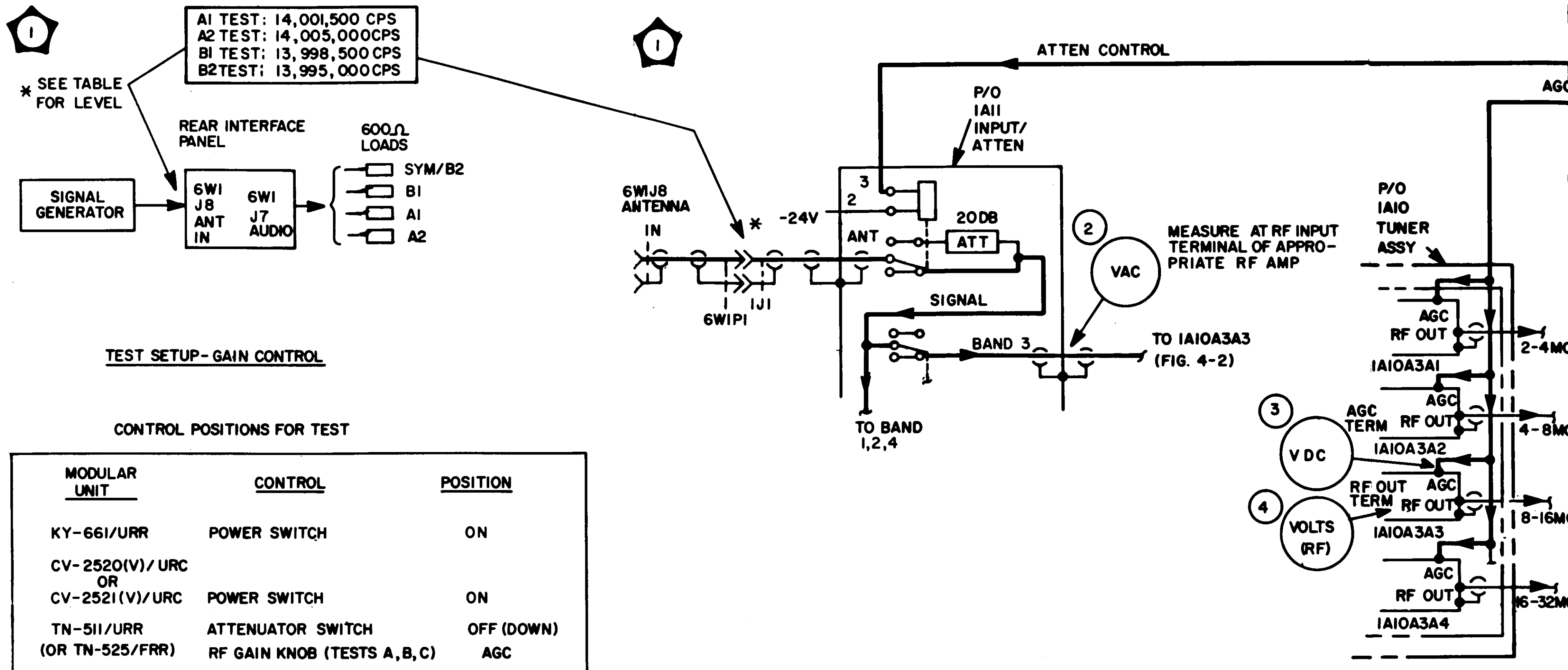
4 FOR INSTRUCTIONS

POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO: -
+24	1A2-3	1A7-5
+24	2A1-3	2A2-1, 2A7-1, 2A9-1 2A11-1, 2A13-1
-24V	1A2-10	1A7-A
-24V	2A1-9	2A2-2

②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲				
RMS	VDC	RMS	RMS	VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC	RMS	VDC	RMS					
—	0	—	12mV	-24	0	0	—	—	—	—	—	—	—	1mV	0	76mV	0				
68mV	-2	60mV	.5V	-.6	-11.0	-11.0	—	—	—	—	—	—	—	165mV	-.2	100mV	-.2				
100mV	-2.05	90mV	.57V	-.6	-11.0	—	—	—	—	—	—	—	—	—	—	—	—				
1.0mV	-3.2	2.4mV	10mV	—	—	—	-13.0	+12.5	+7.4	+7.2	+1.7	+1.65	+2.4	4mV	+.2	76mV	—				
1.1mV	+.15	8.2mV	95mV	—	—	—	-20.0	+.65	0	+7.8	0	+10.4	0	1.65V	0	410 mV	—				

Figure 4-4. Servicing Block Diagram Gain Control (ISB) Mode
(Sheet 1 of 2)



TEST SETUP- GAIN CONTROL

CONTROL POSITIONS FOR TEST

MODULAR UNIT	CONTROL	POSITION
KY-661/URR	POWER SWITCH	ON
CV-2520(V)/URC OR CV-2521(V)/URC	POWER SWITCH	ON
TN-511/URR (OR TN-525/FRR)	ATTENUATOR SWITCH	OFF (DOWN)
	RF GAIN KNOB (TESTS A, B, C)	AGC
"	" (TEST D)	FULLY CCW
"	" (TEST E)	FULLY CW
"	SILENCER SWITCH	OFF (DOWN)
"	POWER SWITCH	ON
"	FUNCTION SWITCH	SYN
"	COUNTER MODE SWITCH	REC
"	BAND SWITCH	AUTO
"	TUNE AND FINE TUNE KNOBS	WILL SERVO TUNE TO OBTAIN 14.0000 ON MEGACYCLES DISPLAY
"	METER FUNCTION SWITCH	RF HIGH
TD-914/URR (OR TD-969/FRR)	METER SENSITIVITY SWITCH	O
	SYM/B2 AGC SOURCE SWITCH	B2
"	BI " "	BI
"	AI " "	AI
"	A2 " "	A2
"	AGC TIME CONSTANT SWITCHES	FAST
"	MODE SWITCH	ISB
"	POWER SWITCH	ON
"	LINE LEVEL ADJ KNOBS	**
O-1510/URR	POWER SWITCH	ON
	FREQUENCY SELECTORS	14.0000

** ADJUST EACH KNOB FOR "O DBM" ON LINE-DBM METER, USING MONITOR SELECTOR SWITCH.

NOTES:

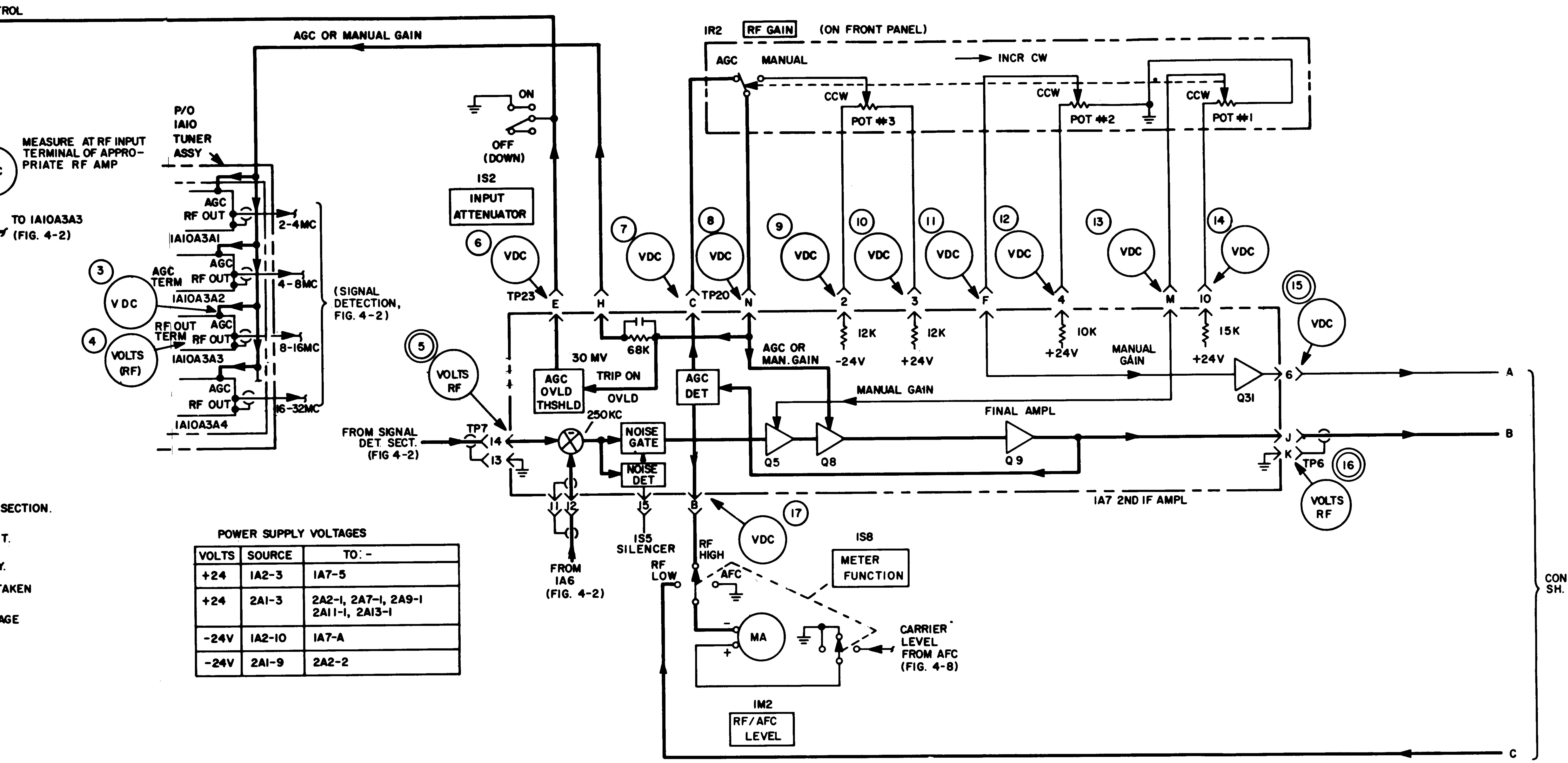
1. ⬠ INPUT/OUTPUT CHECK FOR FUNCTIONAL SECTION.
   ○ INPUT/OUTPUT CHECK FOR MODULAR UNIT.
   ◎ INPUT/OUTPUT CHECK FOR SUBASSEMBLY.
2. READINGS TAKEN FOR BI CHANNEL; READINGS TAKEN FOR A2,AI,A3 SHOULD BE SIMILAR
3. LEAVE METER AT TEST POINT UNTIL AGC VOLTAGE AND/OR SIGNAL VOLTAGES STABILIZE
4. REFER TO PARAGRAPH 4 FOR INSTRUCTIONS

POWER SUPPLY V

VOLTS	SOURCE
+24	IA2-3
+24	2AI-3
-24V	IA2-10
-24V	2AI-9

* SIGNAL VARIATIONS

TEST	1	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭
		RMS	VDC	RMS	RMS	VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC
A AGC (MIN SIGNAL)	luV	—	0	—	12mV	-24	0	0	—	—	—	—	—	—
B AGC (MAX SIGNAL)	1.0V	68mV	-2	60mV	.5V	-.6	-11.0	-11.0	—	—	—	—	—	—
C AGC OVERLOAD	1.5V	100mV	-2.05	90mV	.57V	-.6	-11.0	—	—	—	—	—	—	—
D MANUAL GAIN (MIN)	500uV	1.0mV	-3.2	2.4mV	10mV	—	—	—	-13.0	+12.5	+7.4	+7.2	+1.7	+1.65
E MANUAL GAIN (MAX)		1.1mV	+.15	8.2mV	95mV	—	—	—	-20.0	+.65	0	+7.8	0	+10.4

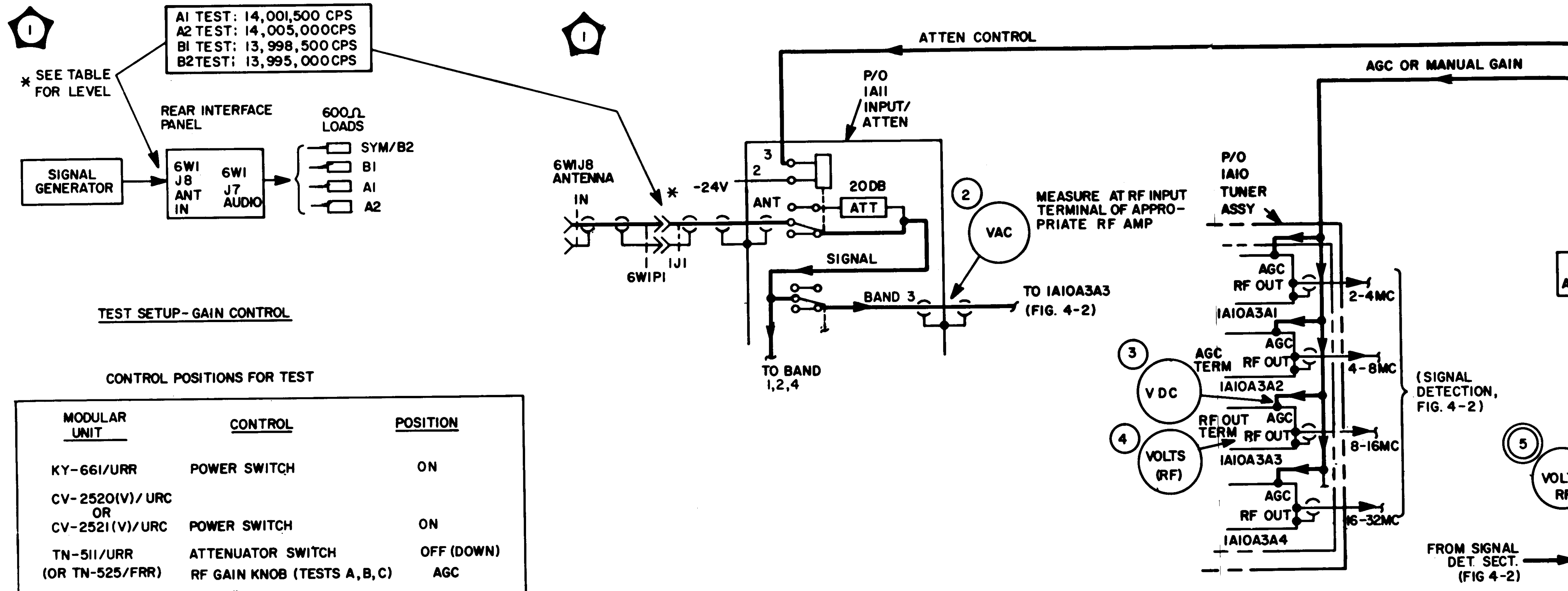


POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:-
+24	1A2-3	1A7-5
+24	2A1-3	2A2-1, 2A7-1, 2A9-1 2A11-1, 2A13-1
-24V	1A2-10	1A7-A
-24V	2A1-9	2A2-2

⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲				
VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC	RMS	VDC	RMS					
-24	0	0	—	—	—	—	—	—	—	1mV	0	76mV	0				
-.6	-11.0	-11.0	—	—	—	—	—	—	—	165mV	-.2	100mV	-.2				
-.6	-11.0	—	—	—	—	—	—	—	—	—	—	—	—				
—	—	—	-13.0	+12.5	+7.4	+7.2	+1.7	+1.65	+2.4	4mV	+.2	76mV	—				
—	—	—	-20.0	+.65	0	+7.8	0	+10.4	0	1.65V	0	410 mV	—				

Figure 4-4. Servicing Block Diagram Gain Control (ISB) Mode
(Sheet 1 of 2)



TEST SETUP-GAIN CONTROL

CONTROL POSITIONS FOR TEST

MODULAR UNIT	CONTROL	POSITION
KY-661/URR	POWER SWITCH	ON
CV-2520(V)/URC OR CV-2521(V)/URC	POWER SWITCH	ON
TN-511/URR (OR TN-525/FRR)	ATTENUATOR SWITCH	OFF (DOWN)
	RF GAIN KNOB (TESTS A, B, C)	AGC
"	" (TEST D)	FULLY CCW
"	" (TEST E)	FULLY CW
"	SILENCER SWITCH	OFF (DOWN)
"	POWER SWITCH	ON
"	FUNCTION SWITCH	SYN
"	COUNTER MODE SWITCH	REC
"	BAND SWITCH	AUTO
"	TUNE AND FINE TUNE KNOBS	WILL SERVO TUNE TO OBTAIN 14.0000 ON MEGACYCLES DISPLAY
"	METER FUNCTION SWITCH	RF HIGH
TD-914/URR (OR TD-969/FRR)	METER SENSITIVITY SWITCH	O
	SYM/B2 AGC SOURCE SWITCH	B2
"	B1 " "	B1
"	A1 " "	A1
"	A2 " "	A2
"	AGC TIME CONSTANT SWITCHES	FAST
"	MODE SWITCH	ISB
"	POWER SWITCH	ON
"	LINE LEVEL ADJ KNOBS	**
O-1510/URR	POWER SWITCH	ON
	FREQUENCY SELECTORS	14.0000

** ADJUST EACH KNOB FOR "O DBM" ON LINE-DBM METER, USING MONITOR SELECTOR SWITCH.

NOTES:

1. ⬠ INPUT/OUTPUT CHECK FOR FUNCTIONAL SECTION.
   ○ INPUT/OUTPUT CHECK FOR MODULAR UNIT.
   ◎ INPUT/OUTPUT CHECK FOR SUBASSEMBLY.
2. READINGS TAKEN FOR B1 CHANNEL; READINGS TAKEN FOR A2,A1,A3 SHOULD BE SIMILAR
3. LEAVE METER AT TEST POINT UNTIL AGC VOLTAGE AND/OR SIGNAL VOLTAGES STABILIZE
4. REFER TO PARAGRAPH 4 FOR INSTRUCTIONS

POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:-
+24	1A2-3	1A7-5
+24	2A1-3	2A2-1, 2A7-1, 2A9-1 2A11-1, 2A13-1
-24V	1A2-10	1A7-A
-24V	2A1-9	2A2-2

* SIGNAL VARIATIONS

TEST	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱
		RMS	VDC	RMS	RMS	VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC	VDC	RMS	VDC	RMS
A AGC (MIN SIGNAL)	1uV	—	0	—	12mV	-24	0	0	—	—	—	—	—	—	—	1mV	0	76mV
B AGC (MAX SIGNAL)	1.0V	68mV	-2	60mV	.5V	-.6	-11.0	-11.0	—	—	—	—	—	—	—	165mV	-.2	100mV
C AGC OVERLOAD	1.5V	100mV	-2.05	90mV	.57V	-.6	-11.0	—	—	—	—	—	—	—	—	—	—	—
D MANUAL GAIN (MIN)	500uV	1.0mV	-3.2	2.4mV	10mV	—	—	—	-13.0	+12.5	+7.4	+7.2	+1.7	+1.65	+2.4	4mV	+.2	76mV
E MANUAL GAIN (MAX)		1.1mV	+.15	8.2mV	95mV	—	—	—	-20.0	+.65	0	+7.8	0	+10.4	0	1.65V	0	410 mV

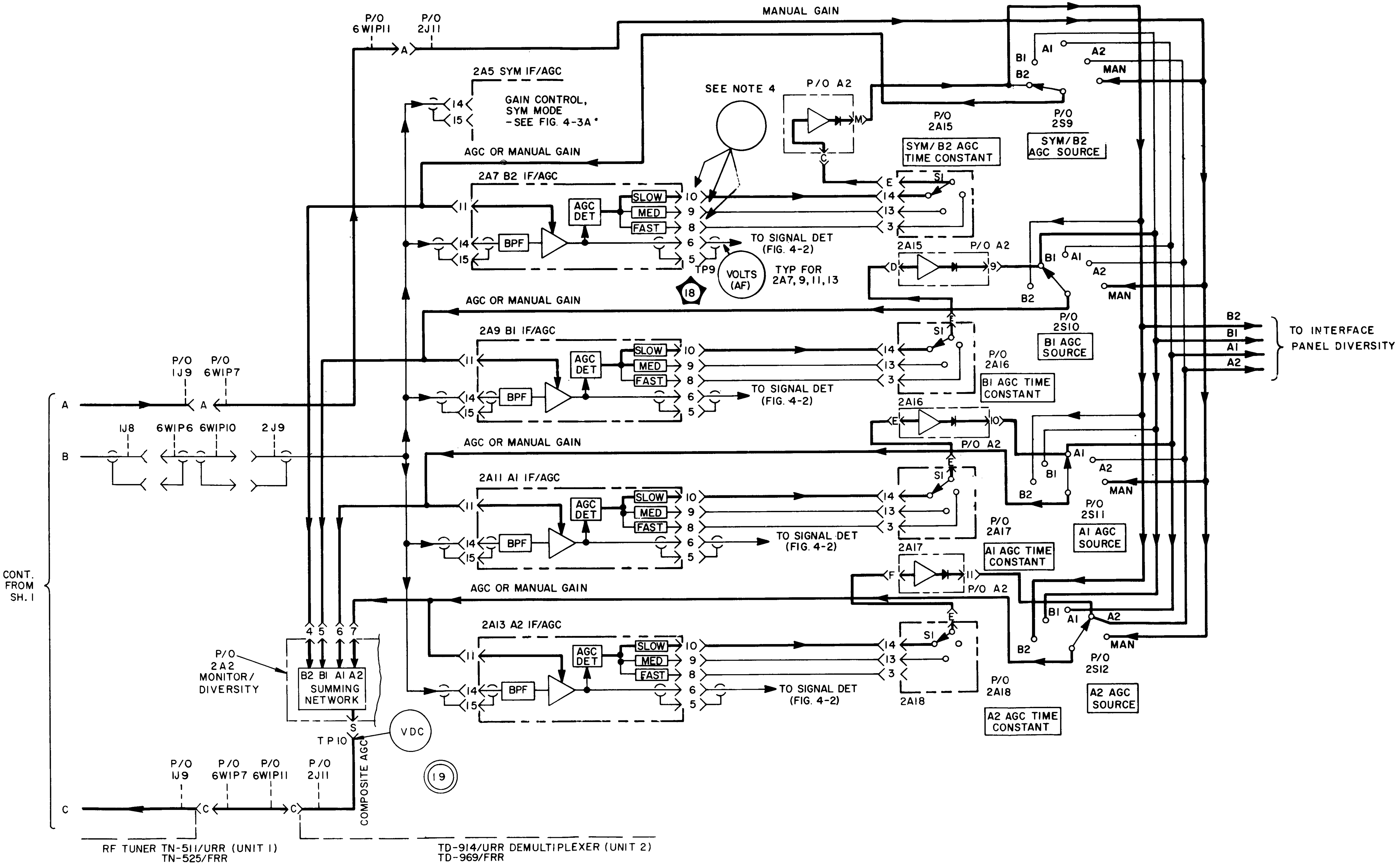
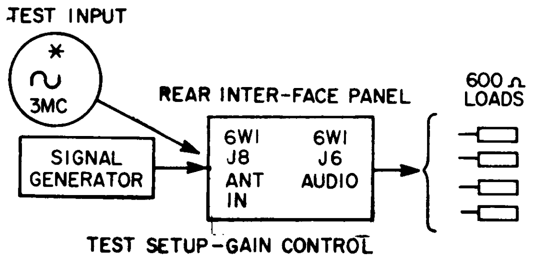


Figure 4-4. Servicing Block Diagram Gain Control (ISB) Mode (Sheet 2 of 2)

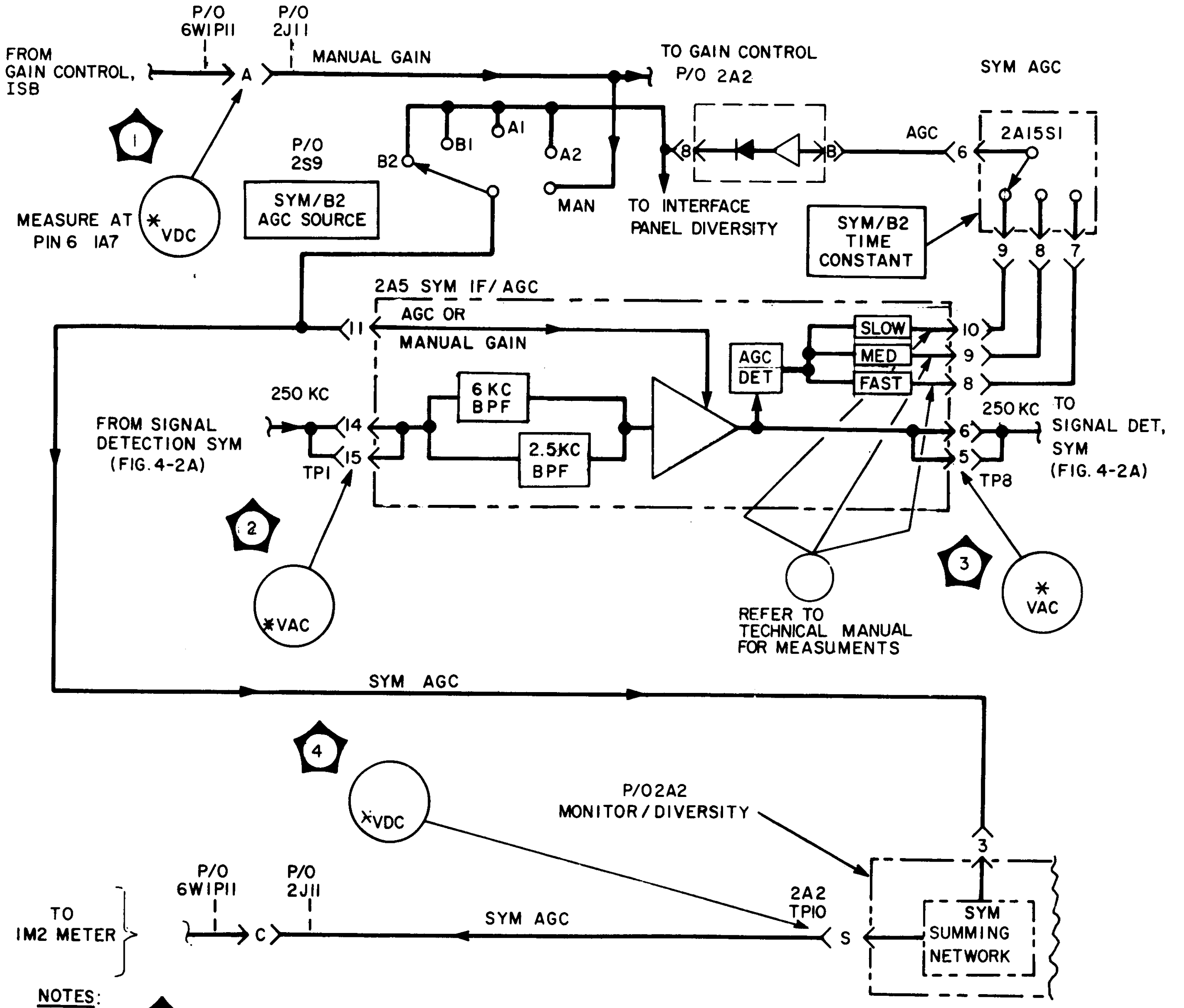


TEST SETUP-GAIN CONTROL

CONTROL POSITIONS FOR TEST

MODULAR UNIT	CONTROL	POSITION
KY-661/URR	POWER SWITCH	OFF
CV-2520(V)/URC OR CV-2521(V)URC	POWER SWITCH	OFF
TN-511/URR (OR TN-525/FAR)	ATTENUATOR SWITCH	OFF(DOWN)
	RF GAIN KNOB(TESTSA,B)	AGC
" "	" " (TEST C)	FULLY CCW
" "	" " (TEST D)	FULLY CW
" "	SILENCER SWITCH	OFF (DOWN)
" "	POWER SWITCH	ON
" "	FUNCTION SWITCH	LOCAL
" "	COUNTER MODE SWITCH	REC
" "	BAND SWITCH	2-4
" "	TUNE AND FINE TUNE KNOBS	TO OBTAIN 3.0000 ON MEGACYCLES DISPLAY
" "	METER FUNCTION SWITCH	RF LOW
TD-914/URR	METER SENSITIVITY SWITCH	0
(OR TD-969/FRR)	SYM/B2 AGC SOURCE	(TESTS A,B)---B2
	" "	(TESTS C,D)---MAN
" "	B,A1,A2,AGC SOURCE SWITCH	OPTIONAL
" "	MODE SWITCH	AM6KC
" "	POWER SWITCH	ON
" "	SYM/B2 LINE LEVEL ADJ KNOB	* *
" "	B1,A1,A2,LINE LEVEL ADJ KNOBS	OPTIONAL
" "	SYM/B2 AGC TIME CONSTANT SWITCH	SLOW
" "	B1,A1,A2,AGC TIME CONSTANT SWITCHES	OPTIONAL
O-1510/URR	POWER SWITCH	OFF

* * SET MONITOR SELECTOR SWITCH AT SYM AND ADJUST KNOB FOR "0 DBM" ON LINE-DBM METER.



NOTES:

1. ⬟ INPUT/OUTPUT CHECK FOR FUNCTIONAL SECTION.

2. ○ INPUT/OUTPUT CHECK FOR SUBASSEMBLY.

VOLTS	SOURCE	TO -
+24	2A1-3	2A5-1

* SIGNAL VARIATIONS

TEST	3MC TEST INPUT (MV)	① VDC	② RMS	③	④ VDC
A AGC (MIN SIGNAL)	1uV	——	1mV	76mV	0V
B AGC (MAX SIGNAL)	1V	——	200mV	100mV	-.2V
C MANUAL GAIN (MIN)	500uV	+2.4V	5mV	76mV	——
D MANUAL GAIN (MAX)	500uV	0V	2V	410mV	——

Figure 4-5. Servicing Block Diagram Gain Control (Symmetrical)

* SIGNAL VARIATIONS

	TEST	SIGNAL GEN "A"	SIGNAL GEN "B"	① (VDC)	② (VDC)	③ (VDC)
A	RCVR "A" WEAK RCVR "B" STRONG	10 uv	30uv	+2.5	+3.0	+3.0V
B	RCVR "B" WEAK RCVR "A" STRONG	30uv	10uv	+3.0	+3.0	+2.5V

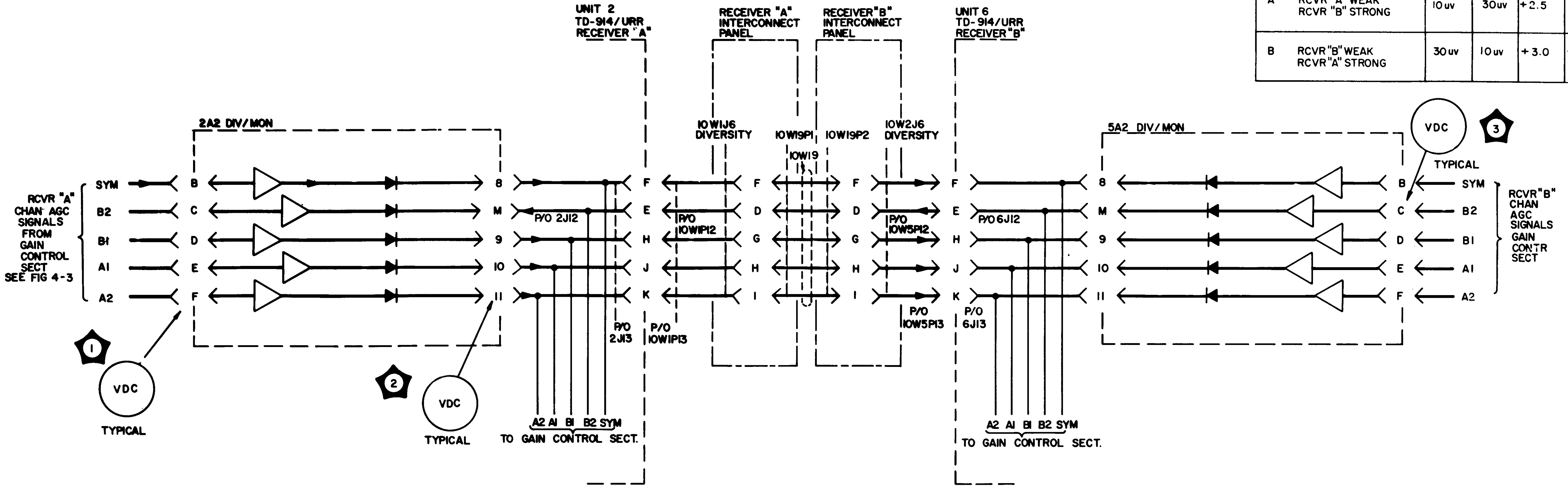
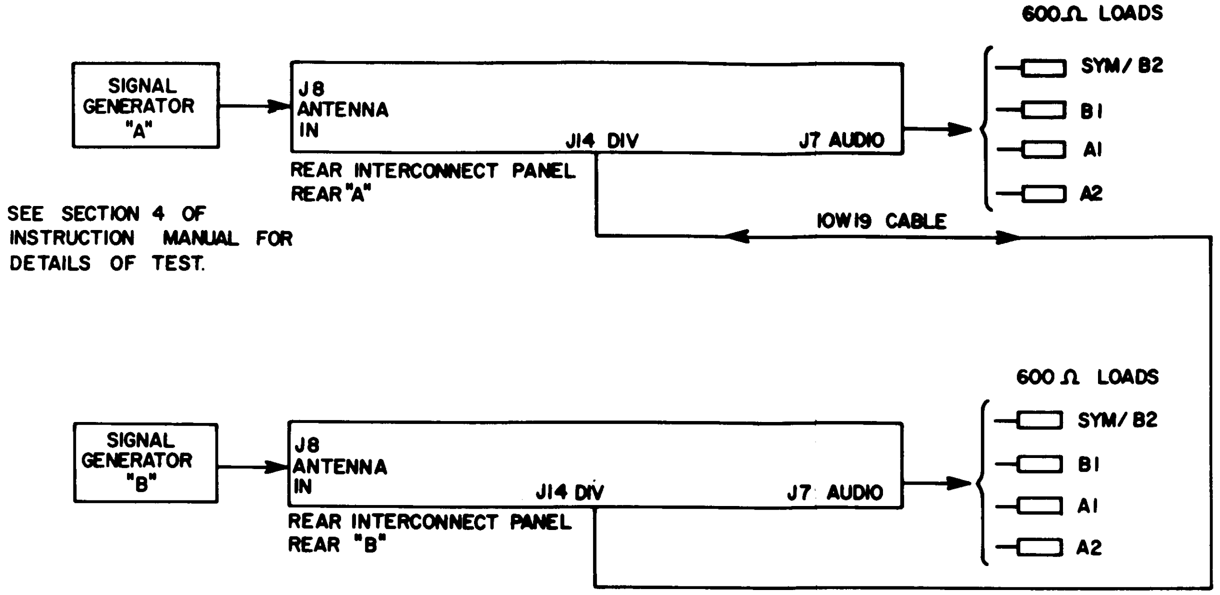


Figure 4-6. Servicing Block Diagram Diversity Quieter Section

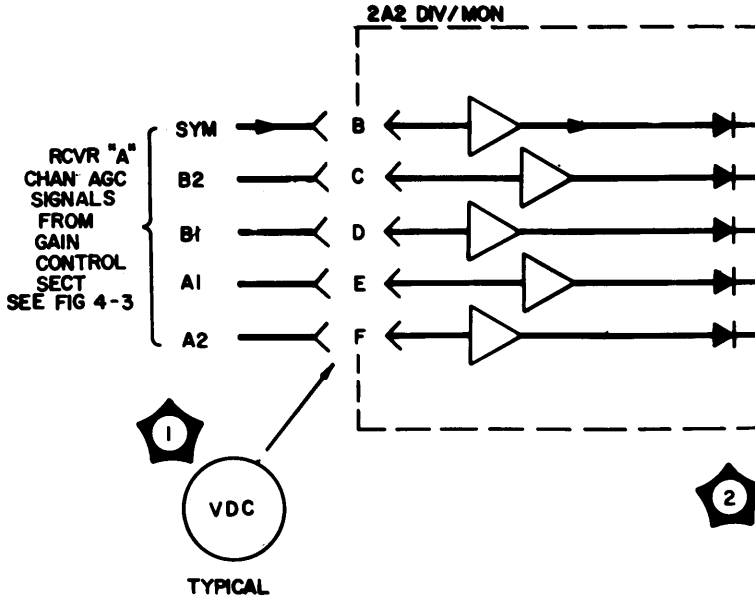


SEE SECTION 4 OF INSTRUCTION MANUAL FOR DETAILS OF TEST.

TEST SETUP-DIVERSITY QUIETER
CONTROL POSITION FOR TEST

MODULAR UNIT	CONTROL	POSITION
KY-661/URR (UNITS 4 & 8)	POWER SWITCHES	OFF
CV-2521(V)/URC	POWER SWITCH	OFF
TN-511/URR (UNITS 1 & 5)	ATTENUATOR SWITCH	OFF(DOWN)
	RF GAIN-KNOB	AGC
	SILENCER SWITCH	OFF(DOWN)
	POWER SWITCH	ON
	FUNCTION SWITCH	LOCAL
	COUNTER MODE SWITCH	REC
	BAND SWITCH	2-4
	TUNE AND FINE TUNE KNOBS	TO OBTAIN 3.0000 ON MEGACYCLES DISPLAY
	METER FUNCTION SWITCH	RF HIGH
TD-914/URR (UNITS 2 & 6)	METER SENSITIVITY SWITCH	O
	SYM/B2 AGC SOURCE SWITCH	B2
	B1 AGC SOURCE SWITCH	B1
	A1 " " "	A1
	A2 " " "	A2
	AGC TIME CONSTANT SWITCH (ALL)	FAST
	MODE SWITCH	ISB
	POWER SWITCH	ON
	LINE LEVEL ADJ KNOBS (ALL)	* *
O-1510/URR (UNITS 3 & 7)	POWER SWITCH	OFF

* * ADJUST EACH KNOB FOR "0" dbm ON LINE DBM METER USING MONITOR SELECTOR SWITCH



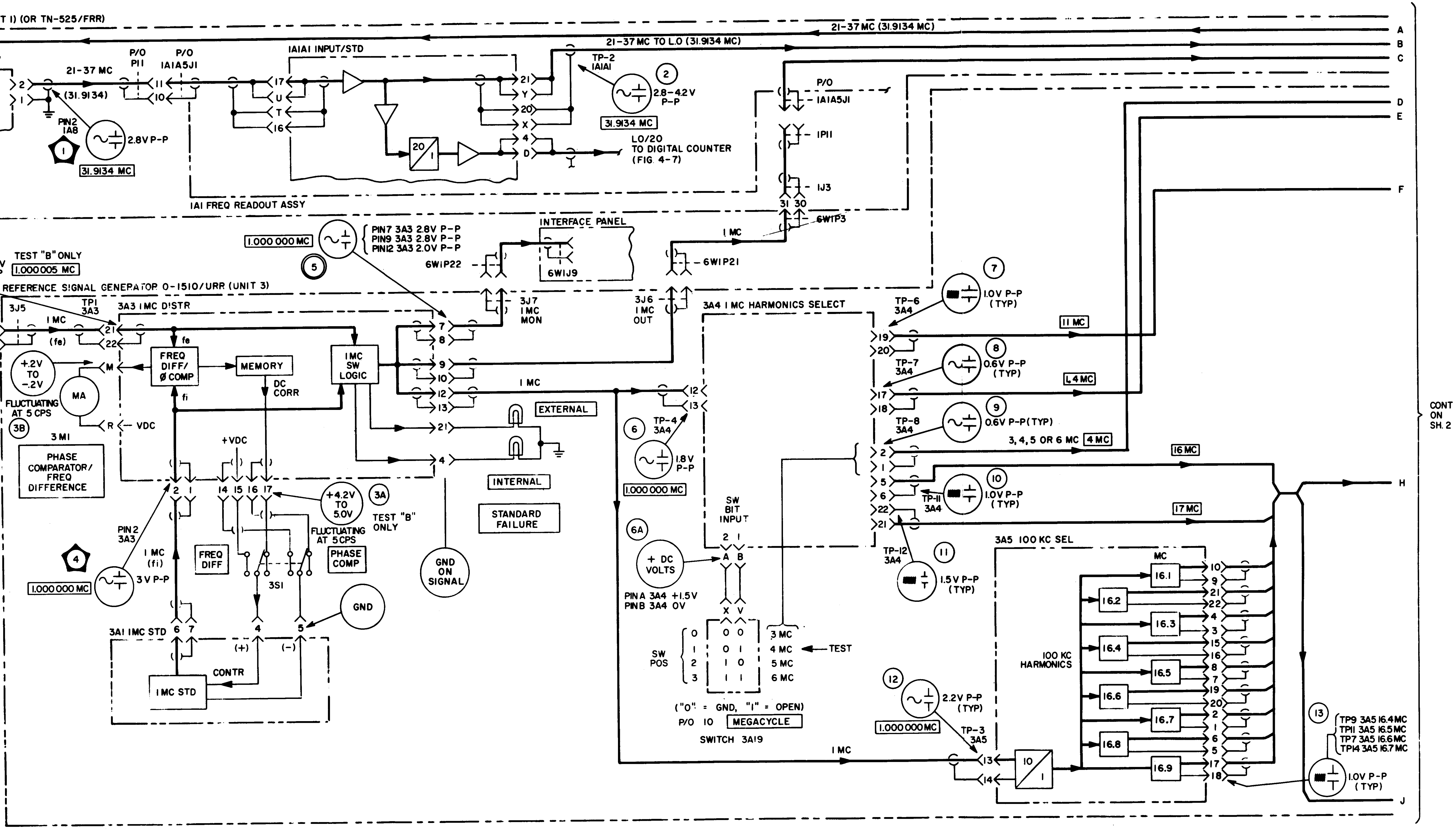
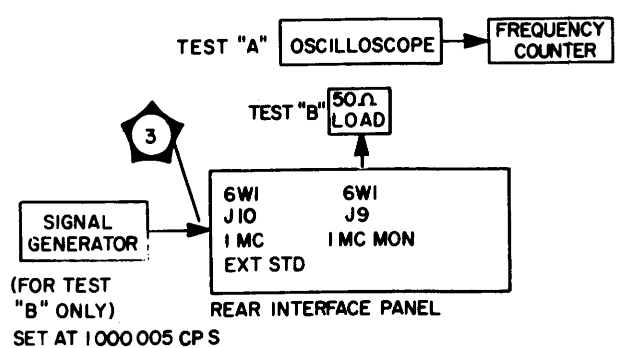


Figure 4-7. Servicing Block Diagram Synthesizer/Phase Lock Section (Sheet 1 of 3)



SET AT 1 000 005 CP S
MC @ 1.0 VRMS
TEST SETUP-SYNTHESIZER/PHASE LOCK

CONTROL POSITIONS FOR TEST *

MODULAR UNIT	CONTROL	POSITION
KY-661/URR	POWER SWITCH	OFF
CV-2520 (V)/URC (OR CV-2521 (V)/URC	POWER SWITCH	OFF
TN-511/URR (OR TN-525/FRR)	POWER SWITCH	ON
"	FUNCTION SWITCH	SYN
"	COUNTER MODE SWITCH	REC
"	BAND SWITCH	8-16
O-1510/URR	10 MEGACYCLE SWITCH	1
"	1 " "	3
"	O1 " "	4
"	.01 " "	5
"	.001 " "	6
"	.0001 " "	7
"	PHASE COMPARATOR/ FREQ DIFFERENCE SW (TEST "A" & "C")	PHASE COMPARATOR
	(TEST "B")	FREQ DIFFERENCE
"	POWER SWITCH	ON

* POSITIONS OF CONTROLS NOT LISTED ARE OPTIONAL

NOTES

1 ⬠ INPUT/OUTPUT CHECKS FOR FUNCTIONAL SECTION

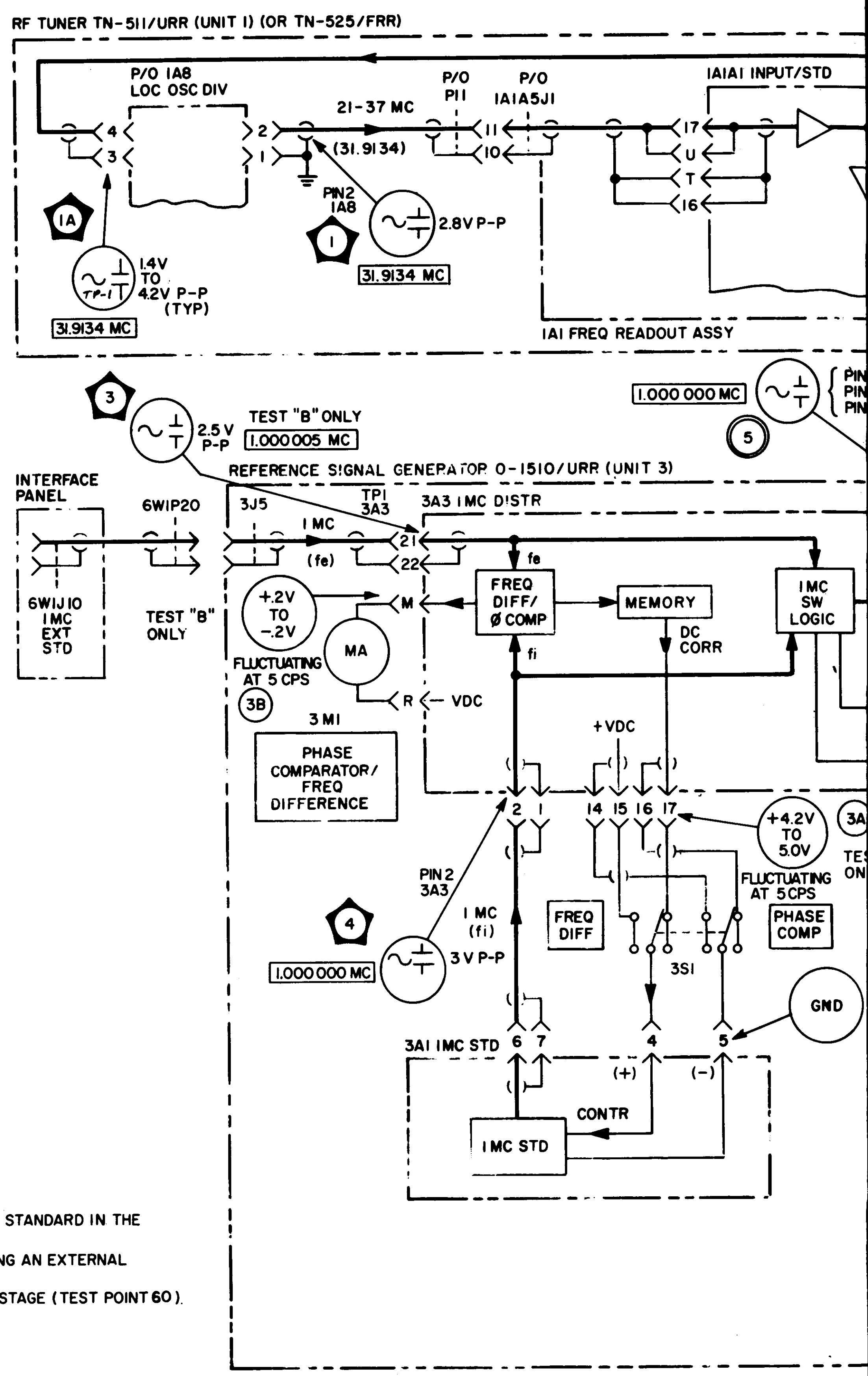
◎ INPUT/OUTPUT CHECKS FOR MODULAR UNITS

○ INPUT/OUTPUT CHECKS FOR SUBASSEMBLIES

2 TEST "A" IS A GENERAL OVERALL TEST USING THE INTERNAL 1MC STANDARD IN THE O-1510/URR AND SYNCHRONIZING THE RECEIVER ON 13.4567 MC.

TEST "B" TESTS THE 1-MC AUTOMATIC TRANSFER SWITCHING, USING AN EXTERNAL 1 MC STANDARD (TEST POINTS 3, 3A & 3B).

TEST "C" TESTS THE PULL-IN FUNCTIONING OF THE PHASE LOCK STAGE (TEST POINT 60).



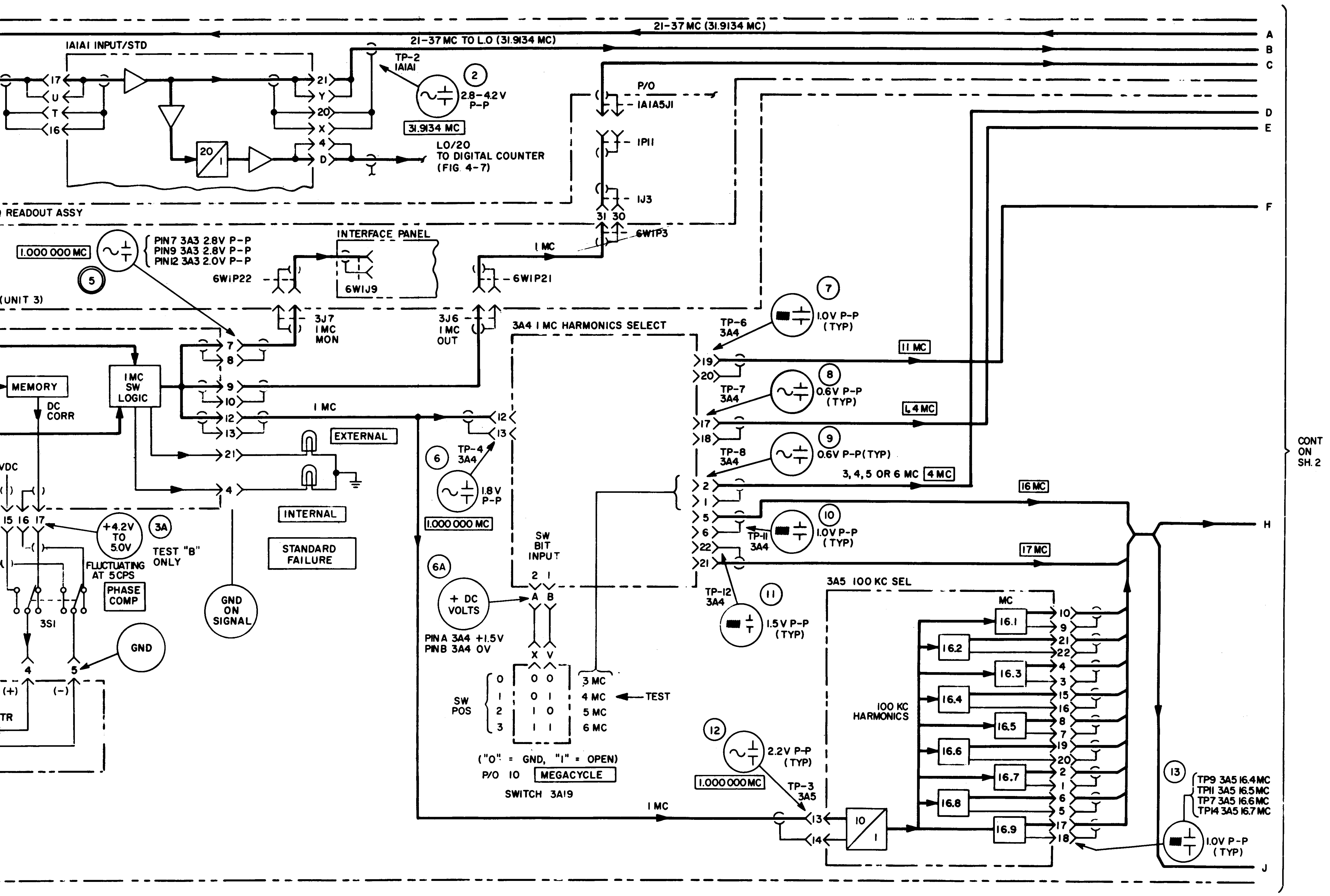
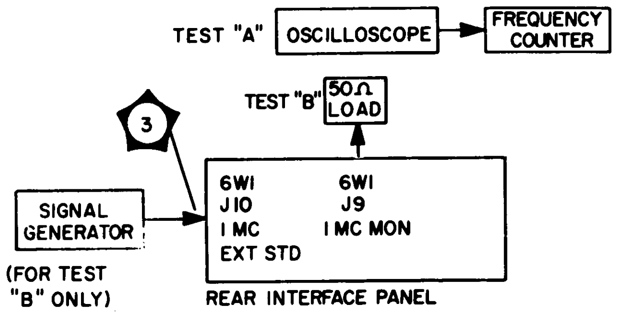


Figure 4-7. Servicing Block Diagram Synthesizer/Phase Lock Section (Sheet 1 of 3)



SET AT 1000 005 CPS MC @ 1.0 VRMS

TEST SETUP - SYNTHESIZER/PHASE LOCK

CONTROL POSITIONS FOR TEST *

MODULAR UNIT	CONTROL	POSITION
KY-661/URR	POWER SWITCH	OFF
CV-2520 (V)/URC (OR CV-2521 (V)/URC	POWER SWITCH	OFF
TN-511/URR (OR TN-525/FRR)	POWER SWITCH	ON
"	FUNCTION SWITCH	SYN
"	COUNTER MODE SWITCH	REC
"	BAND SWITCH	8-16
O-1510/URR	10 MEGACYCLE SWITCH	1
"	1 " "	3
"	0.1 " "	4
"	.01 " "	5
"	.001 " "	6
"	.0001 " "	7
"	PHASE COMPARATOR/ FREQ DIFFERENCE SW (TEST "A") & "C"	PHASE COMPARATOR
	(TEST "B")	FREQ DIFFERENCE
"	POWER SWITCH	ON

* POSITIONS OF CONTROLS NOT LISTED ARE OPTIONAL

NOTES

1 ⬠ INPUT/OUTPUT CHECKS FOR FUNCTIONAL SECTION

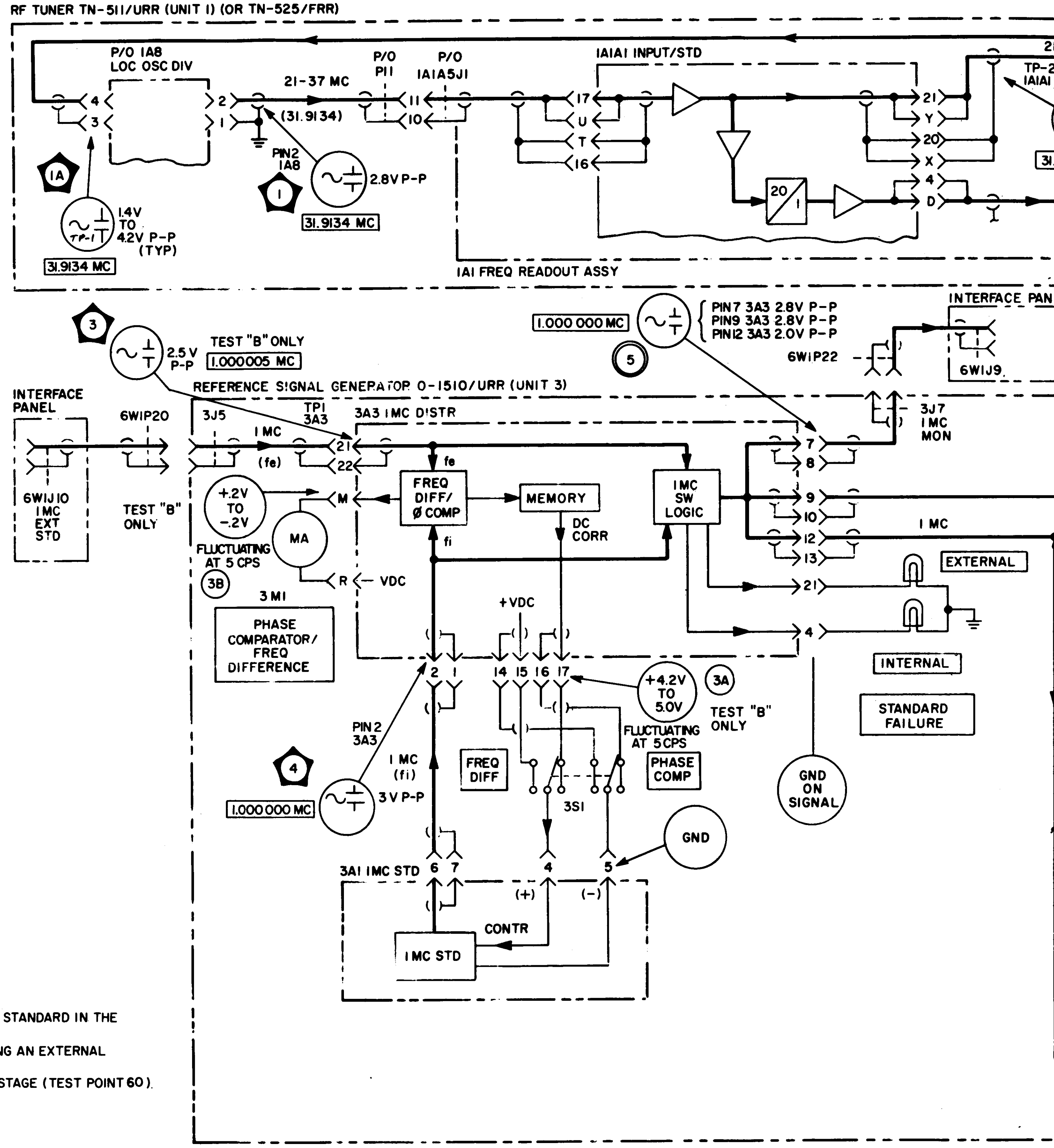
◎ INPUT/OUTPUT CHECKS FOR MODULAR UNITS

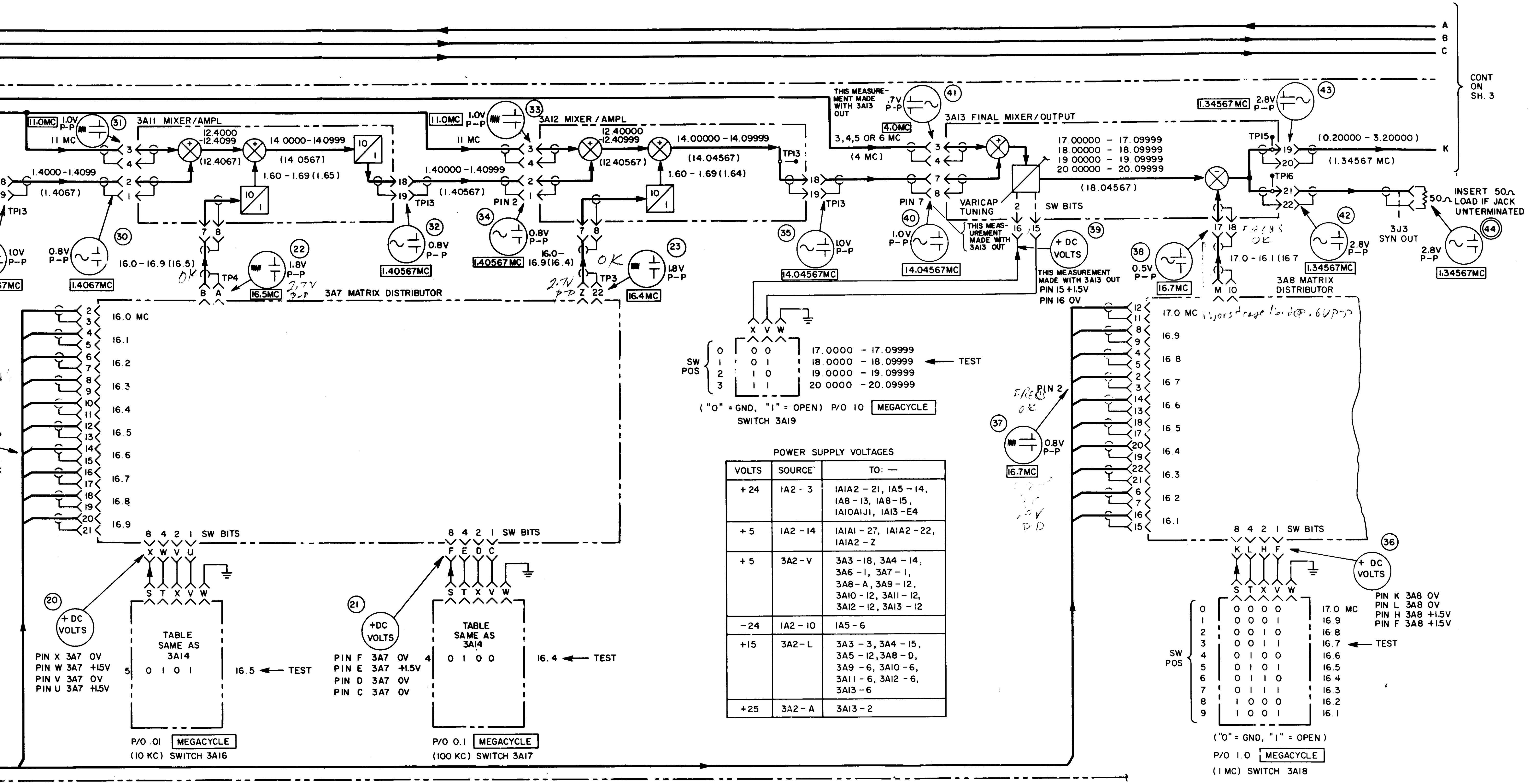
○ INPUT/OUTPUT CHECKS FOR SUBASSEMBLIES

2 TEST "A" IS A GENERAL OVERALL TEST USING THE INTERNAL I MC STANDARD IN THE O-1510/URR AND SYNCHRONIZING THE RECEIVER ON 13.4567 MC.

TEST "B" TESTS THE I-MC AUTOMATIC TRANSFER SWITCHING, USING AN EXTERNAL I MC STANDARD (TEST POINTS 3, 3A & 3B).

TEST "C" TESTS THE PULL-IN FUNCTIONING OF THE PHASE LOCK STAGE (TEST POINT 60).

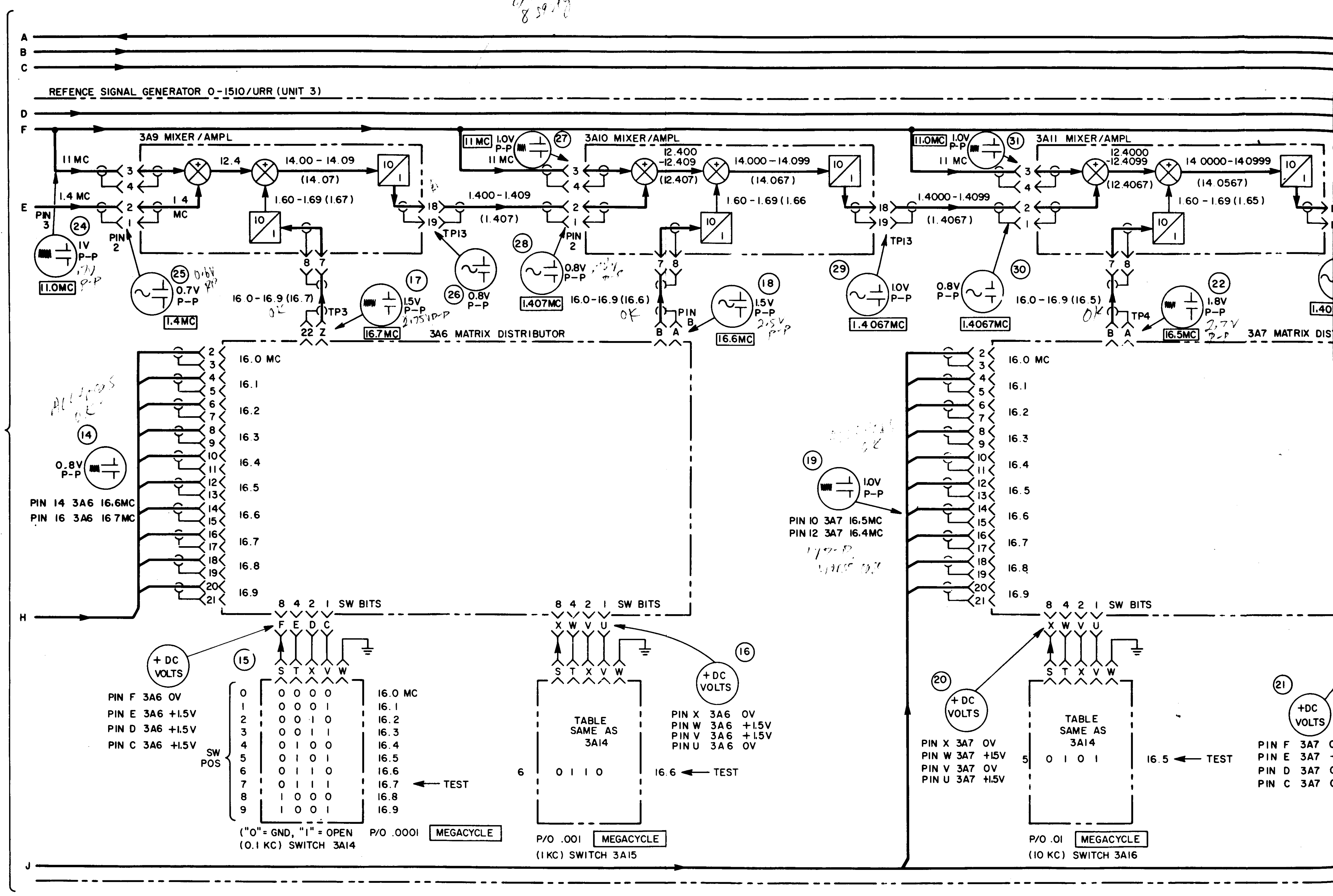


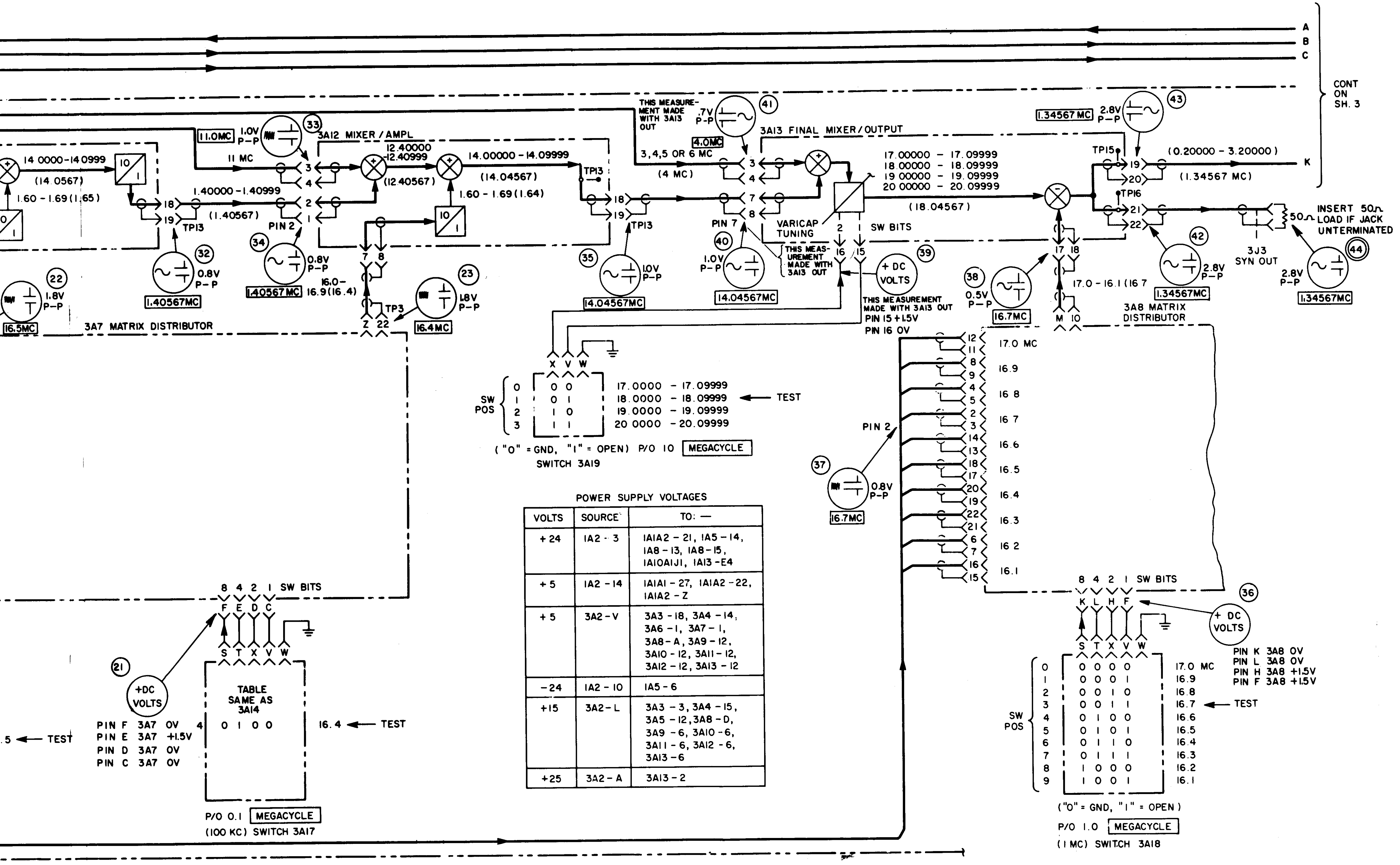


POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO: —
+ 24	1A2 - 3	1A1A2 - 21, 1A5 - 14, 1A8 - 13, 1A8 - 15, 1A10A1J1, 1A13 - E4
+ 5	1A2 - 14	1A1A1 - 27, 1A1A2 - 22, 1A1A2 - Z
+ 5	3A2 - V	3A3 - 18, 3A4 - 14, 3A6 - 1, 3A7 - 1, 3A8 - A, 3A9 - 12, 3A10 - 12, 3A11 - 12, 3A12 - 12, 3A13 - 12
- 24	1A2 - 10	1A5 - 6
+15	3A2 - L	3A3 - 3, 3A4 - 15, 3A5 - 12, 3A8 - D, 3A9 - 6, 3A10 - 6, 3A11 - 6, 3A12 - 6, 3A13 - 6
+25	3A2 - A	3A13 - 2

Figure 4-7. Servicing Block Diagram Synthesizer/Phase Lock Section (Sheet 2 of 3)

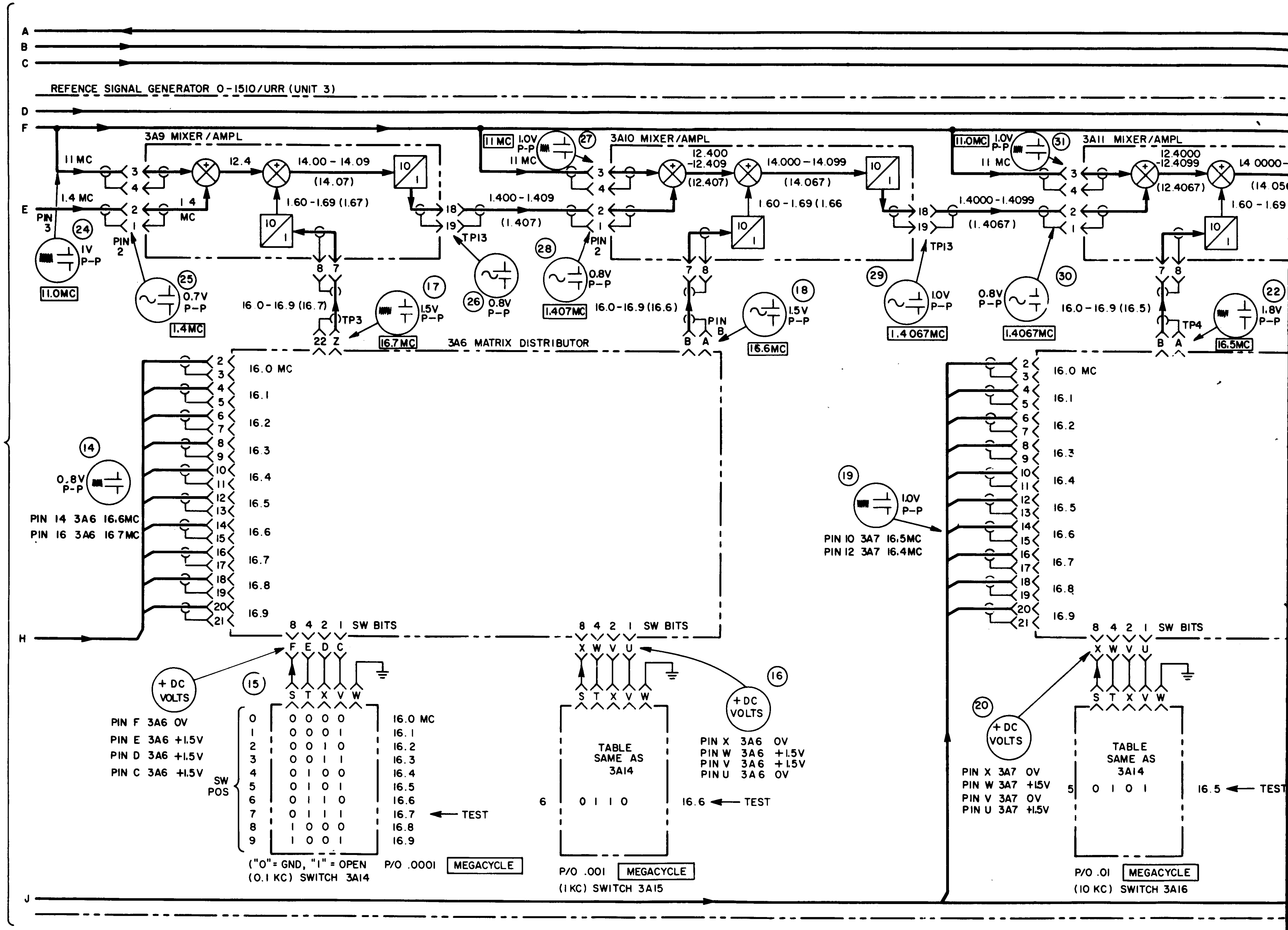

A
B
C
D
F
E
H
J
CONT FROM SH.1
REFENCE SIGNAL GENERATOR O-1510/URR (UNIT 3)
3A9 MIXER/AMPL
11 MC
1.4 MC
12.4
14.00 - 14.09
(14.07)
1.60 - 1.69 (1.67)
PIN 3
PIN 2
(24) 1V P-P
11.0MC
(25) 0.7V P-P
1.4MC
16.0 - 16.9 (16.7)
TP3
22 Z
(17) 1.5V P-P
16.7MC
TP13
(26) 0.8V P-P
1.400 - 1.409
(1.407)
11 MC
(27) 1.0V P-P 11 MC
3A10 MIXER/AMPL
12.400 -12.409
(12.407)
14.000 - 14.099
(14.067)
1.60 - 1.69 (1.66
(28) 0.8V P-P
1.407MC
16.0-16.9 (16.6)
OK
PIN B
B A
(18) 1.5V P-P
16.6MC
3A6 MATRIX DISTRIBUTOR
(29) 1.0V P-P
1.4 067MC
1.4000 - 1.4099
(1.4067)
11.0MC
(31) 1.0V P-P 11 MC
3A11 MIXER/AMPL
12.4000 -12.4099
(12.4067)
14 0000-140999
(14 0567)
1.60 - 1.69 (1.65)
(30) 0.8V P-P
1.4067MC
16.0 - 16.9 (16.5)
OK
TP4
(22) 1.8V P-P
16.5MC
3A7 MATRIX DIS
1.40
16.0 MC
16.1
16.2
16.3
16.4
16.5
16.6
16.7
16.8
16.9
(14) 0.8V P-P
PIN 14 3A6 16.6MC
PIN 16 3A6 16.7MC
(19) 1.0V P-P
PIN 10 3A7 16.5MC
PIN 12 3A7 16.4MC
8 4 2 1 SW BITS
F E D C
S T X V W
X W V U
(15) +DC VOLTS
PIN F 3A6 0V
PIN E 3A6 +1.5V
PIN D 3A6 +1.5V
PIN C 3A6 +1.5V
SW POS
0 0 0 0 0 16.0 MC
1 0 0 0 1 16.1
2 0 0 1 0 16.2
3 0 0 1 1 16.3
4 0 1 0 0 16.4
5 0 1 0 1 16.5
6 0 1 1 0 16.6
7 0 1 1 1 16.7 ← TEST
8 1 0 0 0 16.8
9 1 0 0 1 16.9
("0" = GND, "1" = OPEN
(0.1 KC) SWITCH 3A14
P/O .0001 MEGACYCLE
TABLE SAME AS 3A14
6 0 1 1 0
16.6 ← TEST
P/O .001 MEGACYCLE
(1 KC) SWITCH 3A15
(16) +DC VOLTS
PIN X 3A6 0V
PIN W 3A6 +1.5V
PIN V 3A6 +1.5V
PIN U 3A6 0V
(20) +DC VOLTS
PIN X 3A7 0V
PIN W 3A7 +15V
PIN V 3A7 0V
PIN U 3A7 +1.5V
TABLE SAME AS 3A14
5 0 1 0 1
16.5 ← TEST
P/O .01 MEGACYCLE
(10 KC) SWITCH 3A16
(21) +DC VOLTS
PIN F 3A7
PIN E 3A7
PIN D 3A7
PIN C 3A7



POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO: —
+ 24	1A2 - 3	1A1A2 - 21, 1A5 - 14, 1A8 - 13, 1A8 - 15, 1A10A1J1, 1A13 - E4
+ 5	1A2 - 14	1A1A1 - 27, 1A1A2 - 22, 1A1A2 - Z
+ 5	3A2 - V	3A3 - 18, 3A4 - 14, 3A6 - 1, 3A7 - 1, 3A8 - A, 3A9 - 12, 3A10 - 12, 3A11 - 12, 3A12 - 12, 3A13 - 12
- 24	1A2 - 10	1A5 - 6
+ 15	3A2 - L	3A3 - 3, 3A4 - 15, 3A5 - 12, 3A8 - D, 3A9 - 6, 3A10 - 6, 3A11 - 6, 3A12 - 6, 3A13 - 6
+ 25	3A2 - A	3A13 - 2

Figure 4-7. Servicing Block Diagram Synthesizer/Phase Lock Section (Sheet 2 of 3)



SW POS	S	T	X	V	W		
0	0	0	0	0		16.0 MC	
1	0	0	0	1		16.1	
2	0	0	1	0		16.2	
3	0	0	1	1		16.3	
4	0	1	0	0		16.4	
5	0	1	0	1		16.5	
6	0	1	1	0		16.6	
7	0	1	1	1		16.7	← TEST
8	1	0	0	0		16.8	
9	1	0	0	1		16.9	

("0" = GND, "1" = OPEN P/O .0001 MEGACYCLE
(0.1 KC) SWITCH 3A14

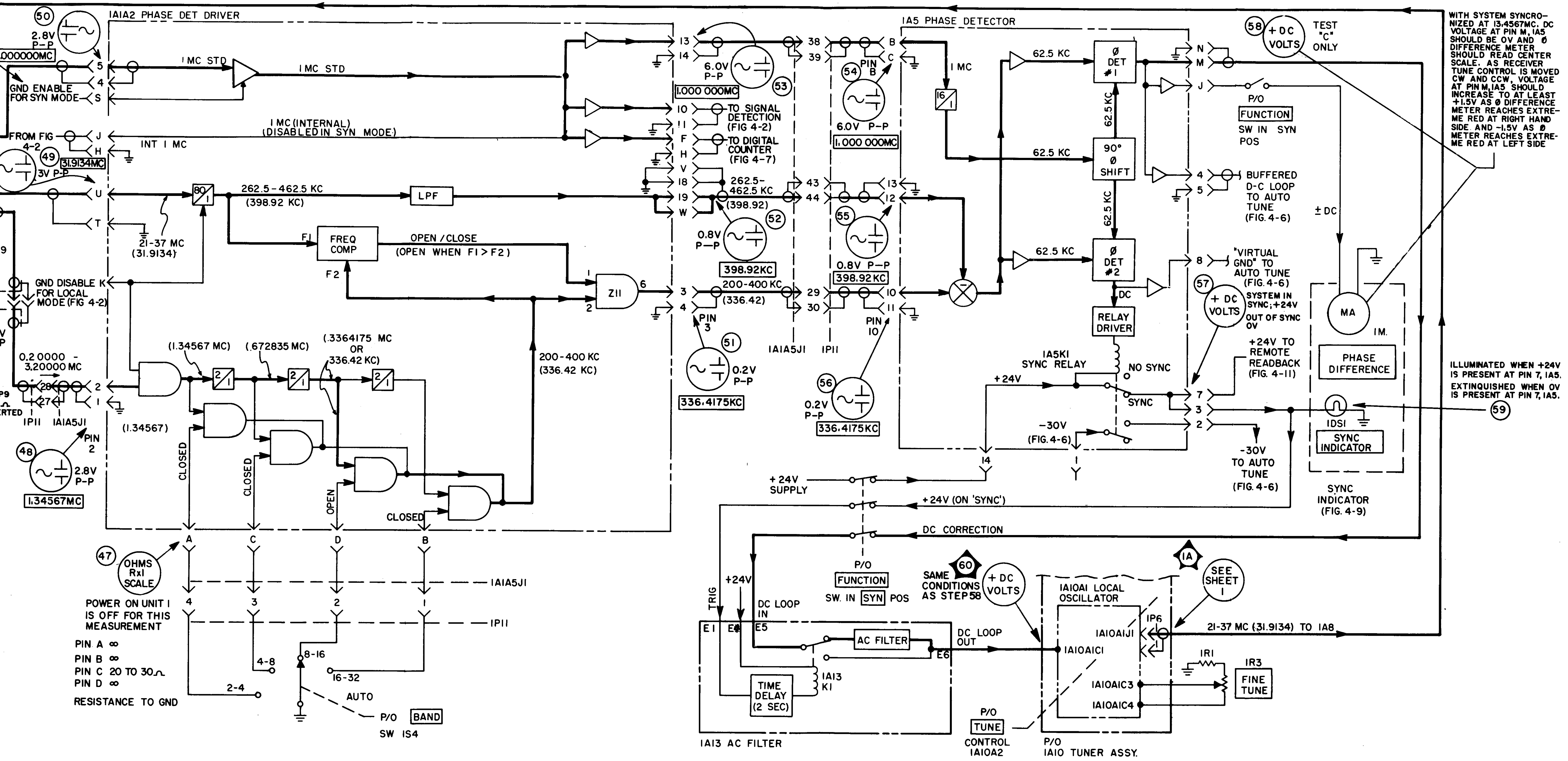
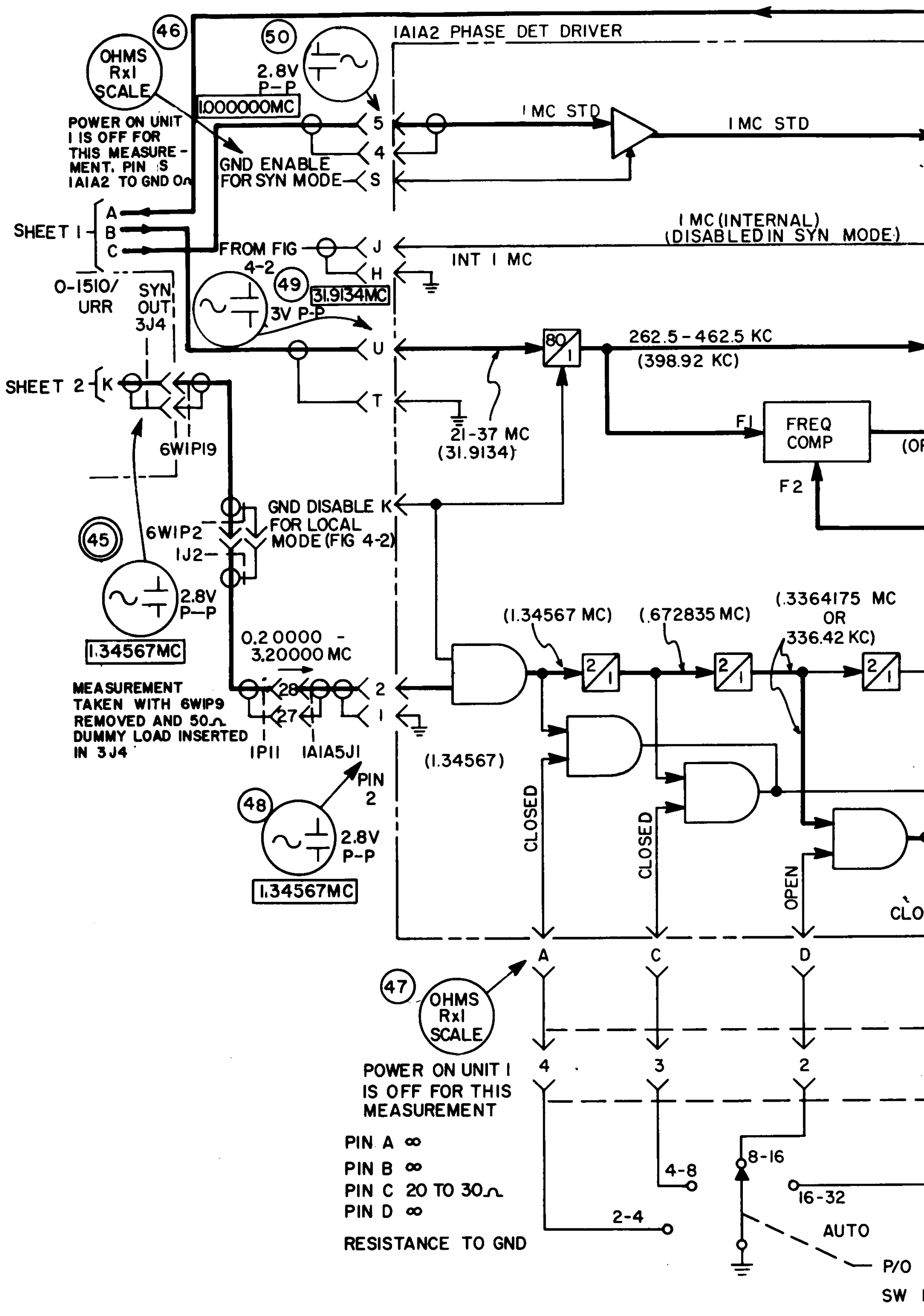


Figure 4-7. Servicing Block Diagram Synthesizer/Phase Lock Section (Sheet 3 of 3)


46
OHMS
RxI
SCALE
POWER ON UNIT I IS OFF FOR THIS MEASUREMENT. PIN S IAIA2 TO GND 0Ω
50
2.8V P-P
1.000000MC
IAIA2 PHASE DET DRIVER
GND ENABLE FOR SYN MODE
5
4
S
I MC STD
I MC STD
SHEET I
A
B
C
O-1510/URR
SYN OUT 3J4
FROM FIG 4-2
J
H
INT I MC
I MC (INTERNAL) (DISABLED IN SYN MODE)
49
31.9134MC
3V P-P
U
T
80/1
262.5 - 462.5 KC
(398.92 KC)
21-37 MC
(31.9134)
F1
FREQ COMP
F2
(OR
SHEET 2
K
6WIP19
GND DISABLE FOR LOCAL MODE (FIG 4-2)
K
45
6WIP2
1J2
2.8V P-P
1.34567MC
0.20000 - 3.20000 MC
28
27
2
1
MEASUREMENT TAKEN WITH 6WIP9 REMOVED AND 50Ω DUMMY LOAD INSERTED IN 3J4
IPII
IAIA5JI
PIN 2
48
2.8V P-P
1.34567MC
(1.34567)
(1.34567 MC)
(.672835 MC)
(.3364175 MC OR 336.42 KC)
2/1
2/1
2/1
CLOSED
CLOSED
OPEN
CLO
A
C
D
4
3
2
47
OHMS
RxI
SCALE
POWER ON UNIT I IS OFF FOR THIS MEASUREMENT
PIN A ∞
PIN B ∞
PIN C 20 TO 30Ω
PIN D ∞
RESISTANCE TO GND
2-4
4-8
8-16
16-32
AUTO
P/O
SW

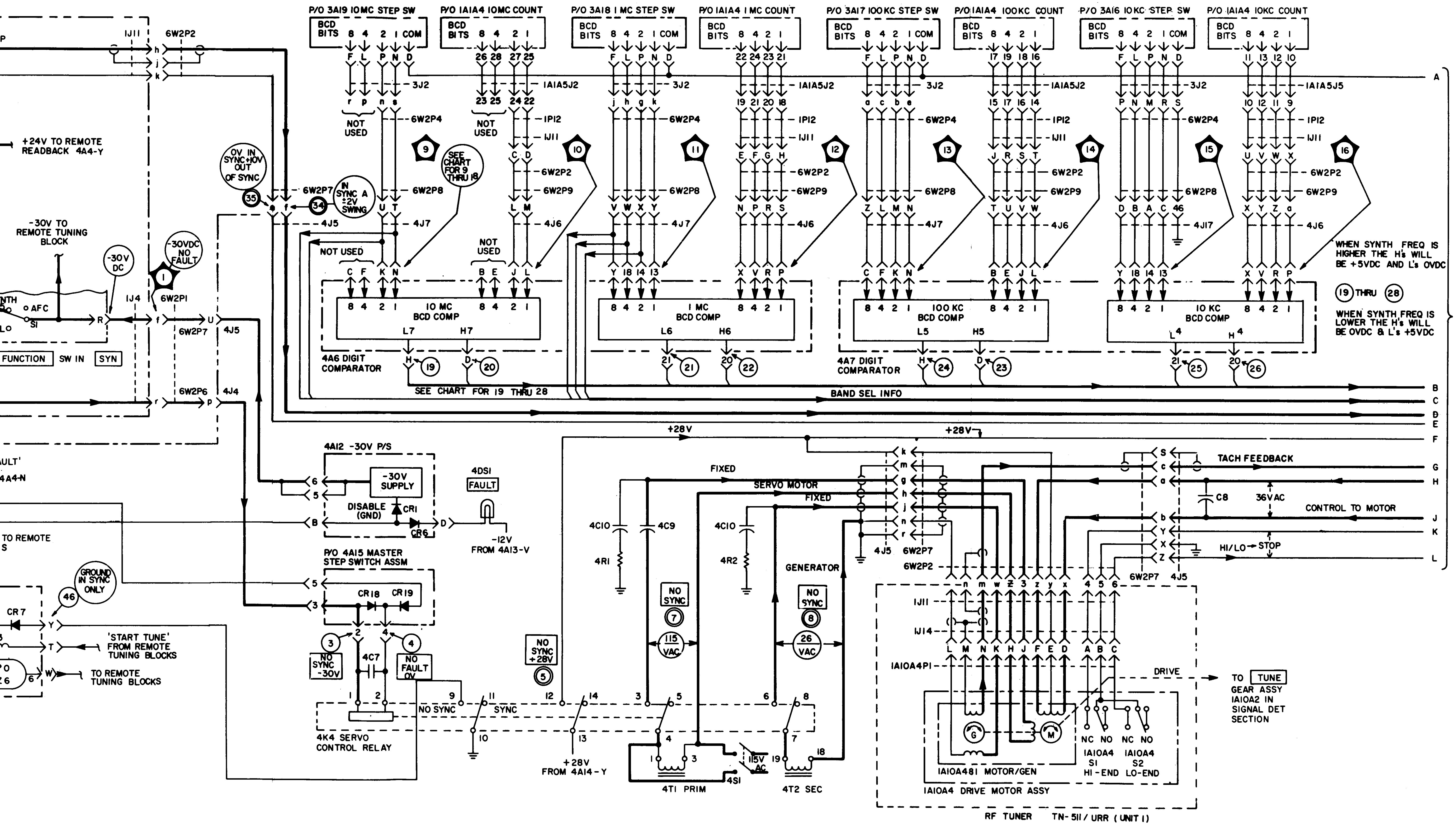


Figure 4-8. Servicing Block Diagram Automatic Servo Tuning Section (Sheet 1 of 2)

CONTROL POSITIONS FOR TEST *

MODULAR UNIT	CONTROL	POSITION
CV-2520 (V)/URC OR CV-2521 (V)/URC	POWER SWITCH	ON
KY-661/URR	POWER SWITCH	(SEE TEST PROCEDURE BELOW)
TN-511/URR (OR TN-525/FRR	POWER SWITCH	ON
"	FUNCTION SWITCH	SYN
"	COUNTER MODE SW.	REC
"	BAND SWITCH	AUTO
"	TUNE AND FINE TUNE KNOBS	(SEE TEST PROCEDURE BELOW)
O-1510/URR	POWER SWITCH	ON
"	PHASE COMPARATOR/ FREQ. DIFFERENCE SW.	PHASE COMPARATOR
"	SIX MEGACYCLE SWITCHES	(SEE TEST PROCEDURE BELOW)

* POSITIONS OF CONTROLS NOT LISTED ARE OPTIONAL.

TEST PROCEDURE: (REFER TO TIMING CHART, FOR MEASUREMENTS.) AND WAVE FORMS.

I. FAST TUNING TESTS

A (HIGH-TO-LOW): FOR FIRST MEASUREMENT, SET KY-661/URR POWER SWITCH AT OFF AND THE SIX O-1510/URR MEGACYCLE SWITCHES FOR 06.6897 MC; THEN SET TUNE & FINE TUNE KNOBS TO BRING "31.9768" ON TN-511/URR MEGACYCLE DISPLAY. FOR EACH NEW MEASUREMENT, SET KY-661/URR POWER SWITCH AT OFF, TUNE & FINE TUNE KNOBS FOR 31.9768 MC AND KY-661/URR POWER SWITCH AT ON.

B. (LOW-TO-HIGH): FOR FIRST MEASUREMENT, SET KY-661/URR POWER SWITCH AT OFF AND THE SIX O-1510/URR MEGACYCLE SWITCHES FOR 31.9768 MC; THEN SET TUNE & FINE TUNE KNOBS TO BRING "06.6897" ON TN-511/URR MEGACYCLE DISPLAY. FOR EACH NEW MEASUREMENT, SET KY-661/URR POWER SWITCH AT OFF, TUNE & FINE TUNE KNOBS FOR 06.6897 MC AND KY-661/URR POWER SWITCH AT ON.

II SLOW TUNING TESTS

A. SYNTHESIZE SYSTEM TO ANY FREQUENCY BETWEEN 02 AND 32 MCS WHEN TESTING FOR VOLTAGES AND WAVE FORMS HOLD TUNE CONTROL ON TN-511 SO THAT SYSTEM IS 'IN' SYNC BUT PHASE DIFFERENCE METER INDICATES IN THE RED AREA AND SERVO SYSTEM PULSING.

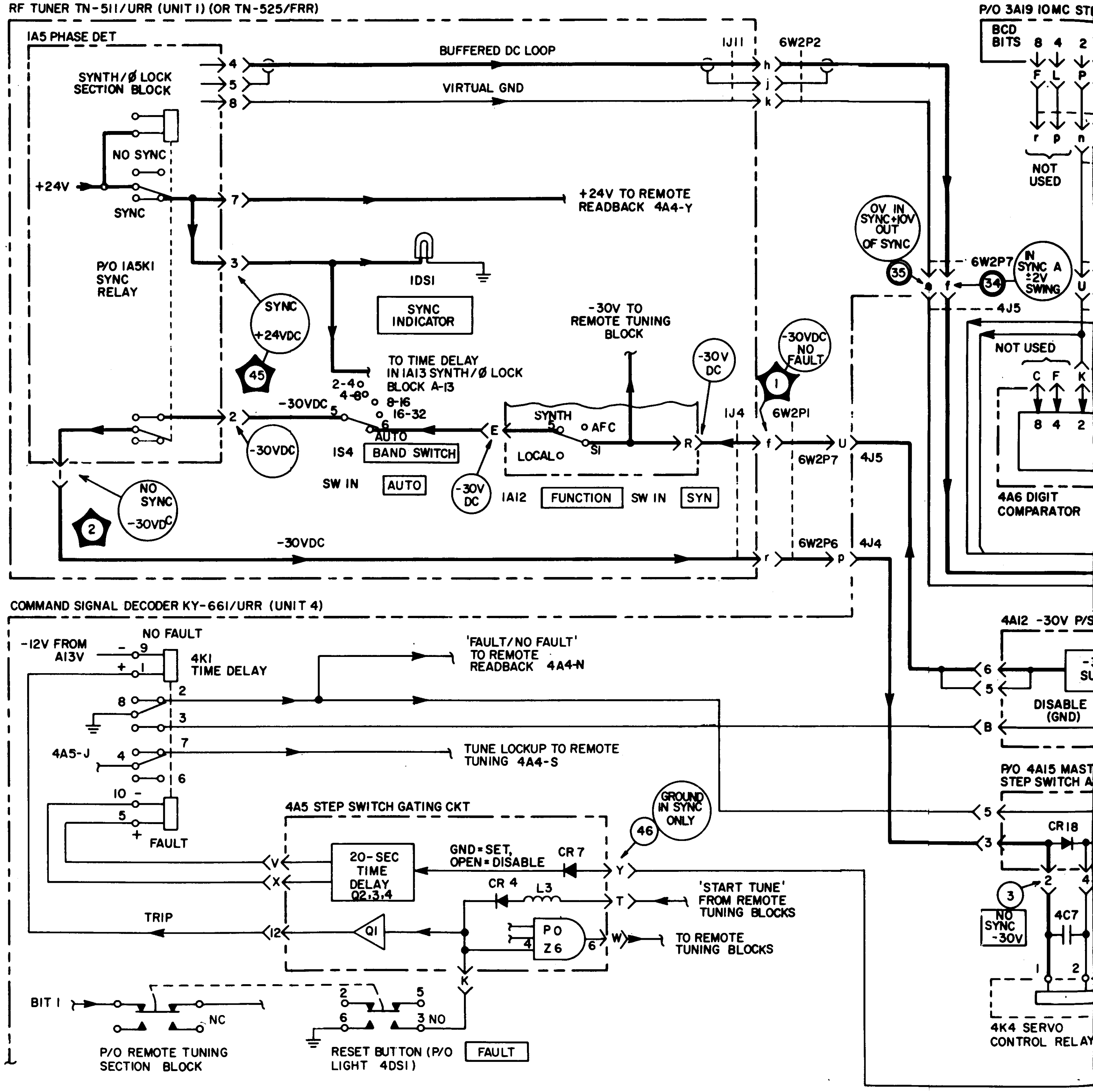
NOTES:

1 ⬠ INPUT/OUTPUT CHECKS FOR FUNCTIONAL SECTION

◯ INPUT/OUTPUT CHECKS FOR MODULE UNIT

○ INPUT/OUTPUT CHECKS FOR SUBASSEMBLIES

2 A DUAL TRACE SCOPE WILL HAVE TO BE USED TO COMPARE ONE WAVEFORM WITH ANOTHER ONE.



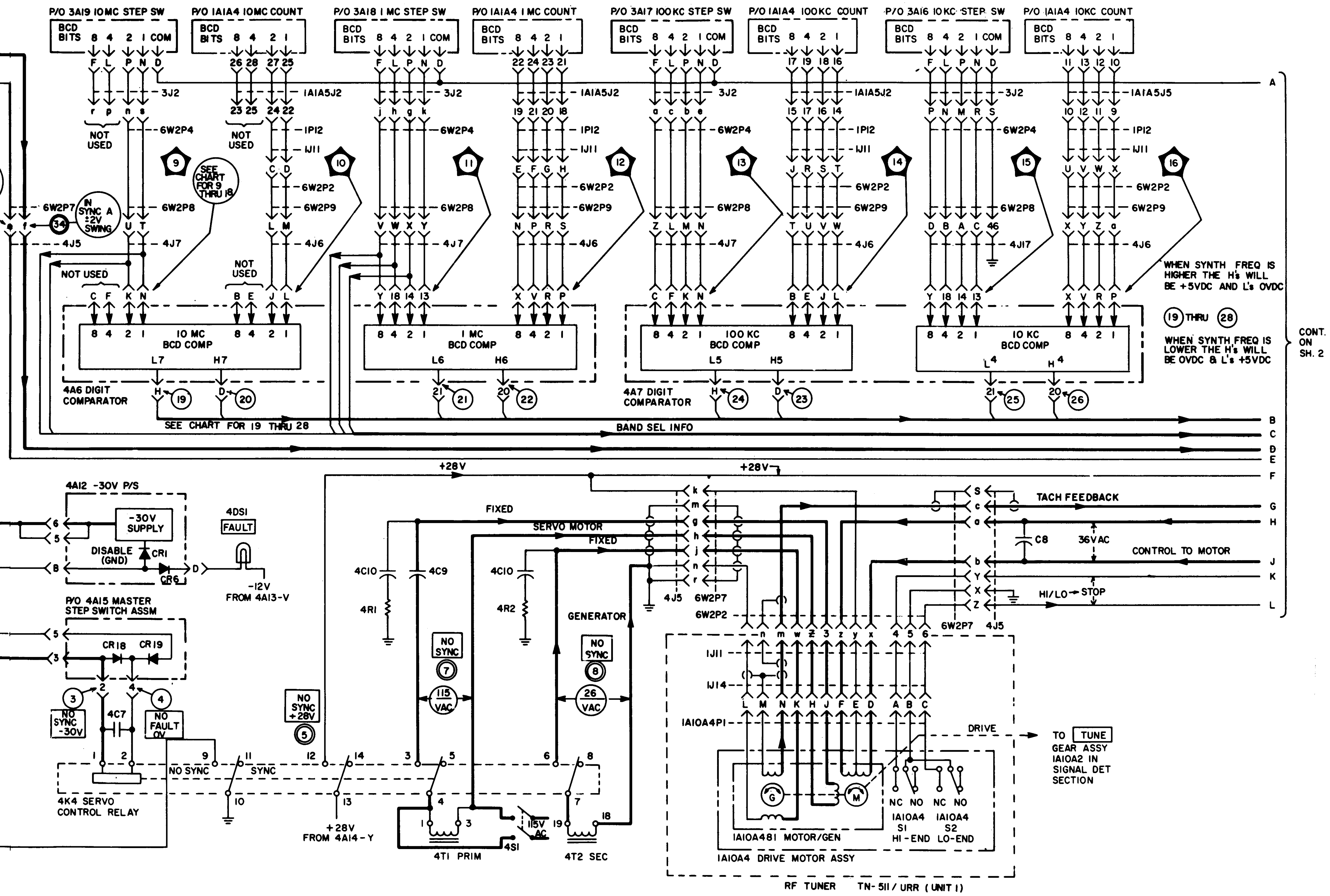


Figure 4-8. Servicing Block Diagram Automatic Servo Tuning Section (Sheet 1 of 2)

CONTROL POSITIONS FOR TEST *

MODULAR UNIT	CONTROL	POSITION
CV-2520(V)/URC OR CV-2521(V)/URC	POWER SWITCH	ON
KY-661/URR	POWER SWITCH	(SEE TEST PROCEDURE BELOW)
TN-511/URR	POWER SWITCH	ON
(OR TN-525/FRR	FUNCTION SWITCH	SYN
"	COUNTER MODE SW.	REC
"	BAND SWITCH	AUTO
"	TUNE AND FINE TUNE KNOBS	(SEE TEST PROCEDURE BELOW)
O-1510/URR	POWER SWITCH	ON
"	PHASE COMPARATOR/ FREQ. DIFFERENCE SW.	PHASE COMPARATOR
"	SIX MEGACYCLE SWITCHES	(SEE TEST PROCEDURE BELOW)

* POSITIONS OF CONTROLS NOT LISTED ARE OPTIONAL.

TEST PROCEDURE: (REFER TO TIMING CHART, FOR MEASUREMENTS.) AND WAVE FORMS.

I. FAST TUNING TESTS

A (HIGH-TO-LOW): FOR FIRST MEASUREMENT, SET KY-661/URR POWER SWITCH AT OFF AND THE SIX O-1510/URR MEGACYCLE SWITCHES FOR 06.6897 MC; THEN SET TUNE & FINE TUNE KNOBS TO BRING "31.9768" ON TN-511/URR MEGACYCLE DISPLAY. FOR EACH NEW MEASUREMENT, SET KY-661/URR POWER SWITCH AT OFF, TUNE & FINE TUNE KNOBS FOR 31.9768 MC AND KY-661/URR POWER SWITCH AT ON.

B. (LOW-TO-HIGH): FOR FIRST MEASUREMENT, SET KY-661/URR POWER SWITCH AT OFF AND THE SIX O-1510/URR MEGACYCLE SWITCHES FOR 31.9768 MC; THEN SET TUNE & FINE TUNE KNOBS TO BRING "06.6897" ON TN-511/URR MEGACYCLE DISPLAY. FOR EACH NEW MEASUREMENT, SET KY-661/URR POWER SWITCH AT OFF, TUNE & FINE TUNE KNOBS FOR 06.6897 MC AND KY-661/URR POWER SWITCH AT ON.

II SLOW TUNING TESTS

A. SYNTHESIZE SYSTEM TO ANY FREQUENCY BETWEEN 02 AND 32 MC'S WHEN TESTING FOR VOLTAGES AND WAVE FORMS HOLD TUNE CONTROL ON TN-511 SO THAT SYSTEM IS 'IN' SYNC BUT PHASE DIFFERENCE METER INDICATES IN THE RED AREA AND SERVO SYSTEM PULSING.

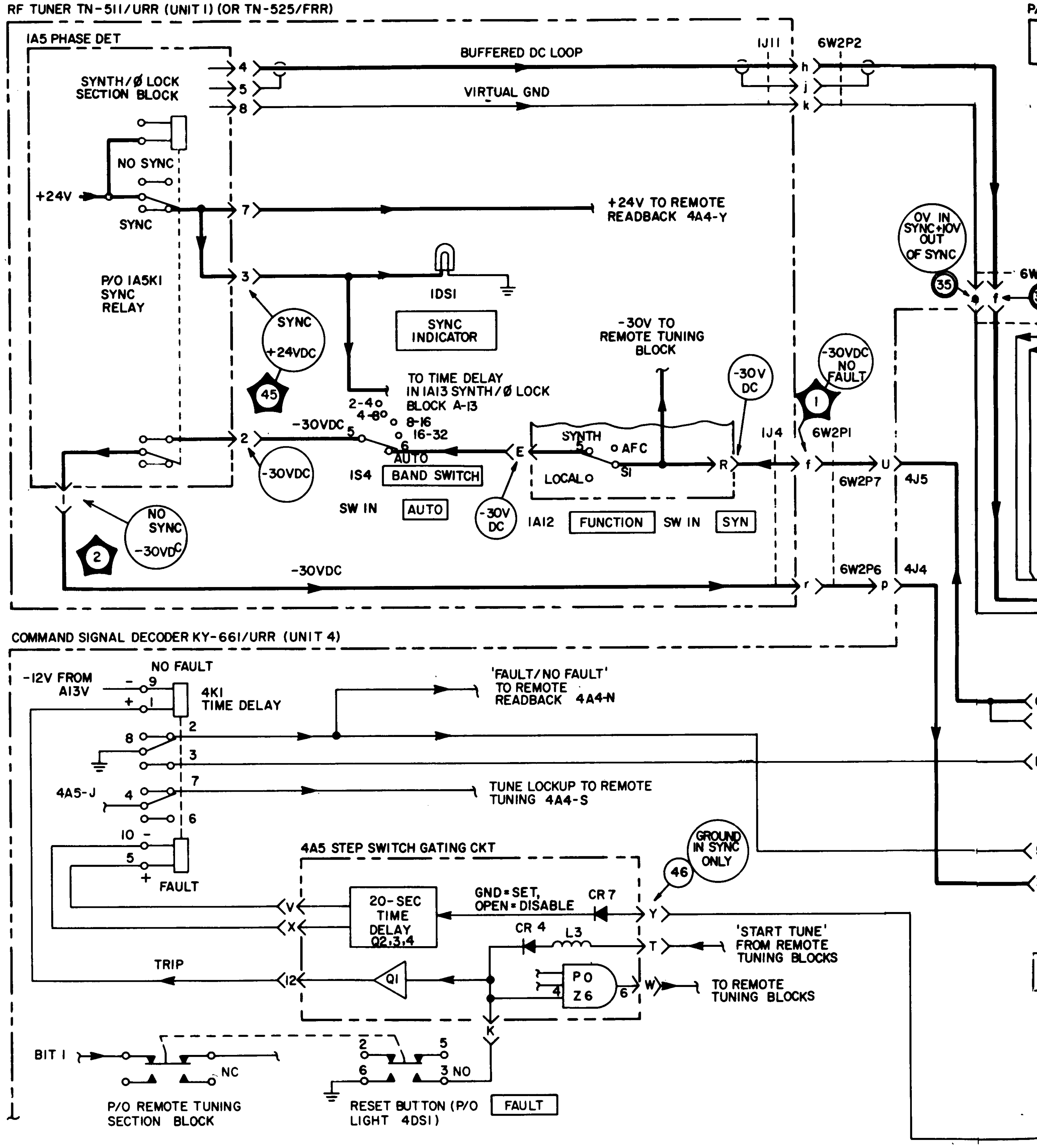
NOTES:

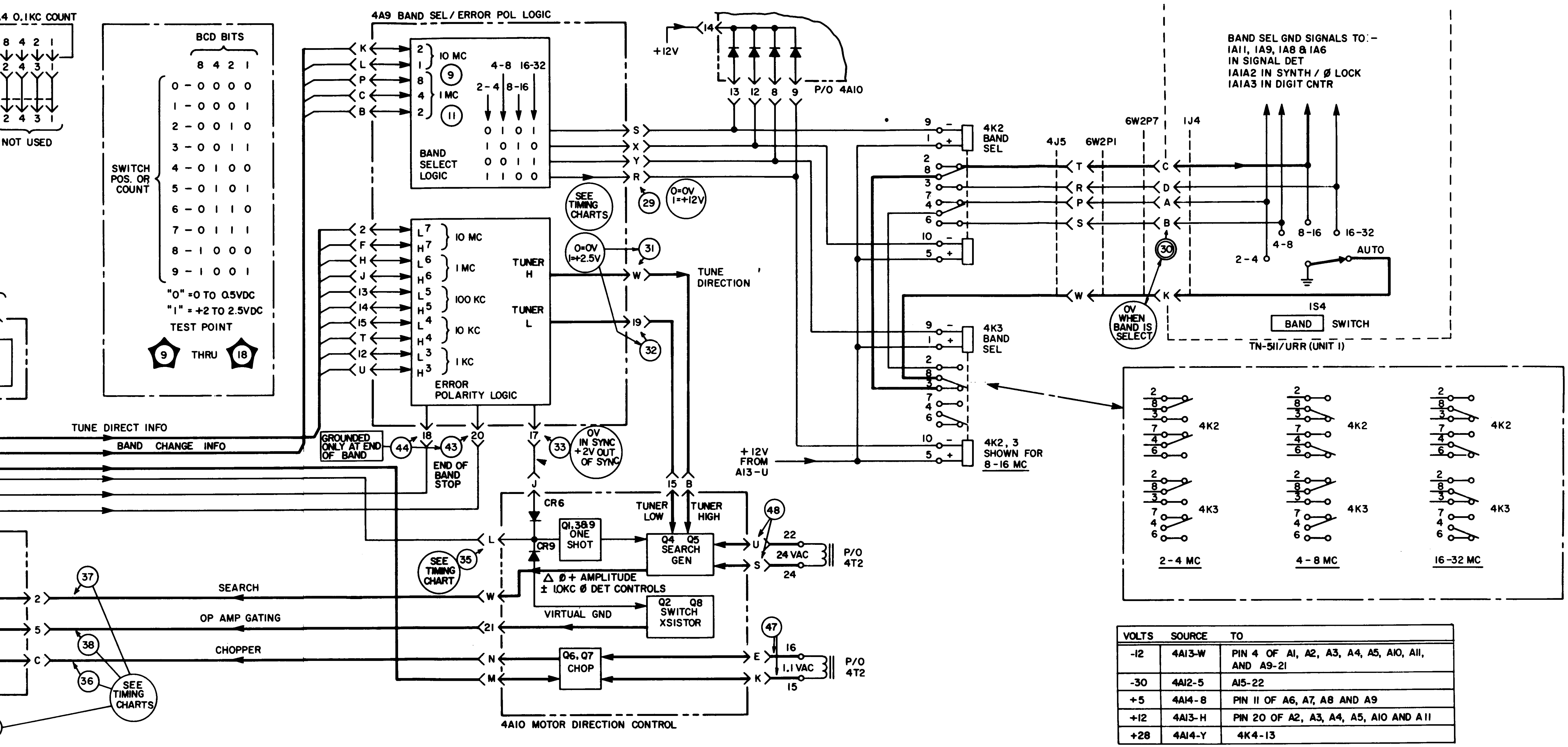
1 ⬠ INPUT/OUTPUT CHECKS FOR FUNCTIONAL SECTION

◯ INPUT/OUTPUT CHECKS FOR MODULE UNIT

○ INPUT/OUTPUT CHECKS FOR SUBASSEMBLIES

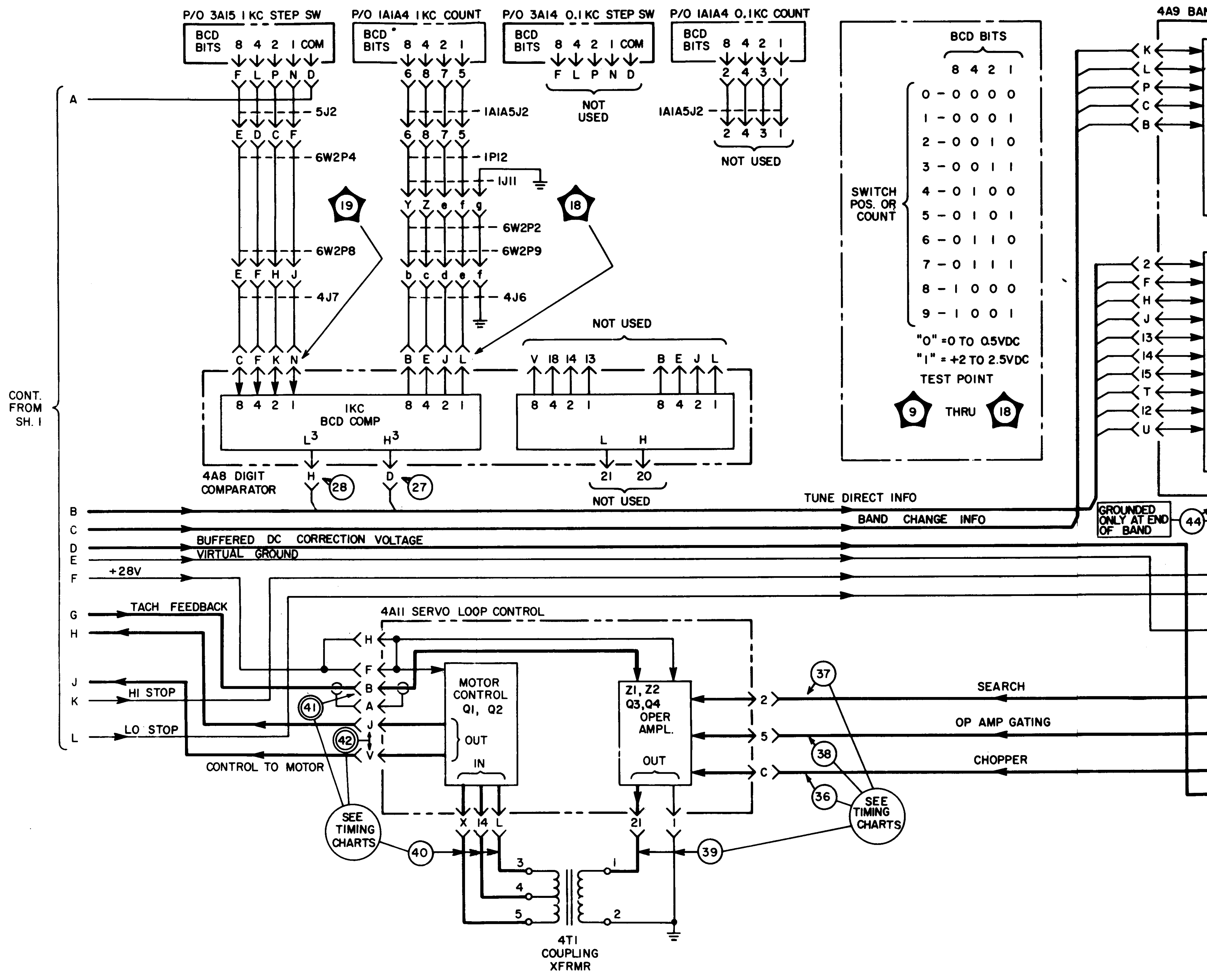
2 A DUAL TRACE SCOPE WILL HAVE TO BE USED TO COMPARE ONE WAVEFORM WITH ANOTHER ONE.

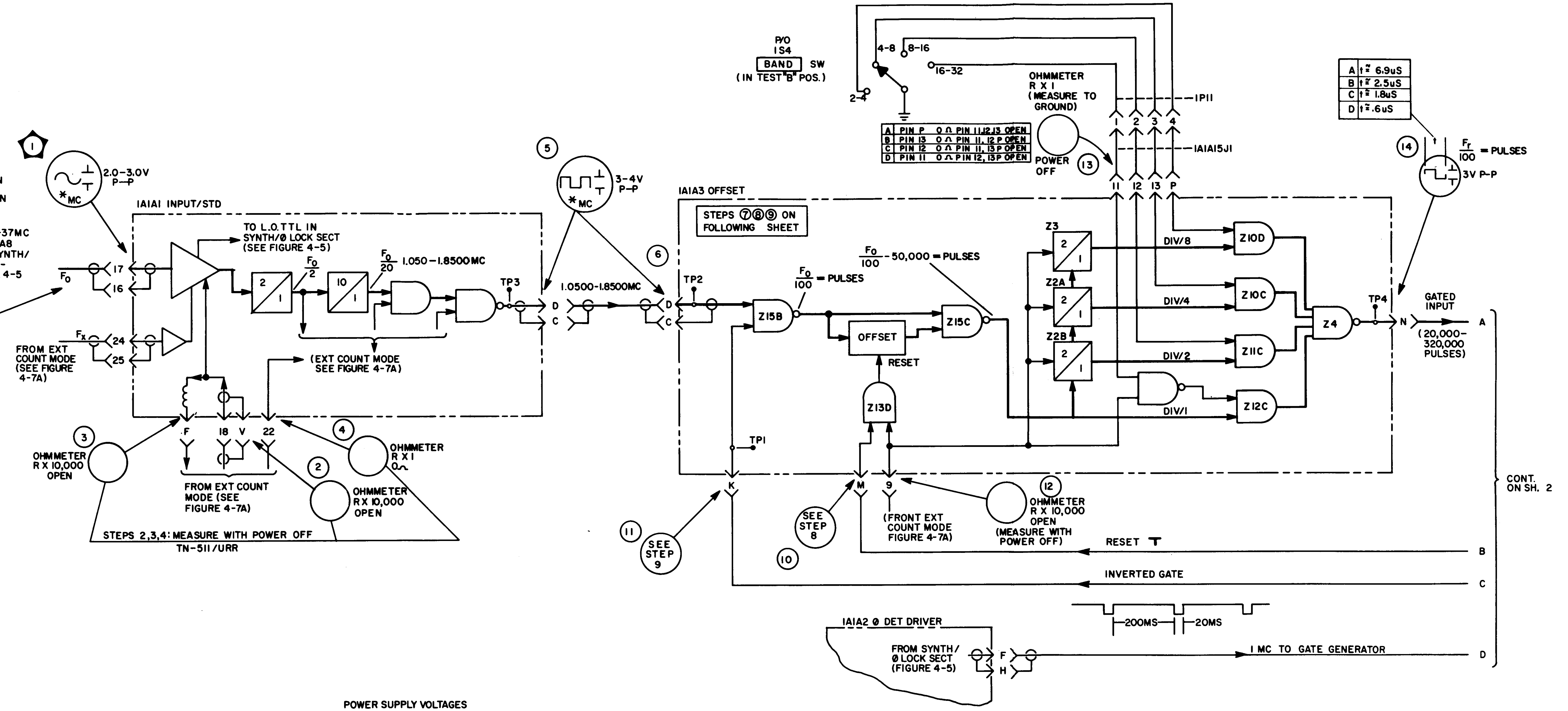




VOLTS	SOURCE	TO
-12	4A13-W	PIN 4 OF A1, A2, A3, A4, A5, A10, A11, AND A9-21
-30	4A12-5	A15-22
+5	4A14-8	PIN 11 OF A6, A7, A8 AND A9
+12	4A13-H	PIN 20 OF A2, A3, A4, A5, A10 AND A11
+28	4A14-Y	4K4-13

Figure 4-8. Servicing Block Diagram Automatic Servo Tuning Section (Sheet 2 of 2)


P/O 3A15 1 KC STEP SW
BCD BITS 8 4 2 1 COM
P/O 1A1A4 1 KC COUNT
BCD* BITS 8 4 2 1
P/O 3A14 0.1 KC STEP SW
BCD BITS 8 4 2 1 COM
NOT USED
P/O 1A1A4 0.1 KC COUNT
BCD BITS 8 4 2 1
1A1A5J2
NOT USED
5J2
6W2P4
6W2P8
4J7
1P12
1J11
6W2P2
6W2P9
4J6
19
18
NOT USED
1KC BCD COMP
L^3
H^3
4A8 DIGIT COMPARATOR
28
27
21 20
NOT USED
BCD BITS
8 4 2 1
SWITCH POS. OR COUNT
0 - 0 0 0 0
1 - 0 0 0 1
2 - 0 0 1 0
3 - 0 0 1 1
4 - 0 1 0 0
5 - 0 1 0 1
6 - 0 1 1 0
7 - 0 1 1 1
8 - 1 0 0 0
9 - 1 0 0 1
"0" = 0 TO 0.5VDC
"1" = +2 TO 2.5VDC
TEST POINT
9 THRU 18
4A9 BAN
CONT. FROM SH. 1
A
B
C
D
E
F
G
H
J
K
L
TUNE DIRECT INFO
BAND CHANGE INFO
GROUNDED ONLY AT END OF BAND
44
BUFFERED DC CORRECTION VOLTAGE
VIRTUAL GROUND
+28V
TACH FEEDBACK
HI STOP
LO STOP
CONTROL TO MOTOR
4A11 SERVO LOOP CONTROL
MOTOR CONTROL Q1, Q2
OUT
IN
Z1, Z2 Q3, Q4 OPER AMPL.
OUT
41
42
SEE TIMING CHARTS
40
39
37
38
36
SEARCH
OP AMP GATING
CHOPPER
4T1 COUPLING XFRMR



POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:
+.5	1A2-14	1A1A1-27, 1A1A1-2, 1A1A13-2, 1A1A4-2
+200	1A2-M	1A1A5J1-24

Figure 4-9. Servicing Block Diagram Digital Count Section Receiving Mode (Sheet 1 of 2)

DIGITAL COUNT SECTION		
RECEIVING MODE TEST		
CONTROL POSITIONS FOR TEST		
MODULAR UNIT	CONTROL	POSITION
TN-511/URR OR TN-525/URR	POWER SWITCH	ON
	FINE TUNE	MID POSITION
	LOCK	OFF
	TUNE	ADJUST FOR FREQENCY INDICATED IN TEST TABLE
	BAND SWITCH	SEE TEST TABLE
	FUNCTION	SYN
	COUNTER MODE	REC
	OTHER CONTROLS	OPTIONAL
O-1510/URR	POWER SWITCH	ON
	FREQUENCY/SELECTOR	SEE TEST TABLE
	OTHER CONTROLS	OPTIONAL
KY-661/URR	POWER SWITCH	OFF
TD-914/URR	POWER SWITCH	OFF
CV-2520/URC OR CV-2521/URC	POWER SWITCH	OFF

1. SET O-1510/URR FREQUENCY SELECTORS TO TEST FREQUENCY
2. ON RF TUNER, SET BANDSWITCH TO APPROPRIATE POSITION AND ADJUST TUNE CONTROL FOR EXTERNAL COUNTER READING SPECIFIED IN TEST TABLE. SYNCRONIZE RECEIVER.
3. CARRY OUT TESTS A,B,C AND D AT EACH TEST POINT (IF APPROPRIATE) BEFORE PROCEEDING TO NEXT STEP.

* SIGNAL VARIATIONS

WHEN F_r = RECEIVER TUNED FREQUENCY IN

WHEN F_o = LOCAL OSCILLATOR FREQUENCY IN

FOR 2-4 MC BAND:-

$F_o = 8F_r + 5$

FOR 4-8 MC BAND:-

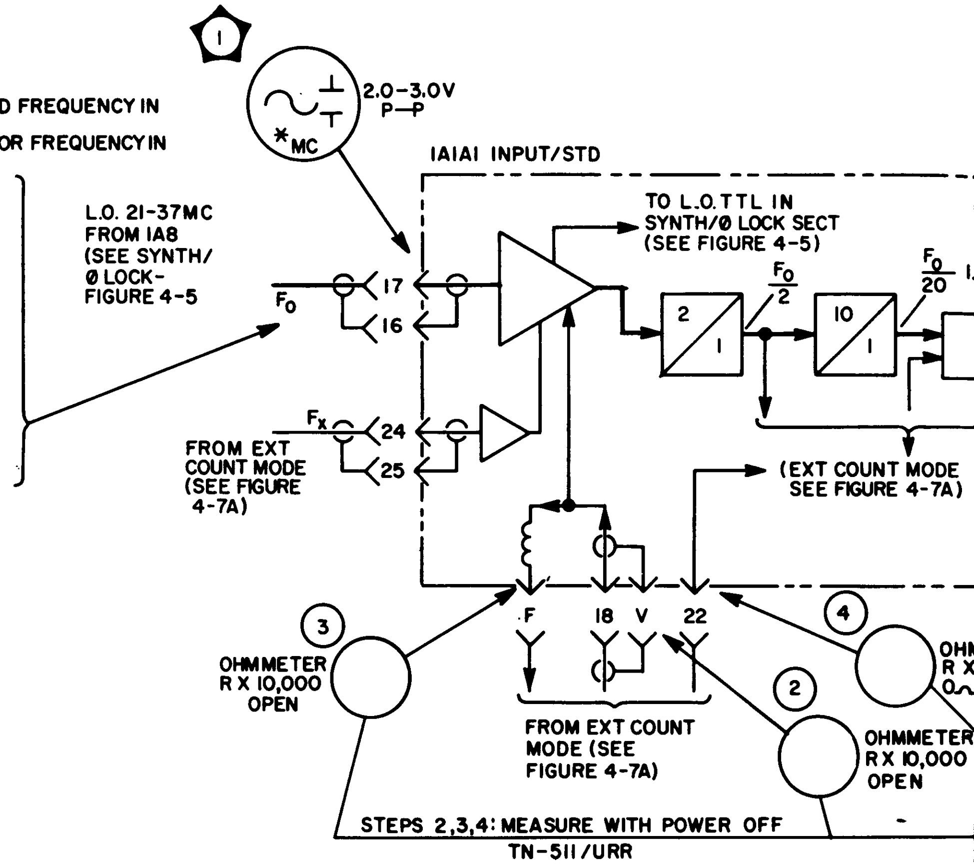
$F_o = 4F_r + 5$

FOR 8-16 MC BAND:-

$F_o = 2F_r + 5$

FOR 16-32 MC BAND:-

$F_o = F_r + 5$



TEST TABLE

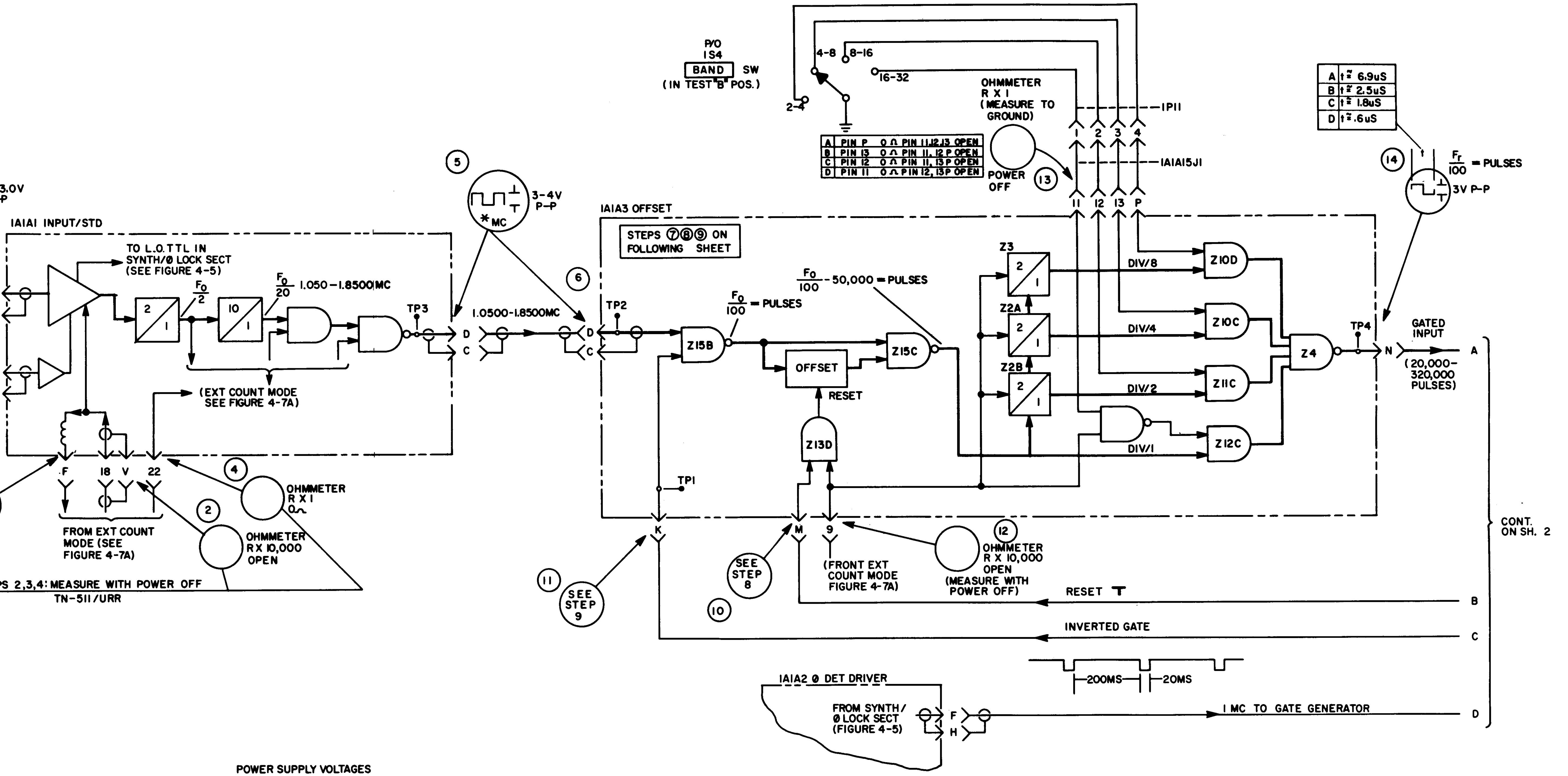
TEST	IS4 BAND SWITCH	① Fo INPUT (MC)	⑥ ⑤ $\frac{F_o}{20}$ (MC)	⑱ MEGACYCLE DISPLAY	⑭	⑯
A	2—4	23.1424	1.15712	2.2678	SEE TABLE AT TEST POINT ⑭	SEE INSTRUCTIONS AT STEP ⑯ AND TABLE AT ⑱
B	4—8	32.5048	1.62524	6.8762		
C	8—16	22.4572	1.12286	8.7286		
D	16-32	32.6827	1.63414	27.6827		

NOTES:

1. INPUT/OUTPUT CHECKS FOR FUNCTIONAL SECTION
2. ◯ INPUT/OUTPUT CHECKS FOR SUBASSEMBLIES
3. HEAVY LINES INDICATE PATH OF COUNT SIGNAL

POWER SUPP

VOLTS
+.5
+200



POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:
+.5	1A2-14	1A1A1-27, 1A1A1-2, 1A1A13-2, 1A1A4-2
+200	1A2-M	1A1A5J1-24

Figure 4-9. Servicing Block Diagram Digital Count Section Receiving Mode (Sheet 1 of 2)

DIGITAL COUNT SECTION		
RECEIVING MODE TEST		
CONTROL POSITIONS FOR TEST		
MODULAR UNIT	CONTROL	POSITION
TN-511/URR OR TN-525/URR	POWER SWITCH	ON
	FINE TUNE	MID POSITION
	LOCK	OFF
	TUNE	ADJUST FOR FREQENCY INDICATED IN TEST TABLE
	BAND SWITCH	SEE TEST TABLE
	FUNCTION	SYN
	COUNTER MODE	REC
	OTHER CONTROLS	OPTIONAL
0-1510/URR	POWER SWITCH FREQUENCY/SELECTOR OTHER CONTROLS	ON SEE TEST TABLE OPTIONAL
KY-661/URR	POWER SWITCH	OFF
TD-914/URR	POWER SWITCH	OFF
CV-2520/URC OR CV-2521/URC	POWER SWITCH	OFF

1. SET 0-1510/URR FREQUENCY SELECTORS TO TEST FREQUENCY
2. ON RF TUNER, SET BANDSWITCH TO APPROPRIATE POSITION AND ADJUST TUNE CONTROL FOR EXTERNAL COUNTER READING SPECIFIED IN TEST TABLE. SYNCRONIZE RECEIVER.
3. CARRY OUT TESTS A,B,C AND D AT EACH TEST POINT (IF APPROPRIATE) BEFORE PROCEEDING TO NEXT STEP.

✱ SIGNAL VARIATIONS

TEST TABLE

TEST	1S4 BAND SWITCH	① F_o INPUT (MC)	⑥ ⑤ $\frac{F_o}{20}$ (MC)	⑱ MEGACYCLE DISPLAY	⑭	⑯
A	2—4	23.1424	1.15712	2.2678	SEE TABLE AT TEST POINT ⑭	SEE INSTRUCTIONS AT STEP ⑯ AND TABLE AT ⑱
B	4—8	32.5048	1.62524	6.8762		
C	8—16	22.4572	1.12286	8.7286		
D	16-32	32.6827	1.63414	27.6827		

WHEN F_r = RECEIVER TUNED FREQUENCY IN

WHEN F_o = LOCAL OSCILLATOR FREQUENCY IN

FOR 2-4 MC BAND:-

$F_o = 8F_r + 5$

FOR 4-8 MC BAND:-

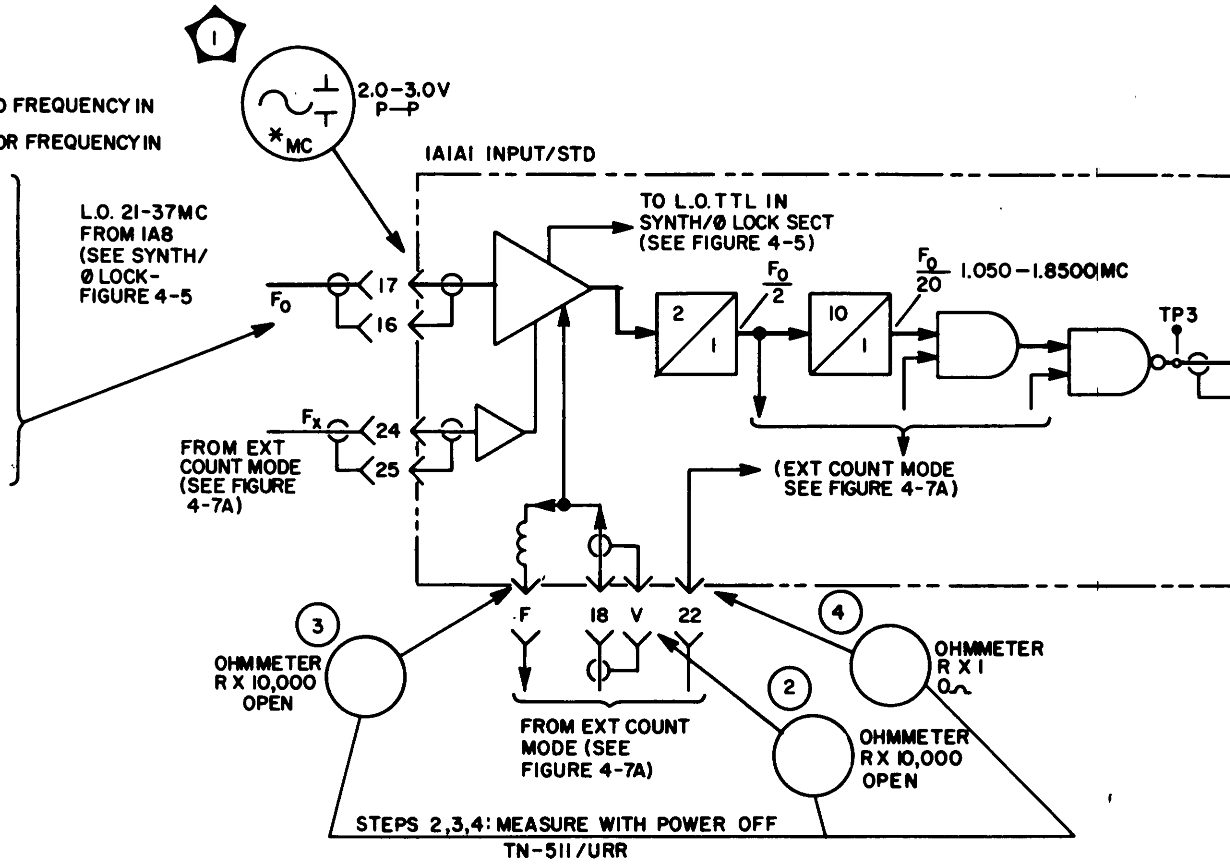
$F_o = 4F_r + 5$

FOR 8-16 MC BAND:-

$F_o = 2F_r + 5$

FOR 16-32 MC BAND:-

$F_o = F_r + 5$

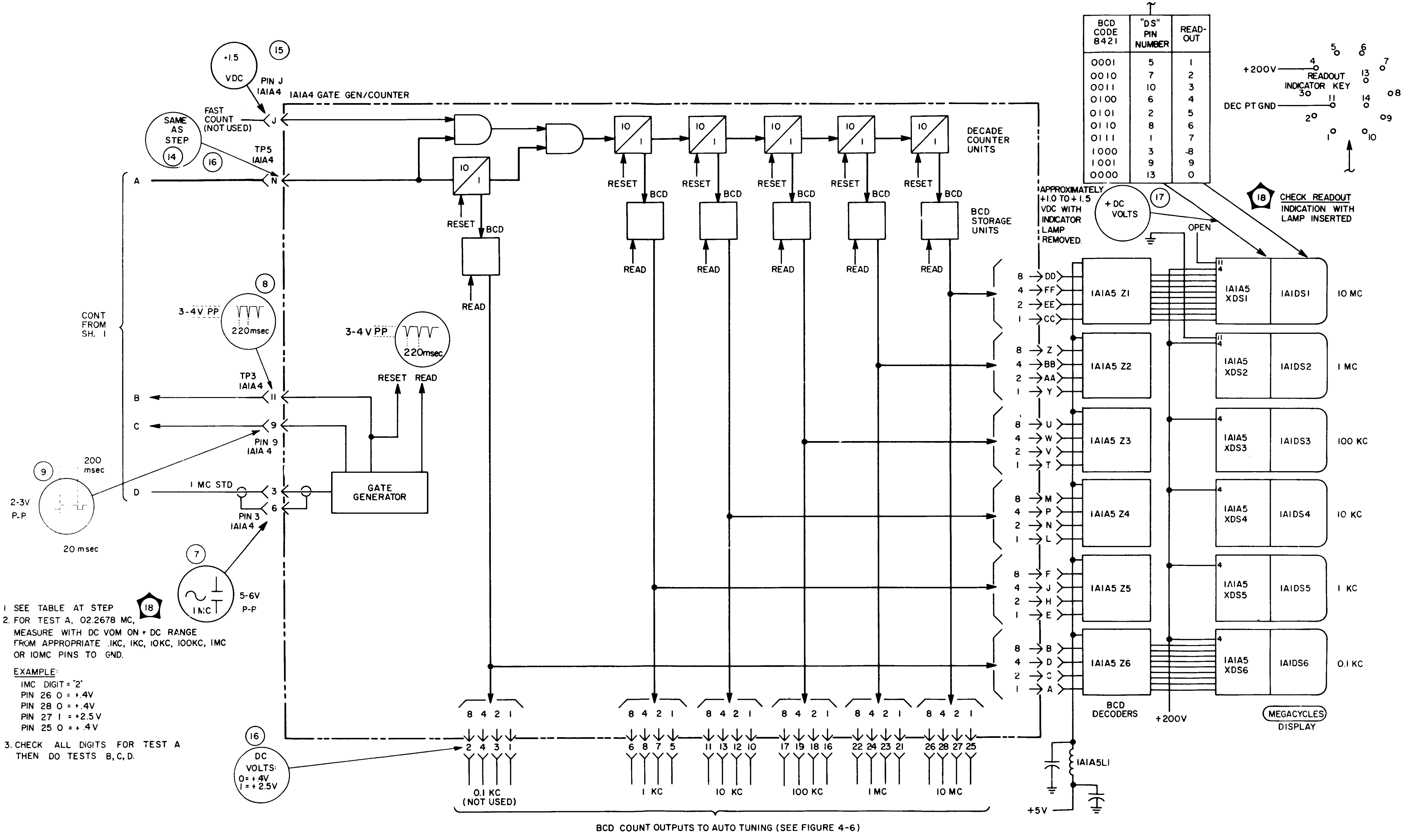


NOTES:

1. INPUT/OUTPUT CHECKS FOR FUNCTIONAL SECTION
2. ○ INPUT/OUTPUT CHECKS FOR SUBASSEMBLIES
3. HEAVY LINES INDICATE PATH OF COUNT SIGNAL

POWER SUPPLY VOLTAGES

VOLTS	SOURCE	
+.5	1A2-14	1A1A1-27, 1 1A1A13-2, 1
+200	1A2-M	1A1A5J1-24



BCD CODE 8421	"DS" PIN NUMBER	READ-OUT
0001	5	1
0010	7	2
0011	10	3
0100	6	4
0101	2	5
0110	8	6
0111	1	7
1000	3	8
1001	9	9
0000	13	0

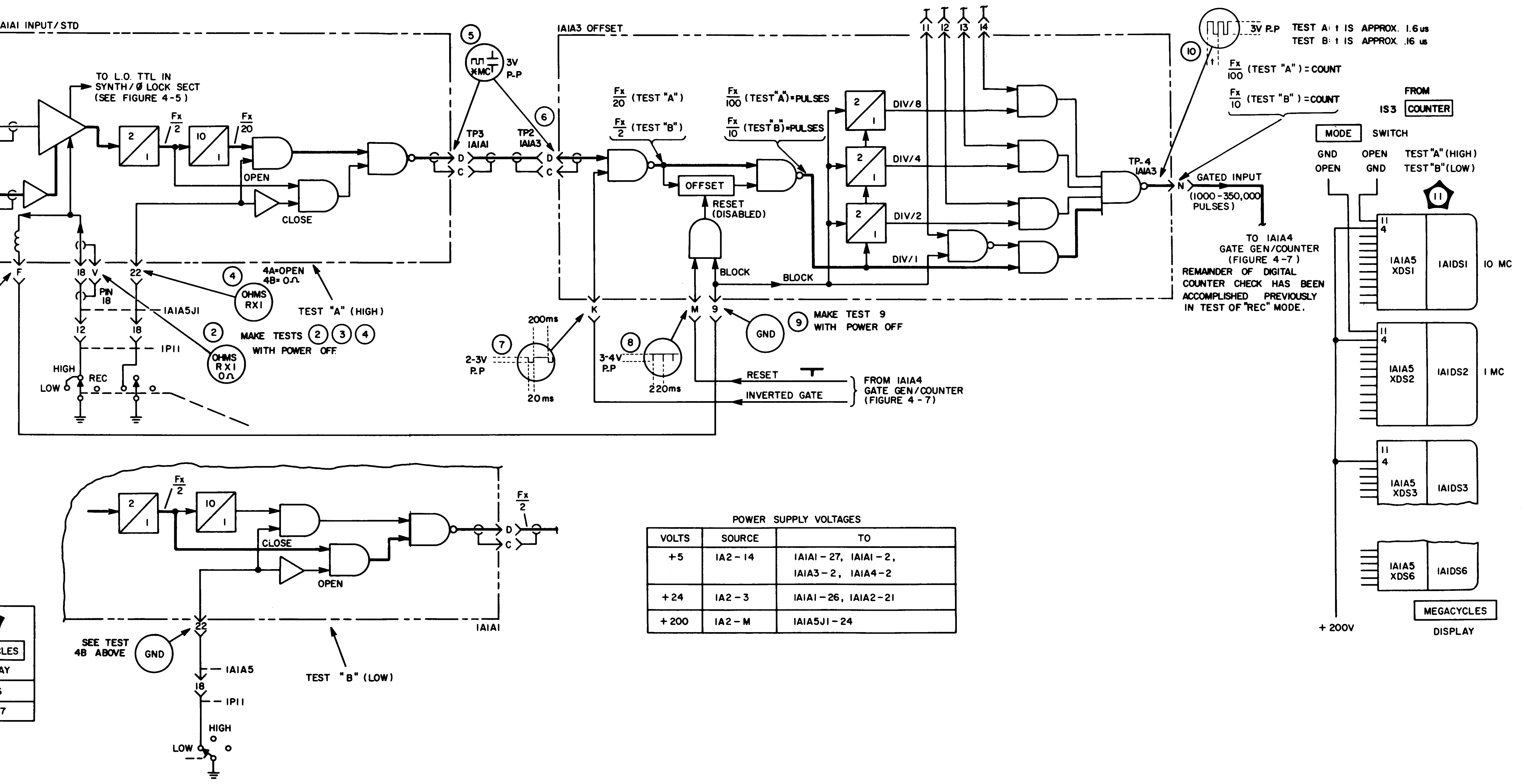
1. SEE TABLE AT STEP 18
2. FOR TEST A, 02.2678 MC, MEASURE WITH DC VOM ON + DC RANGE FROM APPROPRIATE .1KC, 1KC, 10KC, 100KC, 1MC OR 10MC PINS TO GND.

   EXAMPLE:

   1MC DIGIT = "2"
   PIN 26 0 = +.4V
   PIN 28 0 = +.4V
   PIN 27 1 = +2.5V
   PIN 25 0 = +.4V

3. CHECK ALL DIGITS FOR TEST A THEN DO TESTS B, C, D.

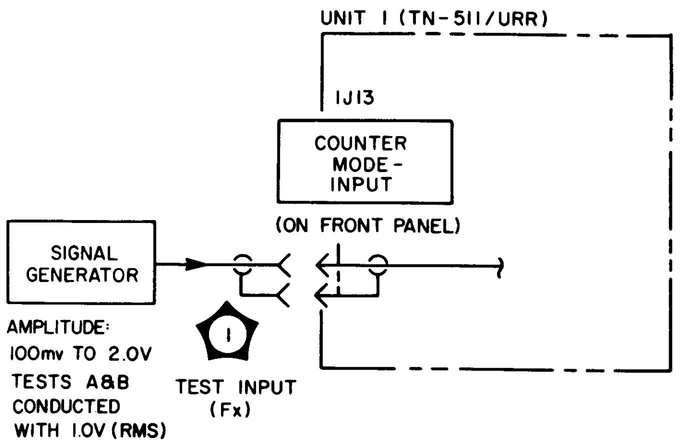
Figure 4-9. Servicing Block Diagram Digital Count Section Receiving Mode (Sheet 2 of 2)



POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO
+5	IA2-14	IAIAI-27, IAIAI-2, IAIA3-2, IAIA4-2
+24	IA2-3	IAIAI-26, IAIA2-21
+200	IA2-M	IAIA5JI-24

Figure 4-10. Servicing Block Diagram Digital Count Section



TEST SETUP - DIGITAL COUNTER
(EXTERNAL MODE)

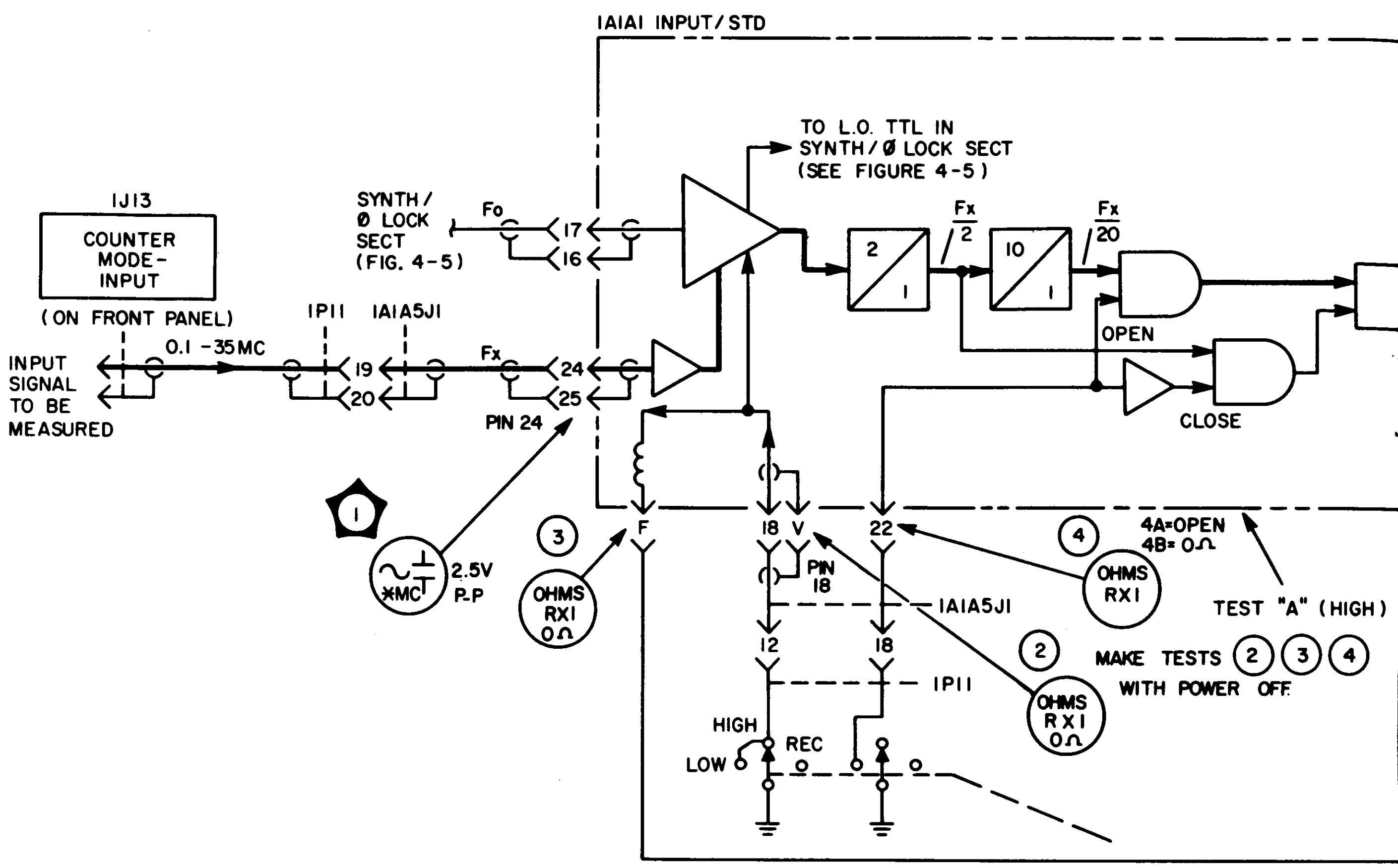
CONTROL POSITIONS FOR TEST * *

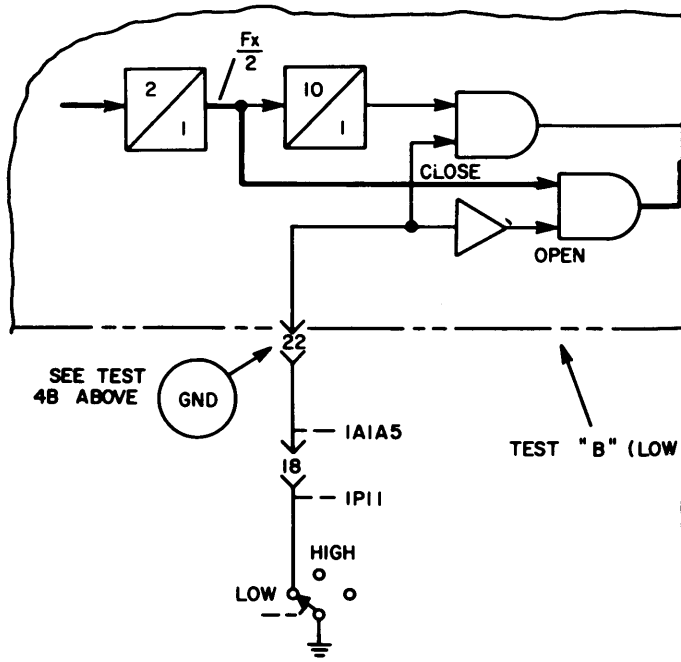
MODULAR UNIT	CONTROL	POSITION
TN-511/URR OR TN-525/FRR	POWER SWITCH	ON
"	FUNCTION SWITCH	SYN
"	COUNTER MODE SW	AS SHOWN IN TEST
O-1510/URR	POWER SWITCH	ON
KY-661/URR	POWER SWITCH	OFF
CV-2520(V)/URC OR CV-2521(V)/URC	POWER SWITCH	OFF

* * POSITIONS OF CONTROLS NOT SHOWN ARE OPTIONAL

NOTES:

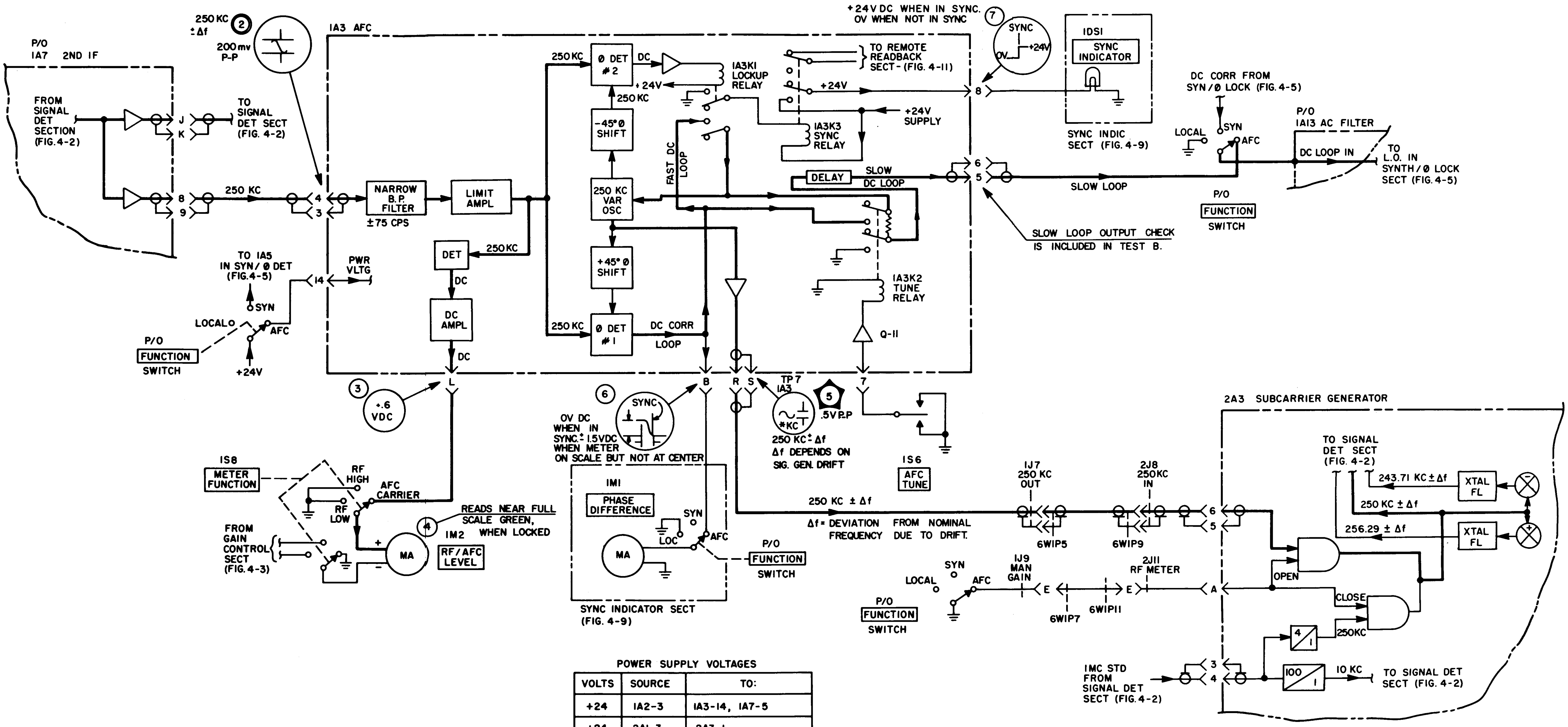
1. ⬠ INPUT/OUTPUT CHECKS FOR FUNCTIONAL SECTION
2. ○ INPUT/OUTPUT CHECKS FOR SUBASSEMBLIES
3. —— HEAVY LINES INDICATE PATH OF COUNT SIGNAL
4. THE CHECK OF THE DIGITAL COUNTER SECTION IN THE "REC" MODE SHOULD BE CONDUCTED PRIOR TO THIS TEST





* SIGNAL VARIATIONS

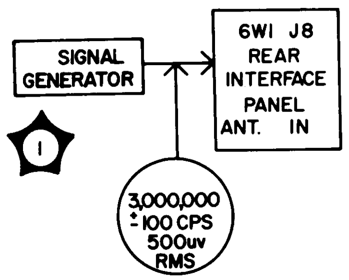
TEST	1S3 COUNTER MODE SW POS	1 FX TEST INPUT (MC)	5 (MC) 6	11 MEGACYCLES DISPLAY
A	HIGH	12.34567	0.61728	12.3456
B	LOW	12.34567	6.17283	2.34567



POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:
+24	1A2-3	1A3-14, 1A7-5
+24	2A1-3	2A3-1
-24	1A2-10	1A3-P

Figure 4-11. Automatic Frequency Control Servicing Block Diagram



CONTROL POSITIONS FOR TEST

MODULAR UNIT	CONTROL	POSITION
CV-2520/URC	POWER SWITCH	OFF
KY-661/URR	POWER SWITCH	OFF
O-1510/URR	POWER SWITCH	OFF
TD-914/URR	POWER SWITCH	OFF
TN-511/URR	POWER SWITCH	ON
	BAND SWITCH	2-4
	COUNTER MODE	REC
	RF GAIN	FULL CCW (AGC)
	FUNCTION	AFC
	SILENCER	OFF (DOWN)
	METER FUNCTION	AFC CARRIER
	FINE TUNE	MID POSITION
	INPUT ATTENUATOR	OUT (DOWN)
	TUNE	ADJUST FOR 03.0000 ON RCVR COUNTER

✪ INPUT / OUTPUT CHECKS FOR FUNCTIONAL SECTION.

◎ INPUT / OUTPUT CHECKS FOR MODULE UNIT.

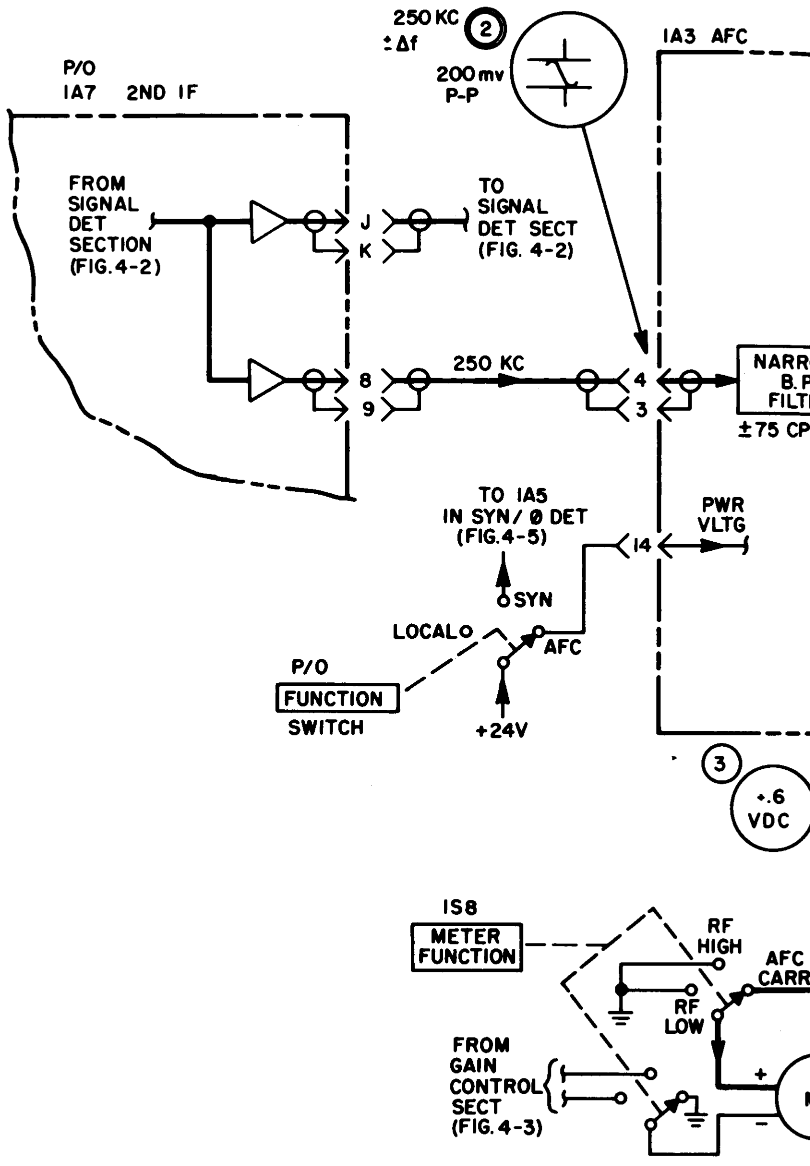
○ INPUT / OUTPUT CHECKS FOR SUBASSEMBLIES.

TEST A

WITH SIGNAL GENERATOR SET AT 3MC ± 100~ 500uv, AND WITH OTHER CONTROLS SET AS INDICATED, DEPRESS AFC TUNE SWITCH AND ADJUST TUNE / FINE TUNE CONTROLS FOR MAXIMUM INDICATION ON AFC CARRIER LEVEL METER AND CENTER SCALE ON PHASE DIFFERENCE METER. RELEASE AFC TUNE SWITCH. PROCEED WITH STEPS ②, ③, ④, ⑤, ⑥, ⑦

TEST B (WITH SIGNAL GENERATOR CONNECTED AS FOR TEST A.)

1. MOVE RECEIVER FINE TUNE CONTROL FULLY CLOCKWISE.
2. DEPRESS AFC TUNE SWITCH AND ADJUST RECEIVER TUNE CONTROL CAREFULLY UNTIL RF/AFC LEVEL METER READS IN THE GREEN, PHASE DIFFERENCE METER READS CENTER SCALE AND SYNC LAMP IS LIGHTED. RELEASE AFC TUNE SWITCH, AFTER RECORDING RECEIVER COUNTER INDICATION.
3. CAREFULLY AND SLOWLY, IN SMALL INCREMENTS, MOVE THE RECEIVER FINE TUNE CONTROL COUNTERCLOCKWISE, ALLOWING THE PHASE DIFFERENCE METER TO STABILIZE AFTER EACH MOVEMENT, UNTIL THE SYNC LAMP GOES OUT.
4. DEPRESS AFC TUNE SWITCH AND RECORD RECEIVER COUNTER INDICATION. THE SECOND READING SHOULD BE AT LEAST ONE KILOCYCLE BELOW THE FIRST READING.
5. REPEAT STEPS 2, 3, AND 4 EXCEPT THAT THE RECEIVER FINE TUNE CONTROL SHOULD BE MOVED CLOCKWISE DURING THE MEASURMENTS. THE SECOND COUNTER READING SHOULD BE AT LEAST ONE KILOCYCLE HIGHER THAN THE FIRST READING.

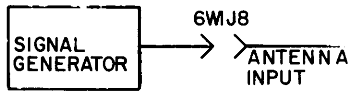


INITIAL SWITCH POSITIONS		
UNIT	SWITCH	POSITION
CV-2520/URR	POWER	OFF
KY-661/URR	POWER	OFF
TD-914/URR	POWER	OFF
TN-511/URR	POWER	ON
0-1510/URR	POWER	ON

TEST OF SYNTHESIZED MODE

1. SET FREQUENCY SELECTORS ON 0-1510/URR TO 09.0000
2. SET TUNER FUNCTION SWITCH TO SYN
3. SET TUNER BANDSWITCH TO 8-16 POSITION
4. SET COUNTER MODE SWITCH TO REC
5. SET TUNER FINE TUNE CONTROL TO MID POSITION
6. ADJUST TUNE CONTROL FOR 09.0000 ON RECEIVER COUNTER, AND CAUSE SYNC INDICATOR TO LIGHT
7. CONNECT DC VOLTMETER TO TP9, IA5
8. CAREFULLY MOVE TUNE CONTROL IN SMALL INCREMENTS TO CAUSE VOLTAGE READINGS AT TP9, IA5 AS INDICATED IN THE TABLE. THE METER POINTER SHOULD APPROXIMATE THE POSITIONS INDICATED
9. MOVE THE DC VOLTMETER TO PIN 3, IA5. WHEN THE SYSTEM IS IN SYNC, THE SYNC LAMP SHOULD BE LIT AND THE VOLTAGE READING SHOULD BE +24VOLTS WHEN THE SYSTEM IS OUT OF SYNC, THE SYNC LAMP SHOULD BE OUT AND THE VOLTAGE READING SHOULD BE 0 VOLTS.

TEST OF AFC MODE

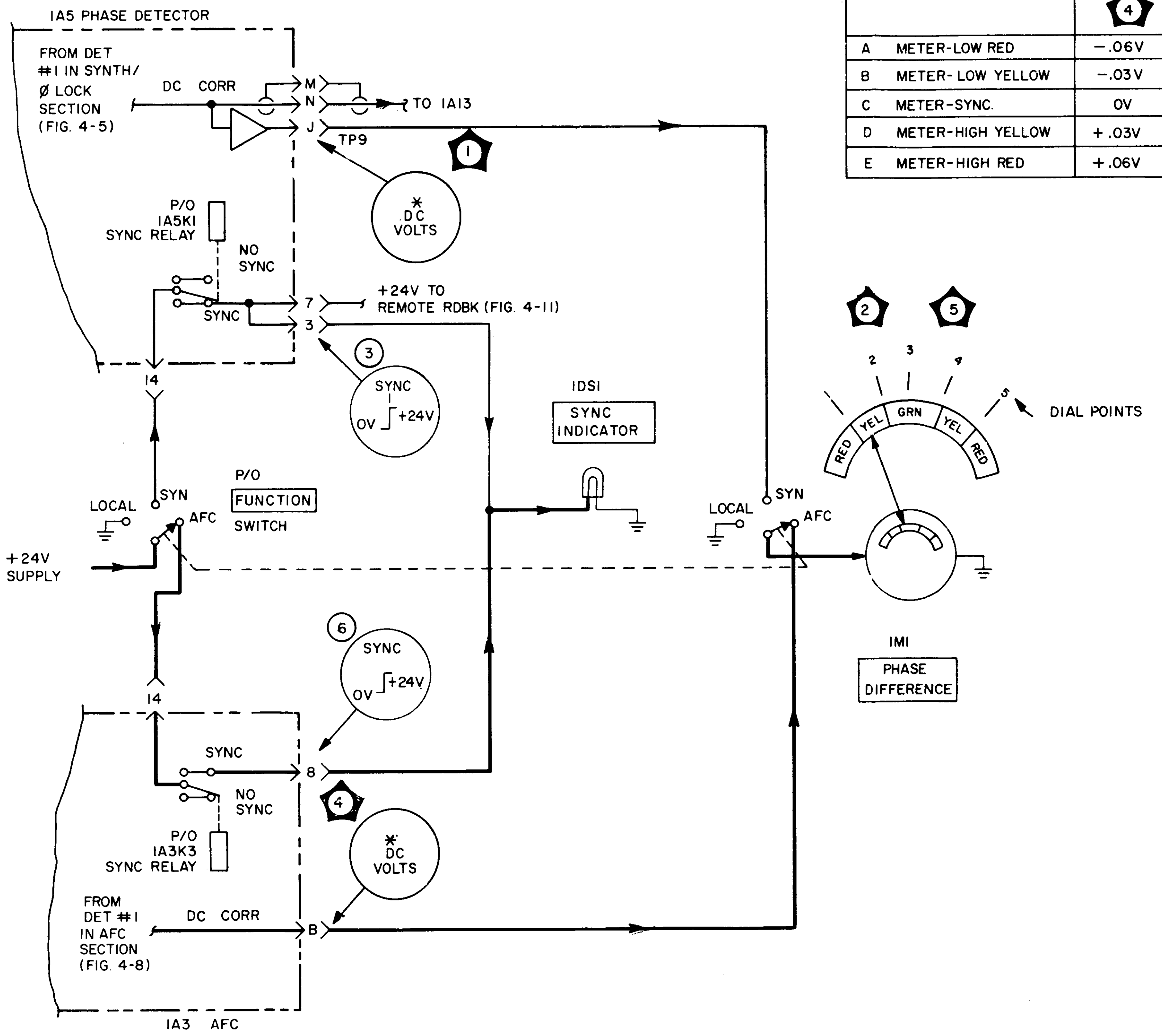


SET AT 09.0000MC ± 200CPS AT ImV, UNMODULATED

1. SET TUNER FUNCTION SWITCH TO AFC
2. SET METER FUNCTION SWITCH ON TUNER TO AFC
3. SET INPUT ATTENUATOR SWITCH DOWN (OUT)
4. CONNECT SIGNAL GENERATOR TO ANTENNA INPUT AT 9MC, +OR − 200 CPS, AT ImV, UNMODULATED
5. DEPRESS AFC TUNE SWITCH AND ADJUST FINE TUNE AND TUNE CONTROLS FOR MAXIMUM INDICATION ON AFC LEVEL METER AND CENTER SCALE INDICATION ON THE PHASE DIFFERENCE METER. RELEASE THE AFC TUNE SWITCH
6. CONNECT DC VOLTMETER TO PIN B, IA3
7. CAREFULLY MOVE THE TUNE CONTROL IN SMALL INCREMENTS TO CAUSE VOLTAGE READINGS AT PIN B, IA3, AS INDICATED IN THE TABLE. THE METER POINTER SHOULD APPROXIMATE THE POSITIONS INDICATED
8. MOVE THE DC VOLTMETER TO PIN 8, IA3
9. WHEN THE SYSTEM IS IN SYNC, THE SYNC LAMP SHOULD BE LIT AND THE VOLTAGE READING SHOULD BE +24 VOLTS. WHEN THE SYSTEM IS OUT OF SYNC, THE SYNC LAMP SHOULD BE OUT AND THE VOLTAGE READING SHOULD BE 0 VOLTS.

NOTES:

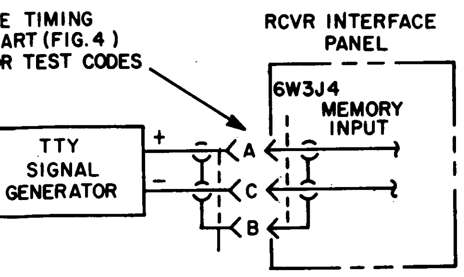
1. ⬟ INPUT/OUTPUT CHECK FOR FUNCTIONAL SECTION
   ○ INPUT/OUTPUT CHECK FOR SUBASSEMBLY



* VOLTAGE VARIATIONS

TEST		1 4	2 5
A	METER-LOW RED	−.06V	DIAL PT 1
B	METER-LOW YELLOW	−.03V	DIAL PT 2
C	METER-SYNC.	0V	DIAL PT 3
D	METER-HIGH YELLOW	+.03V	DIAL PT 4
E	METER-HIGH RED	+.06V	DIAL PT 5

Figure 4-12. Servicing Block Diagram
Sync Indicator Section



TEST SETUP-AUTOMATIC CONTROL

CONTROL POSITION FOR TEST

MODULAR UNIT	CONTROL	POSITION
TN-511/URR	RF GAIN KNOB	AGC
	POWER SWITCH	ON
	COUNTER MODE SWITCH	REC
	BAND SWITCH	AUTO
TD-914/URR	SYM BFO	O
O-1510/URR	POWER SWITCH	ON
KY-661/URR	POWER SWITCHI	ON
CV-2520(V)/URC	POWER SWITCH	ON

OTES:

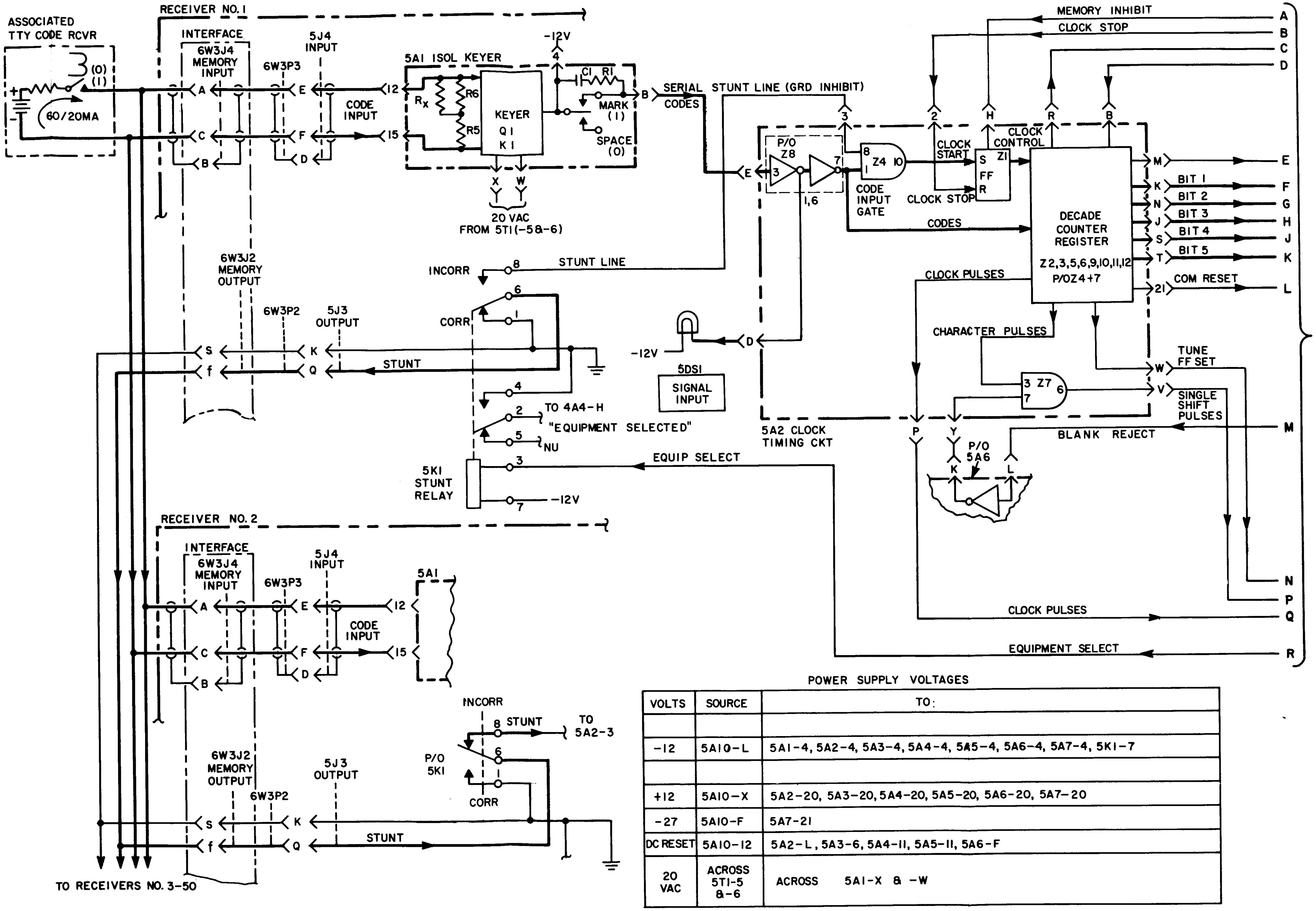
SEE TIMING CHART (FIG.4-) FOR ALL TEST POINT READINGS.

A DUAL TRACE SCOPE SHOULD BE USED TO OBTAIN TEST POINT READINGS. CHANNEL "A" AND TRIGGER OF SCOPE SHOULD BE CONNECTED TO 5A2-P.

. NU= NOT USED IN CV-2520(V)URC

4. "S" DENOTES A SET PULSE, "R" DENOTES A RESET PULSE, ie: 2R=2 BIT RESET, 5S=5 BIT SET

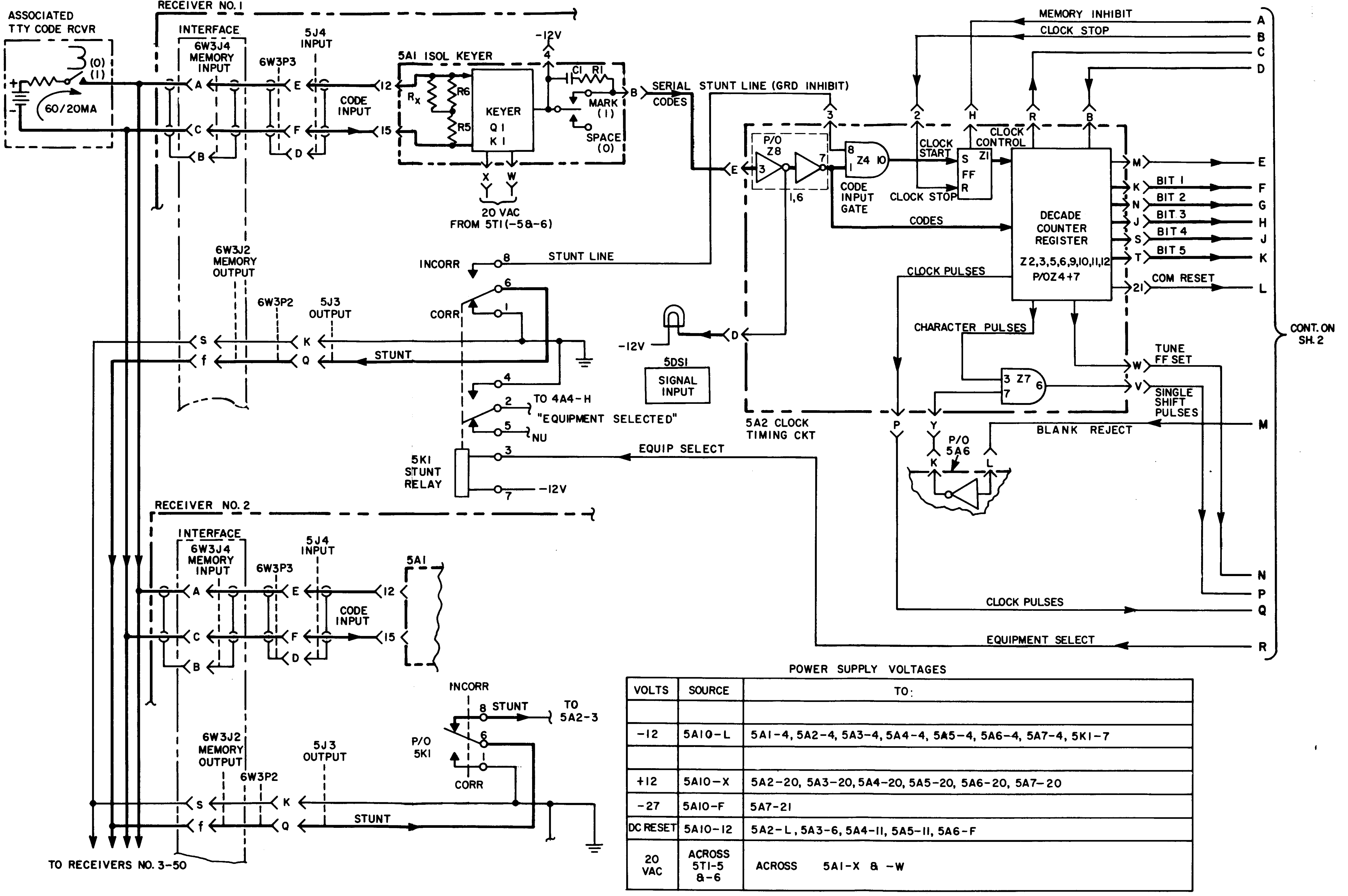
5 ——— DENOTES CODE PATH



POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:
-12	5A10-L	5A1-4, 5A2-4, 5A3-4, 5A4-4, 5A5-4, 5A6-4, 5A7-4, 5K1-7
+12	5A10-X	5A2-20, 5A3-20, 5A4-20, 5A5-20, 5A6-20, 5A7-20
-27	5A10-F	5A7-21
DC RESET	5A10-12	5A2-L, 5A3-6, 5A4-11, 5A5-11, 5A6-F
20 VAC	ACROSS 5T1-5 &-6	ACROSS 5A1-X & -W

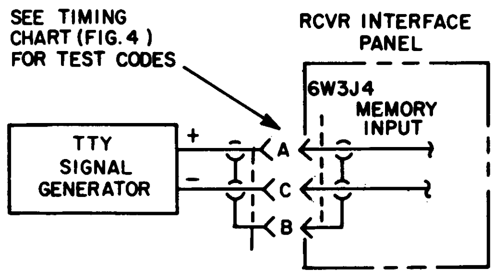
Figure 4-13. Servicing Block Diagram Automatic Tuning Section (Single Memory) (Sheet 1 of 4)



POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:
-12	5A10-L	5A1-4, 5A2-4, 5A3-4, 5A4-4, 5A5-4, 5A6-4, 5A7-4, 5K1-7
+12	5A10-X	5A2-20, 5A3-20, 5A4-20, 5A5-20, 5A6-20, 5A7-20
-27	5A10-F	5A7-21
DC RESET	5A10-12	5A2-L, 5A3-6, 5A4-11, 5A5-11, 5A6-F
20 VAC	ACROSS 5T1-5 &-6	ACROSS 5A1-X & -W

Figure 4-13. Servicing Block Diagram Automatic Tuning Section (Single Memory) (Sheet 1 of 4)



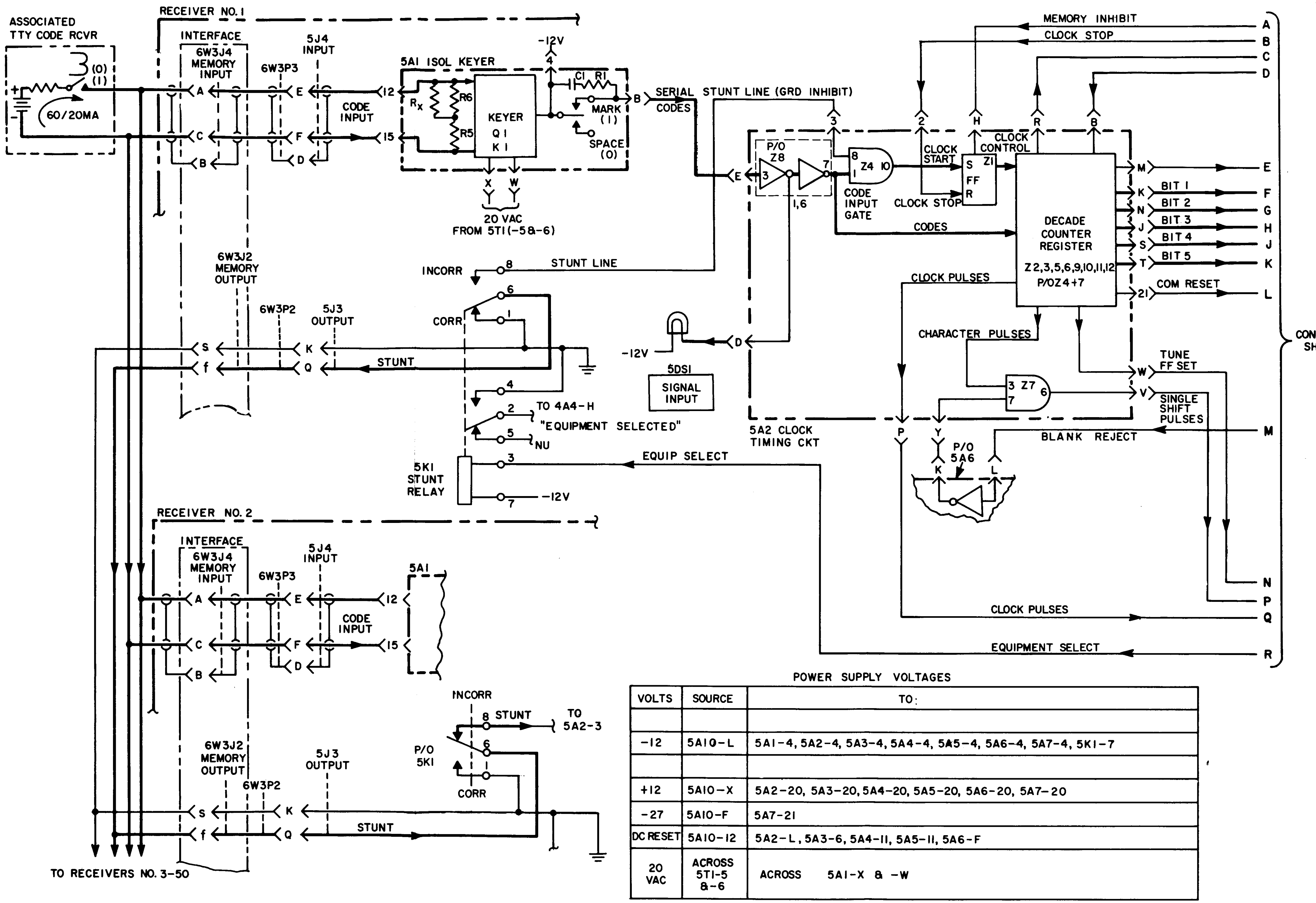
TEST SETUP-AUTOMATIC CONTROL

CONTROL POSITION FOR TEST

MODULAR UNIT	CONTROL	POSITION
TN-511/URR	RF GAIN KNOB	AGC
	POWER SWITCH	ON
	COUNTER MODE SWITCH	REC
	BAND SWITCH	AUTO
TD-914/URR	SYM BFO	O
O-1510/URR	POWER SWITCH	ON
KY-661/URR	POWER SWITCHI	ON
CV-2520(V)/URC	POWER SWITCH	ON

NOTES:

1. SEE TIMING CHART (FIG.4-) FOR ALL TEST POINT READINGS.
2. A DUAL TRACE SCOPE SHOULD BE USED TO OBTAIN TEST POINT READINGS. CHANNEL "A" AND TRIGGER OF SCOPE SHOULD BE CONNECTED TO 5A2-P.
3. NU= NOT USED IN CV-2520(V)URC
4. "S" DENOTES A SET PULSE, "R" DENOTES A RESET PULSE, ie: 2R=2 BIT RESET, 5S=5 BIT SET
5. ━━━ DENOTES CODE PATH



POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:
-12	5A10-L	5A1-4, 5A2-4, 5A3-4, 5A4-4, 5A5-4, 5A6-4, 5A7-4, 5K1-7
+12	5A10-X	5A2-20, 5A3-20, 5A4-20, 5A5-20, 5A6-20, 5A7-20
-27	5A10-F	5A7-21
DC RESET	5A10-12	5A2-L, 5A3-6, 5A4-11, 5A5-11, 5A6-F
20 VAC	ACROSS 5T1-5 & -6	ACROSS 5A1-X & -W

Figure 4-13. Servicing Block Diagram Autom
Tuning Section (Single Memory) (Sheet 1 of 4

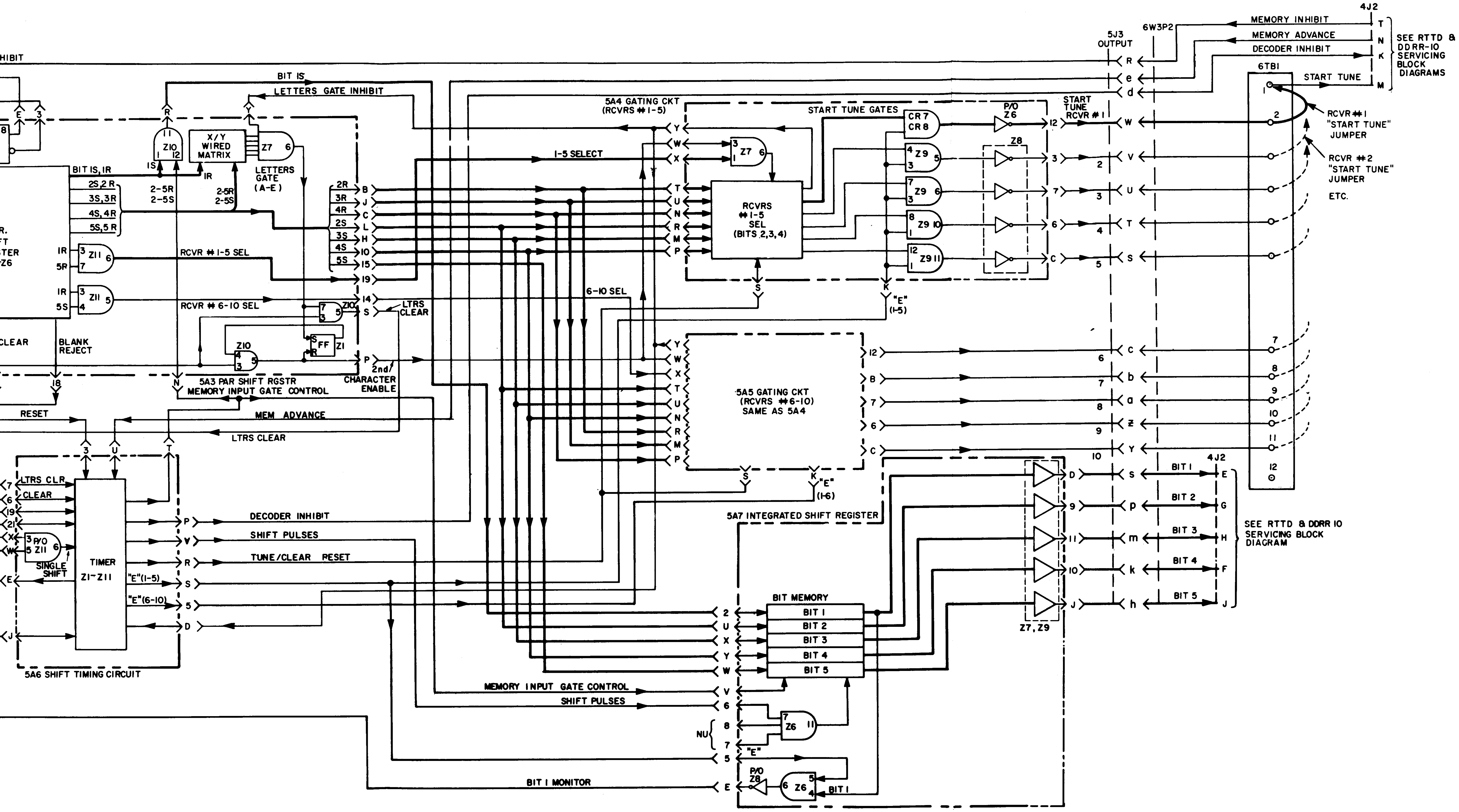
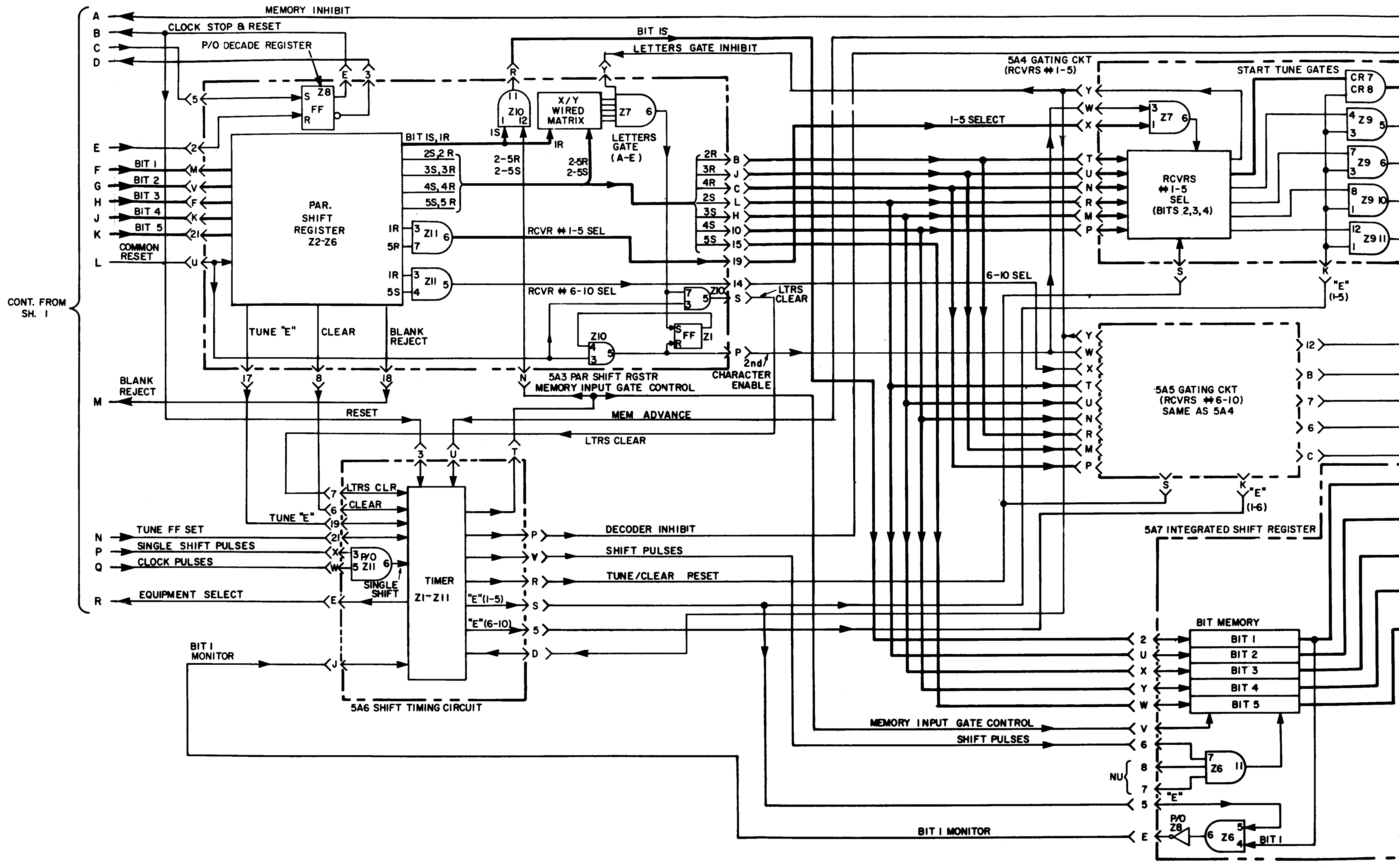


Figure 4-13. Servicing Block Diagram Automatic Tuning Section (Single Memory) (Sheet 2 of 4)


CONT. FROM SH. I
A MEMORY INHIBIT
B CLOCK STOP & RESET
C P/O DECADE REGISTER
D
E
F BIT 1
G BIT 2
H BIT 3
J BIT 4
K BIT 5
L COMMON RESET
M BLANK REJECT
N TUNE FF SET
P SINGLE SHIFT PULSES
Q CLOCK PULSES
R EQUIPMENT SELECT
Z8 FF
PAR. SHIFT REGISTER Z2-Z6
BIT IS, IR
2S,2 R
3S,3R
4S,4R
5S,5 R
TUNE "E"
CLEAR
BLANK REJECT
Z10
X/Y WIRED MATRIX
Z7
LETTERS GATE (A-E)
2-5R 2-5S
IR
RCVR #1-5 SEL
RCVR #6-10 SEL
Z11
FF Z1
2nd CHARACTER ENABLE
5A3 PAR SHIFT RGSTR
MEMORY INPUT GATE CONTROL
RESET
MEM ADVANCE
LTRS CLEAR
BIT IS
LETTERS GATE INHIBIT
LTRS CLR
TUNE "E"
P/O Z11
SINGLE SHIFT
TIMER Z1-Z11
"E"(1-5)
"E"(6-10)
5A6 SHIFT TIMING CIRCUIT
BIT 1 MONITOR
DECODER INHIBIT
SHIFT PULSES
TUNE/CLEAR RESET
1-5 SELECT
6-10 SEL
5A4 GATING CKT (RCVRS #1-5)
RCVRS #1-5 SEL (BITS 2,3,4)
START TUNE GATES
CR7 CR8
Z9
"E" (1-5)
5A5 GATING CKT (RCVRS #6-10) SAME AS 5A4
"E" (1-6)
5A7 INTEGRATED SHIFT REGISTER
BIT MEMORY
BIT 1
BIT 2
BIT 3
BIT 4
BIT 5
MEMORY INPUT GATE CONTROL
SHIFT PULSES
NU
Z6
"E"
P/O Z8
BIT 1 MONITOR
BIT 1

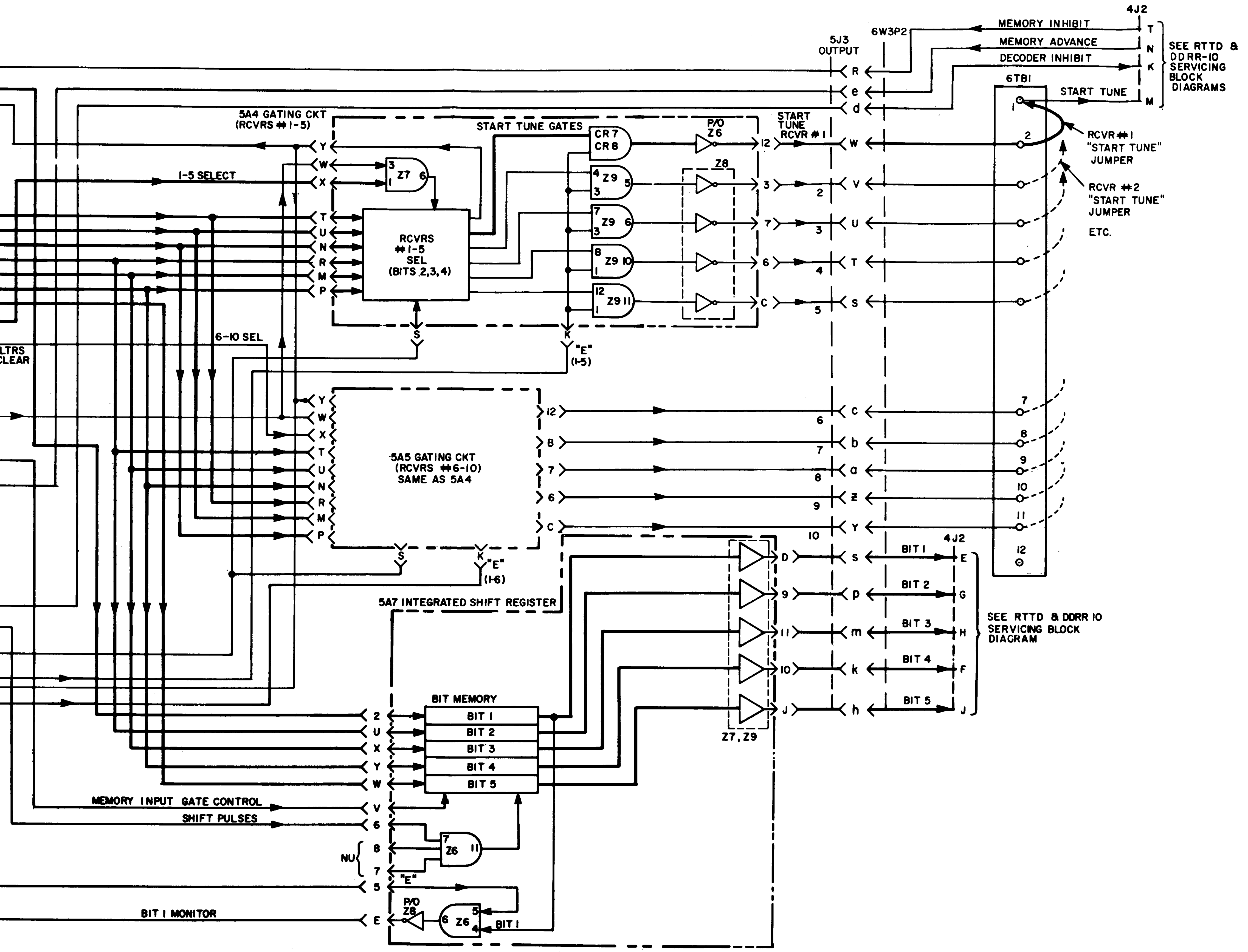
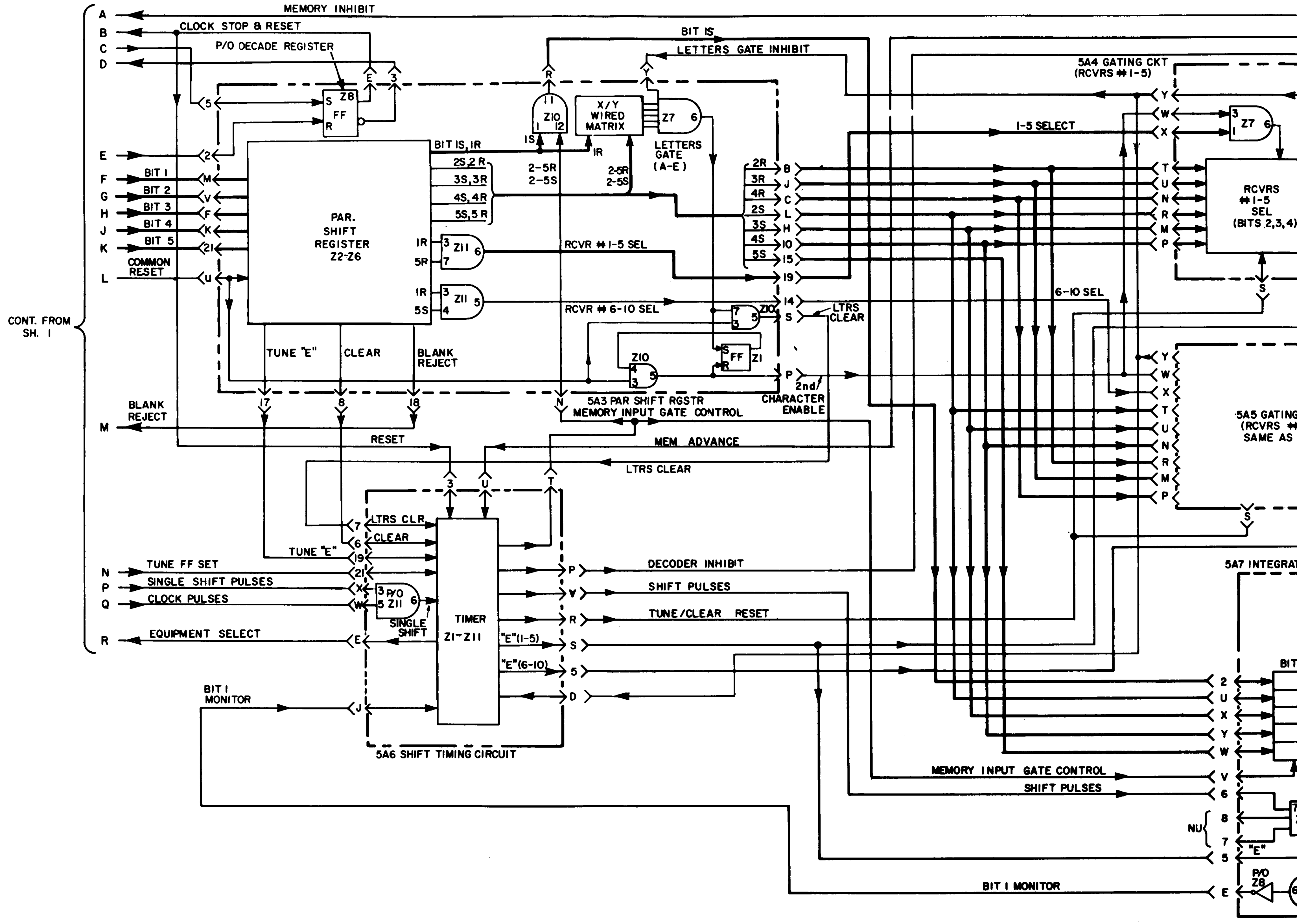


Figure 4-13. Servicing Block Diagram Automatic Tuning Section (Single Memory) (Sheet 2 of 4)


CONT. FROM SH. I
A
B
C
D
E
F
G
H
J
K
L
M
N
P
Q
R
MEMORY INHIBIT
CLOCK STOP & RESET
P/O DECADE REGISTER
BIT 1
BIT 2
BIT 3
BIT 4
BIT 5
COMMON RESET
BLANK REJECT
TUNE FF SET
SINGLE SHIFT PULSES
CLOCK PULSES
EQUIPMENT SELECT
BIT 1 MONITOR
Z8 FF
PAR. SHIFT REGISTER Z2-Z6
BIT 1S, IR
2S,2 R
3S,3R
4S,4R
5S,5 R
Z11
RCVR # 1-5 SEL
RCVR # 6-10 SEL
TUNE "E"
CLEAR
BLANK REJECT
5A3 PAR SHIFT RGSTR
MEMORY INPUT GATE CONTROL
Z10
X/Y WIRED MATRIX
Z7
LETTERS GATE (A-E)
2-5R
2-5S
BIT 1S
LETTERS GATE INHIBIT
Z1 FF
LTRS CLEAR
2nd/ CHARACTER ENABLE
RESET
MEM ADVANCE
LTRS CLEAR
LTRS CLR
CLEAR
TUNE "E"
P/O Z11
SINGLE SHIFT
TIMER Z1-Z11
"E"(1-5)
"E"(6-10)
5A6 SHIFT TIMING CIRCUIT
DECODER INHIBIT
SHIFT PULSES
TUNE/CLEAR RESET
1-5 SELECT
6-10 SEL
5A4 GATING CKT (RCVRS # 1-5)
RCVRS # 1-5 SEL (BITS 2,3,4)
5A5 GATING (RCVRS # SAME AS
5A7 INTEGRAT
MEMORY INPUT GATE CONTROL
SHIFT PULSES
BIT 1 MONITOR
NU
"E"
P/O Z8
BIT

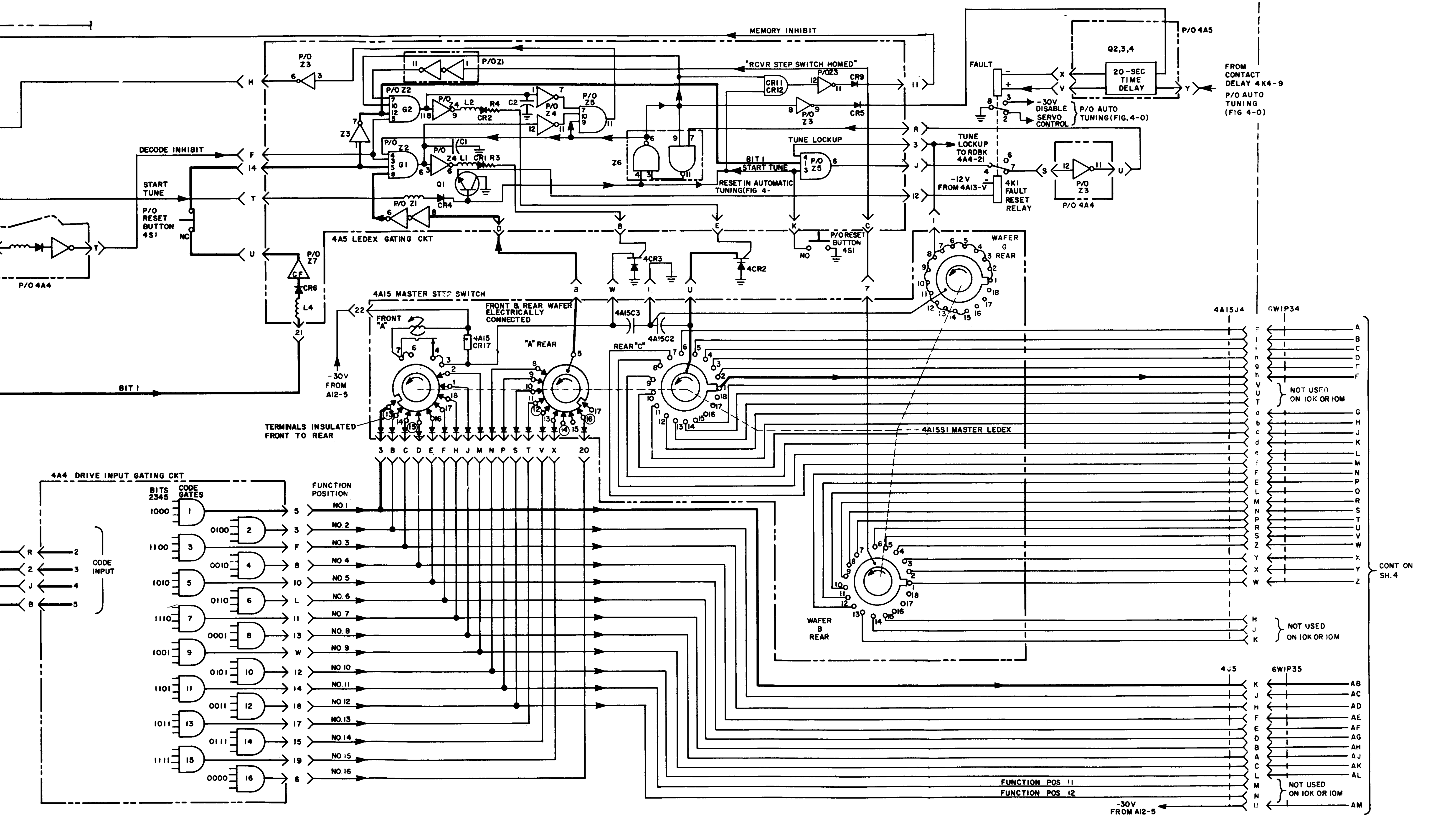
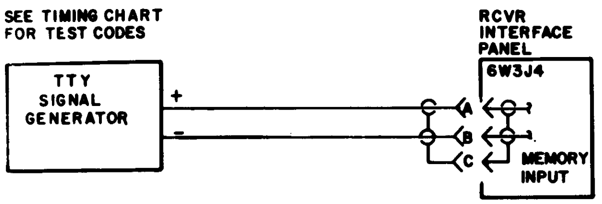


Figure 4-13. Servicing Block Diagram Automatic Tuning Section (Single Memory) (Sheet 3 of 4)



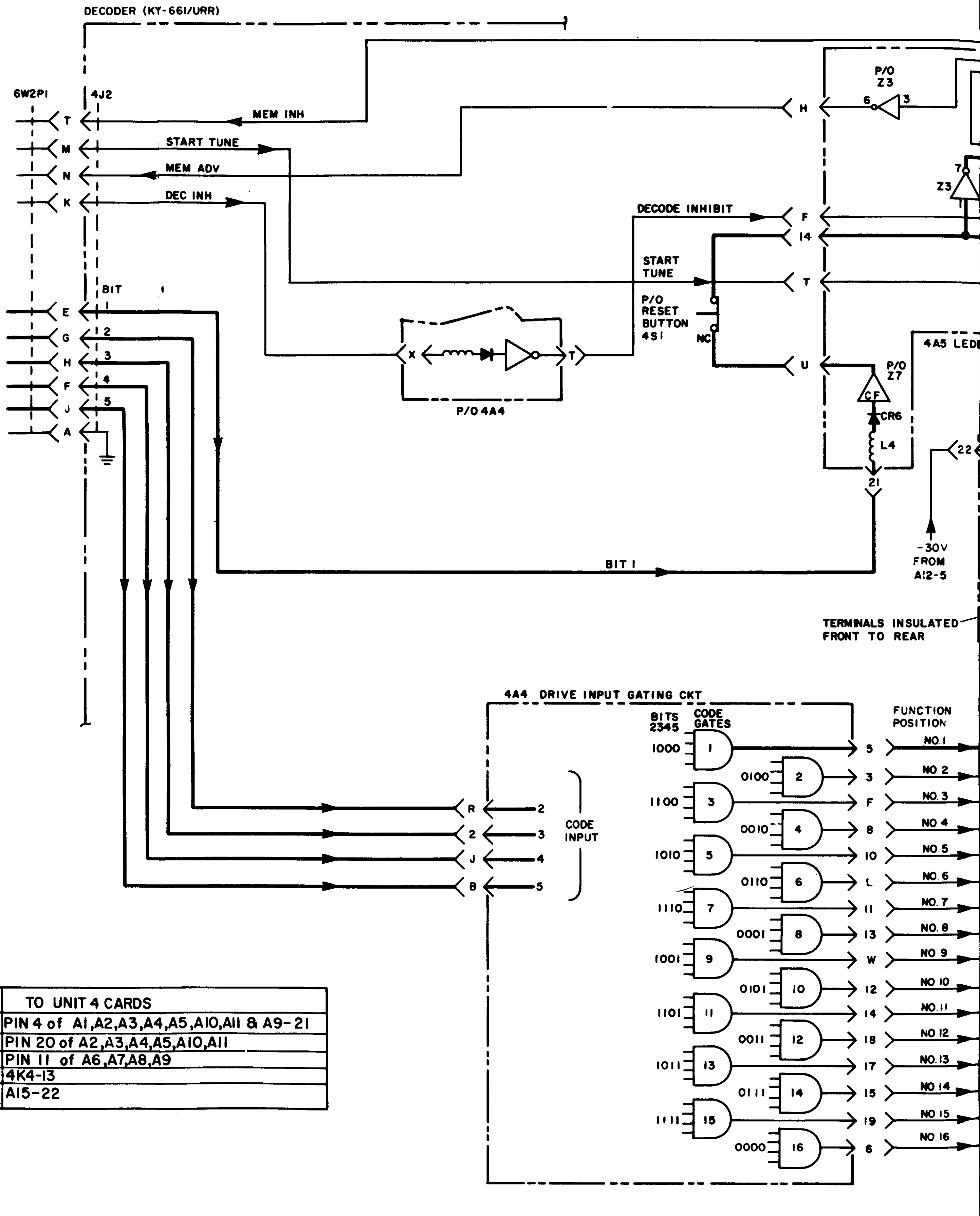
TEST SET-UP AUTOMATIC CONTROL

CONTROL POSITION FOR TEST

MODULAR UNIT	CONTROL	POSITION
TN-511/URR	RF GAIN KNOB POWER SWITCH COUNTER MODE SWITCH BAND SWITCH	AGC ON REC AUTO
TD-914/URR	POWER SWITCH	ON
0-1510/URR	POWER SWITCH	ON
KY-661/URR	POWER SWITCH	ON
CV-2520(V) URC	POWER SWITCH	ON

NOTES

1. SEE TIMING CHARTS (FIG 4-) TEST POINT READINGS
2. NU = NOT USED IN CV-2520(V)URC
   —— CODE PATH
3. USE START TUNE PULSE TO EXTERNALLY SYNC SCOPE (+) TO OBSERVE WAVEFORMS ON TIMING CHART FOR THIS BLOCK
4. A DUAL TRACE SCOPE SHOULD BE USED TO COMPARE ONE WAVEFORM WITH ANOTHER



VOLTS	SOURCE	TO UNIT 4 CARDS
-12	4A13-W	PIN 4 of A1,A2,A3,A4,A5,A10,A11 & A9-21
+12	4A13-H	PIN 20 of A2,A3,A4,A5,A10,A11
+5	4A14-8	PIN 11 of A6,A7,A8,A9
+28	4A14-Y	4K4-13
-30	4A12-5,6	A15-22

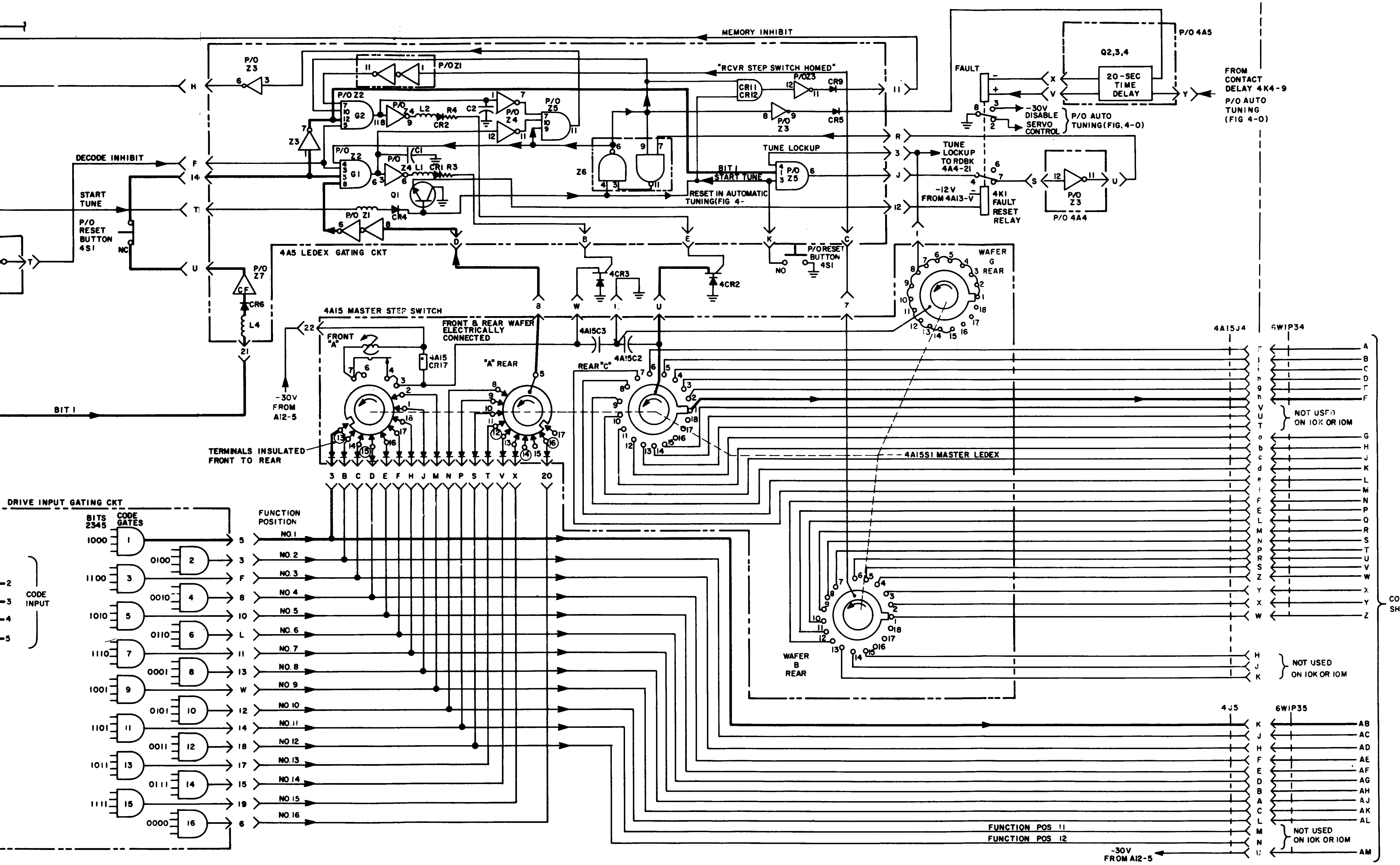
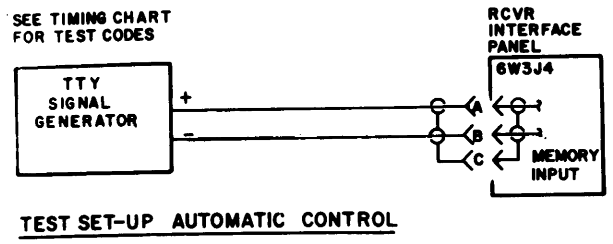
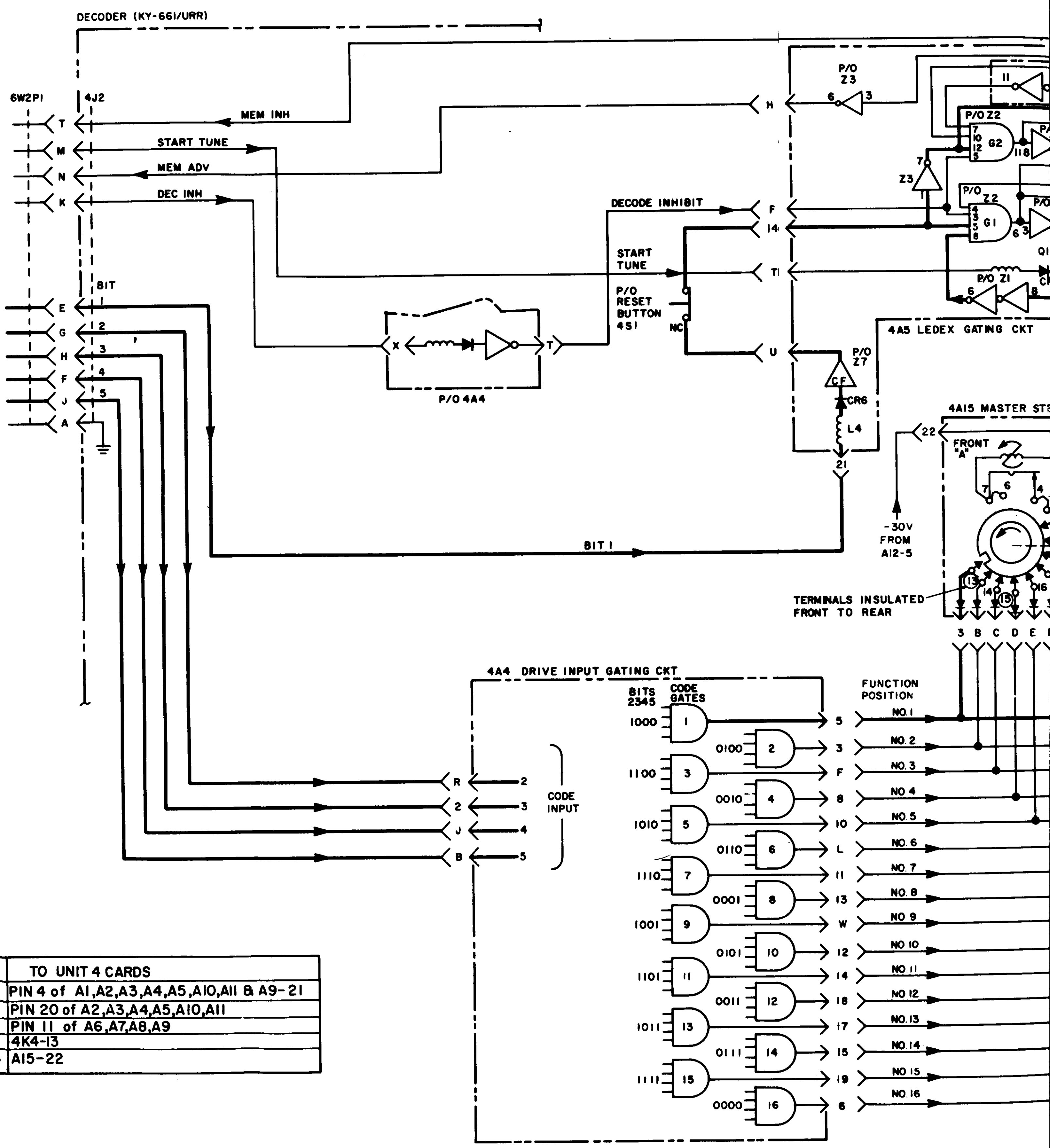


Figure 4-13. Servicing Block Diagram Automatic Tuning Section (Single Memory) (Sheet 3 of 4)



TEST SET-UP AUTOMATIC CONTROL



CONTROL POSITION FOR TEST

MODULAR UNIT	CONTROL	POSITION
TN-511/URR	RF GAIN KNOB POWER SWITCH COUNTER MODE SWITCH BAND SWITCH	AGC ON REC AUTO
TD-914/URR	POWER SWITCH	ON
O-1510/URR	POWER SWITCH	ON
KY-661/URR	POWER SWITCH	ON
CV-2520(V) URC	POWER SWITCH	ON

NOTES

1. SEE TIMING CHARTS (FIG 4-) TEST POINT READINGS
2. NU = NOT USED IN CV-2520(V)URC

   ——— CODE PATH
3. USE START TUNE PULSE TO EXTERNALLY SYNC SCOPE (+) TO OBSERVE WAVEFORMS ON TIMING CHART FOR THIS BLOCK
4. A DUAL TRACE SCOPE SHOULD BE USED TO COMPARE ONE WAVEFORM WITH ANOTHER

VOLTS	SOURCE	TO UNIT 4 CARDS
-12	4A13-W	PIN 4 of A1,A2,A3,A4,A5,A10,A11 & A9-21
+12	4A13-H	PIN 20 of A2,A3,A4,A5,A10,A11
+5	4A14-8	PIN 11 of A6,A7,A8,A9
+28	4A14-Y	4K4-13
-30	4A12-5,6	A15-22

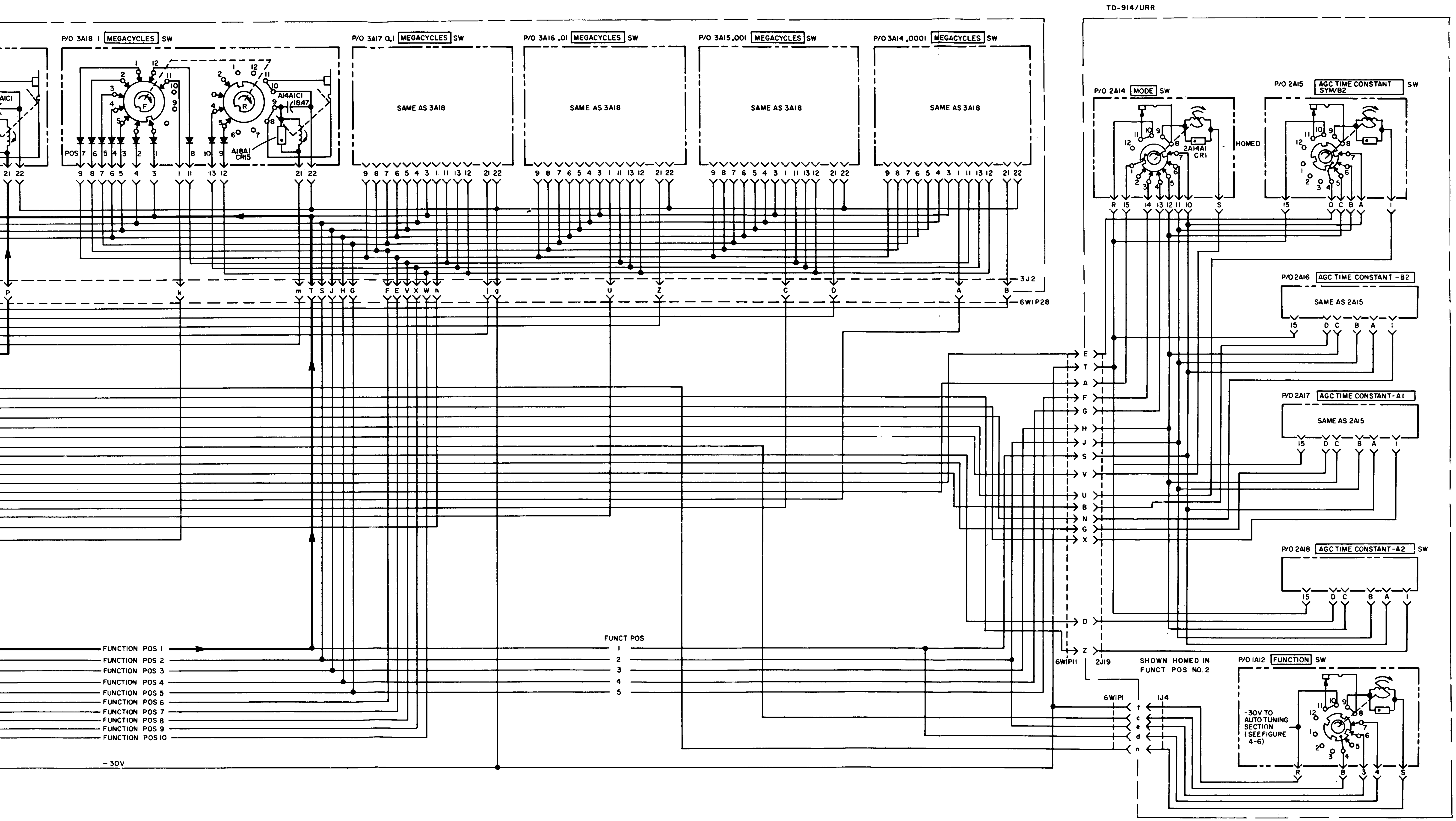
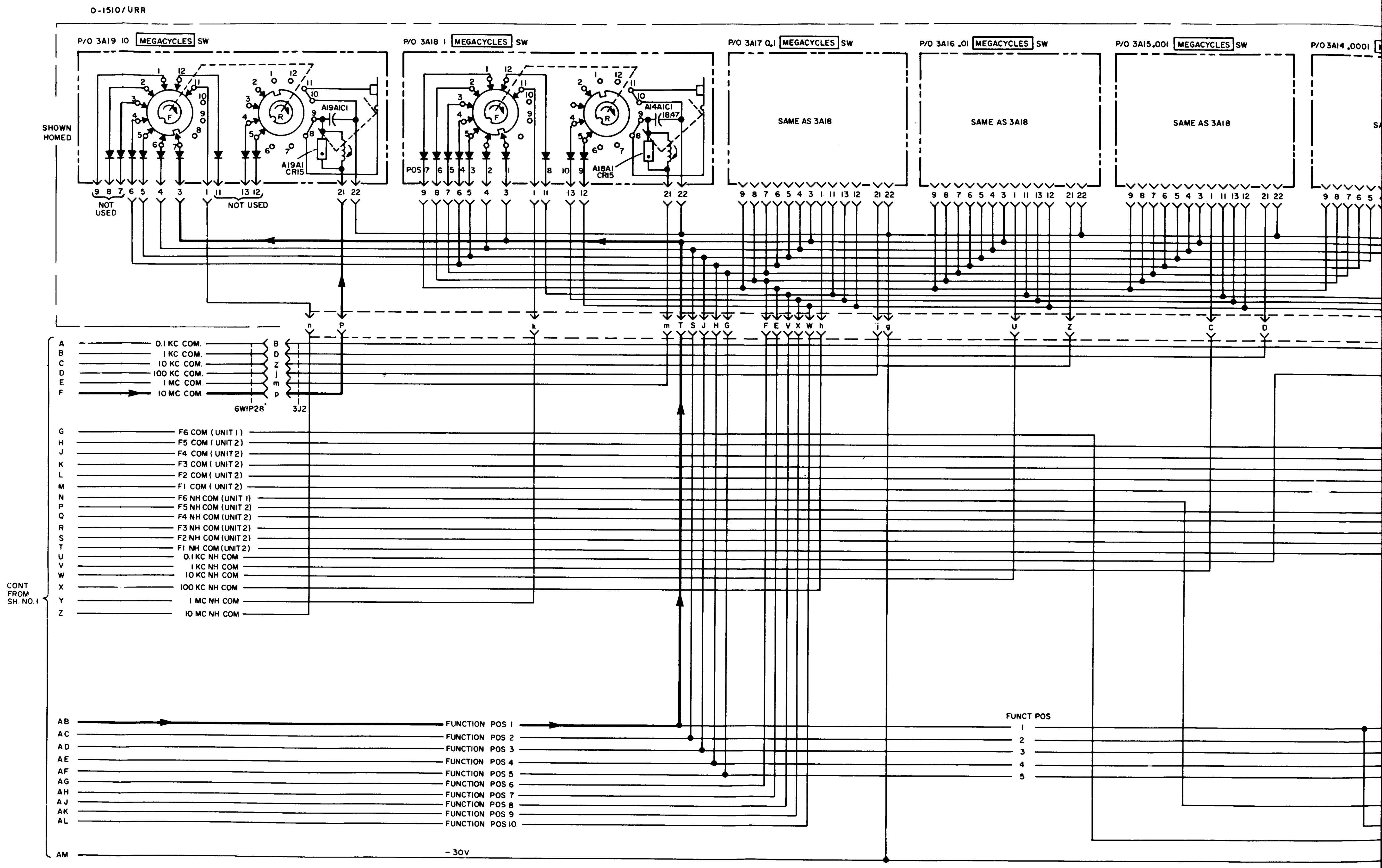
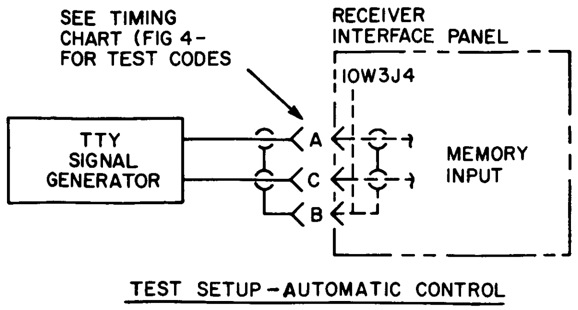


Figure 4-13. Servicing Block Diagram Automatic Tuning Section (Single Memory) (Sheet 4 of 4)


O-1510/URR
P/O 3A19 10 MEGACYCLES SW
P/O 3A18 1 MEGACYCLES SW
P/O 3A17 0.1 MEGACYCLES SW
P/O 3A16 .01 MEGACYCLES SW
P/O 3A15 .001 MEGACYCLES SW
P/O 3A14 .0001
SHOWN HOMED
SAME AS 3A18
SAME AS 3A18
SAME AS 3A18
A19A1C1
A19A1 CR15
A14A1C1
1847
A18A1 CR15
F
R
POS
NOT USED
NOT USED
6W1P28
3J2
CONT FROM SH. NO. 1
A 0.1 KC COM.
B 1 KC COM.
C 10 KC COM.
D 100 KC COM.
E 1 MC COM.
F 10 MC COM.
G F6 COM (UNIT 1)
H F5 COM (UNIT 2)
J F4 COM (UNIT 2)
K F3 COM (UNIT 2)
L F2 COM (UNIT 2)
M F1 COM (UNIT 2)
N F6 NH COM (UNIT 1)
P F5 NH COM (UNIT 2)
Q F4 NH COM (UNIT 2)
R F3 NH COM (UNIT 2)
S F2 NH COM (UNIT 2)
T F1 NH COM (UNIT 2)
U 0.1 KC NH COM
V 1 KC NH COM
W 10 KC NH COM
X 100 KC NH COM
Y 1 MC NH COM
Z 10 MC NH COM
AB FUNCTION POS 1
AC FUNCTION POS 2
AD FUNCTION POS 3
AE FUNCTION POS 4
AF FUNCTION POS 5
AG FUNCTION POS 6
AH FUNCTION POS 7
AJ FUNCTION POS 8
AK FUNCTION POS 9
AL FUNCTION POS 10
AM -30V
FUNCT POS
1
2
3
4
5



CONTROL POSITIONS FOR TEST

MODULAR UNIT	CONTROL	POSITION
TN-511/URR	RF GAIN KNOB	AGC
"	POWER SWITCH	ON
"	COUNTER MODE SWITCH	REC
"	BAND SWITCH	AUTO
TD-914/URR	SYM BFO	+3 KC
"	POWER SWITCH	ON
O-1510/URR	POWER SWITCH	ON
KY-661/URR	POWER SWITCH	ON
CV-2521(V) URC	POWER SWITCH	ON

NOTES: 1. SEE TIMING CHART (FIG. 4-14) FOR ALL TEST POINT READINGS.
2. NU = NOT USED IN AN/URR-63(V)2.
——— = CODE PATH

POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:
-12	9A10-L	9A1-4, 9A2-4, 9A3-4, 9A4-4, 9A6-4, 9A7-4, 9A8-4, 9A9-4, 9K1-7
+12	9A10-X	9A2-20, 9A3-20, 9A4-20, 9A6-20, 9A7-20, 9A8-20, 9A9-20
-27	9A10-F	9A7-21, 9A8-21
DC RESET	9A10-12	9A2-L, 9A3-6, 9A4-11, 9A6-F, 9A9-Y
20 VAC	ACROSS 9T1-5 & -6	ACROSS 9A1-X & -W

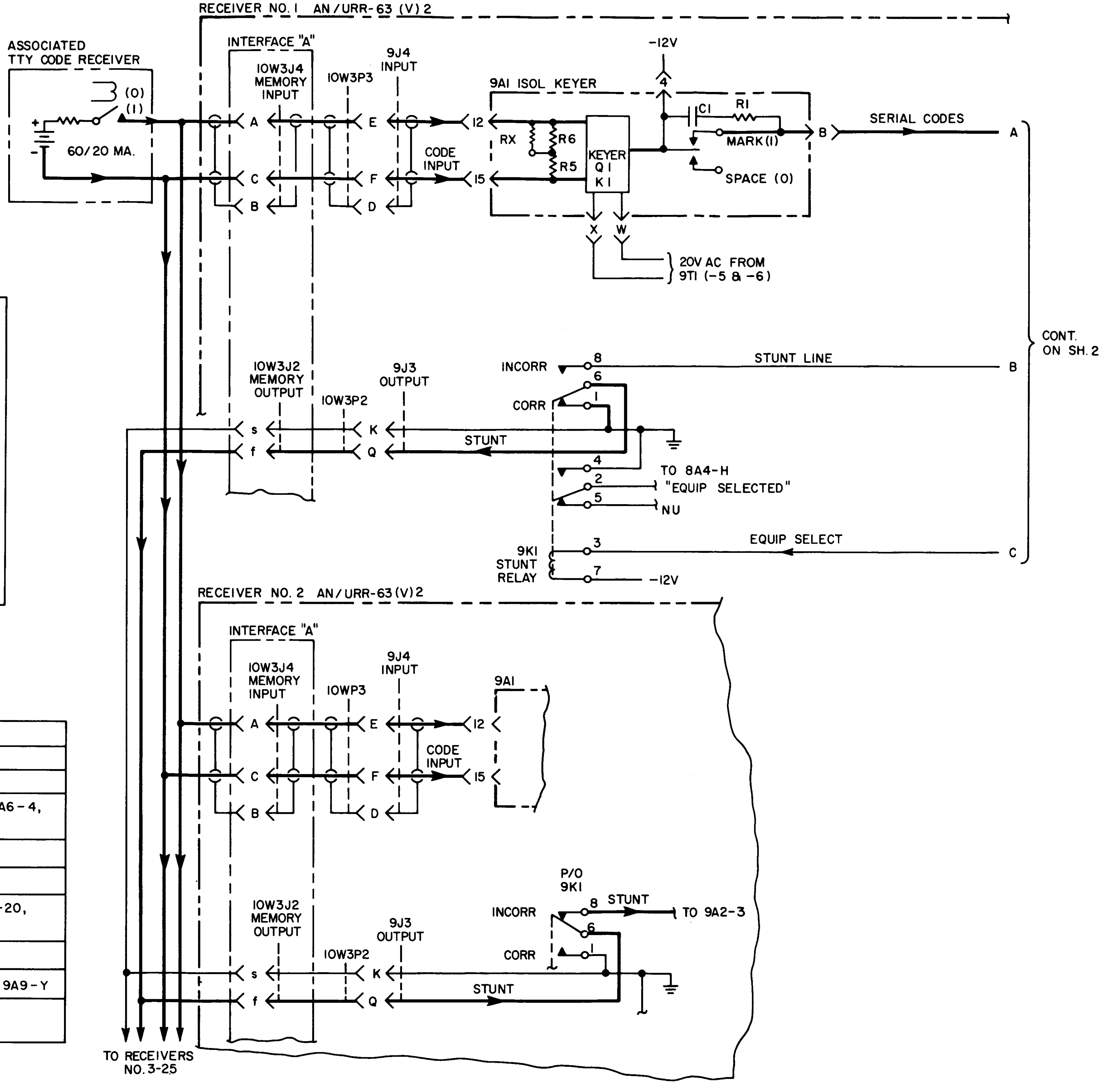
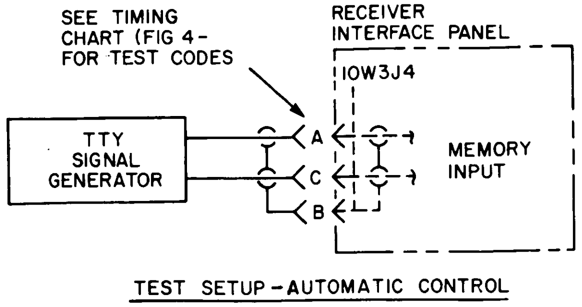


Figure 4-14. Servicing Block Diagram Automatic Tuning Section (Dual Memory) Sheet 1 of 2)



TEST SETUP - AUTOMATIC CONTROL

CONTROL POSITIONS FOR TEST

MODULAR UNIT	CONTROL	POSITION
TN-511/URR	RF GAIN KNOB	AGC
"	POWER SWITCH	ON
"	COUNTER MODE SWITCH	REC
"	BAND SWITCH	AUTO
TD-914/URR	SYM BFO	+3 KC
"	POWER SWITCH	ON
O-1510/URR	POWER SWITCH	ON
KY-661/URR	POWER SWITCH	ON
CV-2521(V) URC	POWER SWITCH	ON

NOTES:
1. SEE TIMING CHART (FIG. 4-14) FOR ALL TEST POINT READINGS.
2. NU = NOT USED IN AN/URR-63(V)2.
━━━━ = CODE PATH

POWER SUPPLY VOLTAGES

VOLTS	SOURCE	TO:
-12	9A10-L	9A1-4, 9A2-4, 9A3-4, 9A4-4, 9A6-4, 9A7-4, 9A8-4, 9A9-4, 9K1-7
+12	9A10-X	9A2-20, 9A3-20, 9A4-20, 9A6-20, 9A7-20, 9A8-20, 9A9-20
-27	9A10-F	9A7-21, 9A8-21
DC RESET	9A10-12	9A2-L, 9A3-6, 9A4-11, 9A6-F, 9A9-Y
20 VAC	ACROSS 9T1-5 & -6	ACROSS 9A1-X & -W

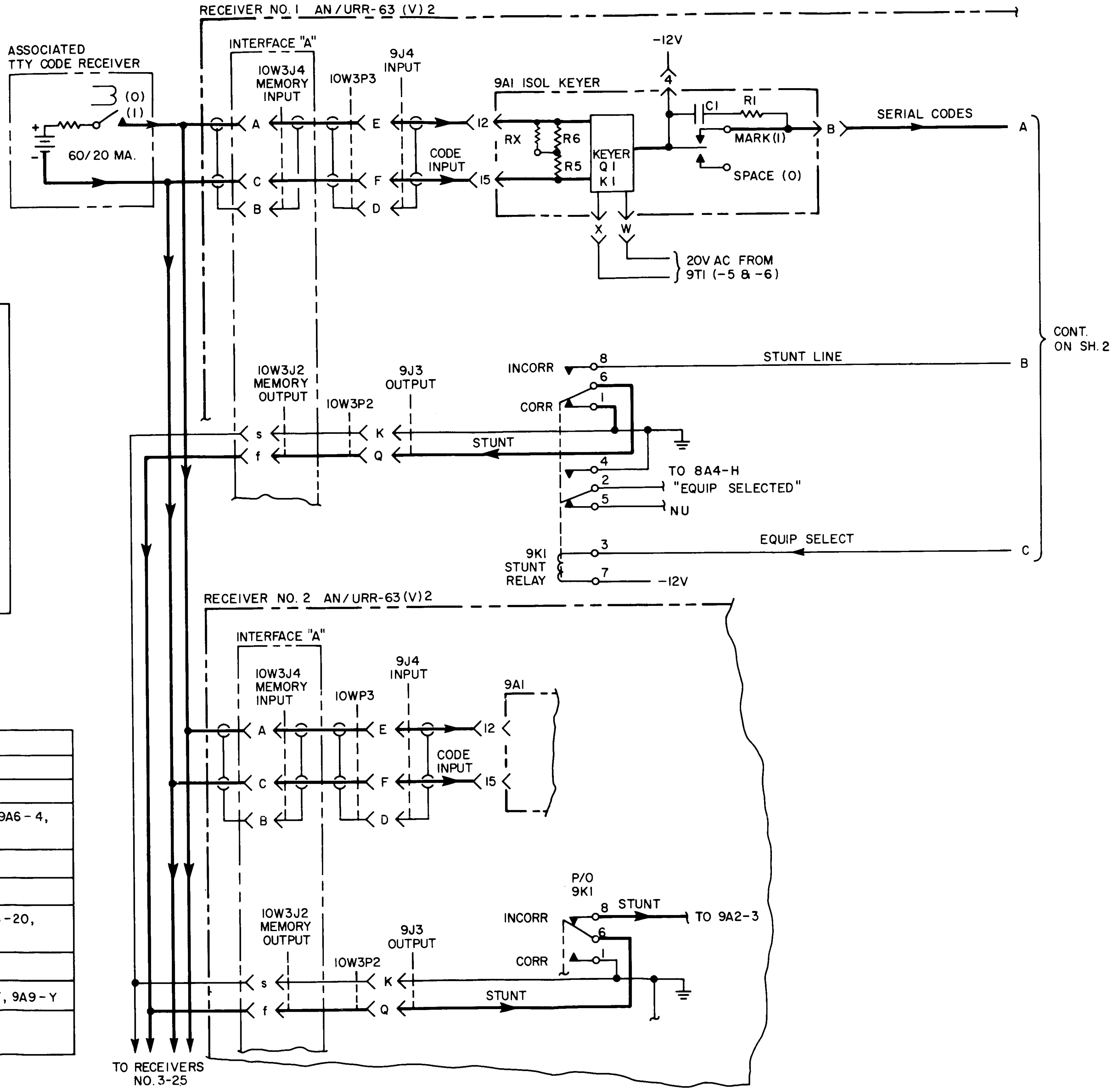


Figure 4-14. Servicing Block Diagram Automatic Tuning Section (Dual Memory) Sheet 1 of 2)

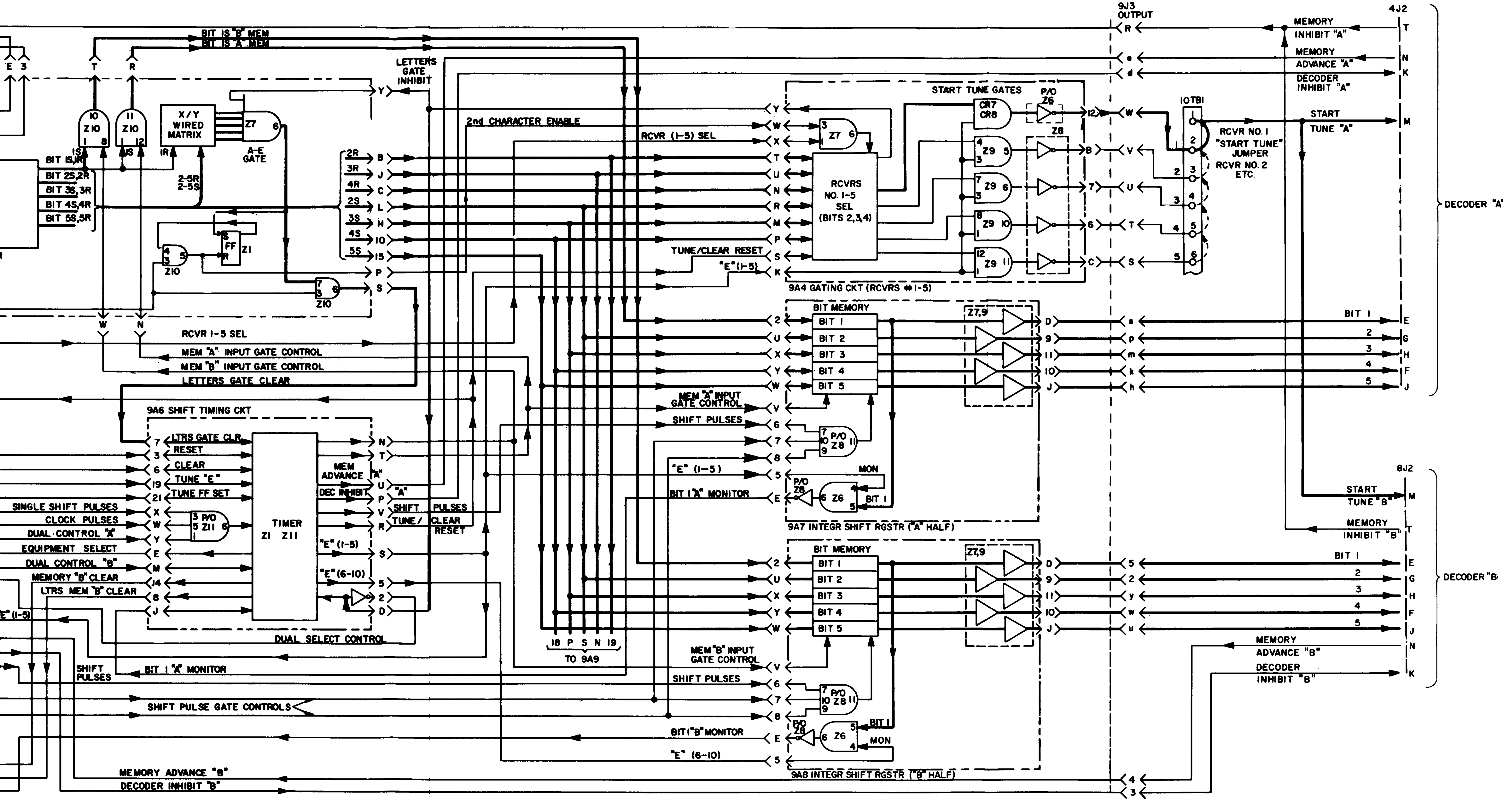
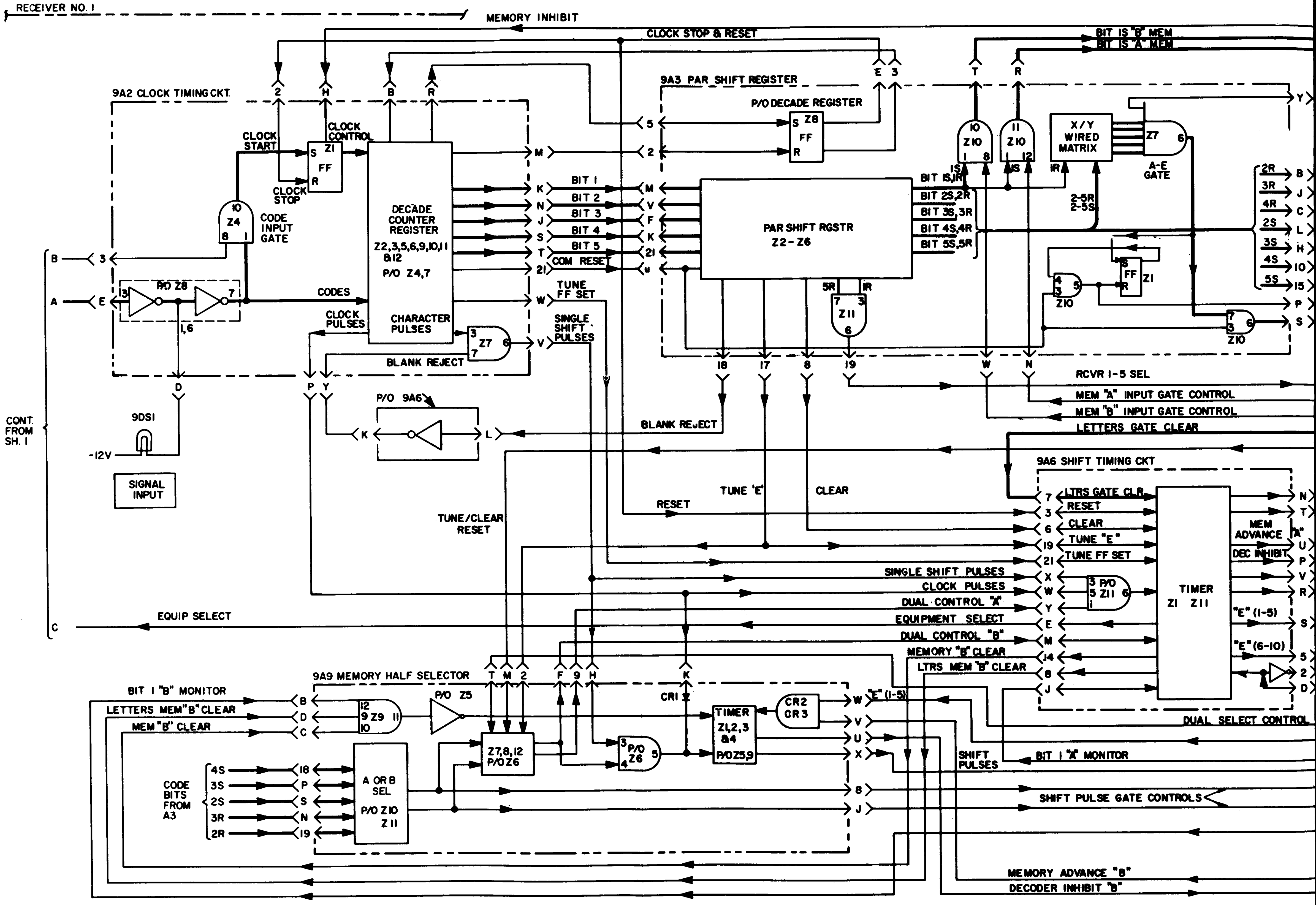
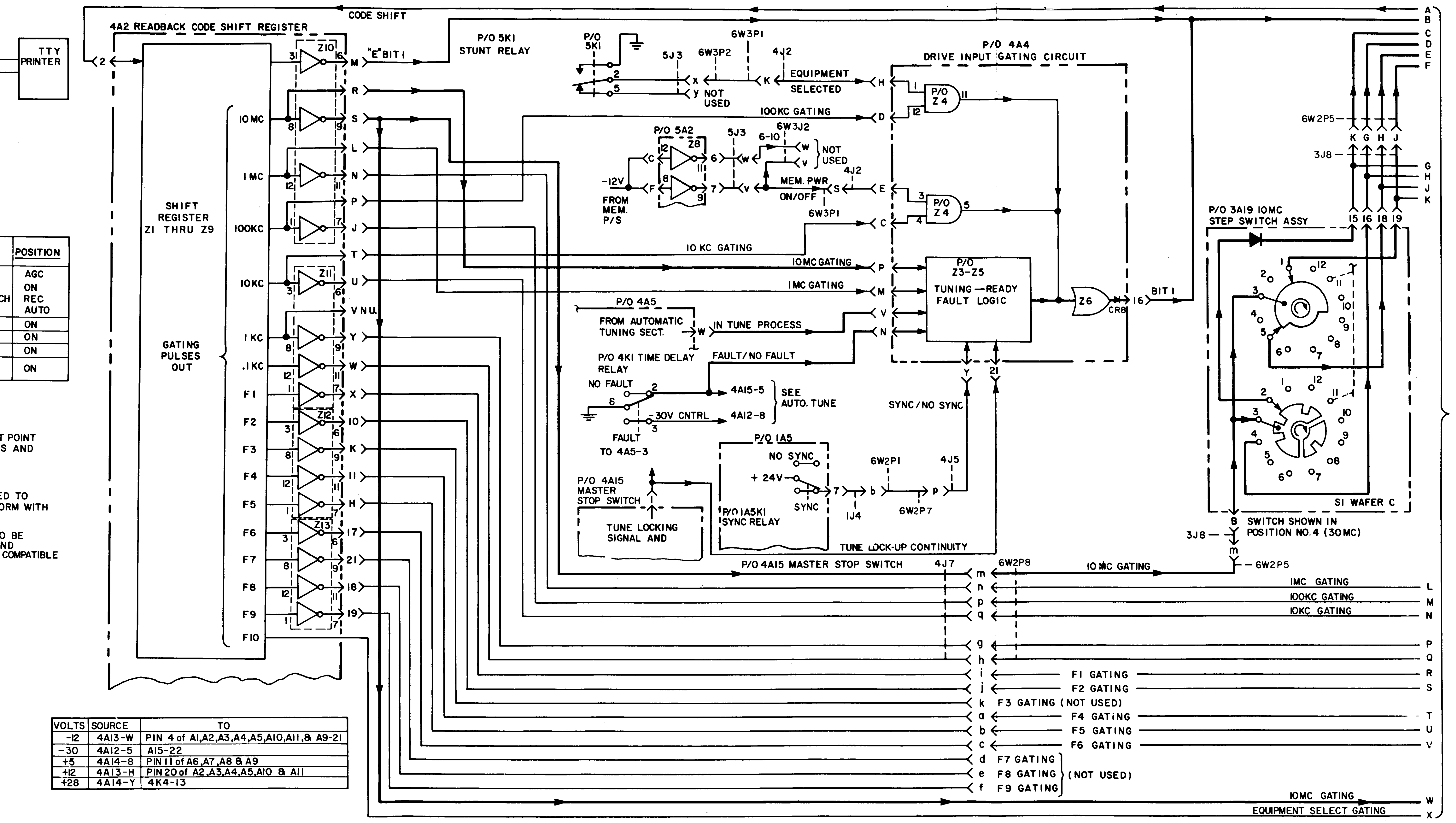


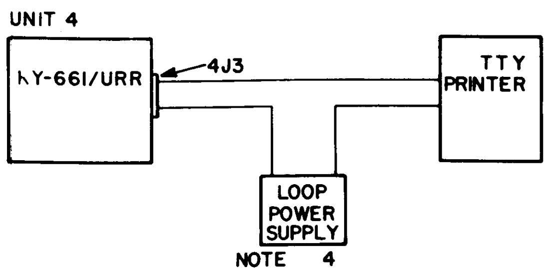
Figure 4-14. Servicing Block Diagram Automatic Tuning Section (Dual Memory) (Sheet 2 of 2)


RECEIVER NO. 1
MEMORY INHIBIT
CLOCK STOP & RESET
BIT IS "B" MEM
BIT IS "A" MEM
9A2 CLOCK TIMING CKT.
CLOCK START
CLOCK CONTROL
Z1
FF
CLOCK STOP
CODE INPUT GATE
Z4
DECADE COUNTER REGISTER
Z2,3,5,6,9,10,11 & 12
P/O Z4,7
CHARACTER PULSES
CODES
CLOCK PULSES
BLANK REJECT
Z7
P/O Z8
1,6
CONT. FROM SH. 1
9DS1
-12V
SIGNAL INPUT
P/O 9A6
BIT 1
BIT 2
BIT 3
BIT 4
BIT 5
COM RESET
TUNE FF SET
SINGLE SHIFT PULSES
9A3 PAR SHIFT REGISTER
P/O DECADE REGISTER
Z8
PAR SHIFT RGSTR
Z2-Z6
BIT 1S,1R
BIT 2S,2R
BIT 3S,3R
BIT 4S,4R
BIT 5S,5R
Z10
Z11
X/Y WIRED MATRIX
A-E GATE
2-5R
2-5S
2R
3R
4R
2S
3S
4S
5S
RCVR 1-5 SEL
MEM "A" INPUT GATE CONTROL
MEM "B" INPUT GATE CONTROL
LETTERS GATE CLEAR
BLANK REJECT
TUNE 'E'
CLEAR
RESET
TUNE/CLEAR RESET
EQUIP SELECT
9A6 SHIFT TIMING CKT
LTRS GATE CLR
RESET
CLEAR
TUNE "E"
TUNE FF SET
SINGLE SHIFT PULSES
CLOCK PULSES
DUAL CONTROL "A"
EQUIPMENT SELECT
DUAL CONTROL "B"
MEMORY "B" CLEAR
LTRS MEM "B" CLEAR
P/O Z11
TIMER
Z1 Z11
MEM ADVANCE "A"
DEC INHIBIT
"E" (1-5)
"E" (6-10)
DUAL SELECT CONTROL
9A9 MEMORY HALF SELECTOR
BIT 1 "B" MONITOR
LETTERS MEM "B" CLEAR
MEM "B" CLEAR
Z9
P/O Z5
CODE BITS FROM A3
A OR B SEL
P/O Z10
Z11
Z7,8,12
P/O Z6
CR1
TIMER
Z1,2,3 & 4
P/O Z5,9
CR2
CR3
"E" (1-5)
SHIFT PULSES
BIT 1 "A" MONITOR
SHIFT PULSE GATE CONTROLS
MEMORY ADVANCE "B"
DECODER INHIBIT "B"



VOLTS	SOURCE	TO
-12	4A13-W	PIN 4 of A1,A2,A3,A4,A5,A10,A11,& A9-21
-30	4A12-5	A15-22
+5	4A14-8	PIN 11 of A6,A7,A8 & A9
+12	4A13-H	PIN 20 of A2,A3,A4,A5,A10 & A11
+28	4A14-Y	4K4-13

Figure 4-15. Servicing Block Diagram Automatic Readback Section AN/URR-63(V)1
(Sheet 1 of 2)

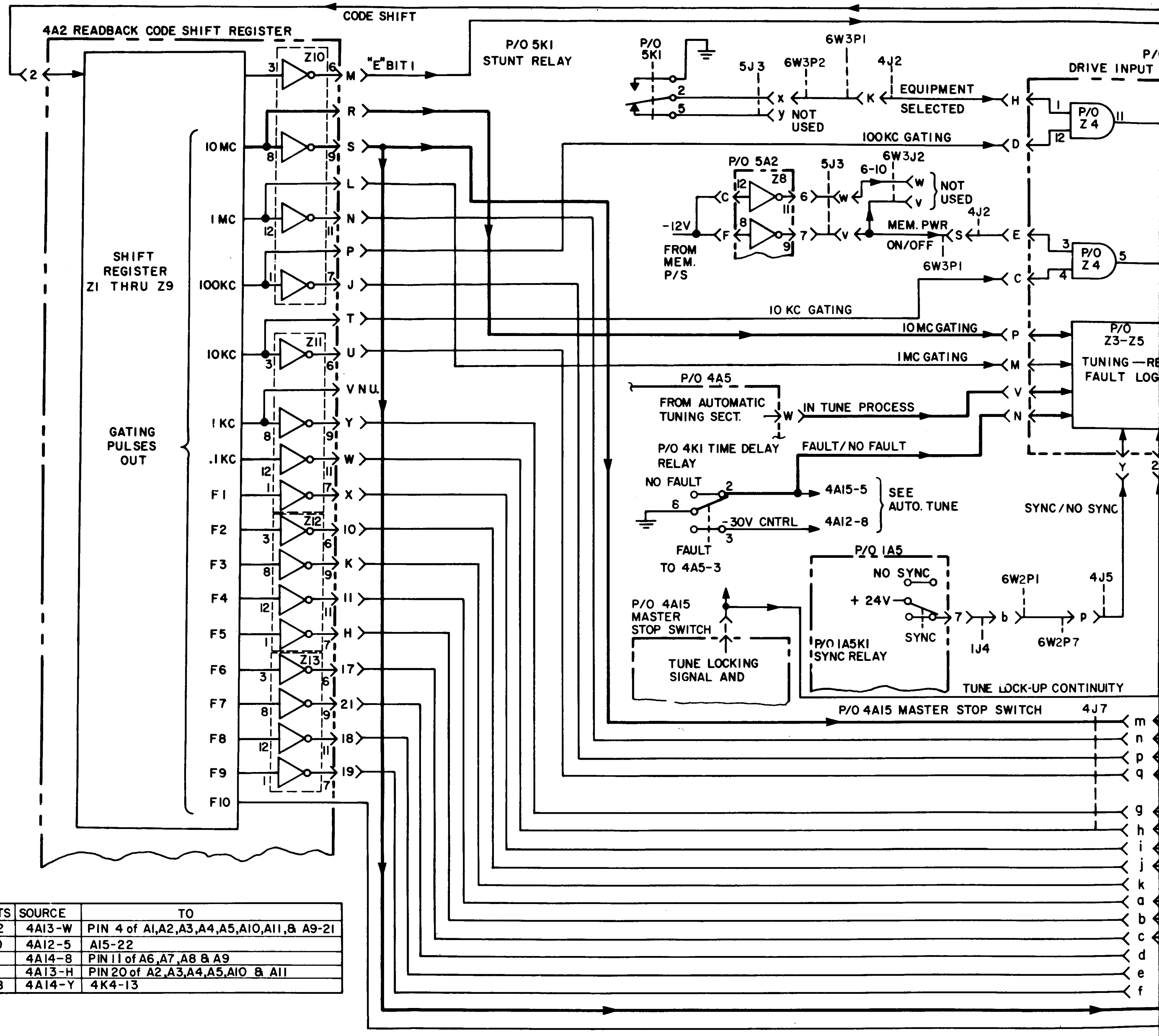


CONTROL POSITION FOR TEST

MODULAR UNIT	CONTROL	POSITION
TN-511/URR	RF GAIN KNOB POWER SWITCH COUNTER MODE SWITCH BAND SWITCH	AGC ON REC AUTO
TD-914/URR	POWER SWITCH	ON
O-1510/URR	POWER SWITCH	ON
KY-661/URR	POWER SWITCH	ON
CV-2520(V) URC	POWER SWITCH	ON

NOTES

1. SEE TIMING CHARTS FOR ALL TEST POINT WAVEFORMS AND SWITCH POSITIONS AND OPERATING CONDITIONS.
2. NU = NOT USED IN CV-2520(V)URC
3. A DUAL TRACE SCOPE MUST BE USED TO COMPARE THE TIME OF ONE WAVEFORM WITH ANOTHER.
4. LOOP POWER SUPPLY WILL HAVE TO BE COMPATIBLE WITH TTY PRINTER AND CONNECTIONS AT 4J3 MADE TO BE COMPATIBLE WITH TTY MACHINE.



VOLTS	SOURCE	TO
-12	4A13-W	PIN 4 of A1,A2,A3,A4,A5,A10,A11,& A9-21
-30	4A12-5	A15-22
+5	4A14-8	PIN 11 of A6,A7,A8 & A9
+12	4A13-H	PIN 20 of A2,A3,A4,A5,A10 & A11
+28	4A14-Y	4K4-13

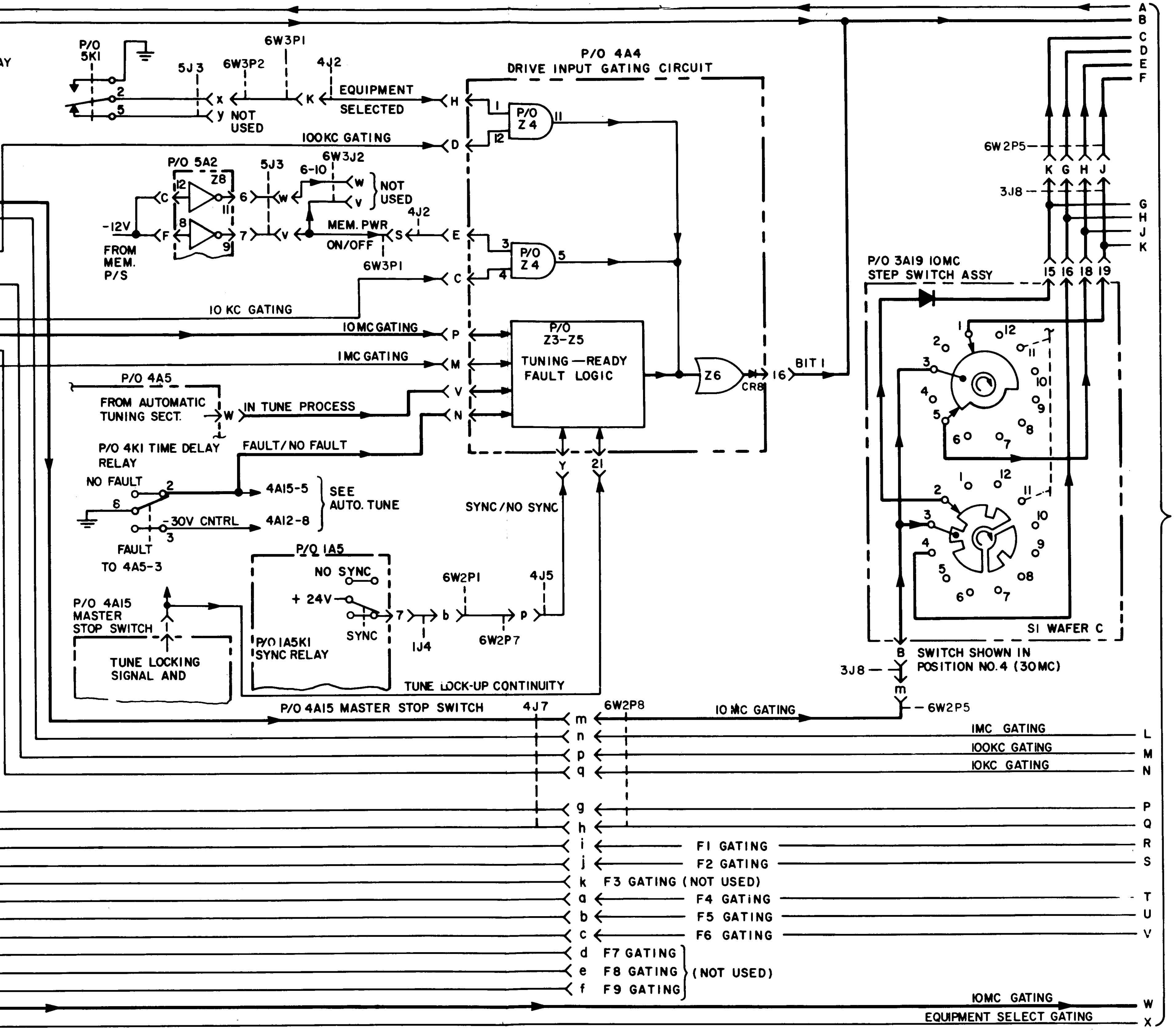
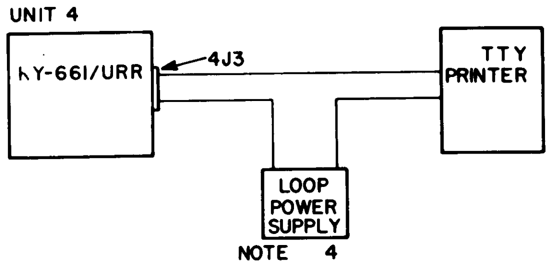


Figure 4-15. Servicing Block Diagram Automatic Readback Section AN/URR-63(V)1
(Sheet 1 of 2)

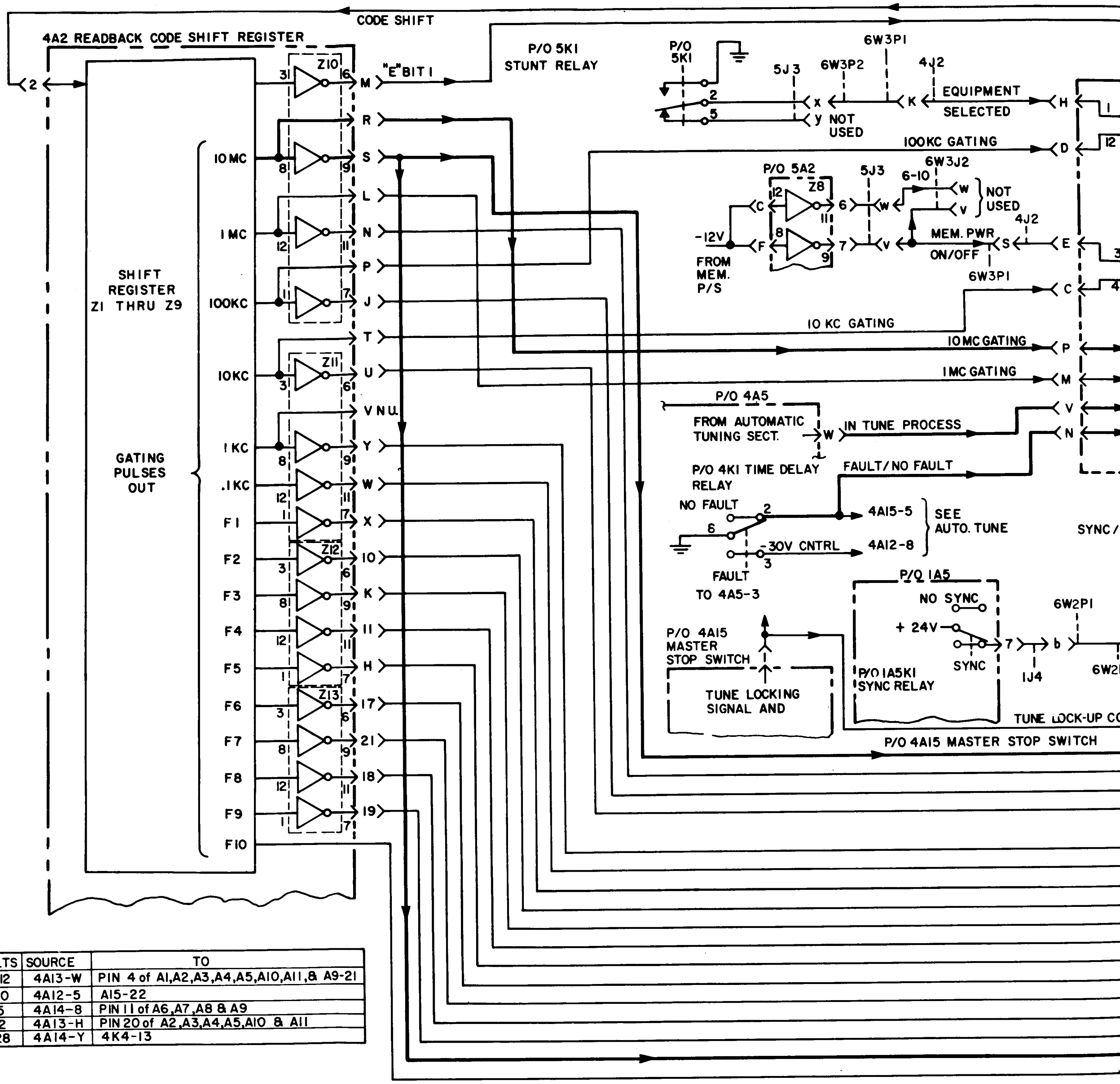


CONTROL POSITION FOR TEST

MODULAR UNIT	CONTROL	POSITION
TN-511/URR	RF GAIN KNOB POWER SWITCH COUNTER MODE SWITCH BAND SWITCH	AGC ON REC AUTO
TD-914/URR	POWER SWITCH	ON
O-1510/URR	POWER SWITCH	ON
KY-661/URR	POWER SWITCH	ON
CV-2520(V) URC	POWER SWITCH	ON

NOTES

1. SEE TIMING CHARTS FOR ALL TEST POINT WAVEFORMS AND SWITCH POSITIONS AND OPERATING CONDITIONS.
2. NU = NOT USED IN CV-2520(V)URC
3. A DUAL TRACE SCOPE MUST BE USED TO COMPARE THE TIME OF ONE WAVEFORM WITH ANOTHER.
4. LOOP POWER SUPPLY WILL HAVE TO BE COMPATIBLE WITH TTY PRINTER AND CONNECTIONS AT 4J3 MADE TO BE COMPATIBLE WITH TTY MACHINE.



VOLTS	SOURCE	TO
-12	4A13-W	PIN 4 of A1,A2,A3,A4,A5,A10,A11,& A9-21
-30	4A12-5	A15-22
+5	4A14-8	PIN 11 of A6,A7,A8 & A9
+12	4A13-H	PIN 20 of A2,A3,A4,A5,A10 & A11
+28	4A14-Y	4K4-13

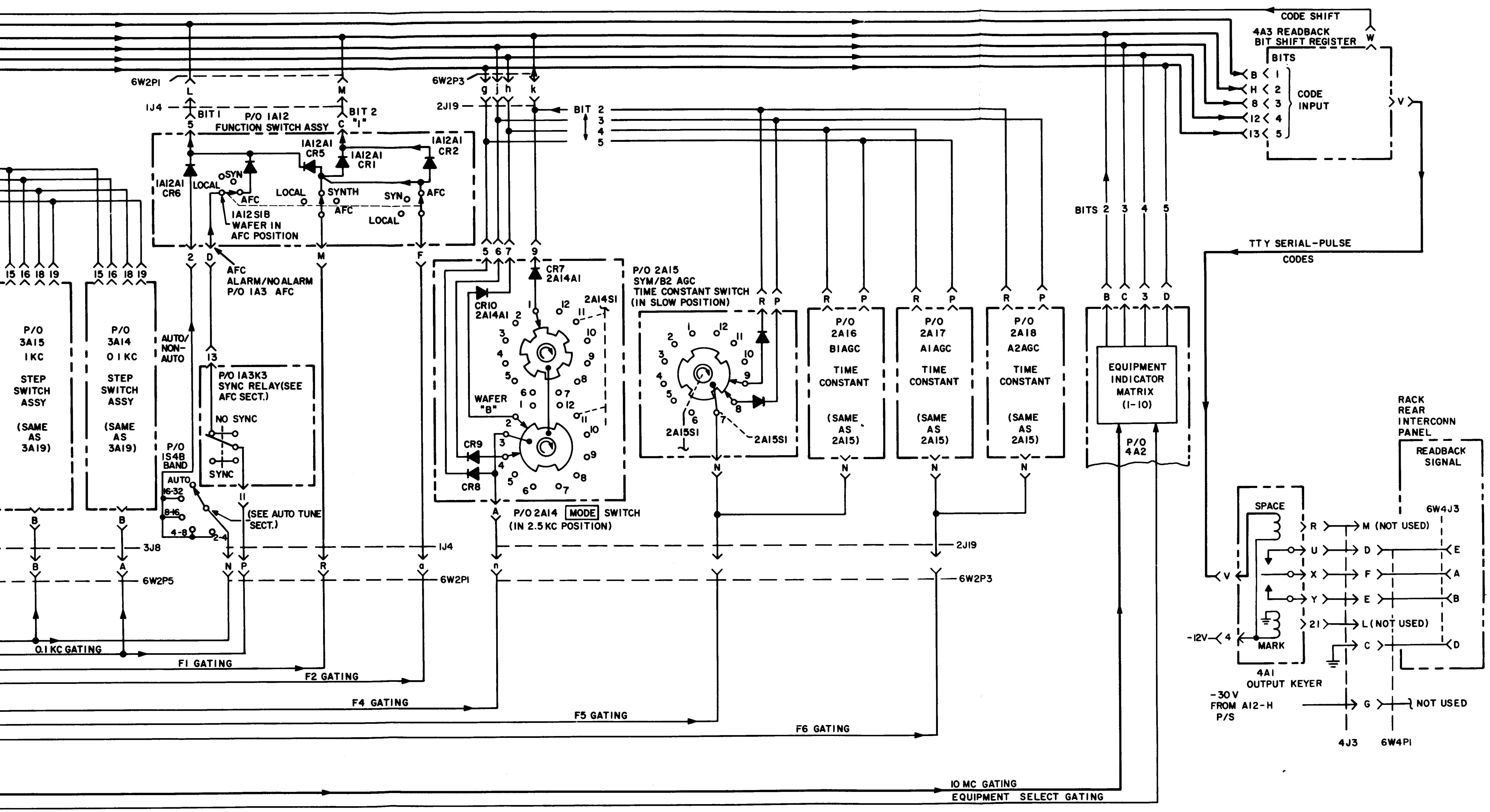
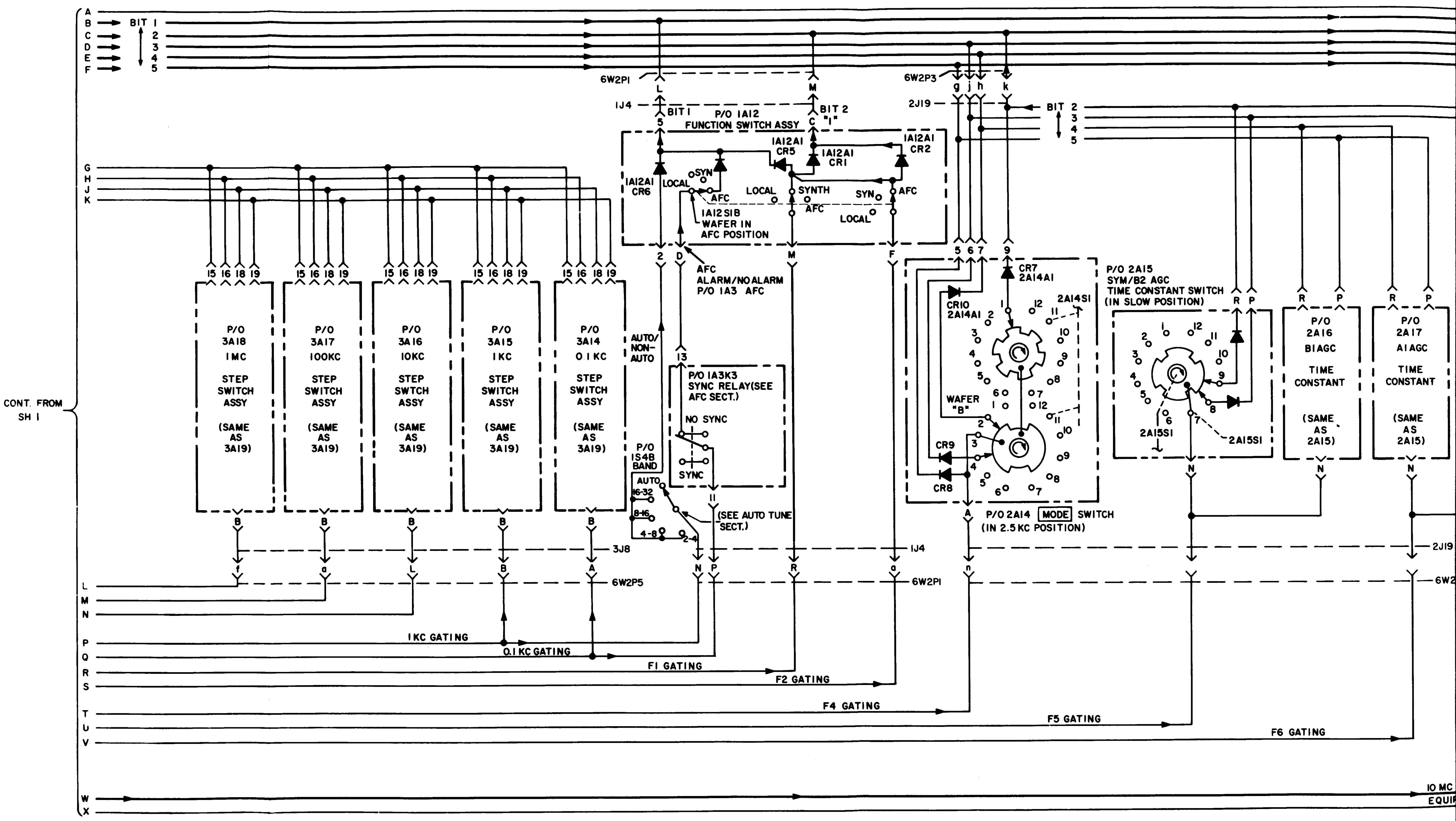


Figure 4-15. Servicing Block Diagram Automatic Readback Section AN/URR-63(V)1
(Sheet 2 of 2)


CONT. FROM SH I
A
B
C
D
E
F
BIT 1 2 3 4 5
G
H
J
K
L
M
N
P
Q
R
S
T
U
V
W
X
P/O 3A18 1MC STEP SWITCH ASSY (SAME AS 3A19)
P/O 3A17 100KC STEP SWITCH ASSY (SAME AS 3A19)
P/O 3A16 10KC STEP SWITCH ASSY (SAME AS 3A19)
P/O 3A15 1KC STEP SWITCH ASSY (SAME AS 3A19)
P/O 3A14 0.1KC STEP SWITCH ASSY (SAME AS 3A19)
15 16 18 19
B
3J8
6W2P5
f
a
L
B
A
1KC GATING
0.1KC GATING
F1 GATING
F2 GATING
F4 GATING
F5 GATING
F6 GATING
AUTO/ NON- AUTO
P/O 1S4B BAND
AUTO
16-32
8-16
4-8
2-4
(SEE AUTO TUNE SECT.)
P/O 1A3K3 SYNC RELAY(SEE AFC SECT.)
NO SYNC
SYNC
13
11
6W2P1
1J4
BIT 1
BIT 2 "I"
P/O 1A12 FUNCTION SWITCH ASSY
1A12A1 CR6
1A12A1 CR5
1A12A1 CR1
1A12A1 CR2
LOCAL
SYN
AFC
SYNTH
1A12S1B WAFER IN AFC POSITION
AFC ALARM/NOALARM P/O 1A3 AFC
L
M
5
C
2
D
M
F
N
P
R
a
6W2P3
2J19
g j h k
BIT 2 3 4 5
5 6 7 9
CR7 2A14A1
CR10 2A14A1
2A14S1
WAFER "B"
CR9
CR8
A
n
P/O 2A14 MODE SWITCH (IN 2.5KC POSITION)
P/O 2A15 SYM/B2 AGC TIME CONSTANT SWITCH (IN SLOW POSITION)
2A15S1
R P N
P/O 2A16 B1AGC TIME CONSTANT (SAME AS 2A15)
P/O 2A17 A1AGC TIME CONSTANT (SAME AS 2A15)
2J19
6W2
10 MC
EQUI

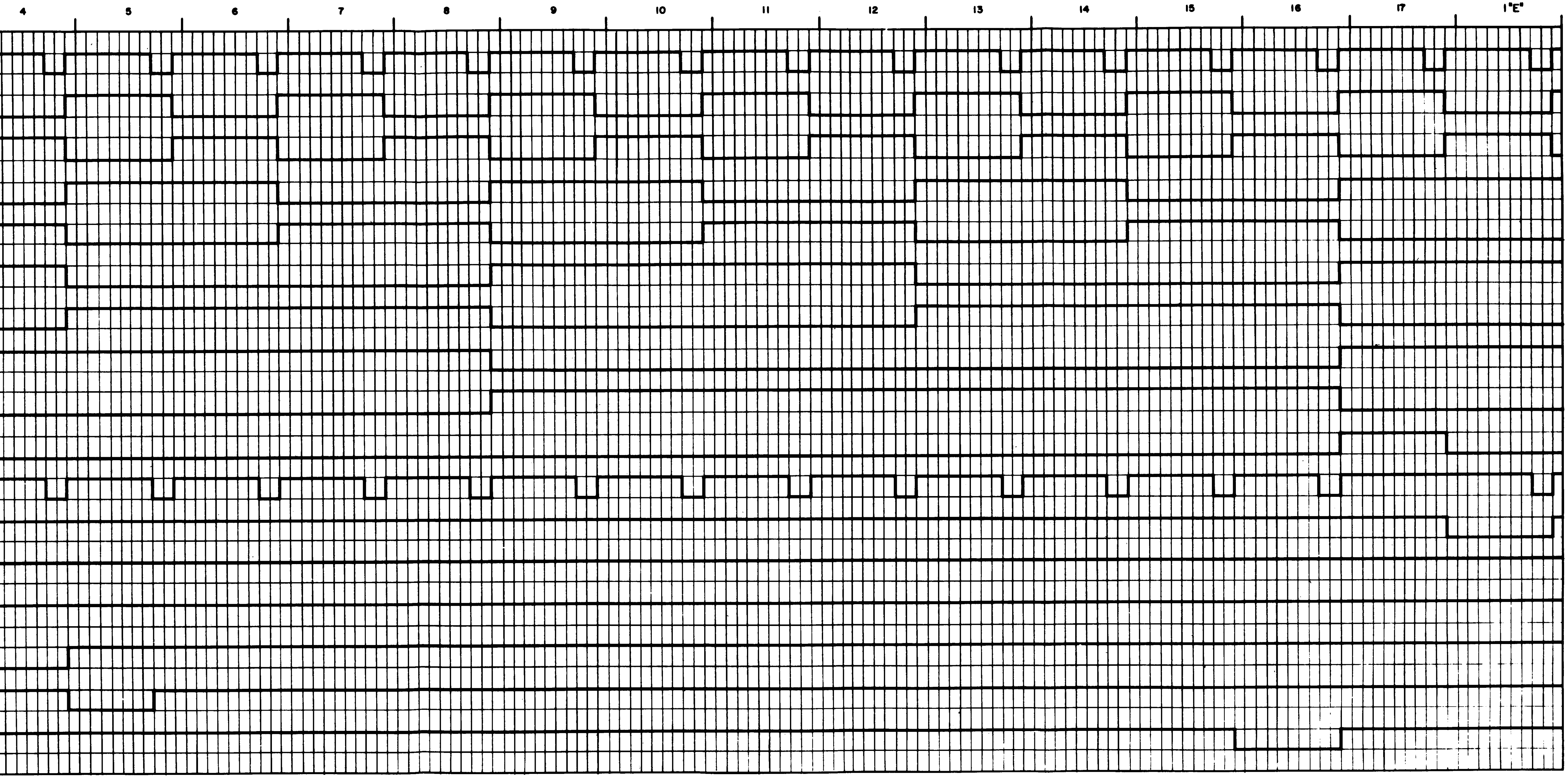
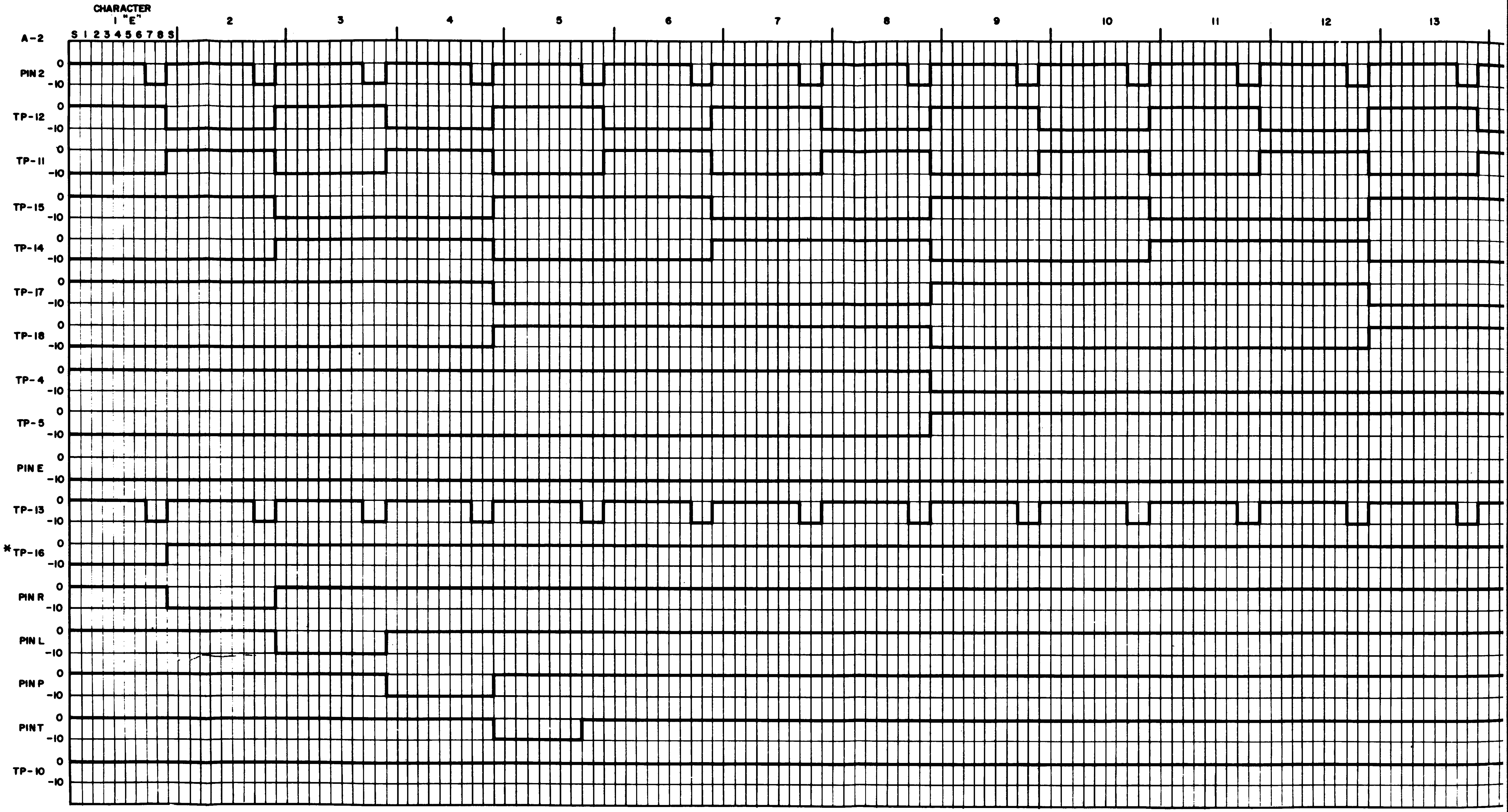
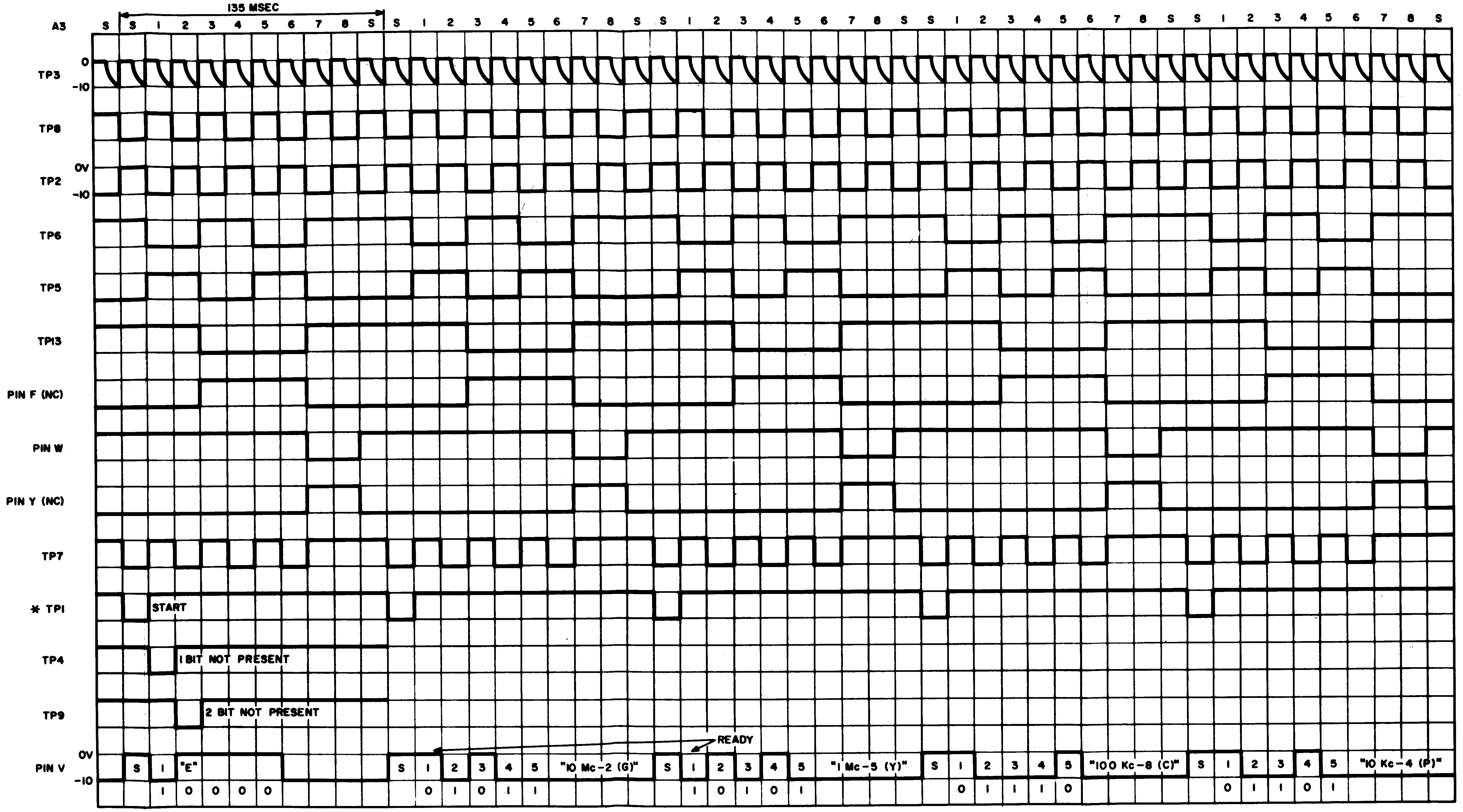


Figure 4-16. Timing Chart, Decoder, Command Signal KY-661/URR (Sheet 1 of 5)

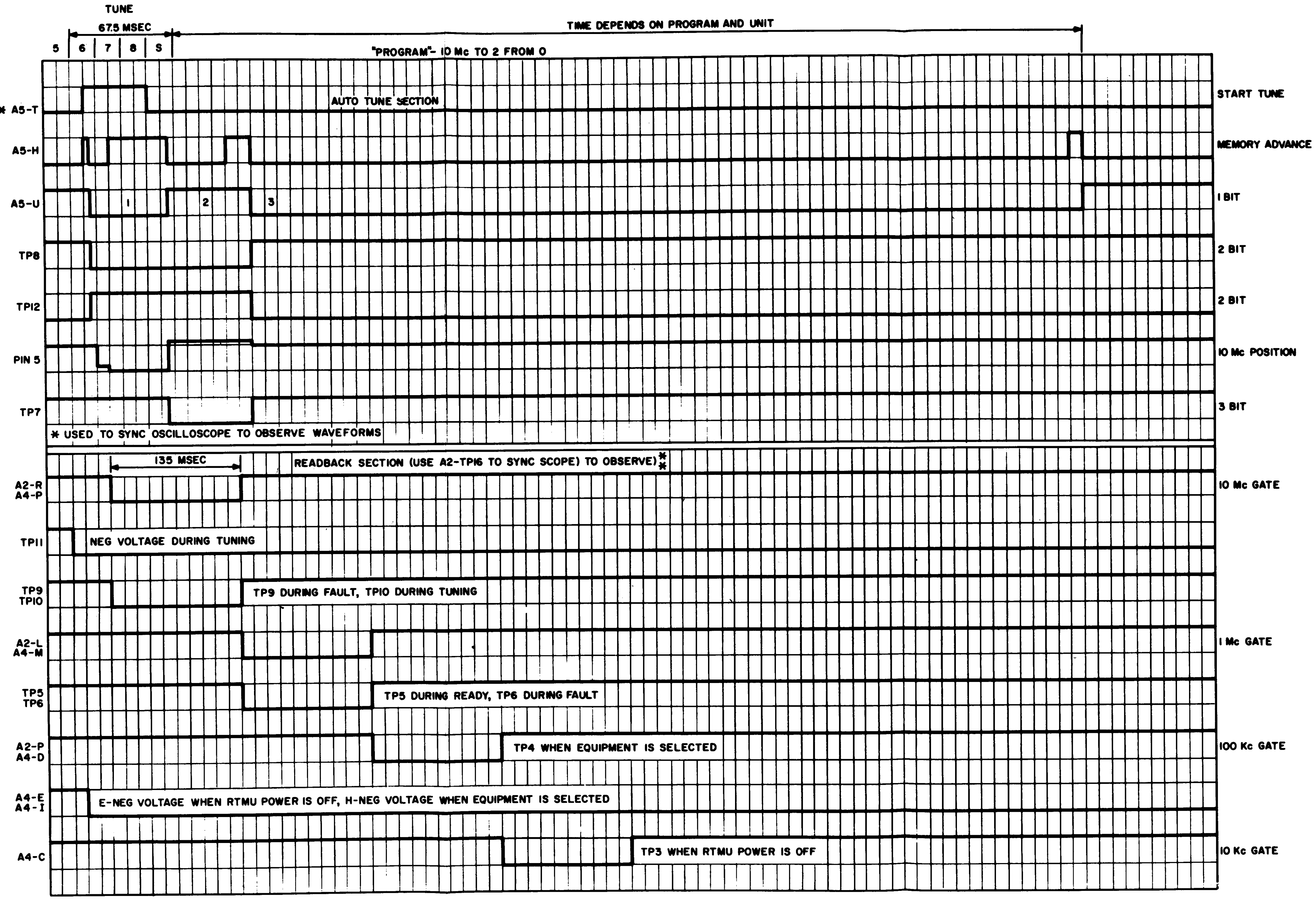


* USED TO SYNC OSCILLOSCOPE
TO OBSERVE OTHER WAVEFORMS



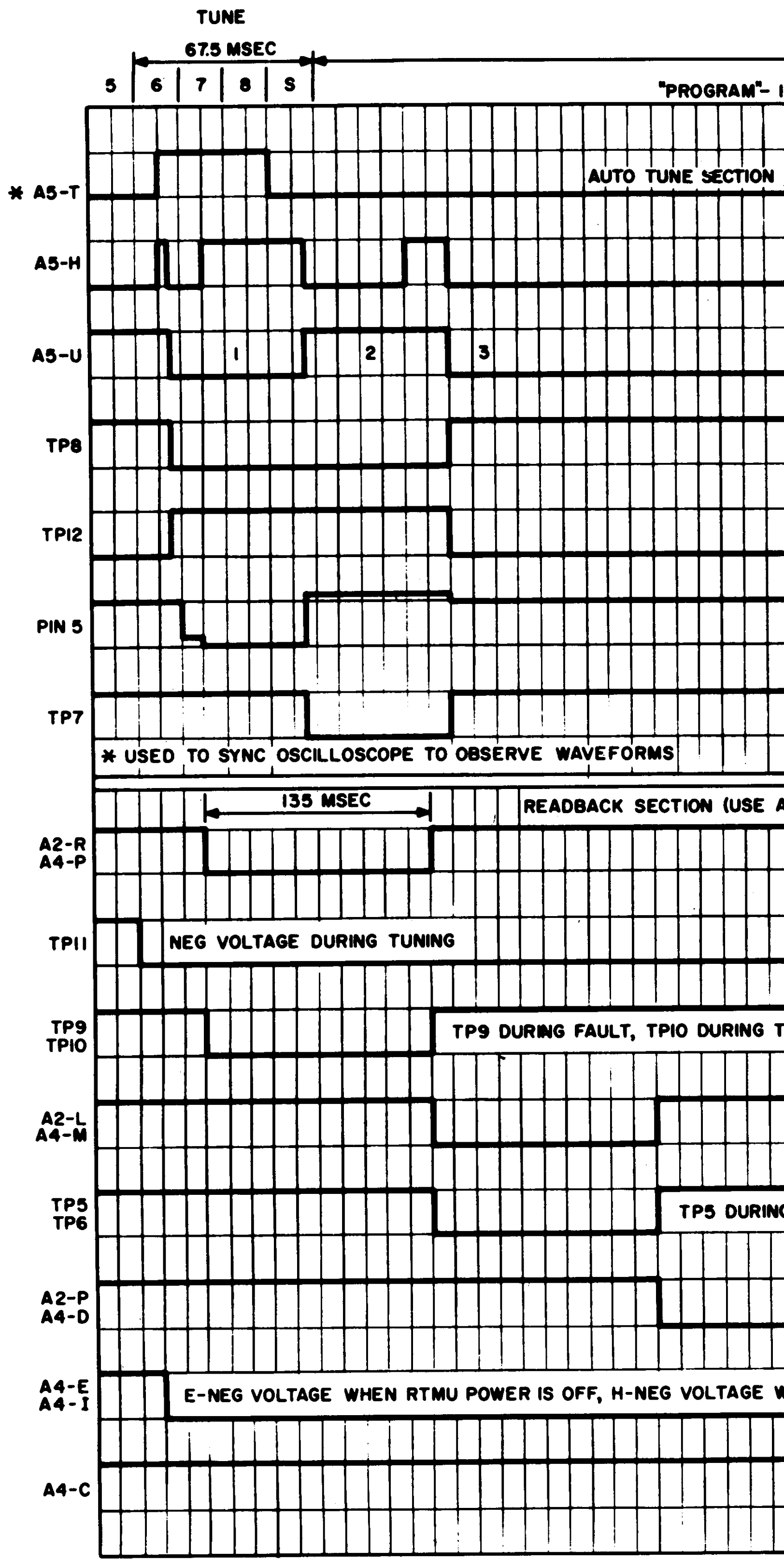
* USED TO SYNC OSCILLOSCOPE TO OBSERVE OTHER WAVEFORMS

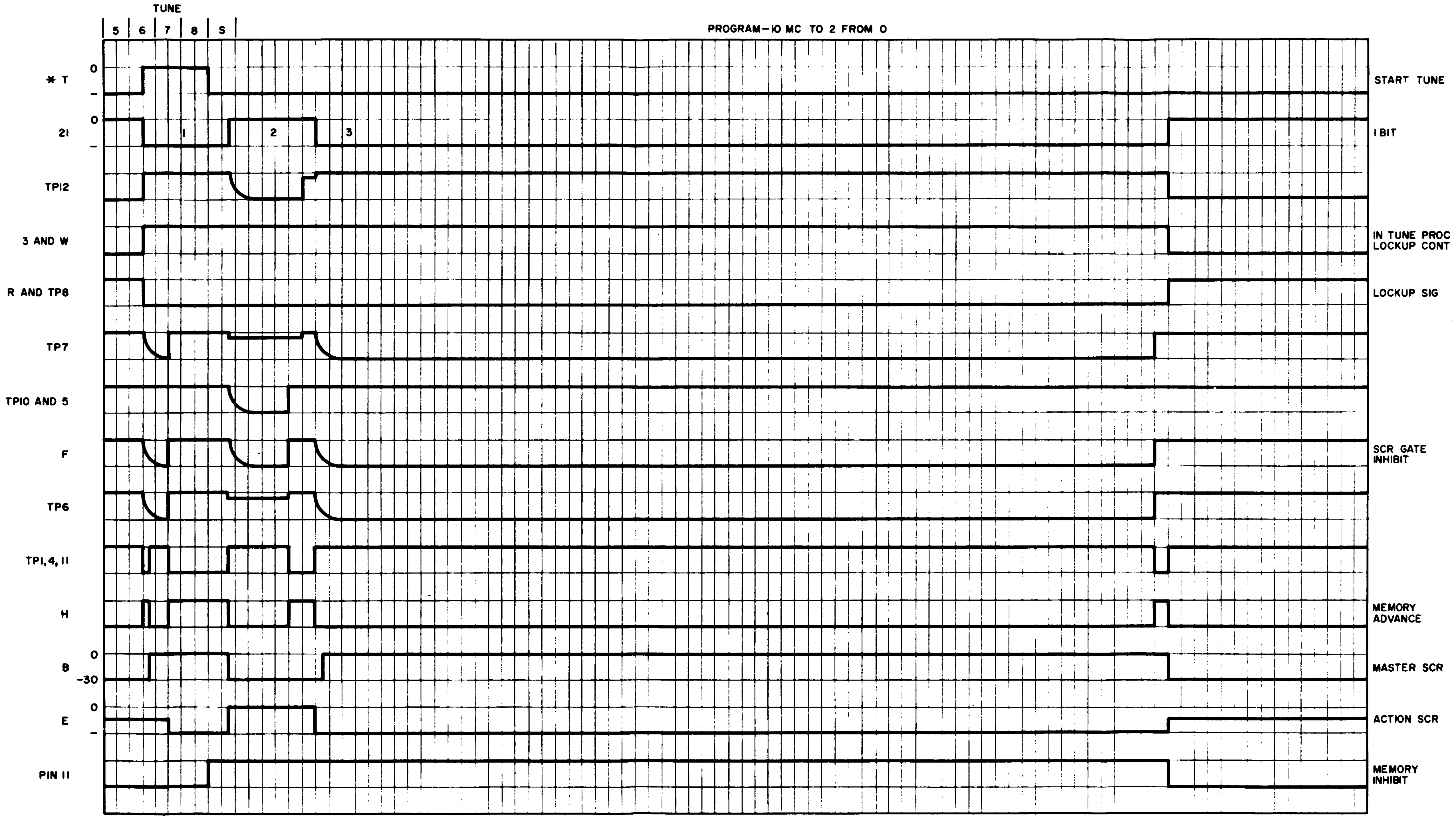
Figure 4-16. Timing Chart, Decoder, Command Signal KY-661/URR (Sheet 2 of 5)



**NOTE: READBACK SECTION.
ABOVE WAVEFORMS WILL CONTINUE UNTIL THE NEXT READBACK CYCLE THEN THEY WILL BE REPEATED UNLESS THE RECEIVER FUNCTIONS HAVE CHANGED.

Figure 4-16. Timing Chart, Decoder, Command Signal KY-661/URR (Sheet 3 of 5)


TUNE
67.5 MSEC
5
6
7
8
S
"PROGRAM"- I
AUTO TUNE SECTION
* A5-T
A5-H
A5-U
1
2
3
TP8
TP12
PIN 5
TP7
* USED TO SYNC OSCILLOSCOPE TO OBSERVE WAVEFORMS
135 MSEC
READBACK SECTION (USE A
A2-R
A4-P
TP11
NEG VOLTAGE DURING TUNING
TP9
TP10
TP9 DURING FAULT, TP10 DURING T
A2-L
A4-M
TP5
TP6
TP5 DURING
A2-P
A4-D
A4-E
A4-I
E-NEG VOLTAGE WHEN RTMU POWER IS OFF, H-NEG VOLTAGE W
A4-C

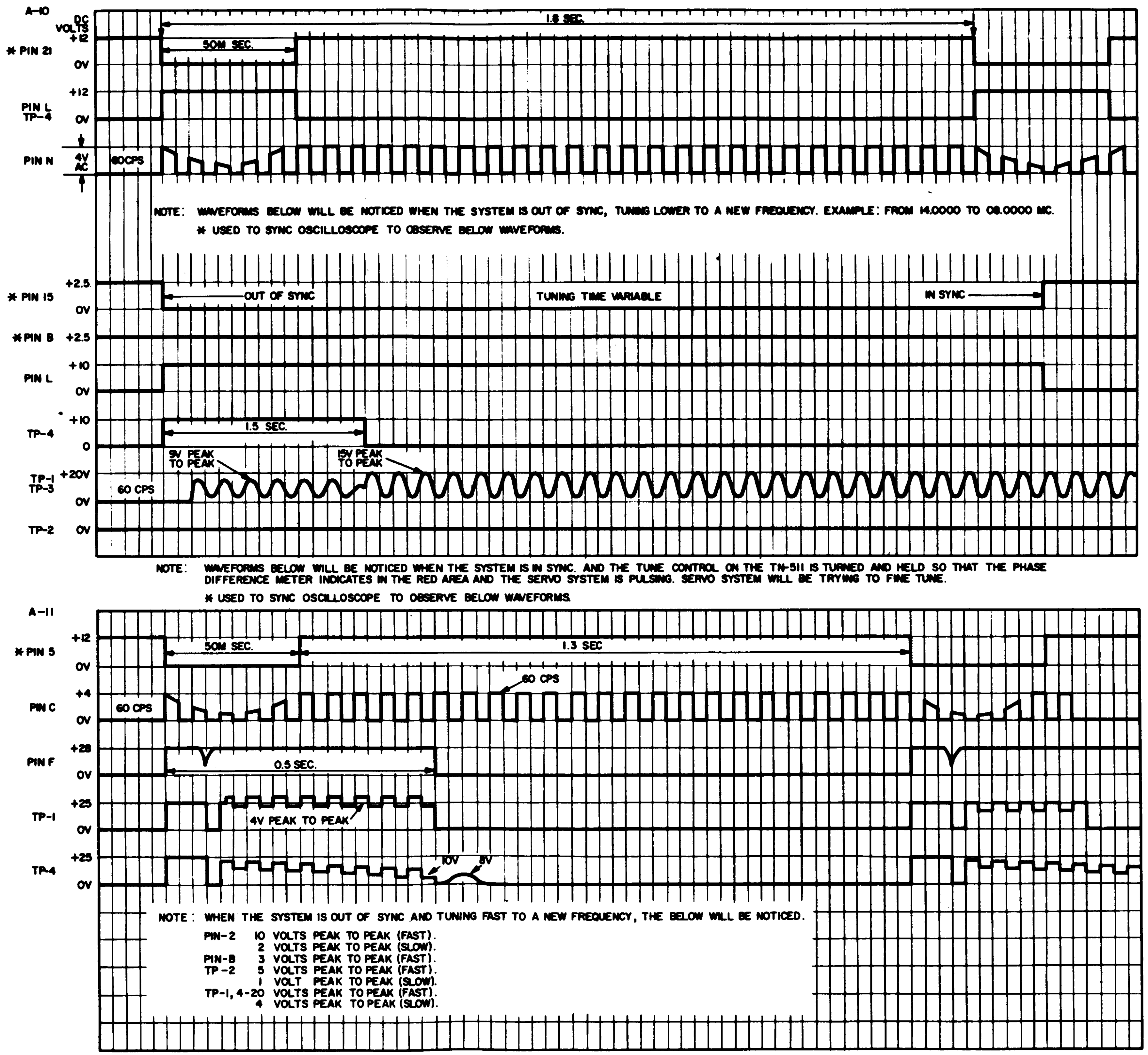


1. MASTER LEDEX TO 10 Mc
2. 10 Mc SWITCH FROM 0 TO 2
3. MASTER LEDEX TO HOME
* USED TO SYNC OSCILLOSCOPE TO OBSERVE WAVEFORMS

Figure 4-16. Timing Chart, Decoder, Command Signal KY-661/URR (Sheet 4 of 5)

NOTE: WAVEFORMS BELOW WILL BE NOTICED WHEN THE SYSTEM IS IN SYNC. AND THE TUNE CONTROL ON THE TN-511 IS TURNED AND HELD SO THAT THE PHASE DIFFERENCE METER INDICATES IN THE RED AREA AND THE SERVO SYSTEM IS PULSING. SERVO SYSTEM WILL BE TRYING TO FINE TUNE.

* USED TO SYNC OSCILLOSCOPE TO OBSERVE BELOW WAVEFORMS.



NOTE: WAVEFORMS BELOW WILL BE NOTICED WHEN THE SYSTEM IS OUT OF SYNC, TUNING LOWER TO A NEW FREQUENCY. EXAMPLE: FROM 14.0000 TO 08.0000 MC.

* USED TO SYNC OSCILLOSCOPE TO OBSERVE BELOW WAVEFORMS.

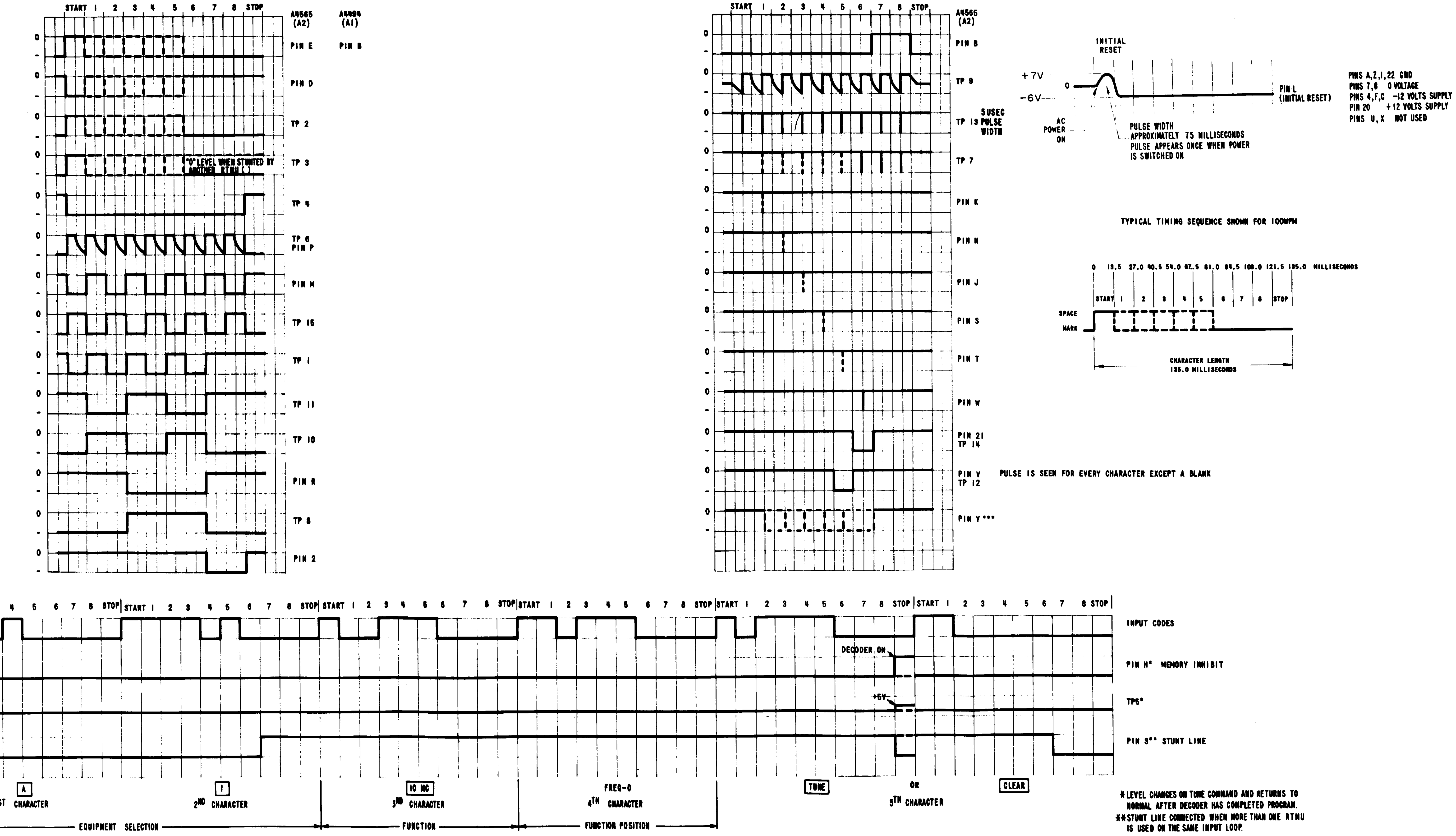
NOTE: WAVEFORMS BELOW WILL BE NOTICED WHEN THE SYSTEM IS IN SYNC. AND THE TUNE CONTROL ON THE TN-511 IS TURNED AND HELD SO THAT THE PHASE DIFFERENCE METER INDICATES IN THE RED AREA AND THE SERVO SYSTEM IS PULSING. SERVO SYSTEM WILL BE TRYING TO FINE TUNE.

* USED TO SYNC OSCILLOSCOPE TO OBSERVE BELOW WAVEFORMS.

NOTE: WHEN THE SYSTEM IS OUT OF SYNC AND TUNING FAST TO A NEW FREQUENCY, THE BELOW WILL BE NOTICED.

PIN-2 10 VOLTS PEAK TO PEAK (FAST).
2 VOLTS PEAK TO PEAK (SLOW).
PIN-B 3 VOLTS PEAK TO PEAK (FAST).
TP-2 5 VOLTS PEAK TO PEAK (FAST).
1 VOLT PEAK TO PEAK (SLOW).
TP-1, 4-20 VOLTS PEAK TO PEAK (FAST).
4 VOLTS PEAK TO PEAK (SLOW).

Figure 4-16. Timing Chart, Decoder, Command Signal KY-661/URR (Sheet 5 of 5)

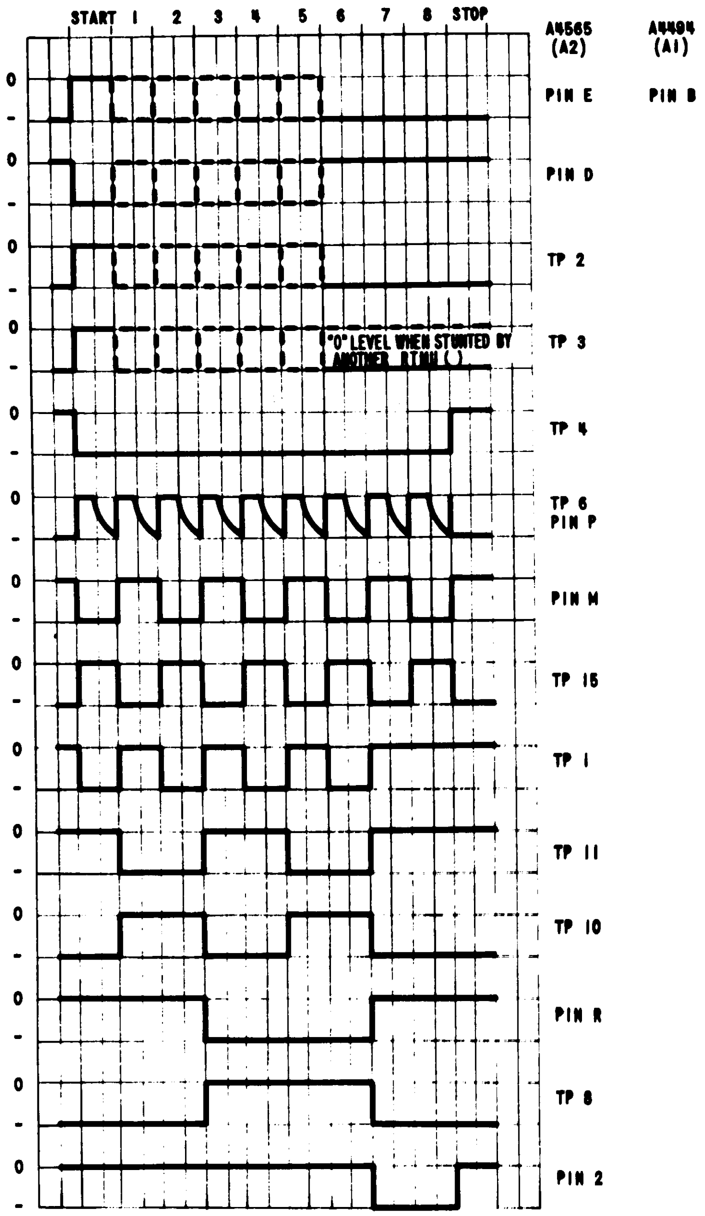


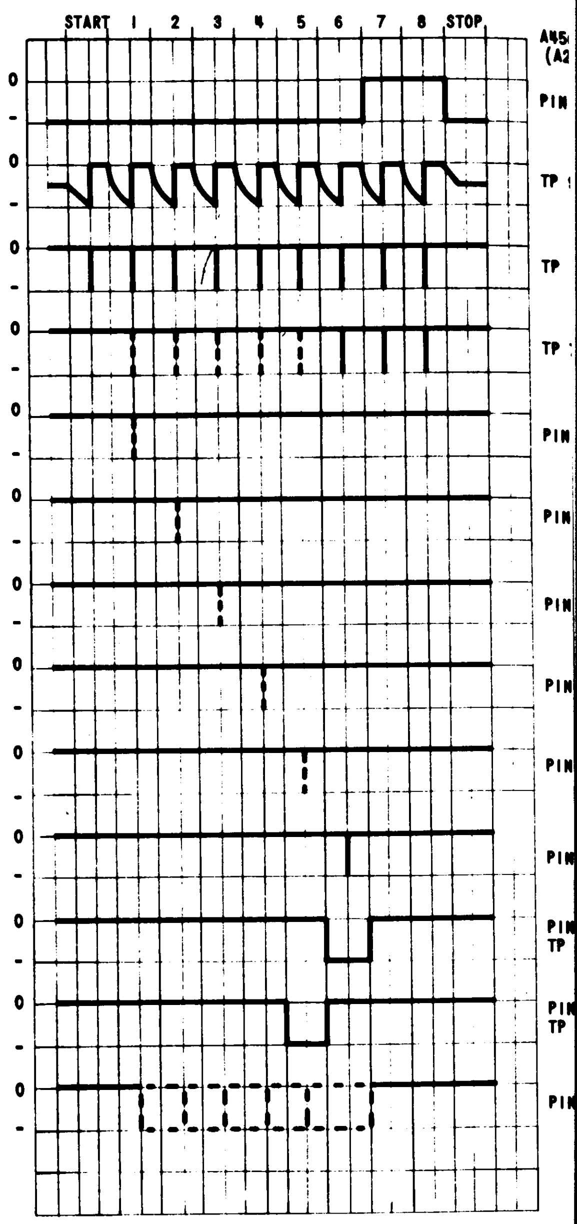
*LEVEL CHANGES ON TUNE COMMAND AND RETURNS TO NORMAL AFTER DECODER HAS COMPLETED PROGRAM.

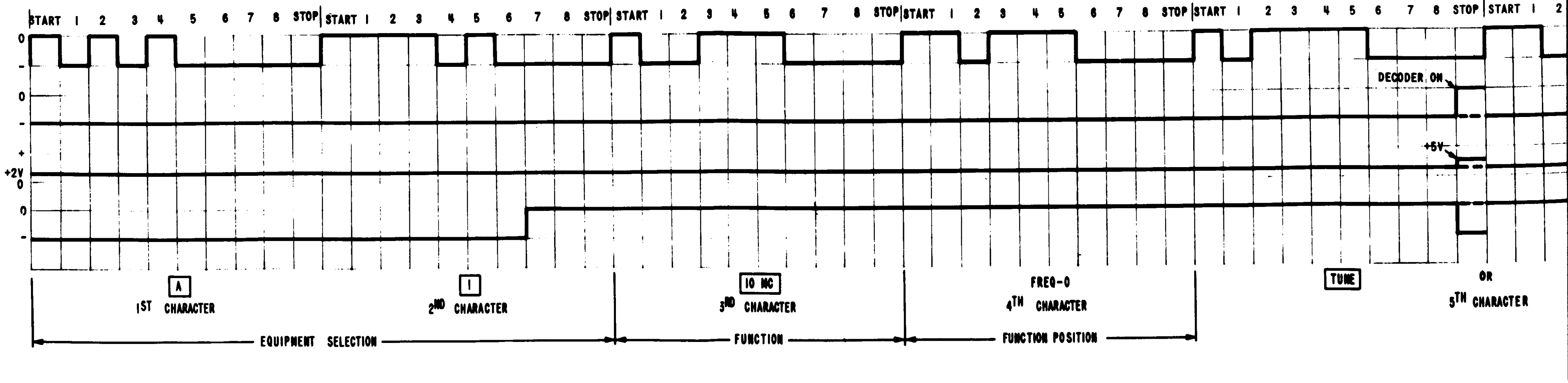
**STUNT LINE CONNECTED WHEN MORE THAN ONE RTMU IS USED ON THE SAME INPUT LOOP.

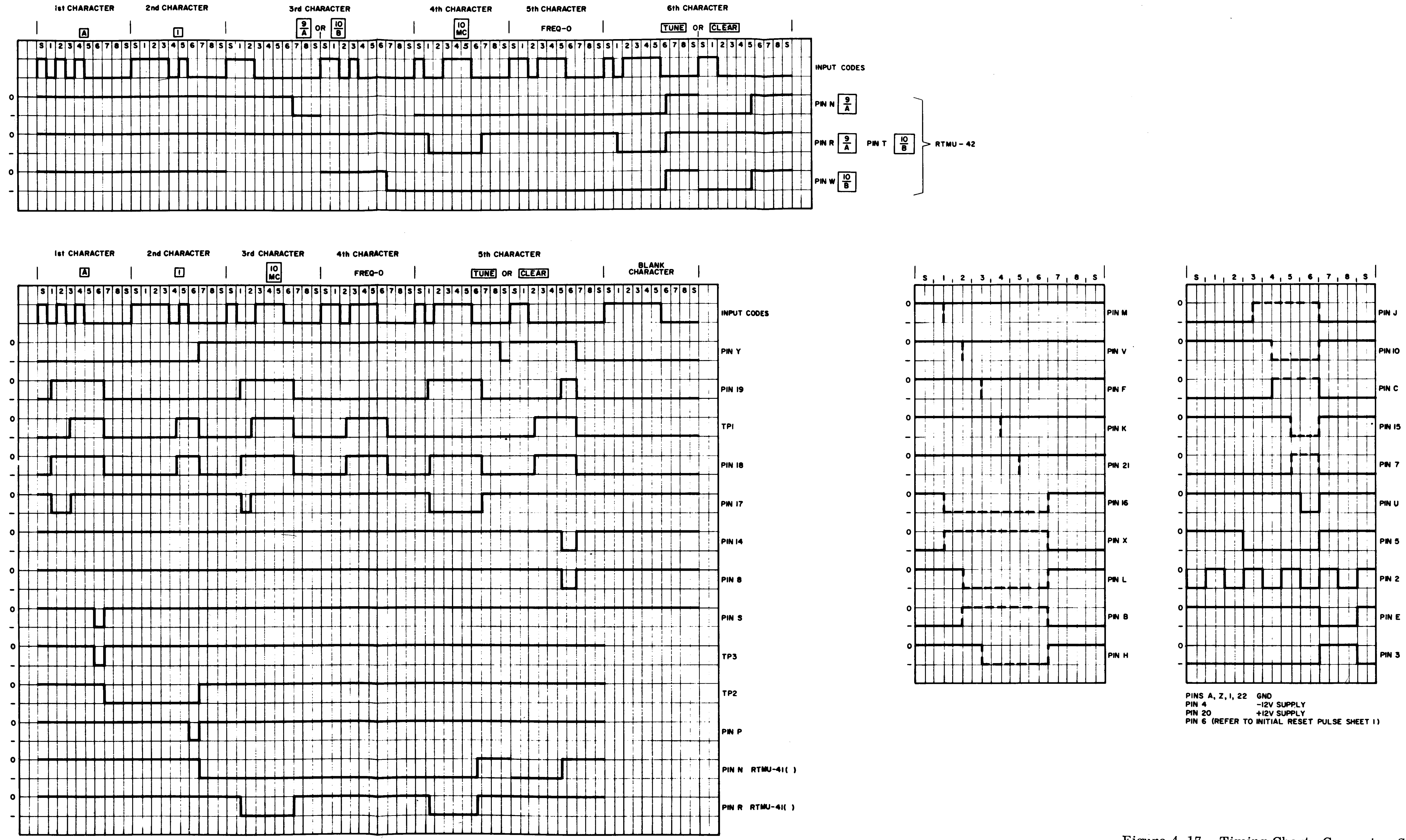
*** PULSES SEEN WHEN TERMINATED WITH A 1.2 K Ω RESISTOR TO -12V

Figure 4-17. Timing Chart, Converter-Storer, Signal Data (Sheet 1 of 10)


START 1 2 3 4 5 6 7 8 STOP
A4565 (A2)
A4494 (A1)
PIN E
PIN B
PIN D
TP 2
TP 3
"0" LEVEL WHEN STUNTED BY ANOTHER RTMN ( )
TP 4
TP 6 PIN P
PIN M
TP 15
TP 1
TP 11
TP 10
PIN R
TP 8
PIN 2
0
-

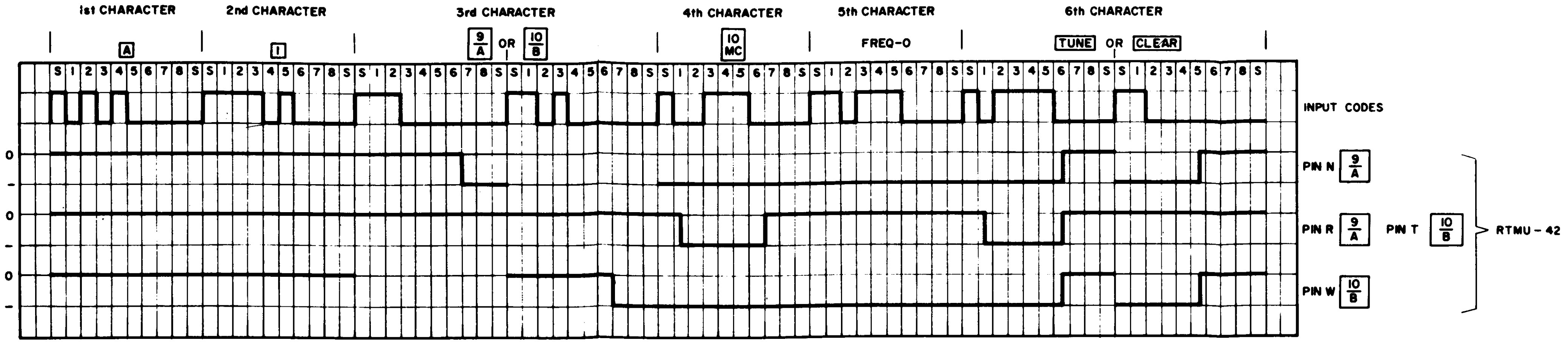

START 1 2 3 4 5 6 7 8 STOP
A45 (A2
PIN
TP
TP
TP
PIN
PIN
PIN
PIN
PIN
PIN
PIN TP
PIN TP
PIN
0
-

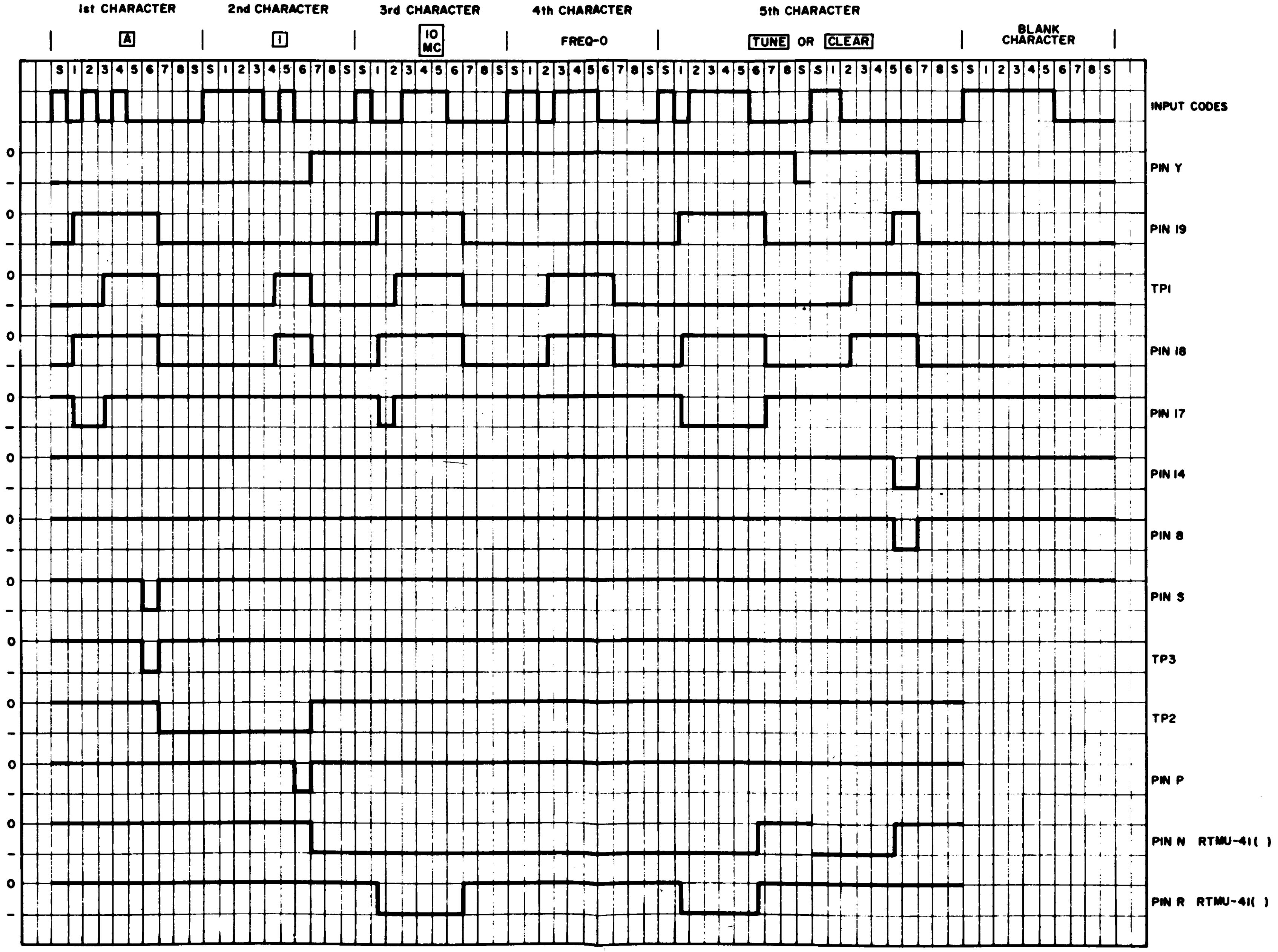

START 1 2 3 4 5 6 7 8 STOP
START 1 2 3 4 5 6 7 8 STOP
START 1 2 3 4 5 6 7 8 STOP
START 1 2 3 4 5 6 7 8 STOP
START 1 2 3 4 5 6 7 8 STOP
START 1 2
0
-
+
+2V
DECODER ON
+5V
A
1ST CHARACTER
I
2ND CHARACTER
10 MC
3RD CHARACTER
FREQ-0
4TH CHARACTER
TUNE
OR
5TH CHARACTER
EQUIPMENT SELECTION
FUNCTION
FUNCTION POSITION

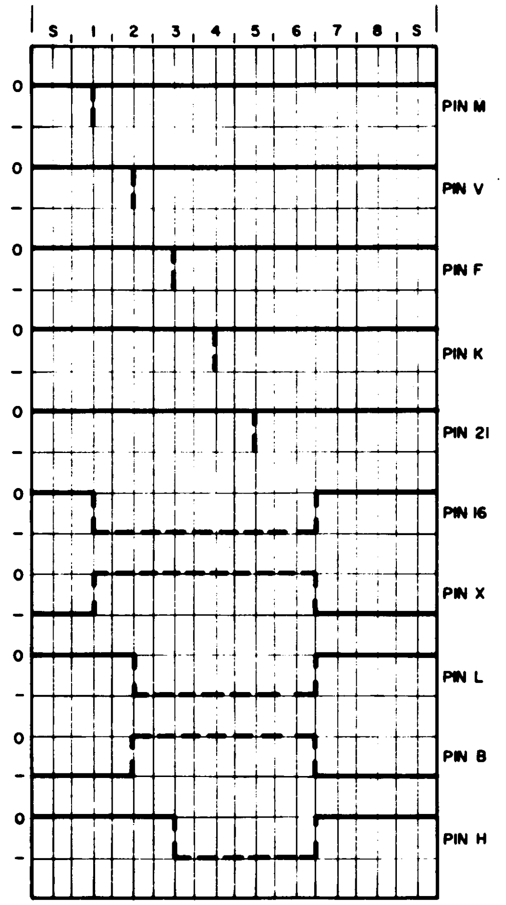


PINS A, Z, 1, 22 GND
PIN 4 -12V SUPPLY
PIN 20 +12V SUPPLY
PIN 6 (REFER TO INITIAL RESET PULSE SHEET 1)

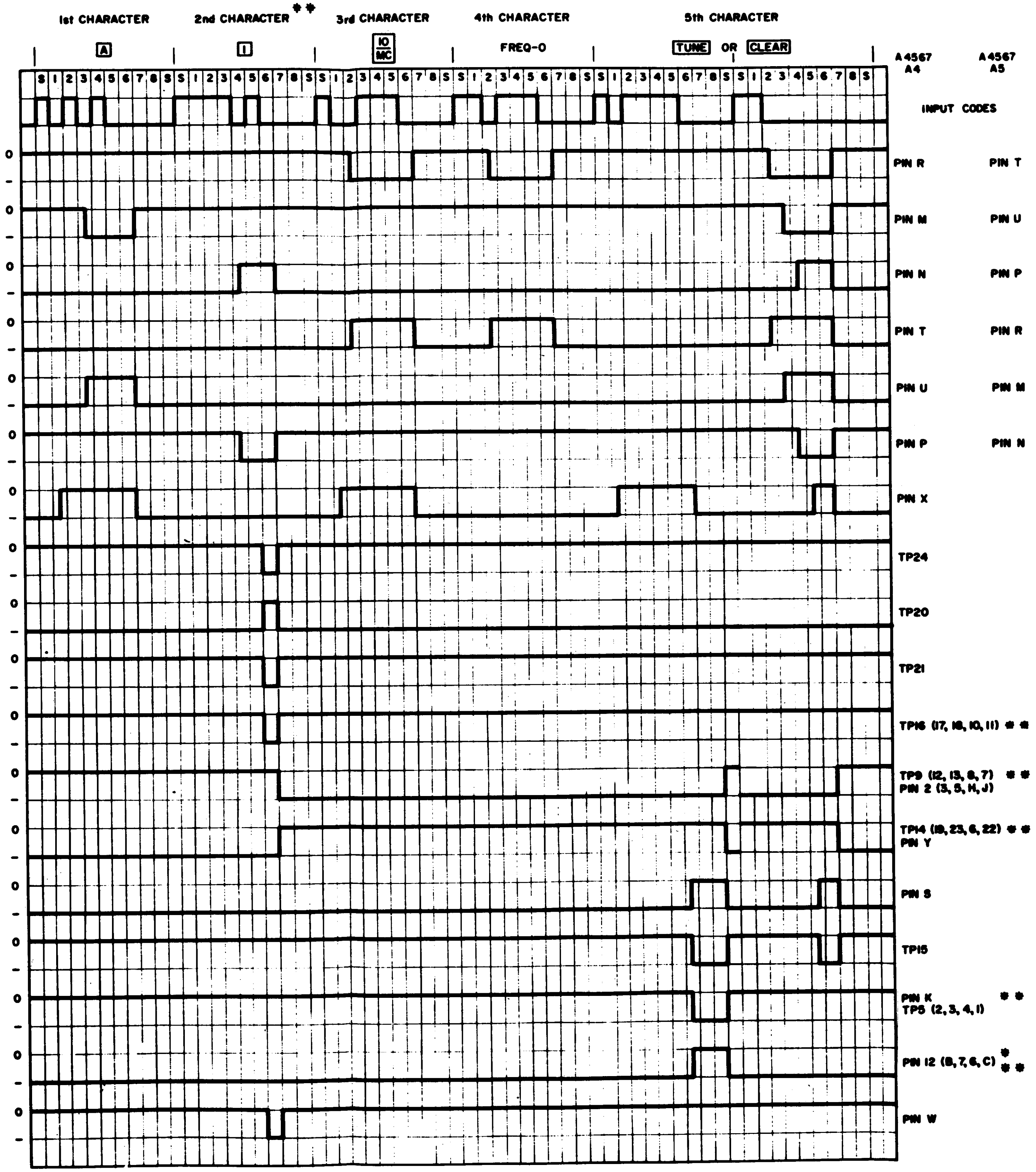
Figure 4-17. Timing Chart, Converter-Storer, Signal Data (Sheet 2 of 10)


1st CHARACTER
A
2nd CHARACTER
I
3rd CHARACTER
9/A OR 10/B
4th CHARACTER
10 MC
5th CHARACTER
FREQ-O
6th CHARACTER
TUNE OR CLEAR
S 1 2 3 4 5 6 7 8 S
INPUT CODES
PIN N 9/A
PIN R 9/A
PIN T 10/B
PIN W 10/B
RTMU - 42
0
-


1st CHARACTER
A
2nd CHARACTER
I
3rd CHARACTER
10 MC
4th CHARACTER
FREQ-O
5th CHARACTER
TUNE OR CLEAR
BLANK CHARACTER
S 1 2 3 4 5 6 7 8 S
INPUT CODES
PIN Y
PIN 19
TP1
PIN 18
PIN 17
PIN 14
PIN 8
PIN S
TP3
TP2
PIN P
PIN N RTMU-41( )
PIN R RTMU-41( )
0
-


S 1 2 3 4 5 6 7 8 S
PIN M
PIN V
PIN F
PIN K
PIN 21
PIN 16
PIN X
PIN L
PIN B
PIN H
0
-

Figu



* PULSE IS SEEN WHEN TERMINATED WITH A 1.2 KΩ RESISTOR TO −12V

** THE SECOND (2nd) CHARACTER SHOULD BE SELECTED TO CORRESPOND TO THE PROPER NUMBER DECODER BEING PROGRAMMED

		2nd CHARACTER				
		1	2	3	4	5
MONITOR	TP	16	17	18	10	11
	TP	9	12	13	8	7
	PIN	2	3	5	H	J
	TP	14	19	23	6	22
	TP	5	2	3	4	1
	PIN	12	8	7	6	C

PINS A, Z, 1, 22 (GND)
PIN 4 (-12V SUPPLY)
PIN 20 (+12V SUPPLY)
PINS V, 21 (NOT USED)
PIN 11 (REFER TO INITIAL RESET PULSE SHEET 1)

Figure 4-17. Timing Chart, Converter-Storer, Signal Data (Sheet 3 of 10)

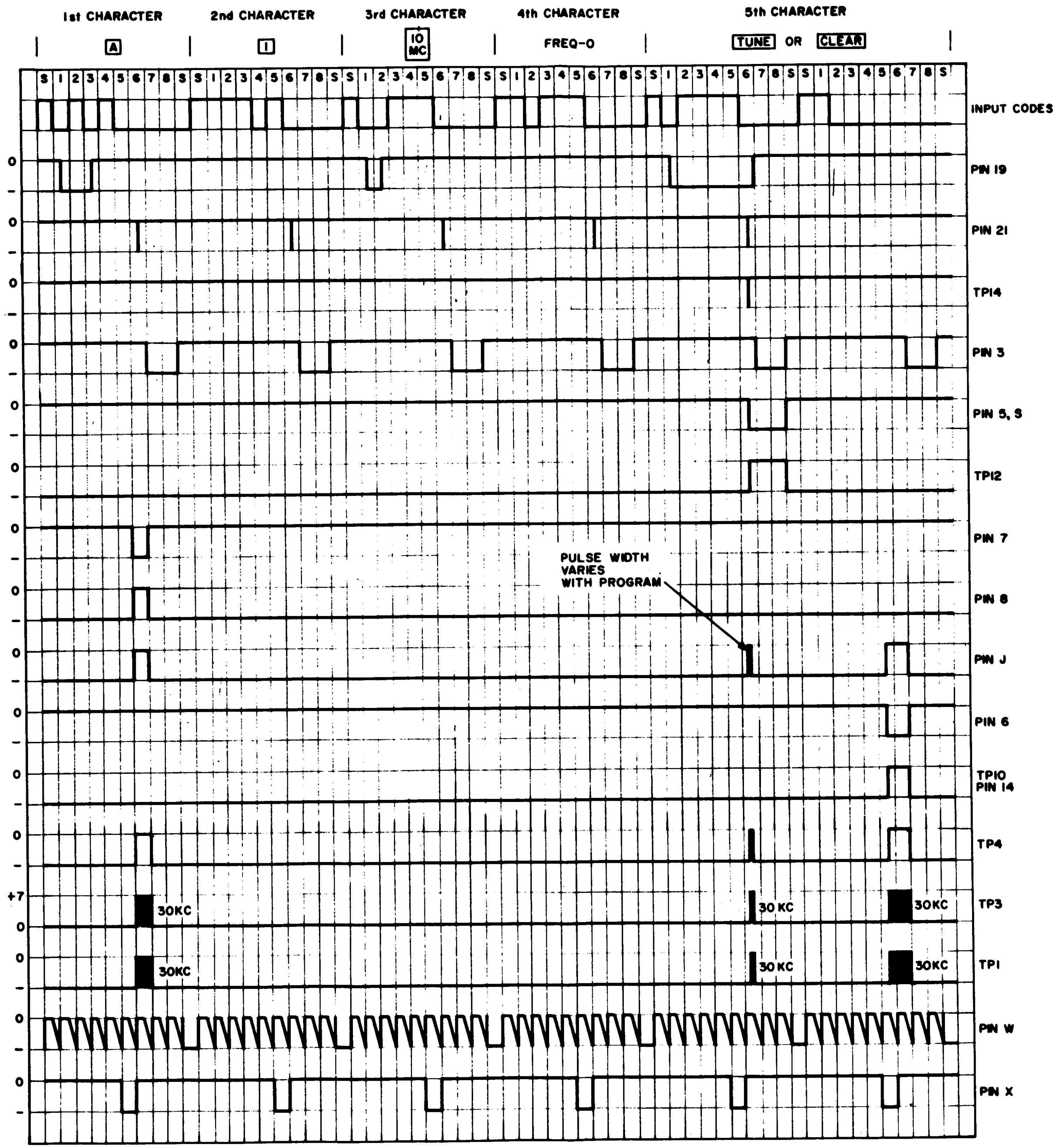
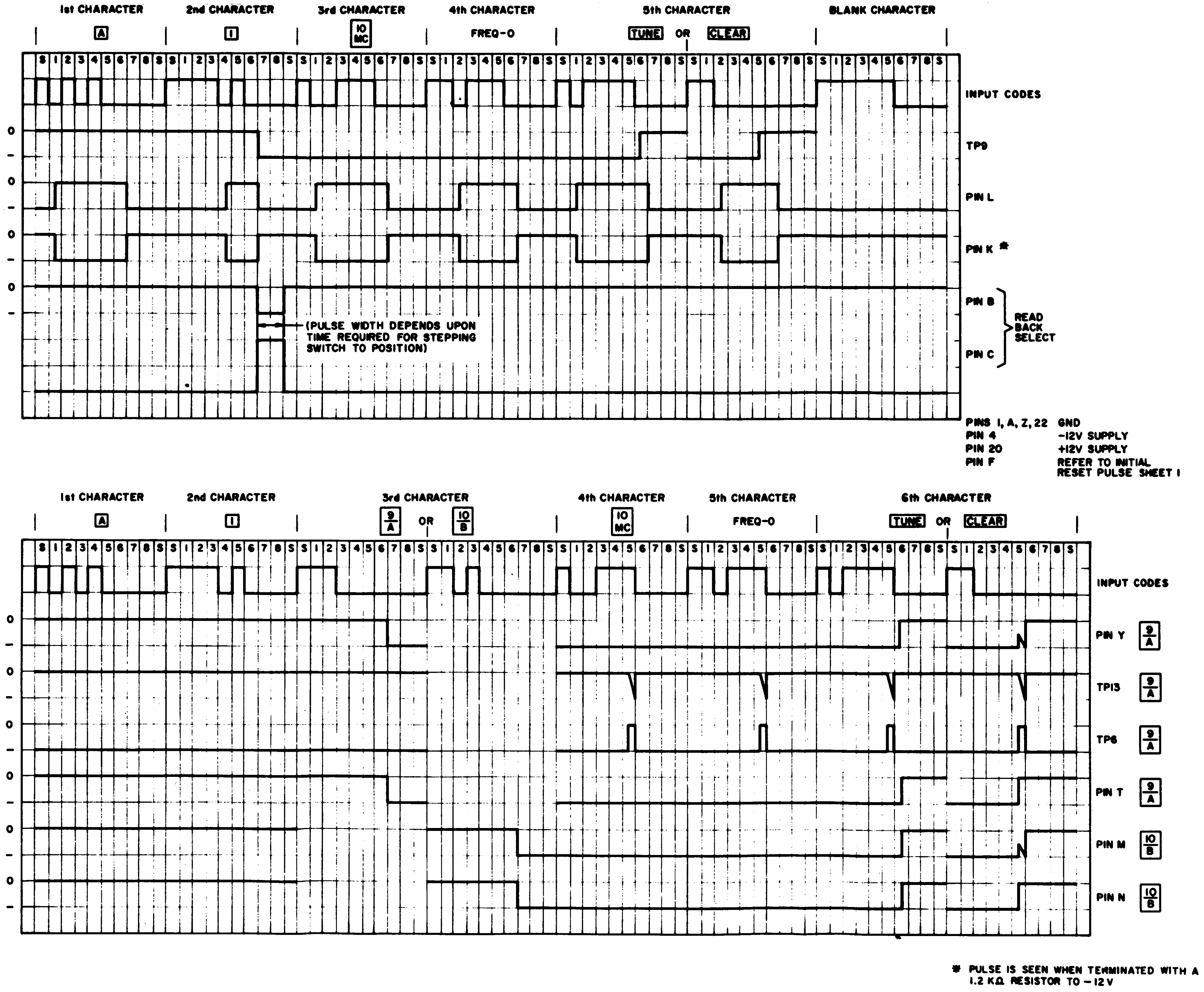
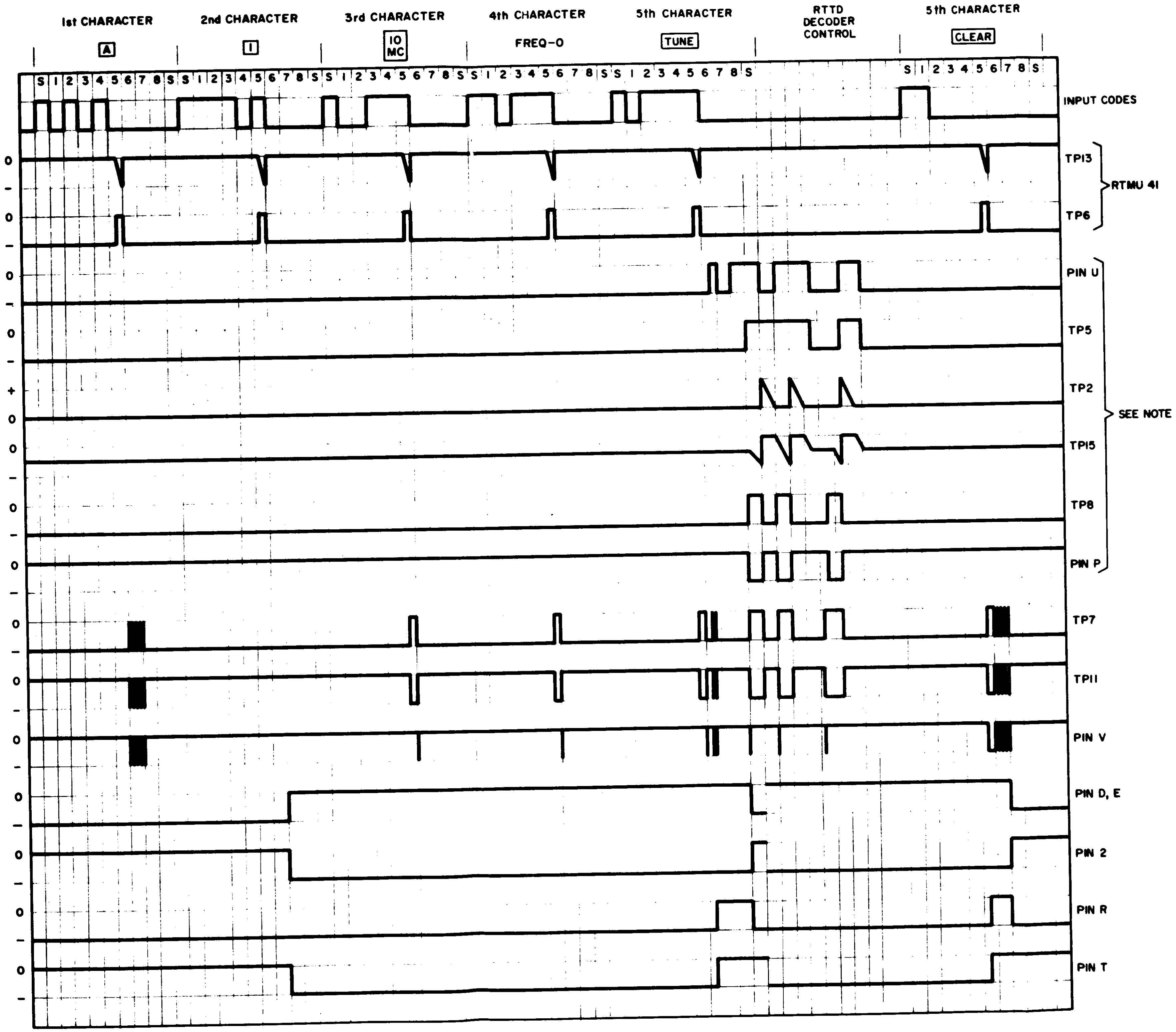


Figure 4-17. Timing Chart, Converter-Storer, Signal Data (Sheet 4 of 10)



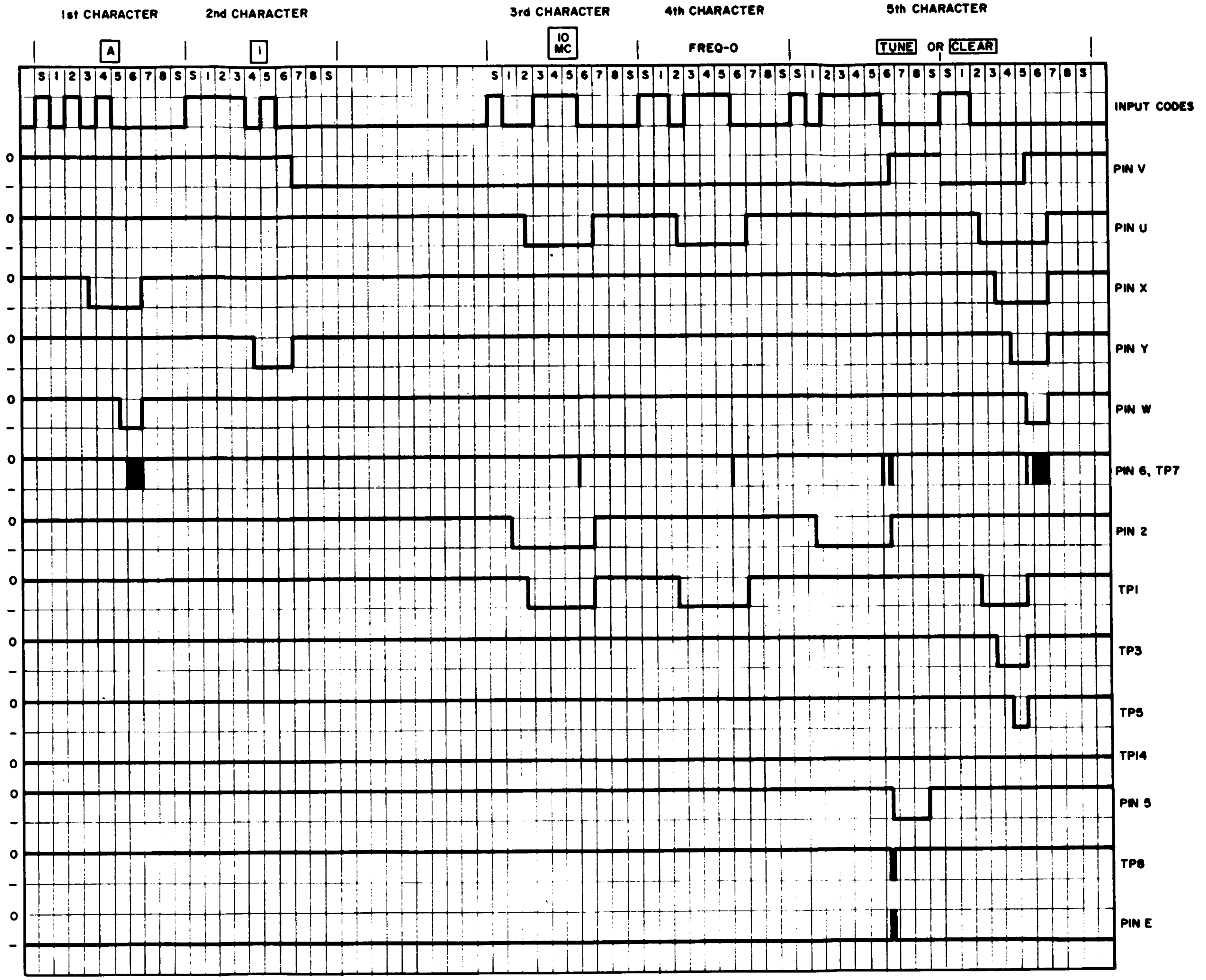
* PULSE IS SEEN WHEN TERMINATED WITH A 1.2 KΩ RESISTOR TO -12V

Figure 4-17. Timing Chart, Converter-Storer, Signal Data (Sheet 5 of 10)

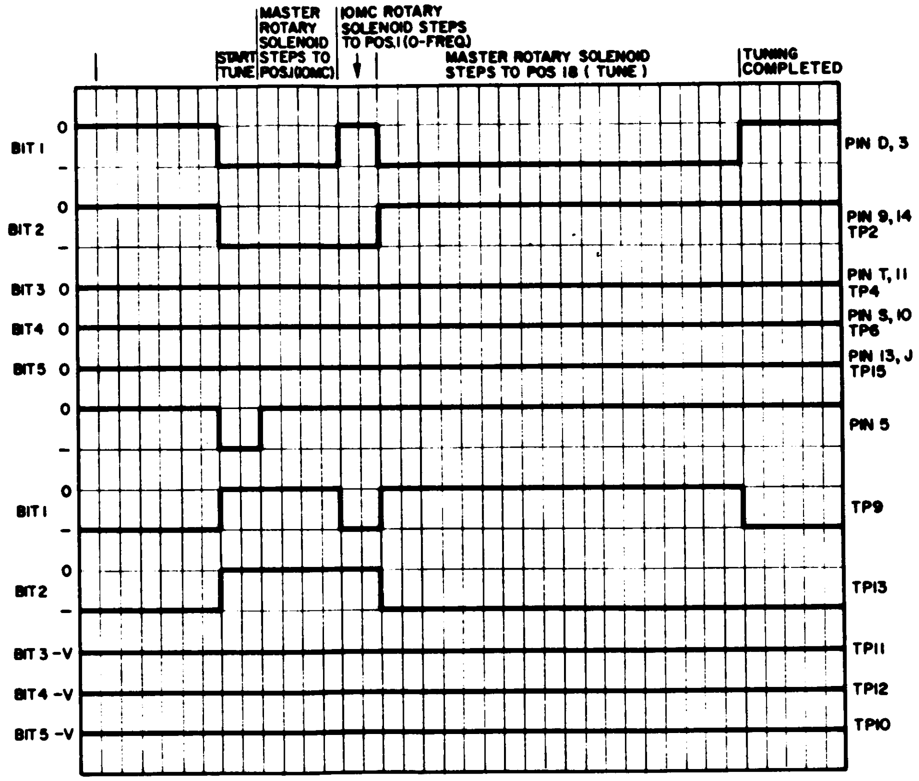


NOTE
WAVEFORMS ON PIN U, TP-5, TP-2, TP-15, TP-8, AND PIN P OCCUR DURING RTTD TUNING CYCLE ONLY

Figure 4-17. Timing Chart, Converter-Storer, Signal Data (Sheet 6 of 10)



TYPICAL DECODER OPERATION FOR PROGRAM A1 10MC 0-FREQ. TUNE



PINS 1, A, Z, 22, C -GND
PIN 4 -12V SUPPLY
PIN 20 +12V SUPPLY
PIN 21 -27V SUPPLY

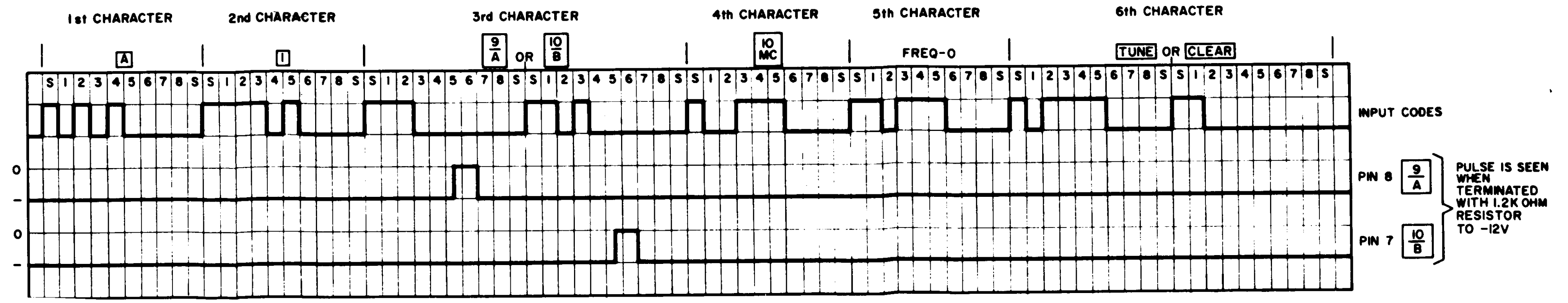


Figure 4-17. Timing Chart, Converter-Storer, Signal Data (Sheet 7 of 10)

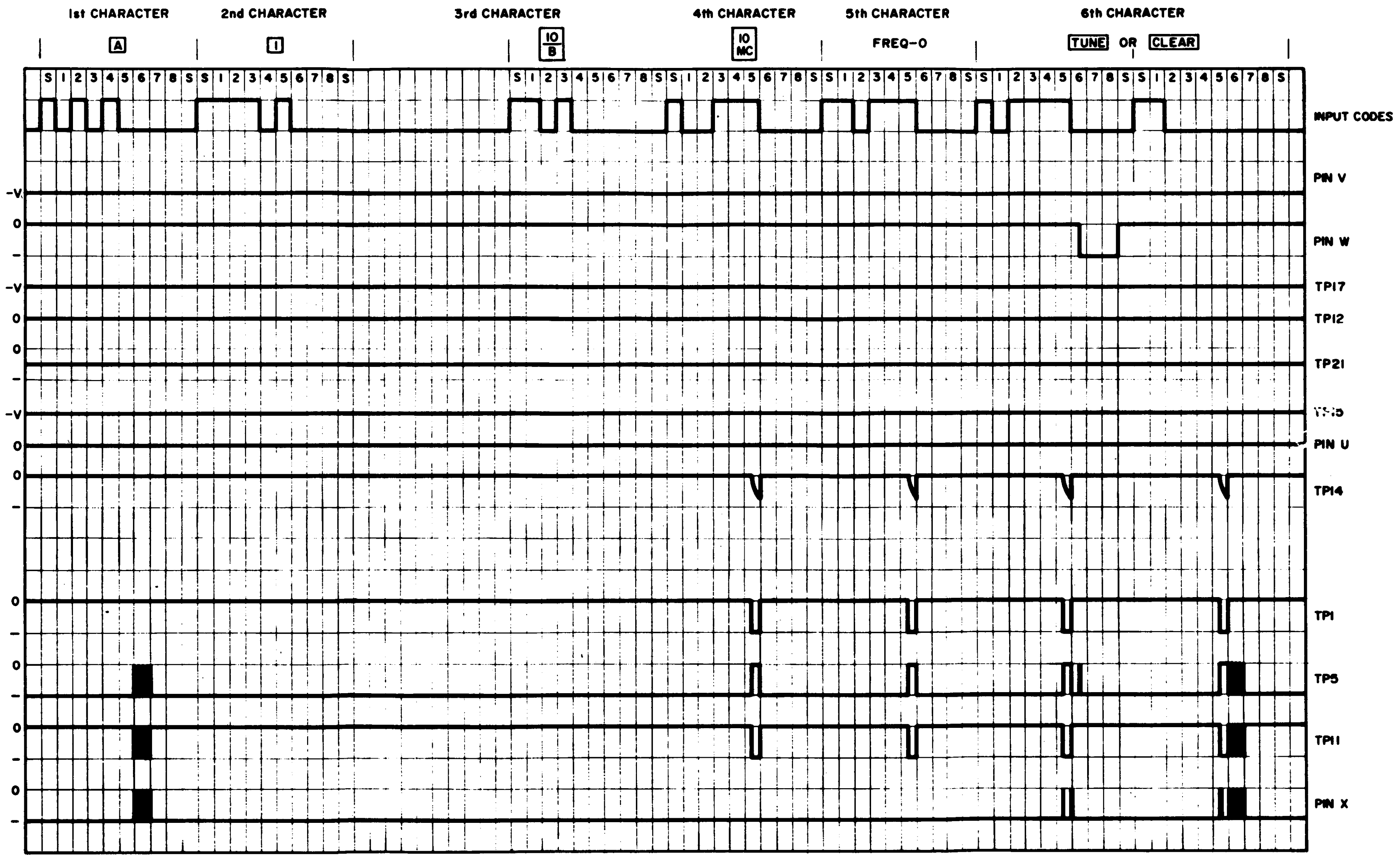
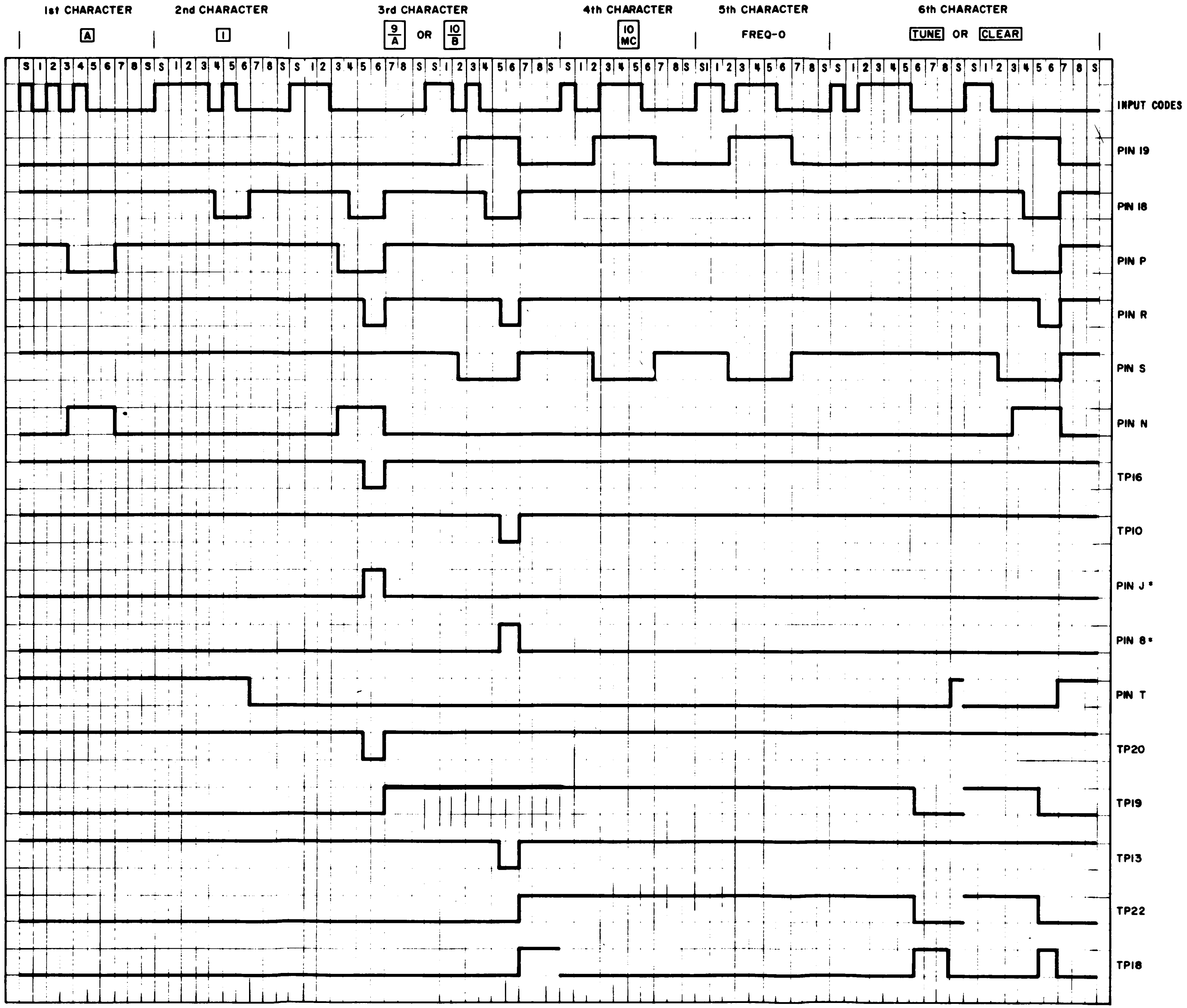
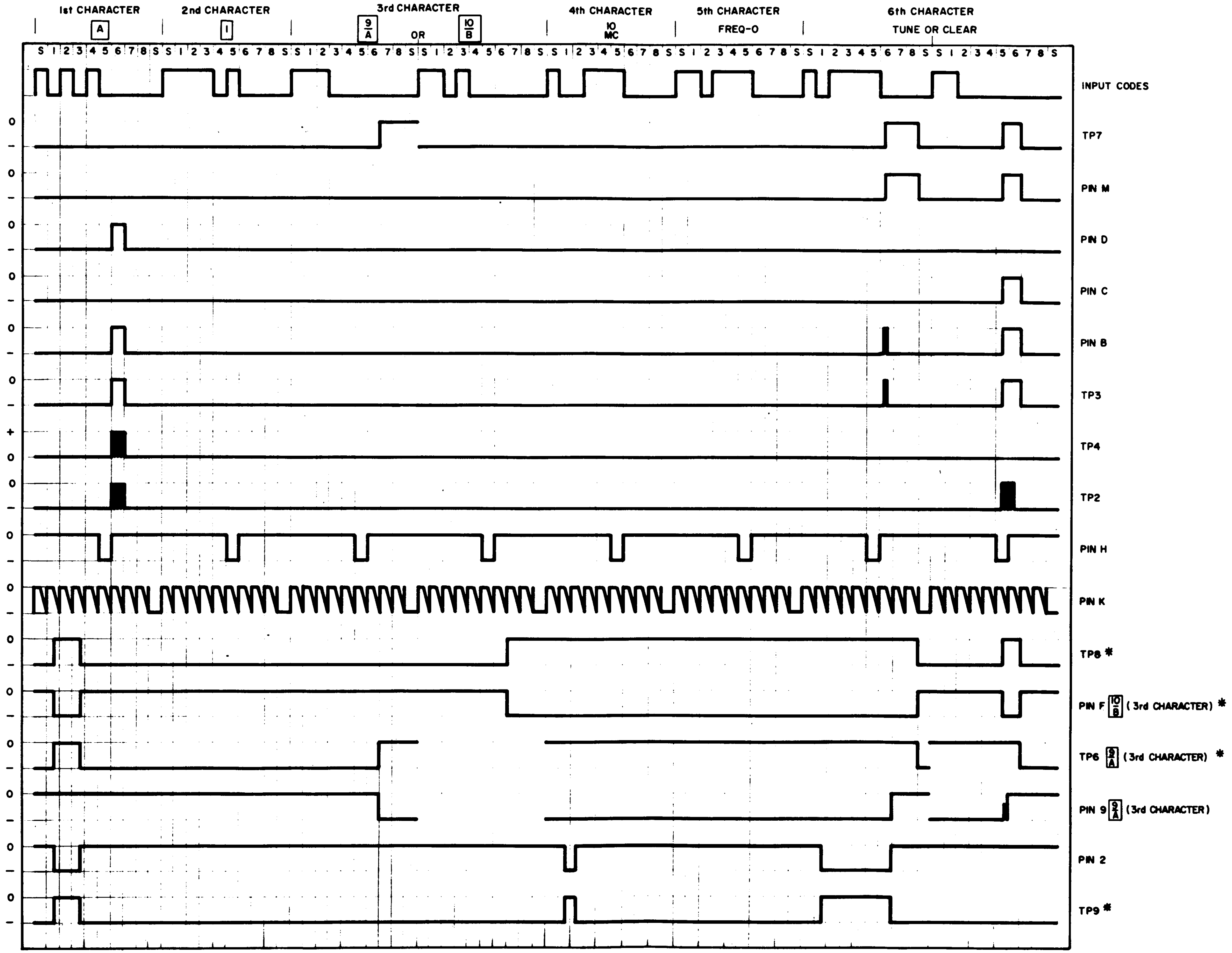


Figure 4-17. Timing Chart, Converter-Storer, Signal Data (Sheet 8 of 10)



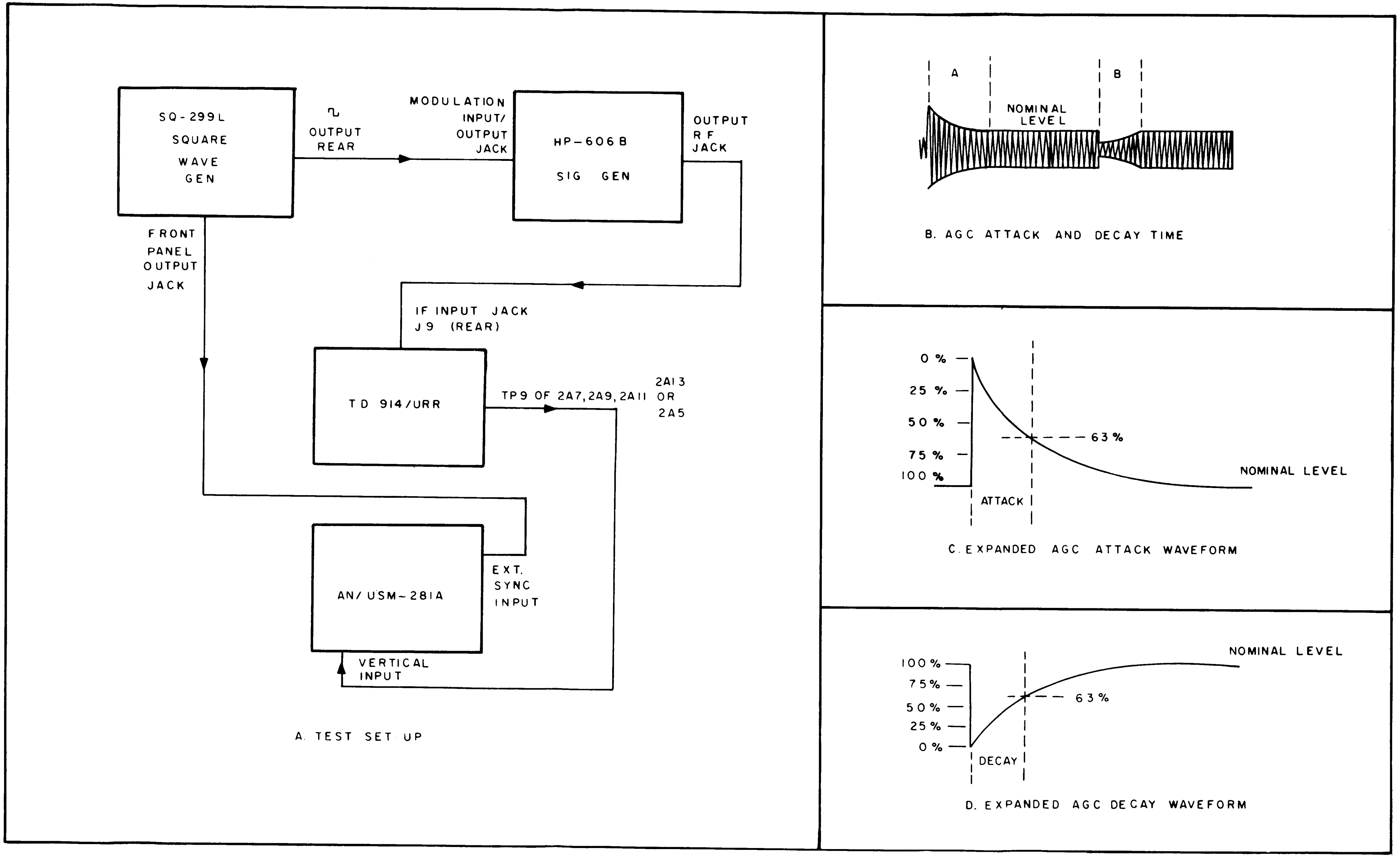
* PULSE IS SEEN WHEN TERMINATED WITH A 1.2KΩ RESISTOR TO -12V

Figure 4-17. Timing Chart, Converter-Storer, Signal Data (Sheet 9 of 10)



* PULSE IS SEEN WHEN TERMINATED WITH A 1.2 K OHM RESISTOR TO -12V

Figure 4-17. Timing Chart, Converter-Storer, Signal Data (Sheet 10 of 10)



A. TEST SET UP

B. AGC ATTACK AND DECAY TIME

C. EXPANDED AGC ATTACK WAVEFORM

D. EXPANDED AGC DECAY WAVEFORM

Figure 4-18. Test and Waveforms of AGC Time Constants

SECTION 6

PARTS LIST

6-1. INTRODUCTION.

a. REFERENCE DESIGNATIONS - The unit numbering method of assigning reference designations has been used to identify units, assemblies, subassemblies and parts of the AN/URR-63(V)1 and AN/URR-63(V)2 Radio Receiving Sets. This method has been expanded as much as necessary to adequately cover the various degrees of subdivision of the equipment. Examples of this unit numbering method and typical expansions of the same are illustrated by the following, using AN/URR-63(V)1 as an example:

Example 1:

1 R 1

Unit No. — Class of Item — Item No. within class

Read as: First (1) resistor (R) of first unit (1) of AN/URR-63(V)1 Receiving Set.

Example 2:

4 A1 R1

Unit No. — Subassembly designation — Class and No. of Item

Read as: First (1) resistor (R) of first (1) subassembly (A) of fourth (4) unit of AN/URR-63(V)1 Receiving Set.

Example 3:

3 A1 A2 R1

Unit No. — Subassembly designation — Subassembly designation — Class and No. of item

Read as: First (1) resistor (R) of second (2) subassembly (A) of first (1) subassembly (A) of third (3) unit of AN/URR-63(V)1 Receiving Set.

b. REFERENCE DESIGNATION PREFIX. - Partial reference designations are used on the equipment and illustrations. The partial reference designations consist of the class letter (s) and the identifying item number. The complete reference designations may be obtained by placing the proper prefix before the partial reference designation. Prefixes are provided on illustrations following the notation "REF DESIG PREFIX".

6-2. LIST OF UNITS.

Tables 6-1 and 6-2 are listings of the modular units comprising Receiving Sets AN/URR-63(V)1 and AN/URR-63(V)2, respectively. The units are listed by unit numbers in numerical order for each Set. Thus when the complete reference designation of a part is known, each table will furnish the identification of the unit in which the part is located, since the first number of a complete reference designation identifies the unit. Tables 6-1 and 6-2 also provide the following information for each unit listed: (1) quantity per equipment, (2) official name, (3) designation, (4) colloquial name, and (5) location of the first page of its parts listing in table 6-3.

6-3. MAINTENANCE PARTS LIST.

Table 6-3 is a listing of maintenance parts in each modular unit. Parts are listed in unit numbering order. Where an identical unit is used more than once, one table serves for all units. The complete reference designations are listed in the REF DESIG column, with the omission of the unit prefix number. The unit prefix number/s are shown at the head of each unit list.

Some small subassemblies are recommended by the manufacturer as non-reparable from a labor or re-alignment cost analysis comparison to the cost of replacing the subassembly. These subassemblies are so noted in the NAME AND DESCRIPTION column and their parts are not included in the list. Other subassemblies are partially reparable, from this point of view. Partially reparable subassemblies are symbollized as "PR" in the NOTES column: their parts are included in the list. Parts that are replaceable are symbollized "R"; parts that are not replaceable are symbollized "NR".

In some cases, subassemblies are recommended as factory reparable (example: 1A10 tuner) from a re-alignment consideration. For these a "factory reparable" notation is included in the NAME AND DESCRIPTION column and their parts are not included in the list.

TABLE 6-1. LIST OF UNITS, AN/URR-63(V)1

UNIT NO.	QTY	NAME OF UNIT	DESIGNATION	COLLOQUIAL NAME	PAGE
1	1	Tuner, Radio Frequency	TN-511/URR	Tuner	6-3
2	1	Demultiplexer	TD-914/URR	Demuxer	6-41
3	1	Generator, Reference Signal	0-1510/URR	Synthesizer	6-64
4	1	Decoder, Command Signal	KY-661/URR	Decoder	6-104
5	1	Converter-Storer, Signal Data	CV-2520(V)/URC	Memory	6-116
6	1	Cabinet, Electrical Equipment	CY-597/G	Rack	6-123

TABLE 6-2. LIST OF UNITS, AN/URR-63(V)2

UNIT NO.	QTY	NAME OF UNIT	DESIGNATION	COLLOQUIAL NAME	PAGE
1, 5	2	Tuner, Radio Frequency	TN-511/URR	Tuner	6-3
2, 6	2	Demultiplexer	TD-914/URR	Demuxer	6-41
3, 7	2	Generator, Reference Signal	0-1510/URR	Synthesizer	6-64
4, 8	2	Decoder, Command Signal	KY-661/URR	Decoder	6-104
9	1	Converter-Storer, Signal Data	CV-2521(V)/URC	Memory	6-125
10	1	Cabinet, Electrical Equipment	CY-597/G	Rack	6-126

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1		HFRR-4 TUNER, RADIO FREQUENCY: TN-511/URR. Tuning unit for the IF and RF stages of a superheterodyne receiver in the 2-32 mc frequency range.(Unit 1 in the AN/URR-63(V)1 and Units 1 and 5 in the AN/URR-63(V)2.)	5-4
1A1		FREQUENCY READOUT ASSEMBLY: Has 5 plug-in circuit card assemblies. 82679 P/N AX5003.	5-6
1A1A1		CIRCUIT CARD ASSEMBLY: 27 resistors, 33 capacitors, 6 integrated circuits, 8 coils, 7 transistors, 5 semiconductors, plug-in item, P/O AX5003; 10.312 in. lg by 2.132 in. wd by 0.812 in. hg. 82679 P/N A4658.	5-6
1A1A2		CIRCUIT CARD ASSEMBLY: 38 resistors, 45 capacitors, 14 coils, 11 integrated circuits, 9 transistors, 10 semiconductors, plug-in item, P/O AX5003; 10.312 in. lg by 5.312 in. wd by 0.500 in. hg. 82679 P/N A4659.	5-6
1A1A3		CIRCUIT CARD ASSEMBLY: 13 capacitors, 4 coils, 17 integrated circuits, plug-in item; P/O AX5003; 10.312 in. lg by 2.312 in. wd by 0.375 in. hg. 82679 P/N A4660.	5-6
1A1A4		CIRCUIT CARD ASSEMBLY: 6 resistors, 7 capacitors, 4 coils, 23 integrated circuits, 2 transistors, 1 semiconductor, plug-in item; P/O AX5003; 10.312 in. lg by 2.312 in. wd by 0.500 in. hg. 82679 P/N A4661.	5-6
1A1A5		CIRCUIT CARD ASSEMBLY: Non-repairable item, P/O AX5003: 10.312 in. lg by 4.062 in. wd by 0.875 in. hg. 82679 P/N A4662.	5-6
1A2		POWER SUPPLY ASSEMBLY: 82679 P/N AX5060.	5-6
1A2A1		CIRCUIT CARD ASSEMBLY: 26 resistors, 19 capacitors, 12 transistors, 17 semiconductors, plug-in item; 10.031 in. lg by 5.060 in. wd by 1.000 in. hg. 82679 P/N A4662.	5-6
1A3		CIRCUIT CARD ASSEMBLY W/SHIELDS: 82679 P/N AX5061.	5-6
1A3A1		CIRCUIT CARD ASSEMBLY: 78 resistors, 62 capacitors, 8 coils, 1 oscillator, 1 filter, 3 integrated circuits, 3 relays, 12 transistors, 19 semiconductors, 2 transformers, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4664.	5-6
1A4		NOT USED.	
1A5		CIRCUIT CARD ASSEMBLY W/SHIELDS. 82679 P/N AX5062.	5-6
1A5A1		CIRCUIT CARD ASSEMBLY: 81 resistors, 62 capacitors, 8 coils, 4 transformers, 1 relay, 2 integrated circuits, 18 transistors, 11 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4668.	5-6
1A6		CIRCUIT CARD ASSEMBLY W/SHIELDS. 82679 P/N AX5063.	5-6
1A6A1		CIRCUIT CARD ASSEMBLY: 117 resistors, 127 capacitors, 32 coils, 3 crystals, 6 integrated circuits, 31 transistors, 18 semiconductors, plug-in item; 10.031 in. lg by 5.959 in. wd by 1.000 in. hg. 82679 P/N A4669.	5-6
1A7		CIRCUIT CARD ASSEMBLY W/SHIELDS: 82679 P/N AX5064.	5-6
1A7A1		CIRCUIT CARD ASSEMBLY: 147 resistors, 91 capacitors, 15 coils, 4 transformers, 1 filter, 40 transistors, 11 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4670.	5-6
1A8		CIRCUIT CARD ASSEMBLY W/SHIELDS: 82679 P/N AX5065.	5-6
1A8A1		CIRCUIT CARD ASSEMBLY: 55 resistors, 75 capacitors, 21 coils, 4 integrated circuits, 19 transistors, 13 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4671.	5-6

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A9		CIRCUIT CARD ASSEMBLY W/SHIELDS: 82679 P/N AX5066.	5-6
1A9A1		CIRCUIT CARD ASSEMBLY: 102 resistors, 71 capacitors, 11 coils, 4 transformers, 4 filters, 24 transistors, 8 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4672.	5-6
1A10		TUNER, RADIO FREQUENCY: Factory Repairable Item, 2-32 mc, with motor driven tuning section and circuit cards A4673, A4674, A4675, A4676; 16.50 in. lg by 6.500 in. wd by 6.500 in. hg. 82679 P/N AX5005.	5-6
1A11		ATTENUATOR ASSEMBLY: Non-repairable item; 3.526 in. lg by 2.000 in. wd by 1.125 in. hg. 82679 P/N AX5007.	5-6
1A12		SWITCH ASSEMBLY: 82679 P/N AX5116-2.	5-6
1A13		CIRCUIT CARD ASSEMBLY: 3 capacitors, 4 resistors, 1 relay, 1 semiconductor, 1 transistor, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg. 82679 P/N A4794.	5-6
1B1		FAN, AXIAL: 115 vac, 50/60 cps, 3300 rpm; plastic blade, aluminum housing with black enamel finish; housing size; 3.625 in. sq by 1.500 in. thk. 82679 P/N BL131.	5-6
1C1 thru 1C9		CAPACITOR, FIXED, CERAMIC: Feed-thru type, 2300 pf, +50, -20% to 1.500 wvdc. 0.625 in. lg by 0.203 dia. Dwg CC118-5, 71590 P/N FT-2300.	5-6
1C10 thru 1C27		CAPACITOR, FIXED, CERAMIC: 1000,000 pf, ±20%, 50 wvdc, 0.335 in. dia, 0.125 in. thk, 0.250 lead spacing. 82679 P/N CC100-42.	5-6
1CR1		SEMICONDUCTOR DEVICE: MIL type 1N914.	5-6
1DS1		LAMP, INCANDESCENT: Single contact, T-1-3/4 base, 14 vac or vdc, 0.08 amps. Dwg BI110-10, 08806 P/N 382.	5-6
1F1		FUSE, CARTRIDGE TYPE: 1.5 amps, 125 v, 0.250 in. dia, 1.250 in. lg. Dwg FU102-1.5, 71400 P/N MDX-1-1/2.	5-7
1F2		SAME AS 1F1.	5-7
1FL1		FILTER, RADIO INTERFERENCE: Current, 1 amp; voltage rating, 600 vac at 60 cps, 1.000 in. dia, 2.688 in. lg. Dwg FI105-1, 80183 P/N 1JX130.	5-7
1FL2		CONNECTOR: MIL type UG58/U.	5-7
1J1		CONNECTOR: MIL type UG58/U.	5-5
1J2		CONNECTOR: MIL type UG625B/U.	5-5
1J3		SAME AS 1J1.	5-5
1J4		CONNECTOR: MIL type MS3102A28-21P.	5-5
1J5		CONNECTOR: MIL type MS3102A14S1P.	5-5
1J6		SAME AS 1J2.	5-5
1J7		SAME AS 1J2.	5-5
1J8		SAME AS 1J2.	5-5
1J9		CONNECTOR, RECEPTACLE, ELECTRICAL: 9 sockets; contacts rated at 7.5 amps; 0.718 in. dia by 0.718 in. lg. Dwg JJ193-9S, 07497, P/N. 126-221.	5-5
1J10		SAME AS 1J2.	5-5
1J11		CONNECTOR: MIL type MS3102A32-414P.	5-5
1J12		NOT USED.	
1J13		CONNECTOR: MIL type UG657/U.	5-5
1J14		CONNECTOR, RECEPTACLE, ELECTRICAL: Sub-miniature female, 14 contacts, screw-lock. 0.340 in. wd, 1.000 in. lg, 0.530 in. thk o/a. Dwg no. JJ242-5S, 11453 P/N 5040-14SS.	5-5
1L1		COIL, RF, FIXED: 100 uh, ±10%, 3.12 ohms max dc res, 0.157 in. dia by 0.450 in. lg. 82679 P/N CL275-101.	5-5
1M1		METER, SPECIAL SCALE: 500 microamp movement, 0 center; case; molded phenolic, 1.750 inc. by 1.750 in by 1.500 in. deep. 82679 P/N MR206.	5-6

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1M2		METER, SPECIAL SCALE: 500 microamp movement; case; molded phenolic, 1.750 in. by 1.750 in. by 1.500 in. deep. 82679 P/N MR205.	5-6
1MP1		KNOB, INSTRUMENT TYPE: Molded plastic body with brass insert, 2 set screws and white filled indicator. 0.750 in. dia by 0.438 in. hg. 82679 P/N MP123-1FB.	5-6
1MP2		KNOB, INSTRUMENT TYPE: Molded plastic body with brass insert, 2 set screws and white filled indicator depression. 0.750 in. dia by 0.438 in. hg. 82679 P/N MP123-3FB.	5-6
1MP3 thru 1MP6		SAME AS 1MP2.	5-6
1MP7		KNOB, INSTRUMENT TYPE: Molded plastic body with brass insert, 2 set screws, and white filled indicator lines. 0.750 in. dia, 0.438 in. high. 82679 P/N MP123-3DB.	5-6
1MP8		KNOB, INSTRUMENT TYPE: Molded phenolic body with brass insert and set screws. 0.750 in. dia by 0.563 in. hg. 82679 P/N MP125-1.	5-6
1MP9		KNOB, INSTRUMENT TYPE: Molded phenolic body with brass insert and set screws. 2.0 in. dia, 0.875 in. high. 82679 P/N MP123-9NB.	5-6
1P1 thru 1P11		NOT USED.	
1P12		CONNECTOR, PLUG, ELECTRICAL: Miniature female, panel mount, 50 contacts, 3.13 in. lg, 0.37 in. wd, 1.18 in. thk o/a. 82679 P/N DL257-42-50S.	5-6
1Q1		TRANSISTOR: MIL type 2N3442.	5-7
1Q2		NOT USED.	
1Q3		SAME AS 1Q1.	5-7
1R1		RESISTOR: MIL type RV4NAYSA103A.	5-7
1R2		RESISTOR, VARIABLE: 3 sections with SPDT switch; each section 10 ohms, 0.938 in. dia by 2.500 in. lg. 82679 P/N RV128.	5-7
1R3		RESISTOR: MIL type RC07GF154J.	5-7
1R4		RESISTOR: MIL type RE65G1500.	5-7
1R5		RESISTOR: MIL type RC42GF181J.	5-7
1S1		SWITCH, ROTARY: Two sections, 3 positions, 30° angle of throw, 6 poles; non-shorting contacts; bakelite insulation. 0.250 in. dia shaft by 0.750 in. lg from mounting surface. 3/8-32 thd bushing mounted. 82679 P/N SW450.	5-7
1S2		NOT USED.	
1S3		SWITCH, ROTARY: Single section, 3 positions, 30° angle of throw, 3 poles; non-shorting type contacts; bakelite insulation. 0.250 in. dia shaft by 0.750 in. from mounting surface. 3/8-32 thd bushing mounted. 82679 P/N SW456.	5-7
1S4		SWITCH, ROTARY: Two sections, 5 positions, 30° angle of throw, 4 poles; non-shorting contacts; bakelite insulation. 0.250 in. dia shaft by 0.750 in. lg from mounting surface. 3/8-32 thd bushing mounted. 82679 P/N SW457.	5-7
1S5		SWITCH: MIL type ST124.	5-7
1S6		SWITCH: MIL type ST40G.	5-7
1S7		SWITCH, ROTARY: Single section, 3 positions, 30° angle of throw, 1 pole; non-shorting contacts; bakelite insulation. 0.250 in. dia shaft by 0.750 in. lg from mounting surface. 3/8032 thd bushing mounted. 82679 P/N SW449.	5-7
1S8		SAME AS 1S5.	5-7

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1T1		TRANSFORMER, POWER, STEP UP-STEP DOWN: Primary; 115/230 v, 50/60 cps, 1 phase; secondary; 37.8 v, 14.8 v, 14.8 v, 28.4 v, 240 v; hermetically sealed metal case, stud mtd; 11 solder stud terminals, 4.625 in. lg by 4.750 in. wd by 2.625 in. hg. 82679 P/N TF362.	5-7
1XA1		NOT USED.	
1XA2 thru 1XA9		CONNECTOR, RECEPTACLE, ELECTRICAL: 15 double sided female contacts rated at 5 amps and 1800 volts rms. Phenolic housing with floating bushing and eyelet terminals. Accepts printed circuit board thickness of 0.954 to 0.071 in. 82679 P/N JJ319A15DFE.	5-7
1XDS1		LIGHT, INDICATOR: Green lens; 1.35 to 28 v; T=1-3/4 lamp base 2 terminals; 0.437 in. dia by 1.500 in. lg. Dwg TS153-9. 72619 P/N 162-8430-1472-502.	5-7
1XF1		FUSEHOLDER, LAMP INDICATING: 90-250 v, 15 amps, neon lamp, clear knob, accommodates 1/4 in. dia by 1-1/4 in. lg fuse. Dwg FH104-3. 71400 P/N HKL-X.	5-7
1XF2		SAME AS 1XF1.	5-7
1A1		FREQUENCY READOUT ASSEMBLY: 5 circuit card assemblies plug-into a non-repairable circuit card, item is electrically connected by 2 connectors, 8 screws for mounting to chassis, bracket enclosed; 10.500 in. lg by 3.000 in. hg by 4.250 in. wd. 82679 P/N AX5003.	5-9
1A1DS1		INDICATOR, DIGITAL DISPLAY: Displays numerals 0 thru 9, min. supply voltage 170 vdc; decimal point to right of numeral. 14 pin-type terminals. 0.750 in. dia by 1.800 in. high from mtg surface. 82679 P/N BI117-2.	5-9
1A1DS2		SAME AS 1DS1.	5-9
1A1DS3 thru 1A1DS6		INDICATOR, DIGITAL DISPLAY: Displays numerals 0 thru 9, min supply voltage 170 vdc. 14 pin-type terminals. 0.750 in. dia by 1.800 in. high from mtg surface. 82679 P/N BI117-1.	5-9
1A1A1		CIRCUIT CARD ASSEMBLY: 27 resistors, 33 capacitors, 8 coils, 6 integrated circuits, 7 transistors, 5 semiconductors, plug-in item; p/o AX5003; 10.312 in. lg by 2.312 in. wd by 0.812 in. hg. 82679 P/N A4658.	5-12
1A1A1C1		CAPACITOR, FIXED, CERAMIC: 10,000 pf ±20%, 100 wvdc, 0.344 in. dia by 0.125 in. thk by 0.250 in. lead spacing. 82679 P/N CC100-43.	5-12
1A1A1C2		SAME AS 1A1A1C1.	5-12
1A1A1C3		CAPACITOR: MIL type CS13BE225K.	5-12
1A1A1C4		SAME AS 1A1A1C1.	5-12
1A1A1C5		CAPACITOR: MIL type CS13BE476K.	5-12
1A1A1C6		SAME AS 1A1A1C1.	5-12
1A1A1C7		CAPACITOR, FIXED, MICA: 390 pf ±2% tol, 100 wvdc, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F391G1S.	5-12
1A1A1C8		SAME AS 1A1A1C3.	5-12
1A1A1C9		SAME AS 1A1A1C1.	5-12
1A1A1C10		SAME AS 1A1A1C1.	5-12
1A1A1C11		SAME AS 1A1A1C5.	5-12
1A1A1C12		SAME AS 1A1A1C1.	5-12
1A1A1C13		SAME AS 1A1A1C1.	5-12

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A1A1C14		SAME AS 1A1A1C1.	5-12
1A1A1C15		SAME AS 1A1A1C5.	5-12
1A1A1C16		SAME AS 1A1A1C1.	5-12
1A1A1C17		CAPACITOR, FIXED, CERAMIC: 1,000 pf, gmv, 500 wvdc, 0.310 in. dia by 0.156 in. thk. 82679 P/N CC100-29.	5-12
1A1A1C18		CAPACITOR, FIXED, MICA: 10 pf, 5% tol, 500 wvdc, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F100J5S.	5-12
1A1A1C19 thru 1A1A1C26		SAME AS 1A1A1C1.	5-12
1A1A1C27		CAPACITOR, FIXED, MICA: 820 pf, ±2% tol, 300 wvdc, 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM111F821G3S.	5-12
1A1A1C28		SAME AS 1A1A1C1.	5-12
1A1A1C29		SAME AS 1A1A1C1.	5-12
1A1A1C30		SAME AS 1A1A1C1.	5-12
1A1A1C31		SAME AS 1A1A1C3.	5-12
1A1A1C32		SAME AS 1A1A1C1.	5-12
1A1A1C33		SAME AS 1A1A1C1.	5-12
1A1A1CR1		SEMICONDUCTOR DEVICE: MIL type 1N914.	5-12
1A1A1CR2		SAME AS 1A1A1CR1.	5-12
1A1A1CR3		SAME AS 1A1A1CR1.	5-12
1A1A1CR4		SAME AS 1A1A1CR1.	5-12
1A1A1L1		COIL, RF, FIXED: 22 uh, Q=46 at 2.5 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-220.	5-12
1A1A1L2		SAME AS 1A1A1L1.	5-12
1A1A1L3		SAME AS 1A1A1L1.	5-12
1A1A1L4		COIL, RF, FIXED: 220 uh, Q=58 at 0.79 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-221.	5-12
1A1A1L5		SAME AS 1A1A1L4.	5-12
1A1A1L6		SAME AS 1A1A1L4.	5-12
1A1A1L7		COIL, RF, FIXED: 33 uh, Q=46 at 25 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-330.	5-12
1A1A1L8		SAME AS 1A1A1L7.	5-12
1A1A1Q1 thru 1A1A1Q5		TRANSISTOR: MIL type 2N918.	5-12
1A1A1Q6		TRANSISTOR: MIL type 2N2907.	5-12
1A1A1Q7		TRANSISTOR: MIL type 2N706.	5-12
1A1A1R1		RESISTOR: MIL type RC42GF221J.	5-12
1A1A1R2		RESISTOR: MIL type RC07GF470J.	5-12
1A1A1R3		RESISTOR: MIL type RC07GF103J.	5-12
1A1A1R4		RESISTOR: MIL type RC07GF222J.	5-12
1A1A1R5		RESISTOR: MIL type RC07GF681J.	5-12
1A1A1R6		RESISTOR: MIL type RC07GF101J.	5-12
1A1A1R7		SAME AS 1A1A1R4.	5-12
1A1A1R8		RESISTOR: MIL type RC07GF151J.	5-12
1A1A1R9		RESISTOR: MIL type RC07GF331J.	5-12
1A1A1R10		RESISTOR: MIL type RC07GF100J.	5-12
1A1A1R11		RESISTOR: MIL type RC07GF471J.	5-12
1A1A1R12		SAME AS 1A1A1R11.	5-12
1A1A1R13		RESISTOR: MIL type RC07GF472J.	5-12
1A1A1R14		SAME AS 1A1A1R11.	5-12
1A1A1R15		SAME AS 1A1A1R11.	5-12
1A1A1R16		SAME AS 1A1A1R11.	5-12
1A1A1R17		RESISTOR: MIL type RC07GF104J.	5-12
1A1A1R18		SAME AS 1A1A1R3.	5-12
1A1A1R19		SAME AS 1A1A1R11.	5-12

TABLE 6-3 MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A1A1R20		RESISTOR: MIL type RC07GF102J.	5-12
1A1A1R21		RESISTOR: MIL type RC07GF153J.	5-12
1A1A1R22		RESISTOR: MIL type RC07GF332J.	5-12
1A1A1R23		SAME AS 1A1A1R13.	5-12
1A1A1R24		SAME AS 1A1A1R6.	5-12
1A1A1R25		SAME AS 1A1A1R20.	5-12
1A1A1R26		SAME AS 1A1A1R4.	5-12
1A1A1R27		SAME AS 1A1A1R22.	5-12
1A1A1VR1		SEMICONDUCTOR DEVICE: MIL type 1N7594.	5-12
1A1A1Z1		INTEGRATED CIRCUIT, NAND/NOR GATE: 14 pins, plastic case; supply voltage 7 v, 0.750 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW169.	5-12
1A1A1Z2		SAME AS 1A1A1Z1.	5-12
1A1A1Z3		INTEGRATED CIRCUIT, INPUT J-K FLIP FLOP: 14 pins, plastic case; supply voltage 7.0 v, 0.750 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW168.	5-12
1A1A1Z4		INTEGRATED CIRCUIT, DECADE DIVIDER: 8 pins, plastic case; digital input dc to 30 mc, analog input 5 cps to 30 mc; 0.438 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW171.	5-12
1A1A1Z5		INTEGRATED CIRCUIT, NAND GATE: 14 pins, plastic case; 4.75 to 5.25 supply volts. 0.770 in. lg by 0.250 in. wd by 0.220 in. hg. 82679 P/N NW176.	5-12
1A1A1Z6		OSCILLATOR, RADIO FREQUENCY: 1000 kc freq, +24 vdc ±5%, 5 ma osc supply; output: 200 mv to 200 ohm load; steel case, stud mtg, 3.000 in. lg by 1.600 in. wd by 0.750 in. hg. 82679 P/N AO122.	5-12
1A1A2		CIRCUIT CARD ASSEMBLY: 38 resistors, 45 capacitors, 14 coils, 11 integrated circuits, 9 transistors, 10 semiconductors, plug-in item; p/o AX5003, 10.312 in. lg by 5.312 in. wd by 0.500 in. hg. 82679 P/N A4659.	5-14
1A1A2C1		CAPACITOR: MIL type CS13BE106K.	5-14
1A1A2C2		SAME AS 1A1A1C1.	5-14
1A1A2C3		SAME AS 1A1A1C17.	5-14
1A1A2C4		SAME AS 1A1A1C1.	5-14
1A1A2C5		SAME AS 1A1A1C17.	5-14
1A1A2C6		SAME AS 1A1A1C1.	5-14
1A1A2C7		SAME AS 1A1A1C1.	5-14
1A1A2C8		CAPACITOR, FIXED, MICA: 430 pf, ±2% tol, 500 wvdc, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F431G5S.	5-14
1A1A2C9		CAPACITOR, FIXED, MICA: 1500 pf, ±1% tol, 500 wvdc, 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM112F152F5S.	5-14
1A1A2C10		SAME AS 1A1A2C8.	5-14
1A1A2C11		CAPACITOR, FIXED, MICA: 100 pf, ±5% tol, 500 wvdc; 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F101J5S.	5-14
1A1A2C12		CAPACITOR, FIXED, MICA: 1,000 pf, ±1% tol, 100 wvdc, 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM111F102F1S.	5-14
1A1A2C13		SAME AS 1A1A1C5.	5-14
1A1A2C14		SAME AS 1A1A2C12.	5-14
1A1A2C15		SAME AS 1A1A2C11.	5-14
1A1A2C16 thru 1A1A2C22		SAME AS 1A1A1C1.	5-14
1A1A2C23		SAME AS 1A1A1C27.	5-14
1A1A2C24 thru 1A1A2C35		SAME AS 1A1A1C1.	5-14
1A1A2C36		SAME AS 1A1A2C1.	5-14
1A1A2C37		SAME AS 1A1A1C1.	5-14

TABLE 6-3 MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A1A2C38		CAPACITOR, FIXED, MICA: 330 pf, ±2% tol, 100 wvdc. 0.440 in. lg by 0.473 in. wd, 0.170 in. thk. 82679 P/N CM111F331G1S.	5-14
1A1A2C39		CAPACITOR, FIXED, MICA: 620pf, ±2% tol, 300 wvdc. 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM111F621G3S.	5-14
1A1A2C40		SAME AS 1A1A2C38.	5-14
1A1A2C41		CAPACITOR, FIXED, CERAMIC: 100,000 pf, ±80% - 20%, 100 wvdc, 0.690 in. dia by 0.156 in. thk by 0.375 in. lead spacing. 82679 P/N CC100-28.	5-14
1A1A2C42		CAPACITOR, FIXED, MICA: 560 pf ±2% tol, 300 wvdc, 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM111F561G3S.	5-14
1A1A2C43		SAME AS 1A1A1C1.	5-14
1A1A2C44		SAME AS 1A1A1C1.	5-14
1A1A2C45		SAME AS 1A1A2C17.	5-14
1A1A2CR1		RECTIFIER, SEMICONDUCTOR DEVICE: Forward voltage, 1.0 v; breakdown voltage, 10 v. 0.170 in. lg by 0.076 in. dia, wire lead mtd. 82679 P/N DD137.	5-14
1A1A2CR2		SAME AS 1A1A1CR1.	5-14
1A1A2CR3		SAME AS 1A1A2CR1.	5-14
1A1A2CR4		SAME AS 1A1A2CR1.	5-14
1A1A2CR5		SAME AS 1A1A1CR1.	5-14
1A1A2CR6		SAME AS 1A1A2CR1.	5-14
1A1A2CR7 thru 1A1A2CR10		SAME AS 1A1A1CR1.	5-14
1A1A2L1		COIL, RF, FIXED: 10 uh, Q=49 at 7.9 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-100.	5-14
1A1A2L2		SAME AS 1A1A1L1.	5-14
1A1A2L3		SAME AS 1A1A1L4.	5-14
1A1A2L4		SAME AS 1A1A1L4.	5-14
1A1A2L5		SAME AS 1A1A2L1.	5-14
1A1A2L6		COIL, RF, FIXED: 330 uh, Q=54 at 0.79 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-331.	5-14
1A1A2L7		SAME AS 1A1A1L7.	5-14
1A1A2L8		SAME AS 1A1A1L4.	5-14
1A1A2L9		SAME AS 1A1A2L6.	5-14
1A1A2L10		SAME AS 1A1A2L6.	5-14
1A1A2L11		COIL, RF, FIXED: 100 uh, Q=52 at 2.5 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-101.	5-14
1A1A2L12		SAME AS 1A1A2L1.	5-14
1A1A2L13		SAME AS 1A1A2L6.	5-14
1A1A2L14		SAME AS 1A1A2L1.	5-14
1A1A2Q1		SAME AS 1A1A1Q1.	5-14
1A1A2Q2		SAME AS 1A1A1Q1.	5-14
1A1A2Q3		TRANSISTOR: MIL type 2N1132.	5-14
1A1A2Q4 thru 1A1A2Q9		SAME AS 1A1A1Q7.	5-14
1A1A2R1		SAME AS 1A1A1R5.	5-14
1A1A2R2		SAME AS 1A1A1R11.	5-14
1A1A2R3		SAME AS 1A1A1R9.	5-14
1A1A2R4		SAME AS 1A1A1R3.	5-14
1A1A2R5		SAME AS 1A1A1R11.	5-14
1A1A2R6		SAME AS 1A1A1R9.	5-14
1A1A2R7		RESISTOR: MIL RC07GF221J.	5-14
1A1A2R8		SAME AS 1A1A2R7.	5-14
1A1A2R9		SAME AS 1A1A1R9.	5-14

TABLE 6-3 MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A1A2R10		SAME AS 1A1A1R11.	5-14
1A1A2R11		SAME AS 1A1A1R3.	5-14
1A1A2R12		SAME AS 1A1A2R7.	5-14
1A1A2R13		SAME AS 1A1A1R21.	5-14
1A1A2R14		SAME AS 1A1A1R17.	5-14
1A1A2R15		SAME AS 1A1A1R20.	5-14
1A1A2R16		SAME AS 1A1A1R20.	5-14
1A1A2R17		SAME AS 1A1A1R21.	5-14
1A1A2R18		SAME AS 1A1A1R3.	5-14
1A1A2R19		SAME AS 1A1A1R20.	5-14
1A1A2R20		SAME AS 1A1A1R3.	5-14
1A1A2R21		SAME AS 1A1A1R21.	5-14
1A1A2R22		SAME AS 1A1A1R13.	5-14
1A1A2R23		SAME AS 1A1A1R11.	5-14
1A1A2R24		SAME AS 1A1A1R20.	5-14
1A1A2R25		SAME AS 1A1A1R22.	5-14
1A1A2R26		SAME AS 1A1A1R13.	5-14
1A1A2R27		SAME AS 1A1A1R3.	5-14
1A1A2R28		SAME AS 1A1A1R4.	5-14
1A1A2R29		SAME AS 1A1A1R7.	5-14
1A1A2R30		SAME AS 1A1A2R7.	5-14
1A1A2R31		SAME AS 1A1A1R4.	5-14
1A1A2R32		SAME AS 1A1A2R7.	5-14
1A1A2R33		SAME AS 1A1A1R4.	5-14
1A1A2R34		SAME AS 1A1A120.	5-14
1A1A2R35		SAME AS 1A1A1R4.	5-14
1A1A2R36		SAME AS 1A1A1R5.	5-14
1A1A2R37		SAME AS 1A1A1R13.	5-14
1A1A2R38		SAME AS 1A1A1R5.	5-14
1A1A2Z1		SAME AS 1A1A1Z3.	5-14
1A1A2Z2		INTEGRATED CIRCUIT, DECADE DIVIDER: 8 pins, plastic case; digital input dc to 30 mc, analog input 5 cps to 30 mc. 0.438 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW170.	5-14
1A1A2Z3		INTEGRATED CIRCUIT, MASTER-SLAVE FLIP FLOP: 14 pins, plastic case; supply voltage 4.75 v to 5.25 v, 0.750 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW159.	5-14
1A1A2Z4		SAME AS 1A1A1Z5.	5-14
1A1A2Z5 thru 1A1A2Z8		SAME AS 1A1A2Z4.	5-14
1A1A2Z9		INTEGRATED CIRCUIT, J-K FLIP FLOP: 14 pins, plastic case; supply voltage 4.75 to 5.25 v. 0.750 in. lg by 0.188 in. wd by 0.125 in. hg. 82679 P/N NW157.	5-14
1A1A2Z10		SAME AS 1A1A2Z3.	5-14
1A1A2Z11		INTEGRATED CIRCUIT, DUAL POSITIVE NANDGATE: 14 pins, plastic case; supply voltage 4.75 v to 5.25 v. 0.750 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW166.	5-14
1A1A3		CIRCUIT CARD ASSEMBLY: 13 capacitors, 4 coils, 17 integrated circuits, plug-in item, p/o AX5003; 10.312 in. lg by 2.312 in. wd by 0.375 in. hg. 82679 P/N A4660.	5-16
1A1A3C1 thru 1A1A3C5		SAME AS 1A1A1C1.	5-16
1A1A3C6		NOT USED.	
1A1A3C7		NOT USED.	
1A1A3C8 thru 1A1A3C13		SAME AS 1A1A1C1.	5-16

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A1A3L1		COIL, RF, FIXED: 1,000 uh, Q=65 at 0.79 mc, 0.157 in. dia by 0.396 in. lg. 82679 P/N CL433-102.	5-16
1A1A3L2		SAME AS 1A1A3L1.	5-16
1A1A3L3		SAME AS 1A1A3L1.	5-16
1A1A3L4		SAME AS 1A1A3L1.	5-16
1A1A3Z1		SAME AS 1A1A2Z3.	5-16
1A1A3Z2		SAME AS 1A1A2Z3.	5-16
1A1A3Z3		SAME AS 1A1A2Z9.	5-16
1A1A3Z4		INTEGRATED CIRCUIT, POSITIVE NANDGAGE: 14 pins, plastic case; supply voltage 4.75 v to 5.25 v. 0.750 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW164.	5-16
1A1A3Z5		SAME AS 1A1A2Z3.	5-16
1A1A3Z6		INTEGRATED CIRCUIT, POSITIVE NANDGATE: 14 pins, plastic case; supply voltage 4.75 v to 5.25 v case; 0.770 in. lg by 0.250 in. wd by 0.200 in. hg. 82679 P/N NW134.	5-16
1A1A3Z7		SAME AS 1A1A3Z6.	5-16
1A1A3Z8		SAME AS 1A1A3Z6.	5-16
1A1A3Z10 thru 1A1A3Z15		SAME AS 1A1A1Z5.	5-16
1A1A3Z16		SAME AS 1A1A3Z6.	5-16
1A1A3Z17		SAME AS 1A1A3Z6.	5-16
1A1A4		CIRCUIT CARD ASSEMBLY: 6 resistors, 7 capacitors, 4 coils, 23 integrated circuits, 2 transistors, 1 semiconductor, plug-in item, p/o AX5003; 10.312 in. lg by 2.312 in. wd by 0.500 in. hg. 82679 P/N A4661.	5-18
1A1A4C1 thru 1A1A4C7		SAME AS 1A1A1C1.	5-18
1A1A4CR1		SAME AS 1A1A1CR1.	5-18
1A1A4L1 thru 1A1A4L4		SAME AS 1A1A2L1.	5-18
1A1A4Q1		TRANSISTOR: MIL type 2N2222.	5-18
1A1A4Q2		SAME AS 1A1A1Q7.	5-18
1A1A4R1		SAME AS 1A1A1R20.	5-18
1A1A4R2		SAME AS 1A1A1R20.	5-18
1A1A4R3		SAME AS 1A1A1R11.	5-18
1A1A4R4		SAME AS 1A1A1R11.	5-18
1A1A4R5		SAME AS 1A1A1R11.	5-18
1A1A4R6		SAME AS 1A1A1R4.	5-18
1A1A4Z1		SAME AS 1A1A3Z6.	5-18
1A1A4Z2		SAME AS 1A1A2Z3.	5-18
1A1A4Z3 thru 1A1A4Z12		SAME AS 1A1A3Z6.	5-18
1A1A4Z13 thru 1A1A4Z18		INTEGRATED CIRCUIT, QUADRUPLE BISTABLE LATCH: 16 pins, plastic case. 0.438 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW177.	5-18
1A1A4Z19 thru 1A1A4Z23		SAME AS 1A1A2Z5.	5-18
1A1A5		CIRCUIT CARD ASSEMBLY: Non-repairable item, p/o AX5003; 10.312 in. lg by 4.062 in. wd by 0.875 in. hg. 82679 P/N A4662.	

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A2		POWER SUPPLY ASSEMBLY: Circuit card assembly and shields. 82679 P/N AX5060.	5-20
1A2CR1		RECTIFIER, SEMICONDUCTOR DEVICE: 140 v input, dc output, 125 v res load, 200 v cap. load; plastic case. 0.900 in. lg by 0.670 in. hg by 0.260 in. wd. 82679 P/N DD144-6.	5-20
1A2CR2		NOT USED.	
1A2CR3		NOT USED.	
1A2CR4		SAME AS 1A2CR1.	5-20
1A2E1		SHIELD, CIRCUIT CARD ASSEMBLY: 82679 P/N MS5288.	5-20
1A2E2		SHIELD, CIRCUIT CARD ASSEMBLY: 82679 P/N MS5479.	5-20
1A2R1 thru 1A2R4		NOT USED.	
1A2R5		RESISTOR: MIL type RW69V1R2J.	5-20
1A2R6 thru 1A2R13		NOT USED.	
1A2R14		RESISTOR: MIL type RW69V1R0J.	5-20
1A2R15 thru 1A2R27		NOT USED.	
1A2R28		RESISTOR: MIL type RW67V222J.	5-20
1A2A1		CIRCUIT CARD ASSEMBLY: 26 resistors, 19 capacitors, 12 transistors, 17 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4663.	5-20
1A2A1C1		CAPACITOR, FIXED, ELECTROLYTIC: 350 uf, 75 wvdc, 0.750 in. dia by 2.125 in. lg. Dwg CE119-350-75, 80183 P/N 39D357C075GV4.	5-20
1A2A1C2		CAPACITOR, FIXED, ELECTROLYTIC: 200 uf, -10% + 150% at 125 cps, 25°C, 15 wvdc, 0.437 in. dia by 1.625 in. lg. Dwg CE105-200-15. 14655 P/N NW200-15.	5-20
1A2A1C3		SAME AS 1A1A2C41.	5-20
1A2A1C4		CAPACITOR, FIXED, ELECTROLYTIC: 10 uf, -10% + 150% at 125 cps, 25°C wvdc, 0.312 in. dia by 0.750 in lg. Dwg CE105-10-25. 14655 P/N NLW10-25.	5-20
1A2A1C5		SAME AS 1A1A2C41.	5-20
1A2A1C6		SAME AS 1A1A1C5.	5-20
1A2A1C7		CAPACITOR, FIXED, ELECTROLYTIC: 1,000 uf, 25 wvdc, 0.813 in. dia by 2.250 in. lg. Dwg CE119-1000-25. 80183 P/N 39D108G025GL4.	5-20
1A2A1C8		SAME AS 1A2A1C2.	5-20
1A2A1C9		SAME AS 1A1A2C41.	5-20
1A2A1C10		SAME AS 1A2A1C4.	5-20
1A2A1C11		SAME AS 1A1A2C41.	5-20
1A2A1C12		CAPACITOR: MIL type CS13BC227K.	5-20
1A2A1C13		CAPACITOR, FIXED, ELECTROLYTIC: 500 uf, 50 wvdc, 0.875 in. dia by 2.125 in. lg. Dwg CE119-500-50. 80183 P/N 39D507G050HL4.	5-20
1A2A1C14		SAME AS 1A2A1C2.	5-20
1A2A1C15		SAME AS 1A1A2C41.	5-20
1A2A1C16		SAME AS 1A2A1C4.	5-20
1A2A1C17		SAME AS 1A1A2C41.	5-20
1A2A1C18		SAME AS 1A1A1C5.	5-20
1A2A1C19		CAPACITOR, FIXED, ELECTROLYTIC: 12 uf, 350 wvdc, 0.562 in. dia by 2.250 in. lg. Dwg CE119-12-350. 80183 P/N 39D126F350E14.	5-20
1A2A1CR1 thru 1A2A1CR6		NOT USED.	

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A1A3L1		COIL, RF, FIXED: 1,000 uh, Q=65 at 0.79 mc, 0.157 in. dia by 0.396 in. lg. 82679 P/N CL433-102.	5-16
1A1A3L2		SAME AS 1A1A3L1.	5-16
1A1A3L3		SAME AS 1A1A3L1.	5-16
1A1A3L4		SAME AS 1A1A3L1.	5-16
1A1A3Z1		SAME AS 1A1A2Z3.	5-16
1A1A3Z2		SAME AS 1A1A2Z3.	5-16
1A1A3Z3		SAME AS 1A1A2Z9.	5-16
1A1A3Z4		INTEGRATED CIRCUIT, POSITIVE NANDGAGE: 14 pins, plastic case; supply voltage 4.75 v to 5.25 v. 0.750 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW164.	5-16
1A1A3Z5		SAME AS 1A1A2Z3.	5-16
1A1A3Z6		INTEGRATED CIRCUIT, POSITIVE NANDGATE: 14 pins, plastic case; supply voltage 4.75 v to 5.25 v case; 0.770 in. lg by 0.250 in. wd by 0.200 in. hg. 82679 P/N NW134.	5-16
1A1A3Z7		SAME AS 1A1A3Z6.	5-16
1A1A3Z8		SAME AS 1A1A3Z6.	5-16
1A1A3Z10 thru 1A1A3Z15		SAME AS 1A1A1Z5.	5-16
1A1A3Z16		SAME AS 1A1A3Z6.	5-16
1A1A3Z17		SAME AS 1A1A3Z6.	5-16
1A1A4		CIRCUIT CARD ASSEMBLY: 6 resistors, 7 capacitors, 4 coils, 23 integrated circuits, 2 transistors, 1 semiconductor, plug-in item, p/o AX5003; 10.312 in. lg by 2.312 in. wd by 0.500 in. hg. 82679 P/N A4661.	5-18
1A1A4C1 thru 1A1A4C7		SAME AS 1A1A1C1.	5-18
1A1A4CR1		SAME AS 1A1A1CR1.	5-18
1A1A4L1 thru 1A1A4L4		SAME AS 1A1A2L1.	5-18
1A1A4Q1		TRANSISTOR: MIL type 2N2222.	5-18
1A1A4Q2		SAME AS 1A1A1Q7.	5-18
1A1A4R1		SAME AS 1A1A1R20.	5-18
1A1A4R2		SAME AS 1A1A1R20.	5-18
1A1A4R3		SAME AS 1A1A1R11.	5-18
1A1A4R4		SAME AS 1A1A1R11.	5-18
1A1A4R5		SAME AS 1A1A1R11.	5-18
1A1A4R6		SAME AS 1A1A1R4.	5-18
1A1A4Z1		SAME AS 1A1A3Z6.	5-18
1A1A4Z2		SAME AS 1A1A2Z3.	5-18
1A1A4Z3 thru 1A1A4Z12		SAME AS 1A1A3Z6.	5-18
1A1A4Z13 thru 1A1A4Z18		INTEGRATED CIRCUIT, QUADRUPLE BISTABLE LATCH: 16 pins, plastic case. 0.438 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW177.	5-18
1A1A4Z19 thru 1A1A4Z23		SAME AS 1A1A2Z5.	5-18
1A1A5		CIRCUIT CARD ASSEMBLY: Non-repairable item, p/o AX5003; 10.312 in. lg by 4.062 in. wd by 0.875 in. hg. 82679 P/N A4662.	

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A2		POWER SUPPLY ASSEMBLY: Circuit card assembly and shields. 82679 P/N AX5060.	5-20
1A2CR1		RECTIFIER, SEMICONDUCTOR DEVICE: 140 v input, dc output, 125 v res load, 200 v cap. load; plastic case. 0.900 in. lg by 0.670 in. hg by 0.260 in. wd. 82679 P/N DD144-6.	5-20
1A2CR2		NOT USED.	
1A2CR3		NOT USED.	
1A2CR4		SAME AS 1A2CR1.	5-20
1A2E1		SHIELD, CIRCUIT CARD ASSEMBLY: 82679 P/N MS5288.	5-20
1A2E2		SHIELD, CIRCUIT CARD ASSEMBLY: 82679 P/N MS5479.	5-20
1A2R1 thru 1A2R4		NOT USED.	
1A2R5		RESISTOR: MIL type RW69V1R2J.	5-20
1A2R6 thru 1A2R13		NOT USED.	
1A2R14		RESISTOR: MIL type RW69V1R0J.	5-20
1A2R15 thru 1A2R27		NOT USED.	
1A2R28		RESISTOR: MIL type RW67V222J.	5-20
1A2A1		CIRCUIT CARD ASSEMBLY: 26 resistors, 19 capacitors, 12 transistors, 17 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4663.	5-20
1A2A1C1		CAPACITOR, FIXED, ELECTROLYTIC: 350 uf, 75 wvdc, 0.750 in. dia by 2.125 in. lg. Dwg CE119-350-75, 80183 P/N 39D357C075GV4.	5-20
1A2A1C2		CAPACITOR, FIXED, ELECTROLYTIC: 200 uf, -10% + 150% at 125 cps, 25°C, 15 wvdc, 0.437 in. dia by 1.625 in. lg. Dwg CE105-200-15. 14655 P/N NW200-15.	5-20
1A2A1C3		SAME AS 1A1A2C41.	5-20
1A2A1C4		CAPACITOR, FIXED, ELECTROLYTIC: 10 uf, -10% + 150% at 125 cps, 25°C wvdc, 0.312 in. dia by 0.750 in lg. Dwg CE105-10-25. 14655 P/N NLW10-25.	5-20
1A2A1C5		SAME AS 1A1A2C41.	5-20
1A2A1C6		SAME AS 1A1A1C5.	5-20
1A2A1C7		CAPACITOR, FIXED, ELECTROLYTIC: 1,000 uf, 25 wvdc, 0.813 in. dia by 2.250 in. lg. Dwg CE119-1000-25. 80183 P/N 39D108G025GL4.	5-20
1A2A1C8		SAME AS 1A2A1C2.	5-20
1A2A1C9		SAME AS 1A1A2C41.	5-20
1A2A1C10		SAME AS 1A2A1C4.	5-20
1A2A1C11		SAME AS 1A1A2C41.	5-20
1A2A1C12		CAPACITOR: MIL type CS13BC227K.	5-20
1A2A1C13		CAPACITOR, FIXED, ELECTROLYTIC: 500 uf, 50 wvdc, 0.875 in. dia by 2.125 in. lg. Dwg CE119-500-50. 80183 P/N 39D507G050HL4.	5-20
1A2A1C14		SAME AS 1A2A1C2.	5-20
1A2A1C15		SAME AS 1A1A2C41.	5-20
1A2A1C16		SAME AS 1A2A1C4.	5-20
1A2A1C17		SAME AS 1A1A2C41.	5-20
1A2A1C18		SAME AS 1A1A1C5.	5-20
1A2A1C19		CAPACITOR, FIXED, ELECTROLYTIC: 12 uf, 350 wvdc, 0.562 in. dia by 2.250 in. lg. Dwg CE119-12-350. 80183 P/N 39D126F350E14.	5-20
1A2A1CR1 thru 1A2A1CR6		NOT USED.	

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A2A1CR7		SEMICONDUCTOR DEVICE: MIL type 1N649.	5-20
1A2A1CR8		NOT USED.	
1A2A1CR9		NOT USED.	
1A2A1CR10		SAME AS 1A2A1CR7.	5-20
1A2A1CR11 thru 1A2A1CR14		SAME AS 1A1A1CR1.	5-20
1A2A1Q1		TRANSISTOR: MIL type 2N4036.	5-20
1A2A1Q2		TRANSISTOR: MIL type 2N2631.	5-20
1A2A1Q3		SAME AS 1A1A1Q7.	5-20
1A2A1Q4		TRANSISTOR: MIL type 2N1711.	5-20
1A2A1Q5		SAME AS 1A2A1Q1.	5-20
1A2A1Q6		SAME AS 1A2A1Q2.	5-20
1A2A1Q7		SAME AS 1A1A1Q7.	5-20
1A2A1Q8		SAME AS 1A1A1Q7.	5-20
1A2A1Q9		SAME AS 1A2A1Q2.	5-20
1A2A1Q6		SAME AS 1A2A1Q1.	5-20
1A2A1Q11		SAME AS 1A1A12Q3.	5-20
1A2A1Q12		SAME AS 1A2A1Q1.	5-20
1A2A1R1		RESISTOR: MIL type RC20GF682J.	5-20
1A2A1R2		SAME AS 1A1A1R9.	5-20
1A2A1R3		SAME AS 1A1A1R8.	5-20
1A2A1R4		RESISTOR, VARIABLE, WIRE WOUND: 100 ohms, ±20% tol; 0.250 in. dia by 0.250 in hg. P. C. type mounting pins. Dwg RV126-61P101, 80740 P/N 61P101.	5-20
1A2A1R5		NOT USED	
1A2A1R6		RESISTOR: MIL type RC07GF162J.	5-20
1A2A1R7		SAME AS 1A1A1R13.	5-20
1A2A1R9		SAME AS 1A2A1R6.	5-20
1A2A1R10		SAME AS 1A2A1R6,	5-20
1A2A1R11		SAME AS 1A1A1R8.	5-20
1A2A1R12		SAME AS 1A1A1R6.	5-20
1A2A1R13		SAME AS 1A2A1R4.	5-20
1A2A1R14		NOT USED.	
1A2A1R15		SAME AS 1A1A1R6.	5-20
1A2A1R16		SAME AS 1A1A1R6.	5-20
1A2A1R17		SAME AS 1A2A1R4.	5-20
1A2A1R18		RESISTOR: MIL type RC07GF2R7J.	5-20
1A2A1R19		RESISTOR: MIL type RC20GF472J.	5-20
1A2A1R20		SAME AS 1A1A2R7.	5-20
1A2A1R21		SAME AS 1A1A1R8.	5-20
1A2A1R22		SAME AS 1A2A1R8.	5-20
1A2A1R23		RESISTOR: MIL type RC07GF150J.	5-20
1A2A1R24		SAME AS 1A1A1R22.	5-20
1A2A1R25		SAME AS 1A1A1R21.	5-20
1A2A1R26		RESISTOR, VARIABLE, WIRE WOUND: 5,000 ohms, ±20% tol; 0.250 in. dia by 0.250 in. hg. P. C. type mounting pins. Dwg RV126-61P502. 80740 P/N 61P502.	5-20
1A2A1R27		RESISTOR: MIL type RC07GF682J.	5-20
1A2A1R28		NOT USED.	
1A2A1R29		RESISTOR: MIL type RC20GF224J.	5-20
1A2A1VR1		NOT USED.	
1A2A1VR2		SEMICONDUCTOR DEVICE: MIL type 1N4370A.	5-20
1A2A1VR3		SEMICONDUCTOR DEVICE: MIL type 1N754A.	5-20
1A2A1VR4		NOT USED.	
1A2A1R7		SAME AS 1A1A1R13	5-20

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A2A1VR5		SAME AS 1A2A1VR2.	5-20
1A2A1VR6		SAME AS 1A2A1VR2.	5-20
1A2A1VR7		NOT USED.	
1A2A1VR8		SAME AS 1A2A1VR2.	5-20
1A2A1VR9		SAME AS 1A2A1VR3.	5-20
1A3		CIRCUIT CARD ASSEMBLY W/SHIELDS: 82679 P/N AX5061.	5-22
1A3E1		SHIELD, CIRCUIT CARD ASSEMBLY: 82679 P/N 5288.	5-22
1A3E2		SHIELD, CIRCUIT CARD ASSEMBLY: 82679 P/N MS5289.	5-22
1A3A1		CIRCUIT CARD ASSEMBLY: 78 resistors, 62 capacitors, 8 coils, 2 transformers, 1 oscillator, 1 filter, 3 integrated circuits, 3 relays, 12 transistors, 19 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4664.	5-22
1A3A1C1		SAME AS 1A1A2C41.	5-22
1A3A1C2		SAME AS 1A1A2C41.	5-22
1A3A1C3		CAPACITOR, FIXED, MICA: 22 uuf, ±5% tol, 500 wvdc, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111E220J5S.	5-22
1A3A1C4		SAME AS 1A1A2C41.	5-22
1A3A1C5		SAME AS 1A1A1C17.	5-22
1A3A1C6		SAME AS 1A1A2C41.	5-22
1A3A1C7		CAPACITOR, FIXED, MICA: 2,700 uuf, ±5% tol, 500 wvdc, 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM 112F272J5S.	5-22
1A3A1C8		SAME AS 1A1A2C41.	5-22
1A3A1C9		SAME AS 1A1A1C17.	5-22
1A3A1C10		SAME AS 1A1A2C41.	5-22
1A3A1C11		SAME AS 1A3A1C7.	5-22
1A3A1C12		SAME AS 1A1A2C41.	5-22
1A3A1C13		SAME AS 1A1A1C17.	5-22
1A3A1C14		SAME AS 1A1A2C41.	5-22
1A3A1C15		SAME AS 1A3A1C7.	5-22
1A3A1C16		SAME AS 1A1A2C41.	5-22
1A3A1C17		SAME AS 1A1A1C17.	5-22
1A3A1C18		SAME AS 1A1A2C41.	5-22
1A3A1C19		SAME AS 1A3A1C7.	5-22
1A3A1C20 thru 1A3A1C26		SAME AS 1A1A2C41.	5-22
1A3A1C27		CAPACITOR, FIXED, MICA: 3,900 uuf, ±1% tol, 500 wvdc. 0.680 in. lg by 0.540 in. wd by 0.270 in. thk. 82679 P/N CM112F392F5S.	5-22
1A3A1C28 thru 1A3A1C31		SAME AS 1A1A2C41.	5-22
1A3A1C32		CAPACITOR, FIXED, MICA: 470 uuf, ±2% tol, 500 wvdc, 0.440 in. wd by 0.170 in. thk. 82679 P/N CM111E471G5S.	5-22
1A3A1C33		CAPACITOR, FIXED, CERAMIC: 10,000 uuf, gmv, 600 wvdc, 0.600 in. dia by 0.156 in. thk by 0.375 in. lead spacing. 82679 P/N CC100-16.	5-22
1A3A1C34		SAME AS 1A3A1C3.	5-22
1A3A1C35		SAME AS 1A1A2C41.	5-22
1A3A1C36		CAPACITOR, FIXED, MICA: 3,300 uuf, ±2% tol, 500 wvdc, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F332G5S.	5-22
1A3A1C37		SAME AS 1A1A2C41.	5-22
1A3A1C38		SAME AS 1A1A2C39.	5-22
1A3A1C39		SAME AS 1A1A2C41.	5-22
1A3A1C40		SAME AS 1A1A2C41.	5-22

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A3A1C41		SAME AS 1A1A2C39.	5-22
1A3A1C42		SAME AS 1A1A2C41.	5-22
1A3A1C43		SAME AS 1A1A2C41.	5-22
1A3A1C44		SAME AS 1A3A1C36.	5-22
1A3A1C45		SAME AS 1A1A2C41.	5-22
1A3A1C46		SAME AS 1A1A2C41.	5-22
1A3A1C47		SAME AS 1A3A1C32.	5-22
1A3A1C48		SAME AS 1A3A1C3.	5-22
1A3A1C49		SAME AS 1A3A1C33.	5-22
1A3A1C50		SAME AS 1A1A2C41.	5-22
1A3A1C51		SAME AS 1A1A2C41.	5-22
1A3A1C52		SAME AS 1A1A2C41.	5-22
1A3A1C53		SAME AS 1A2A1C12.	5-22
1A3A1C54		SAME AS 1A2A1C12.	5-22
1A3A1C55 thru 1A3A1C58		SAME AS 1A1A2C41.	5-22
1A3A1C59		SAME AS 1A3A1C32.	5-22
1A3A1C60		SAME AS 1A1A2C41.	5-22
1A3A1C61		SAME AS 1A1A2C41.	5-22
1A3A1C62		CAPACITOR: MIL type CL33CE200MN3.	5-22
1A3A1CR1 thru 1A3A1CR12		SAME AS 1A1A1CR1.	5-22
1A3A1CR13		NOT USED.	
1A3A1CR14		NOT USED.	
1A3A1CR15		NOT USED.	
1A3A1CR16		SAME AS 1A1A1CR1.	5-22
1A3A1CR17		SAME AS 1A1A1CR1.	5-22
1A3A1CR18		SAME AS 1A1A1CR1.	5-22
1A3A1FL1		FILTER, BANDPASS: 250 kc nom center freq; output imp 510 ohms; hermetically sealed steel case, 3.480 in. lg by 0.660 in. hg by 1.100 in. wd. 82679 P/N FX256.	5-22
1A3A1K1		RELAY, ARMATURE, DC: Dpdt, 400 milliwatt sensitivity; coil data; 6.0 milliamps, 2,500 ohms; operate time; 15 milliseconds; release time; 10 milliseconds; hermetically sealed metal case 1.281 in. hg by 0.800 in. wd by 0.400 in. thk; bracket mounted. 82679 P/N RL178-U6D4R0.	5-22
1A3A1K1		SAME AS 1A3A1K1.	5-22
1A3A1K2		SAME AS 1A3A1K1.	5-22
1A3A1L1		SAME AS 1A1A2L11.	5-22
1A3A1L2 thru 1A3A1L5		COIL, RF, FIXED: 150 uh, Q=50 at .79 mc, 0.400 in. dia by 0.500 in. lg. Dwg CL430-4. 72259 P/N VIV-150.0.	5-22
1A3A1L6		COIL, RF, FIXED: 4,700 uh, Q=44 at 0.25 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-472.	5-22
1A3A1L7		SAME AS 1A3A1L6.	5-22
1A3A1L8		SAME AS 1A1A2L11.	5-22
1A3A1Q1 thru 1A3A1Q4		TRANSISTOR: MIL type 2N4221.	5-22
1A3A1Q5 thru 1A3A1Q9		SAME AS 1A1A1Q7.	5-22
1A3A1Q10		SAME AS 1A2A1Q4.	5-22
1A3A1Q11		SAME AS 1A1A2Q3.	5-22

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A3A1Q12		TRANSISTOR: MIL type 3N128.	5-22
1A3A1R1		RESISTOR: MIL type RC02GF681.	5-22
1A3A1R2		SAME AS 1A3A1R1.	5-22
1A3A1R3		RESISTOR, VARIABLE, WIRE WOUND: 500 ohms, ±50% tol, 200 wvdc. 0. 250 in. dia by 0. 250 in. hg. 82679 P/N RV124-1-501.	5-22
1A3A1R4		SAME AS 1R3.	5-22
1A3A1R5		RESISTOR: MIL type RC07GF474J.	5-22
1A3A1R6		SAME AS 1A1A1R13.	5-22
1A3A1R7		RESISTOR: MIL type RC07GF473J.	5-22
1A3A1R8		SAME AS 1A1A1R13.	5-22
1A3A1R9		SAME AS 1A1A1R13.	5-22
1A3A1R10		SAME AS 1A3A1R5.	5-22
1A3A1R11		SAME AS 1R3.	5-22
1A3A1R12		SAME AS 1A3A1R7.	5-22
1A3A1R13		SAME AS 1A1A1R2.	5-22
1A3A1R14		SAME AS 1A1A1R13.	5-22
1A3A1R15		SAME AS 1R3.	5-22
1A3A1R16		SAME AS 1A3A1R5.	5-22
1A3A1R17		SAME AS 1A1A1R13.	5-22
1A3A1R18		SAME AS 1A3A1R7.	5-22
1A3A1R19		SAME AS 1A1A1R2.	5-22
1A3A1R20		SAME AS 1A1A1R13.	5-22
1A3A1R21		SAME AS 1A3A1R5.	5-22
1A3A1R22		SAME AS 1R3.	5-22
1A3A1R23		SAME AS 1A1A1R3.	5-22
1A3A1R24		SAME AS 1A1A1R2.	5-22
1A3A1R25		SAME AS 1A1A1R13.	5-22
1A3A1R26		SAME AS 1A1A1R13.	5-22
1A3A1R27		SAME AS 1A1A2R7.	5-22
1A3A1R28		SAME AS 1A1A1R11.	5-22
1A3A1R29		SAME AS 1A1A1R11.	5-22
1A3A1R30		SAME AS 1A1A1R22.	5-22
1A3A1R31		SAME AS 1A1A2R7.	5-22
1A3A1R32		SAME AS 1A1A1R13.	5-22
1A3A1R33		SAME AS 1A1A1R4.	5-22
1A3A1R34		RESISTOR, VARIABLE, WIRE WOUND: 5, 000 ohms ±5% tol. 0. 500 in. by 0. 500 in. by 0. 220 in.; gold plated nickel 0. 028 in. dia p. c. pins. Dwg RV125-P502. 80294 P/N 3250P502.	5-22
1A3A1R35		SAME AS 1A1A1R3.	5-22
1A3A1R36		SAME AS 1A1A1R3.	5-22
1A3A1R37		SAME AS 1A1A1R20.	5-22
1A3A1R38		SAME AS 1A1A1R20.	5-22
1A3A1R39		SAME AS 1A1A1R3.	5-22
1A3A1R40		SAME AS 1A2A1R6.	5-22
1A3A1R41		SAME AS 1A1A1R3.	5-22
1A3A1R42		SAME AS 1A1A1R3.	5-22
1A3A1R43		SAME AS 1A1A1R20.	5-22
1A3A1R44		RESISTOR, VARIABLE, WIRE WOUND: 10, 000 ohms, ±30% tol, 200 wvdc, 0. 250 in. dia by 0. 250 in. hg. 82679 P/N RV124-1-103.	5-22
1A3A1R45		SAME AS 1A1A1R3.	5-22
1A3A1R46		SAME AS 1A1A1R3.	5-22
1A3A1R47		SAME AS 1A1A1R11.	5-22
1A3A1R48		SAME AS 1A1A2R7.	5-22
1A3A1R49		SAME AS 1A1A1R13.	5-22
1A3A1R50		SAME AS 1A1A1R20.	5-22
1A3A1R51		SAME AS 1A1A1R3.	5-22
1A3A1R52		SAME AS 1A1A1R3.	5-22

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A3A1R53		SAME AS 1A1A1R13.	5-22
1A3A1R54		SAME AS 1A1A1R17.	5-22
1A3A1R55		SAME AS 1A1A2R7.	5-22
1A3A1R56		SAME AS 1A1A1R13.	5-22
1A3A1R57		SAME AS 1A3A1R44.	5-22
1A3A1R58		SAME AS 1A2A1R6.	5-22
1A3A1R59		SAME AS 1A1A1R11.	5-22
1A3A1R60		SAME AS 1A1A1R3.	5-22
1A3A1R61		SAME AS 1A1A1R17.	5-22
1A3A1R62		SAME AS 1A3A1R7.	5-22
1A3A1R63		SAME AS 1A1A1R20.	5-22
1A3A1R64		RESISTOR: MIL type RC07GF223J.	5-22
1A3A1R65		SAME AS 1A2A1R6.	5-22
1A3A1R66		SAME AS 1A3A1R7.	5-22
1A3A1R67		SAME AS 1A3A1R7.	5-22
1A3A1R68		SAME AS 1A3A1R6.	5-22
1A3A1R69		SAME AS 1A1A1R2.	5-22
1A3A1R70		SAME AS 1A1A1R2.	5-22
1A3A1R71		SAME AS 1A3A1R7.	5-22
1A3A1R72		SAME AS 1A1A1R11.	5-22
1A3A1R73		SAME AS 1A3A1R7.	5-22
1A3A1R74		SAME AS 1A3A1R7.	5-22
1A3A1R75		SAME AS 1A2A1R6.	5-22
1A3A1R76		SAME AS 1A1A1R3.	5-22
1A3A1R77		RESISTOR: MIL type RC07GF333J.	5-22
1A3A1R78		SAME AS 1A3A1R44.	5-22
1A3A1T1		TRANSFORMER, RADIO FREQUENCY, ADJUSTABLE: 50 min Q at 795 kc test frequency; metal case 0.614 in. dia by 0.532 in. hg. 82679 P/N TT300.	5-22
1A3A1T2		SAME AS 1A3A1T1.	5-22
1A3A1VR1		SEMICONDUCTOR DEVICE: MIL type 1N756A.	5-22
1A3A1VR2		SAME AS 1A3A1VR1.	5-22
1A3A1VR3		SEMICONDUCTOR DEVICE: MIL type 1N758A.	5-22
1A3A1VR4		SAME AS 1A3A1VR3.	5-22
1A3A1Z1		INTEGRATED CIRCUIT, OPERATIONAL AMPLIFIER: 8 pins, metal case; supply voltage ±18 v, 0.375 in. dia by 0.187 in. hg. 82679 P/N NW156.	5-22
1A3A1Z2		SAME AS 1A3A1Z1.	5-22
1A3A1Z3		SAME AS 1A3A1Z1.	5-22
1A3A1Z4		OSCILLATOR, RADIO FREQUENCY: 250 kc freq, +24 vdc + 5%, 20 ma osc supply; output, 1 v rms into 500 ohm load; steel case, stud mtd. 3,000 in. lg by 1.600 in. wd by 0.750 in. hg. 82679 P/N A0124.	5-22
1A4		NOT USED	
1A5		CIRCUIT CARD ASSEMBLY W/SHIELDS. 82679 P/N AX5062.	5-24
1A5E1		SAME AS 1A2E1.	5-24
1A5E2		SAME AS 1A3E2.	5-24
1A5A1		CIRCUIT CARD ASSEMBLY: 81 resistors, 62 capacitors, 8 coils, 4 transformers, 1 relay, 2 integrated circuits, 18 transistors, 11 semiconductors, plug-in item; 10.031 in. by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4668.	5-24

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A5A1C2		CAPACITOR: MIL type CS13BF106K.	5-24
1A5A1C3 thru 1A5A1C7		SAME AS 1A1A2C41.	5-24
1A5A1C8		CAPACITOR, FIXED, MICA: 2,700 uuf, ±5% tol, 300 wvdc. 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM112F272J3S.	5-24
1A5A1C9		SAME AS 1A1A2C41.	5-24
1A5A1C10		SAME AS 1A1A2C41.	5-24
1A5A1C11		CAPACITOR, FIXED, MICA: 6,800 uuf, ±5% tol, 100 wvdc. 0.690 in. lg by 0.560 in. wd by 0.320 in. thk. 82679 P/N CM112F682J1S.	5-24
1A5A1C12		SAME AS 1A1A2C41.	5-24
1A5A1C13		SAME AS 1A1A2C41.	5-24
1A5A1C14		SAME AS 1A5A1C11.	5-24
1A5A1C15		SAME AS 1A1A2C41.	5-24
1A5A1C16		SAME AS 1A1A2C41.	5-24
1A5A1C17		CAPACITOR, FIXED, MICA: 10,000 uuf, ±1% tol, 100 wvdc. 0.790 in. lg by 0.570 in. wd by 0.340 in. thk. 82679 P/N CM112F103F1S.	5-24
1A5A1C18		SAME AS 1A5A1C17.	5-24
1A5A1C19		SAME AS 1A1A2C12.	5-24
1A5A1C20		SAME AS 1A3A1C36.	5-24
1A5A1C21		SAME AS 1A1A2C41.	5-24
1A5A1C22		CAPACITOR, FIXED, MICA: 4,700 uug, ±5% tol, 500 wvdc. 0.665 in. lg, 0.625 in. wd, 0.240 in. thk. 82679 P/N CM112F472J5S.	5-24
1A5A1C23		SAME AS 1A1A2C12.	5-24
1A5A1C24		SAME AS 1A3A1C33.	5-24
1A5A1C25		SAME AS 1A5A1C2.	5-24
1A5A1C26		SAME AS 1A1A2C41.	5-24
1A5A1C27		SAME AS 1A5A1C11.	5-24
1A5A1C28		SAME AS 1A1A2C41.	5-24
1A5A1C29		SAME AS 1A1A2C41.	5-24
1A5A1C30		CAPACITOR, FIXED, MICA: 8,200 uuf, ±1% tol, 100 wvdc. 0.790 in. lg by 0.570 in. wd by 0.340 in. thk. 82679 P/N CM112F822F1S.	5-24
1A5A1C31		SAME AS 1A5A1C30.	5-24
1A5A1C32		SAME AS 1A1A2C41.	5-24
1A5A1C33		SAME AS 1A1A2C41.	5-24
1A5A1C34		SAME AS 1A5A1C11.	5-24
1A5A1C35 thru 1A5A1C38		SAME AS 1A1A2C41.	5-24
1A5A1C39		SAME AS 1A3A1C33.	5-24
1A5A1C40		SAME AS 1A3A1C33.	5-24
1A5A1C41		SAME AS 1A1A2C41.	5-24
1A5A1C42		SAME AS 1A1A2C41.	5-24
1A5A1C43		SAME AS 1A5A1C17.	5-24
1A5A1C44		SAME AS 1A5A1C2.	5-24
1A5A1C45		SAME AS 1A1A2C41.	5-24
1A5A1C46		SAME AS 1A1A2C41.	5-24
1A5A1C47		SAME AS 1A5A1C11.	5-24
1A5A1C48		SAME AS 1A1A2C41.	5-24
1A5A1C49		SAME AS 1A1A2C41.	5-24
1A5A1C50		SAME AS 1A5A1C17.	5-24
1A5A1C51		SAME AS 1A3A1C36.	5-24
1A5A1C52 thru 1A5A1C56		SAME AS 1A1A2C41.	5-24
1A5A1C57		SAME AS 1A5A1C2.	5-24
1A5A1C58		NOT USED.	

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A5A1C59 thru 1A5A1C62		SAME AS 1A1A2C41.	5-24
1A5A1C63		SAME AS 1A1A1C17.	5-24
1A5A1CR1 thru 1A5A1CR7		SAME AS 1A1A1CR1.	5-24
1A5A1K1		SAME AS 1A3A1K1.	5-24
1A5A1L1		SAME AS 1A1A1L4.	5-24
1A5A1L2		NOT USED.	
1A5A1L3		SAME AS 1A1A3L1.	5-24
1A5A1L4		SAME AS 1A1A3L1.	5-24
1A5A1L5		SAME AS 1A1A1L1.	5-24
1A5A1L6		COIL, RF, FIXED: 680 uh, Q=60 at 0.79 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-681.	5-24
1A5A1L7		SAME AS 1A1A1L4.	5-24
1A5A1L8		SAME AS 1A1A3L1.	5-24
1A5A1L9		SAME AS 1A1A1L4.	5-24
1A5A1Q1 thru 1A5A1Q15		SAME AS 1A1A1Q7.	5-24
1A5A1Q16		SAME AS 1A2A1Q4.	5-24
1A5A1Q17		SAME AS 1A2A1Q4.	5-24
1A5A1Q18		SAME AS 1A1A1Q7.	5-24
1A5A1R1		SAME AS 1A1A1R3.	5-24
1A5A1R2		SAME AS 1A1A1R21.	5-24
1A5A1R3		SAME AS 1A1A1R22.	5-24
1A5A1R4		SAME AS 1A3A1R77.	5-24
1A5A1R5		SAME AS 1A2A1R27.	5-24
1A5A1R6		SAME AS 1A1A1R2.	5-24
1A5A1R7		SAME AS 1A3A1R44.	5-24
1A5A1R8		SAME AS 1A1A1R2.	5-24
1A5A1R9		SAME AS 1A2A1R27.	5-24
1A5A1R10		SAME AS 1A1A1R21.	5-24
1A5A1R11		SAME AS 1A2A1R6.	5-24
1A5A1R12		SAME AS 1A1A1R5.	5-24
1A5A1R13		SAME AS 1A2A1R6.	5-24
1A5A1R14		SAME AS 1A1A1R21.	5-24
1A5A1R15		SAME AS 1A1A1R3.	5-24
1A5A1R16		SAME AS 1A2A1R6.	5-24
1A5A1R17		SAME AS 1A1A1R5.	5-24
1A5A1R18		SAME AS 1A1A1R13.	5-24
1A5A1R19		SAME AS 1A1A2R7.	5-24
1A5A1R20		SAME AS 1A3A1R44.	5-24
1A5A1R21		RESISTOR: MIL type RC07GF272J.	5-24
1A5A1R22		SAME AS 1A1A1R20.	5-24
1A5A1R23		SAME AS 1A3A1R77.	5-24
1A5A1R24		SAME AS 1A2A1R6.	5-24
1A5A1R25		SAME AS 1A3A1R77.	5-24
1A5A1R26		RESISTOR: MIL type RC07GF683J.	5-24
1A5A1R27		SAME AS 1A2A1R6.	5-24
1A5A1R28		SAME AS 1A2A1R6.	5-24
1A5A1R29		SAME AS 1A3A1R5.	5-24
1A5A1R30		SAME AS 1A1A1R22.	5-24
1A5A1R31		SAME AS 1A1A1R21.	5-24
1A5A1R32		SAME AS 1A1A1R13.	5-24
1A5A1R33		SAME AS 1A1A1R6.	5-24

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A5A1R34		SAME AS 1A1A1R22.	5-24
1A5A1R35		SAME AS 1A1A1R3.	5-24
1A5A1R36		SAME AS 1A1A1R9.	5-24
1A5A1R37		NOT USED.	
1A5A1R38		SAME AS 1A1A1R9.	5-24
1A5A1R39		SAME AS 1A1A1R21.	5-24
1A5A1R40		SAME AS 1A1A1R3.	5-24
1A5A1R41		SAME AS 1A1A1R6.	5-24
1A5A1R42		SAME AS 1A1A1R22.	5-24
1A5A1R43		SAME AS 1A1A1R13.	5-24
1A5A1R44		SAME AS 1A1A1R22.	5-24
1A5A1R45		SAME AS 1A1A1R3.	5-24
1A5A1R46		SAME AS 1A1A1R21.	5-24
1A5A1R47		SAME AS 1A1A1R9.	5-24
1A5A1R48		SAME AS 1A2A1R6.	5-24
1A5A1R49		SAME AS 1A1A1R21.	5-24
1A5A1R50		SAME AS 1A1A1R13.	5-24
1A5A1R51		SAME AS 1A1A2R7.	5-24
1A5A1R52		SAME AS 1A1A1R22.	5-24
1A5A1R53		SAME AS 1A1A1R5.	5-24
1A5A1R54		SAME AS 1A2A1R6.	5-24
1A5A1R55		SAME AS 1A2A1R6.	5-24
1A5A1R56		RESISTOR: MIL type RC52GF471J.	5-24
1A5A1R57		SAME AS 1A1A1R20.	5-24
1A5A1R58		SAME AS 1A1A2R7.	5-24
1A5A1R59		SAME AS 1A1A1R5.	5-24
1A5A1R60		SAME AS 1A2A1R6.	5-24
1A5A1R61		SAME AS 1A3A1R44.	5-24
1A5A1R62		SAME AS 1A1A1R21.	5-24
1A5A1R63		SAME AS 1A5A1R26.	5-24
1A5A1R64		RESISTOR, VARIABLE, WIRE WOUND: 50,000 ohms, ±30% tol, 200 wvdc. 0.250 in. dia by 0.250 in. hg. 82679 P/N RV124-1-503.	5-24
1A5A1R65		SAME AS 1A1A1R17.	5-24
1A5A1R66		SAME AS 1A1A1R17.	5-24
1A5A1R67		SAME AS 1A1A1R21.	5-24
1A5A1R68		SAME AS 1A1A1R4.	5-24
1A5A1R69		SAME AS 1A5A1R26.	5-24
1A5A1R70		SAME AS 1A3A1R7.	5-24
1A5A1R71		SAME AS 1A1A1R13.	5-24
1A5A1R72		SAME AS 1A3A1R7.	5-24
1A5A1R73		SAME AS 1A1A1R13.	5-24
1A5A1R74		SAME AS 1A1A1R4.	5-24
A15A1R75		SAME AS 1A1A1R20.	5-24
1A5A1R76		SAME AS 1A1A1R13.	5-24
1A5A1R77		SAME AS 1A1A1R13.	5-24
1A5A1R78		SAME AS 1A1A1R17.	5-24
1A5A1R79		RESISTOR: MIL type RC07GF223J.	5-24
1A5A1R80		RESISTOR, VARIABLE, WIRE WOUND: 1,000 ohms, ±30± tol, 200 wvdc. 0.250 in. dia by 0.250 in. hg. 82679 P/N RV124-1-102.	5-24
1A5A1R81		SAME AS 1A1A1R20.	5-24
1A5A1R82		RESISTOR: MIL type RC20GF100J.	5-24
1A5A1T1		TRANSFORMER, PULSE: 2,500 uh, ±20% tol, wire leads. 0.500 in. lg by 0.350 in. wd by 0.250 in. hg. Dwg TF374-5. 90095 P/N 21PHA	5-24
1A5A1T2		SAME AS 1A5A1T1.	5-24
1A5A1T3		TRANSFORMER, RF, ADJUSTABLE: Q=100 at 252.5 kc test frequency. 0.614 in. dia by 0.532 in. hg. 82679 P/N TT299.	5-24
1A5A1T4		SAME AS 1A5A1T3.	5-24

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A5A1VR1		SEMICONDUCTOR DEVICE: MIL type 1N751A.	5-24
1A5A1VR2		SAME AS 1A5A1VR1.	5-24
1A5A1VR3		SAME AS 1A3A1VR3.	5-24
1A5A1VR4		SAME AS 1A3A1VR3.	5-24
1A5A1Z1		SAME AS 1A3A1Z1.	5-24
1A5A1Z2		INTEGRATED CIRCUIT, 4 BIT BINARY COUNTER: Supply voltage 4.5 to 5.5 v, 14 pins, plastic case. 6.750 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW174.	5-24
1A6		CIRCUIT CARD ASSEMBLY W/SHIELDS: 82679 P/N AX5063.	5-26
1A6E1		SAME AS 1A2E1.	5-26
1A6E2		SAME AS 1A3E2.	5-26
1A6A1		CIRCUIT CARD ASSEMBLY: 117 resistors, 127 capacitors, 32 coils, 3 crystals, 6 integrated circuits, 31 transistors, 18 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4669.	5-26
1A6A1C1		SAME AS 1A1A2C41.	5-26
1A6A1C2		CAPACITOR: MIL type CS13BF476K.	5-26
1A6A1C3		SAME AS 1A1A2C41.	5-26
1A6A1C4		SAME AS 1A6A1C2.	5-26
1A6A1C5		SAME AS 1A1A2C41.	5-26
1A6A1C6		SAME AS 1A6A1C2.	5-26
1A6A1C7		SAME AS 1A1A2C41.	5-26
1A6A1C8		SAME AS 1A1A2C41.	5-26
1A6A1C9		CAPACITOR, VARIABLE, CERAMIC: 9-35 uuf, 100 wvdc, min Q=500 at mc. 0.375 in. dia by 0.375 in. hg. 82679 P/N CV112-8.	5-26
1A6A1C10		SAME AS 1A1A1C1.	5-26
1A6A1C11		SAME AS 1A1A1C1.	5-26
1A6A1C12		CAPACITOR, FIXED, MICA: 15 uuf, ±5% tol, 500 wvdc, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111C150J5S.	5-26
1A6A1C13		SAME AS 1A1A2C11.	5-26
1A6A1C14		CAPACITOR, FIXED, MICA: 220 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F221G5S.	5-26
1A6A1C15 thru 1A6A1C18		SAME AS 1A1A1C1.	5-26
1A6A1C19		CAPACITOR, FIXED, MICA: 200 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F201G5S.	5-26
1A6A1C20		SAME AS 1A1A1C1.	5-26
1A6A1C21		SAME AS 1A1A1C1.	5-26
1A6A1C22		SAME AS 1A1A1C1.	5-26
1A6A1C23		SAME AS 1A6A1C19.	5-26
1A6A1C24		CAPACITOR, FIXED, MICA: 10 uuf, ±5% tol, 300 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111C100J3S.	5-26
1A6A1C25		SAME AS 1A6A1C19.	5-26
1A6A1C26		CAPACITOR, FIXED, MICA: 10 uuf, ±5% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111C100J5S.	5-26
1A6A1C27		SAME AS 1A6A1C19.	5-26
1A6A1C28		SAME AS 1A1A1C1.	5-26
1A6A1C29		SAME AS 1A1A1C1.	5-26
1A6A1C30		SAME AS 1A1A2C41.	5-26
1A6A1C31		SAME AS 1A1A2C41.	5-26
1A6A1C32		SAME AS 1A6A1C9.	5-26

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A6A1C33		SAME AS 1A1A1C1.	5-26
1A6A1C34		SAME AS 1A1A1C1.	5-26
1A6A1C35		CAPACITOR, FIXED, MICA: 27 uuf, ±10% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. hg. 82679 P/N CM111E270K5S.	5-26
1A6A1C36		SAME AS 1A1A2C11.	5-26
1A6A1C37		SAME AS 1A1A1C7.	5-26
1A6A1C38 thru 1A6A1C41		SAME AS 1A1A1C1.	5-26
1A6A1C42		CAPACITOR, FIXED, MICA: 69 uuf, ±1% tol, 300 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111E680F5S.	5-26
1A6A1C43		SAME AS 1A1A1C1.	5-26
1A6A1C44		SAME AS 1A1A1C1.	5-26
1A6A1C45		SAME AS 1A1A1C1.	5-26
1A6A1C46		SAME AS 1A1A2C38.	5-26
1A6A1C47		SAME AS 1A6A1C26.	5-26
1A6A1C48		SAME AS 1A1A2C38.	5-26
1A6A1C49		SAME AS 1A6A1C26.	5-26
1A6A1C50		SAME AS 1A1A2C38.	5-26
1A6A1C51		SAME AS 1A1A1C1.	5-26
1A6A1C52		SAME AS 1A1A1C1.	5-26
1A6A1C53		SAME AS 1A1A2C41.	5-26
1A6A1C54		SAME AS 1A1A2C41.	5-26
1A6A1C55		CAPACITOR, FIXED, MICA: 2,700 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F272G5S.	5-26
1A6A1C56		SAME AS 1A1A2C41.	5-26
1A6A1C57		SAME AS 1A1A2C41.	5-26
1A6A1C58		SAME AS 1A1A2C41.	5-26
1A6A1C59		SAME AS 1A1A1C27.	5-26
1A6A1C60		SAME AS 1A1A1C1.	5-26
1A6A1C61		SAME AS 1A1A1C1.	5-26
1A6A1C62		CAPACITOR, FIXED, MICA: 910 pf, ±2% tol, 500 wvdc. 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM111F911G5S.	5-26
1A6A1C63		SAME AS 1A6A1C26.	5-26
1A6A1C64		SAME AS 1A6A1C62.	5-26
1A6A1C65		SAME AS 1A1A1C1.	5-26
1A6A1C66		SAME AS 1A6A1C26.	5-26
1A6A1C67		SAME AS 1A1A1C1.	5-26
1A6A1C68		SAME AS 1A1A1C1.	5-26
1A6A1C69		CAPACITOR, FIXED, MICA: 510 uuf, ±2% tol, 500 wvdc, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F511G5S.	5-26
1A6A1C70		SAME AS 1A1A1C1.	5-26
1A6A1C71		SAME AS 1A1A1C1.	5-26
1A6A1C72		SAME AS 1A1A1C1.	5-26
1A6A1C73		SAME AS 1A6A1C69.	5-26
1A6A1C74		CAPACITOR, FIXED, MICA: 47 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F470G5S.	5-26
1A6A1C75		SAME AS 1A6A1C69.	5-26
1A6A1C76		SAME AS 1A6A1C74.	5-26
1A6A1C77		SAME AS 1A6A1C69.	5-26
1A6A1C78		SAME AS 1A1A1C1.	5-26
1A6A1C79		SAME AS 1A1A1C1.	5-26
1A6A1C80		SAME AS 1A1A1C1.	5-26
1A6A1C81		CAPACITOR, FIXED, MICA: 150 uuf, ±1% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F151F5S.	5-26
1A6A1C82		SAME AS 1A6A1C26.	5-26

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A6A1C83		CAPACITOR, FIXED, MICA: 120 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F121G5S.	5-26
1A6A1C84		SAME AS 1A6A1C83.	5-26
1A6A1C85		SAME AS 1A6A1C81.	5-26
1A6A1C86		SAME AS 1A1A1C1.	5-26
1A6A1C87 thru 1A6A1C90		SAME AS 1A1A2C41.	5-26
1A6A1C91		SAME AS 1A6A1C9.	5-26
1A6A1C92		SAME AS 1A1A1C1.	5-26
1A6A1C93		CAPACITOR, FIXED, MICA: 22 uuf, ±5% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111C220J5S.	5-26
1A6A1C94		SAME AS 1A1A1C1.	5-26
1A6A1C95		SAME AS 1A1A2C11.	5-26
1A6A1C96 thru 1A6A1C99		SAME AS 1A1A1C17.	5-26
1A6A1C100		SAME AS 1A1A1C1.	5-26
1A6A1C101		SAME AS 1A6A1C14.	5-26
1A6A1C102		SAME AS 1A1A1C1.	5-26
1A6A1C103		SAME AS 1A1A1C1.	5-26
1A6A1C104		SAME AS 1A1A1C1.	5-26
1A6A1C105		SAME AS 1A1A2C12.	5-26
1A6A1C106		SAME AS 1A1A1C1.	5-26
1A6A1C107		SAME AS 1A1A1C1.	5-26
1A6A1C108		SAME AS 1A1A1C1.	5-26
1A6A1C109		SAME AS 1A1A2C12.	5-26
1A6A1C110		CAPACITOR, FIXED, MICA: 56 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111E560G5S.	5-26
1A6A1C111		SAME AS 1A1A2C12.	5-26
1A6A1C112		SAME AS 1A6A1C110.	5-26
1A6A1C113		SAME AS 1A1A1C17.	5-26
1A6A1C114		SAME AS 1A1A2C12.	5-26
1A6A1C115 thru 1A6A1C123		SAME AS 1A1A1C1.	5-26
1A6A1C124 thru 1A6A1C126		SAME AS 1A1A1C17.	5-26
1A6A1C127		SAME AS 1A1A2C11.	5-26
1A6A1CR1 thru 1A6A1CR13		SAME AS 1A1A1CR1.	5-26
1A6A1L1		SAME AS 1A1A2L11.	5-26
1A6A1L2		SAME AS 1A1A2L11.	5-26
1A6A1L3		COIL, RF, FIXED: 12 uf, Q=55 at 2.5 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-120.	5-26
1A6A1L4		COIL, RF, FIXED: 1.0 uh, Q=47 at 25 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N C1433-1R0.	5-26
1A6A1L5		COIL, RF, FIXED: 4.7 uh, Q=44 at 2.5 mc, 0.157 in. dia by 0.395 in. lg. 82579 P/N CL433-4R7.	5-26
1A6A1L6		SAME AS 1A6A1L5.	5-26
1A6A1L7		SAME AS 1A6A1L5.	5-26
1A6A1L8		SAME AS 1A6A1L5.	5-26
1A6A1L9		COIL, RF, FIXED: 27 uh, Q=47 at 2.5 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-270.	5-26

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A6A1L10		COIL, RF, FIXED: 2.2 uh, Q=47 at 2.5 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-2R2.	5-26
1A6A1L11		COIL, RF, FIXED: 47 uh, Q=52 at 2.5 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-470.	5-26
1A6A1L12 thru 1A6A1L15		SAME AS 1A1A2L1.	5-26
1A6A1L16		COIL, RF, FIXED: 3.3 uh, Q=44 at 7.9 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-3R3.	5-26
1A6A1L17		SAME AS 1A6A1L16.	5-26
1A6A1L18 thru 1A6A1L22		SAME AS 1A1A1L1.	5-26
1A6A1L23		SAME AS 1A6A1L10.	5-26
1A6A1L24 thru 1A6A1L27		SAME AS 1A1A1L7.	5-26
1A6A1L28		SAME AS 1A1A2L11.	5-26
1A6A1L29		SAME AS 1A6A1L16.	5-26
1A6A1L30		SAME AS 1A6A1L11.	5-26
1A6A1L31		SAME AS 1A1A1L7.	5-26
1A6A1L32		COIL, RF, FIXED: 6.8 uh, Q=50 at 7.9 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-6R8.	5-26
1A6A1Q1		SAME AS 1A1A2Q3.	5-26
1A6A1Q2		SAME AS 1A1A1Q7.	5-26
1A6A1Q3		SAME AS 1A3A1Q12.	5-26
1A6A1Q4		SAME AS 1A1A1Q7.	5-26
1A6A1Q5		SAME AS 1A1A1Q7.	5-26
1A6A1Q6		SAME AS 1A1A1Q7.	5-26
1A6A1Q7		SAME AS 1A1A2Q3.	5-26
1A6A1Q8		SAME AS 1A1A1Q7.	5-26
1A6A1Q9		SAME AS 1A3A1Q12.	5-26
1A6A1Q10 thru 1A6A1Q19		SAME AS 1A1A1Q7.	5-26
1A6A1Q20		SAME AS 1A1A2Q3.	5-26
1A6A1Q21		SAME AS 1A1A2Q3.	5-26
1A6A1Q22		SAME AS 1A1A1Q7.	5-26
1A6A1Q23		SAME AS 1A3A1Q12.	5-26
1A6A1Q24		SAME AS 1A1A1Q7.	5-26
1A6A1Q25		SAME AS 1A1A1Q7.	5-26
1A6A1Q26		SAME AS 1A1A1Q7.	5-26
1A6A1Q27		SAME AS 1A2A1Q4.	5-26
1A6A1Q28 thru 1A6A1Q31		SAME AS 1A1A1Q7.	5-26
1A6A1R1		SAME AS 1A1A1R3.	5-26
1A6A1R2		SAME AS 1A3A1R7.	5-26
1A6A1R3		SAME AS 1A1A1R20.	5-26
1A6A1R4		SAME AS 1A1A1R3.	5-26
1A6A1R5		SAME AS 1A1A1R20.	5-26
1A6A1R6		SAME AS 1A1A1R20.	5-26
1A6A1R7		SAME AS 1A1A1R20.	5-26
1A6A1R8		SAME AS 1A3A1R64.	5-26
1A6A1R9		SAME AS 1A3A1R64.	5-26
1A6A1R10		SAME AS 1A1A1R13.	5-26
1A6A1R11		SAME AS 1A1A1R6.	5-26
1A6A1R12		SAME AS 1A1A1R20.	5-26

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A6A1R13		RESISTOR: MIL type RC32GF102J.	5-26
1A6A1R14		SAME AS 1A1A1R20.	5-26
1A6A1R15		SAME AS 1A1A1R13.	5-26
1A6A1R16		SAME AS 1A1A1R3.	5-26
1A6A1R17		SAME AS 1A1A1R3.	5-26
1A6A1R18		SAME AS 1A1A1R20.	5-26
1A6A1R19		SAME AS 1A1A1R13.	5-26
1A6A1R20		SAME AS 1A5A1R80.	5-26
1A6A1R21		SAME AS 1A1A1R13.	5-26
1A6A1R22		SAME AS 1A1A1R3.	5-26
1A6A1R23		SAME AS 1A1A1R3.	5-26
1A6A1R24		SAME AS 1A1A2R7.	5-26
1A6A1R25		SAME AS 1A1A1R22.	5-26
1A6A1R26		SAME AS 1A1A1R3.	5-26
1A6A1R27		SAME AS 1A3A1R7.	5-26
1A6A1R28		SAME AS 1A1A1R20.	5-26
1A6A1R29		SAME AS 1A1A1R3.	5-26
1A6A1R30		SAME AS 1A1A1R20.	5-26
1A6A1R31		SAME AS 1A1A1R20.	5-26
1A6A1R32		SAME AS 1A3A1R64.	5-26
1A6A1R33		SAME AS 1A1A1R20.	5-26
1A6A1R34		SAME AS 1A1A1R13.	5-26
1A6A1R35		SAME AS 1A1A1R13.	5-26
1A6A1R36		SAME AS 1A1A1R6.	5-26
1A6A1R37		SAME AS 1A1A1R20.	5-26
1A6A1R38		SAME AS 1A6A1R13.	5-26
1A6A1R39		SAME AS 1A1A1R20.	5-26
1A6A1R40		SAME AS 1A1A1R13.	5-26
1A6A1R41		SAME AS 1A1A1R3.	5-26
1A6A1R42		SAME AS 1A1A1R3.	5-26
1A6A1R43		SAME AS 1A1A1R20.	5-26
1A6A1R44		SAME AS 1A1A1R13.	5-26
1A6A1R45		SAME AS 1A5A1R80.	5-26
1A6A1R46		SAME AS 1A1A1R13.	5-26
1A6A1R47		SAME AS 1A1A1R3.	5-26
1A6A1R48		SAME AS 1A1A1R3.	5-26
1A6A1R49		SAME AS 1A1A1R11.	5-26
1A6A1R50		SAME AS 1A1A1R22.	5-26
1A6A1R51		SAME AS 1A1A1R22.	5-26
1A6A1R52		SAME AS 1A1A1R20.	5-26
1A6A1R53		SAME AS 1A3A1R64.	5-26
1A6A1R54		SAME AS 1A1A1R20.	5-26
1A6A1R55		SAME AS 1A3A1R64.	5-26
1A6A1R56		SAME AS 1A1A1R6.	5-26
1A6A1R57		SAME AS 1A1A1R4.	5-26
1A6A1R58		SAME AS 1A1A1R4.	5-26
1A6A1R59		SAME AS 1A6A1R13.	5-26
1A6A1R60		SAME AS 1A1A1R20.	5-26
1A6A1R61		SAME AS 1A1A1R20.	5-26
1A6A1R62		SAME AS 1A1A1R3.	5-26
1A6A1R63 thru 1A6A1R66		SAME AS 1A1A1R20.	5-26
1A6A1R67		SAME AS 1A3A1R64.	5-26
1A6A1R68		SAME AS 1A3A1R64.	5-26
1A6A1R69		SAME AS 1A1A1R6.	5-26

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A6A1R70		SAME AS 1A1A1R4.	5-26
1A6A1R71		SAME AS 1A1A1R4.	5-26
1A6A1R72		SAME AS 1A6A1R13.	5-26
1A6A1R73		SAME AS 1A1A1R20.	5-26
1A6A1R74		SAME AS 1A1A1R3.	5-26
1A6A1R75		SAME AS 1A1A1R3.	5-26
1A6A1R76		SAME AS 1A1A1R3.	5-26
1A6A1R77		SAME AS 1A1A1R20.	5-26
1A6A1R78		SAME AS 1A1A1R13.	5-26
1A6A1R79		SAME AS 1A5A1R80.	5-26
1A6A1R80		SAME AS 1A1A1R13.	5-26
1A6A1R81		SAME AS 1A1A1R3.	5-26
1A6A1R82		SAME AS 1A1A1R11.	5-26
1A6A1R83		SAME AS 1A1A1R22.	5-26
1A6A1R84		NOT USED.	
1A6A1R85		SAME AS 1A1A1R3.	5-26
1A6A1R86		NOT USED.	
1A6A1R87		SAME AS 1A1A1R20.	5-26
1A6A1R88		SAME AS 1A1A1R22.	5-26
1A6A1R89		SAME AS 1A1A1R3.	5-26
1A6A1R90		SAME AS 1A3A1R7.	5-26
1A6A1R91		SAME AS 1A1A1R3.	5-26
1A6A1R92		SAME AS 1A3A1R7.	5-26
1A6A1R93		SAME AS 1A1A1R3.	5-26
1A6A1R94		SAME AS 1A1A1R20.	5-26
1A6A1R95		SAME AS 1A1A1R20.	5-26
1A6A1R96		SAME AS 1A1A1R20.	5-26
1A6A1R97		SAME AS 1A3A1R64.	5-26
1A6A1R98		SAME AS 1A3A1R64.	5-26
1A6A1R99		SAME AS 1A1A1R20.	5-26
1A6A1R100		SAME AS 1A1A1R6.	5-26
1A6A1R101		SAME AS 1A1A1R13.	5-26
1A6A1R102		SAME AS 1A5A1R56.	5-26
1A6A1R103		SAME AS 1A1A1R20.	5-26
1A6A1R104		SAME AS 1A1A1R20.	5-26
1A6A1R105		SAME AS 1A1A1R3.	5-26
1A6A1R106		SAME AS 1A1A1R3.	5-26
1A6A1R107		SAME AS 1A1A1R13.	5-26
1A6A1R108		SAME AS 1A1A1R3.	5-26
1A6A1R109		SAME AS 1A1A1R20.	5-26
1A6A1R110		SAME AS 1A5A1R80.	5-26
1A6A1R111		SAME AS 1A1A1R13.	5-26
1A6A1R112		SAME AS 1A1A1R11.	5-26
1A6A1R113		SAME AS 1A1A1R22.	5-26
1A6A1R114 thru 1A6A1R117		SAME AS 1A1A1R3.	5-26
1A6A1R118		NOT USED.	
1A6A1R119		SAME AS 1A1A1R11.	5-26
1A6A1R120		RESISTOR: MIL type RC07GF221J.	5-26
1A6A1VR1 thru 1A6A1VR5		SAME AS 1A5A1VR1.	5-26
1A6A1Y1		CRYSTAL UNIT, QUARTZ: 10.5 mc, 0.510 in. hg by 0.400 in. wd by 0.150 in. thk. 82679 P/N CR109-153.	5-26
1A6A1Y2		CRYSTAL UNIT, QUARTZ: 5.5 mc, 0.510 in. hg by 0.440 in. wd by 0.150 in. thk. 82679 P/N CR109-151.	5-26

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A6A1Y3		CRYSTAL UNIT, QUARTZ: 7.0 mc, 0.510 in. hg by 0.440 in. wd by 0.150 in. thk. 82679 P/N CR109-152.	5-26
1A6A1Z1 thru 1A6A1Z5		SAME AS 1A1A2Z9.	5-26
1A6A1Z6		SAME AS 1A1A2Z3.	5-26
1A7		CIRCUIT CARD ASSEMBLY W/SHIELDS: 82679 P/N AX5064.	5-28
1A7E1		SAME AS 1A2E1.	5-28
1A7E2		SAME AS 1A3E2.	5-28
1A7A1		CIRCUIT CARD ASSEMBLY: 147 resistors, 91 capacitors, 15 coils, 4 transformers, 1 filter, 40 transistors, 11 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4670.	5-28
1A7A1C1 thru 1A7A1C8		SAME AS 1A1A2C41.	5-28
1A7A1C9		SAME AS 1A6A1C83.	5-28
1A7A1C10		SAME AS 1A1A2C41.	5-28
1A7A1C11		NOT USED.	
1A7A1C12		CAPACITOR, FIXED, MICA: 220 uuf, ±5% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F221J5S.	5-28
1A7A1C13 thru 1A7A1C19		SAME AS 1A1A2C41.	5-28
1A7A1C20		NOT USED.	
1A7A1C21 thru 1A7A1C28		SAME AS 1A1A2C41.	5-28
1A7A1C29		SAME AS 1A3A1C33.	5-28
1A7A1C30		SAME AS 1A1A2C41.	5-28
1A7A1C31		SAME AS 1A1A2C41.	5-28
1A7A1C32		CAPACITOR, FIXED, MICA: 180 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F181G5S.	5-28
1A7A1C33		SAME AS 1A3A1C33.	5-28
1A7A1C34		SAME AS 1A1A2C41.	5-28
1A7A1C35		SAME AS 1A3A1C33.	5-28
1A7A1C36		SAME AS 1A1A2C41.	5-28
1A7A1C37		SAME AS 1A7A1C32.	5-28
1A7A1C38		SAME AS 1A3A1C33.	5-28
1A7A1C39		SAME AS 1A1A2C41.	5-28
1A7A1C40		SAME AS 1A1A2C41.	5-28
1A7A1C41		SAME AS 1A7A1C32.	5-28
1A7A1C42		SAME AS 1A3A1C33.	5-28
1A7A1C43		SAME AS 1A1A2C41.	5-28
1A7A1C44		SAME AS 1A3A1C33.	5-28
1A7A1C45		SAME AS 1A1A2C41.	5-28
1A7A1C46		SAME AS 1A7A1C32.	5-28
1A7A1C47		SAME AS 1A3A1C33.	5-28
1A7A1C48		SAME AS 1A1A2C41.	5-28
1A7A1C49		SAME AS 1A3A1C33.	5-28
1A7A1C50		SAME AS 1A1A2C41.	5-28

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A7A1C51		SAME AS 1A1A2C41.	5-28
1A7A1C52		SAME AS 1A1A2C41.	5-28
1A7A1C53		CAPACITOR, FIXED, MICA: 2,200 uuf, + 5% tol, 500 wvdc. 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM111F22J5S.	5-28
1A7A1C54		SAME AS 1A1A2C41.	5-28
1A7A1C55		SAME AS 1A5A1C2.	5-28
1A7A1C56		SAME AS 1A6A1C2.	5-28
1A7A1C57		SAME AS 1A1A2C41.	5-28
1A7A1C58		SAME AS 1A3A1C33.	5-28
1A7A1C59 thru 1A7A1C69		SAME AS 1A1A2C41.	5-28
1A7A1C70		SAME AS 1A5A1C2.	5-28
1A7A1C71		SAME AS 1A1A2C41.	5-28
1A7A1C72		SAME AS 1A1A2C41.	5-28
1A7A1C73		SAME AS 1A1A2C41.	5-28
1A7A1C74		SAME AS 1A5A1C2.	5-28
1A7A1C75		SAME AS 1A1A2C41.	5-28
1A7A1C76		SAME AS 1A5A1C2.	5-28
1A7A1C77		SAME AS 1A1A2C41.	5-28
1A7A1C78		SAME AS 1A1A2C41.	5-28
1A7A1C79		SAME AS 1A6A1C2.	5-28
1A7A1C80		SAME AS 1A6A1C2.	5-28
1A7A1C81		SAME AS 1A5A1C2.	5-28
1A7A1C82 thru 1A7A1C86		SAME AS 1A1A2C41.	5-28
1A7A1C87		SAME AS 1A5A1C2.	5-28
1A7A1C88		SAME AS 1A1A2C41.	5-28
1A7A1C89		SAME AS 1A1A2C41.	5-28
1A7A1C90		SAME AS 1A6A1C2.	5-28
1A7A1C91		SAME AS 1A1A2C41.	5-28
1A7A1C92		SAME AS 1A1A1C17.	5-28
1A7A1C93		SAME AS 1A1A1C17.	5-28
1A7A1CR1		SAME AS 1A1A1CR1.	5-28
1A7A1CR2		SAME AS 1A1A1CR1.	5-28
1A7A1CR3		SEMICONDUCTOR DEVICE: MIL type 1N277.	5-28
1A7A1CR4		SAME AS 1A7A1CR3.	5-28
1A7A1CR5		SAME AS 1A1A1CR1.	5-28
1A7A1CR6		NOT USED.	
1A7A1CR7		SAME AS 1A1A1CR1.	5-28
1A7A1CR8		NOT USED.	
1A7A1CR9		NOT USED.	
1A7A1CR10		SAME AS 1A1A1CR1.	5-28
1A7A1CR11		NOT USED.	
1A7A1CR12		NOT USED.	
1A7A1CR13		SAME AS 1A1A1CR1.	5-28
1A7A1FL1		FILTER, BANDPASS: 0.250 mc nom center frequency type; symmetrical, bal inpit, single ended output; hermetically sealed steel case, 3.500 in. lg by 0.670 in. hg by 1.100 in. wd. 82679 P/N FX271-0.250.	5-28
1A7A1L1		COIL, RF, FIXED: 10,000 uh, Q=39 at 0.25 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-103.	5-28
1A7A1L1		SAME AS 1A7A1L1.	5-28
1A7A1L3		SAME AS 1A1A3L1.	5-28
1A7A1L4		SAME AS 1A7A1L1.	5-28

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A7A1L5 thru 1A7A1L8		COIL, RF, FIXED: 2,200 uh, Q=50 at 0.25 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-222.	5-28
1A7A1L9 thru 1A7A1L14		SAME AS 1A7A1L1.	5-28
1A7A1L15		COIL, RF, FIXED: 3,300 uh, Q=43 at 0.25 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-332.	5-28
1A7A1Q1		SAME AS 1A3A1Q12.	5-28
1A7A1Q2		SAME AS 1A3A1Q12.	5-28
1A7A1Q3		SAME AS 1A3A1Q1.	5-28
1A7A1Q4		SAME AS 1A1A1Q7.	5-28
1A7A1Q5		SAME AS 1A3A1Q1.	5-28
1A7A1Q6		NOT USED.	
1A7A1Q7		SAME AS 1A1A1Q7.	5-28
1A7A1Q8		SAME AS 1A3A1Q1.	5-28
1A7A1Q9		SAME AS 1A1A1Q7.	5-28
1A7A1Q10		SAME AS 1A2A1Q4.	5-28
1A7A1Q11		SAME AS 1A2A1Q4.	5-28
1A7A1Q12 thru 1A7A1Q16		SAME AS 1A3A1Q1.	5-28
1A7A1Q17		SAME AS 1A2A1Q4.	5-28
1A7A1Q18		SAME AS 1A3A1Q1.	5-28
1A7A1Q19		SAME AS 1A2A1Q4.	5-28
1A7A1Q20		SAME AS 1A2A1Q4.	5-28
1A7A1Q21		SAME AS 1A2A1Q4.	5-28
1A7A1Q22		SAME AS 1A1A2Q3.	5-28
1A7A1Q23 thru 1A7A1Q31		SAME AS 1A2A1Q4.	5-28
1A7A1Q32		SAME AS 1A1A1Q7.	5-28
1A7A1Q33		SAME AS 1A1A1Q7.	5-28
1A7A1Q34		SAME AS 1A1A1Q7.	5-28
1A7A1Q35		SAME AS 1A2A1Q4.	5-28
1A7A1Q36 thru 1A7A1Q41		SAME AS 1A1A2Q3.	5-28
1A7A1R1		SAME AS 1A1A1R13.	5-28
1A7A1R2		SAME AS 1A1A1R13.	5-28
1A7A1R3		SAME AS 1A1A1R6.	5-28
1A7A1R4		RESISTOR, VARIABLE: 5,000 ohms, ±30% tol, 200 wvdc. 0.250 in. dia by 0.250 in. hg. 82679 P/N RV124-1-502.	5-28
1A7A1R5		SAME AS 1A1A1R6.	5-28
1A7A1R6		SAME AS 1A1A1R11.	5-28
1A7A1R7		SAME AS 1A1A1R20.	5-28
1A7A1R8		SAME AS 1A1A1R3.	5-28
1A7A1R9		NOT USED.	
1A7A1R10		SAME AS 1A1A1R20.	5-28
1A7A1R11		RESISTOR: MIL type RC07GF224J.	5-28
1A7A1R12		SAME AS 1A1A1R17.	5-28
1A7A1R13		SAME AS 1A1A1R13.	5-28
1A7A1R14		SAME AS 1A1A1R3.	5-28
1A7A1R15		SAME AS 1A1A1R20.	5-28
1A7A1R16		SAME AS 1A1A1R3.	5-28
1A7A1R17		SAME AS 1A1A1R3.	5-28

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A7A1R18		SAME AS 1A2A1R27.	5-28
1A7A1R19		SAME AS 1A1A1R6.	5-28
1A7A1R20		SAME AS 1A1A1R13.	5-28
1A7A1R21		SAME AS 1A3A1R64.	5-28
1A7A1R22		SAME AS 1A1A1R20.	5-28
1A7A1R23		SAME AS 1A1A1R3.	5-28
1A7A1R24		SAME AS 1A1A1R3.	5-28
1A7A1R25		SAME AS 1A1A1R20.	5-28
1A7A1R26		SAME AS 1A1A1R6.	5-28
1A7A1R27		RESISTOR: MIL type RC07GF562J.	5-28
1A7A1R28		SAME AS 1A3A1R64.	5-28
1A7A1R29		SAME AS 1A1A1R3.	5-28
1A7A1R30		SAME AS 1A1A1R17.	5-28
1A7A1R31		SAME AS 1A1A1R20.	5-28
1A7A1R32		SAME AS 1A2A1R6.	5-28
1A7A1R33		SAME AS 1A5A1R80.	5-28
1A7A1R34		SAME AS 1A1A1R3.	5-28
1A7A1R35		SAME AS 1A1A1R4.	5-28
1A7A1R36		SAME AS 1A1A1R13.	5-28
1A7A1R37		SAME AS 1A1A1R13.	5-28
1A7A1R38		SAME AS 1A1A1R11.	5-28
1A7A1R39		SAME AS 1A1A1R3.	5-28
1A7A1R40		SAME AS 1A5A1R80.	5-28
1A7A1R41		RESISTOR: MIL type RC07GF330J.	5-28
1A7A1R42		SAME AS 1A1A1R20.	5-28
1A7A1R43		SAME AS 1A1A1R17.	5-28
1A7A1R44		SAME AS 1A1A1R3.	5-28
1A7A1R45		SAME AS 1A1A1R21.	5-28
1A7A1R46		SAME AS 1A7A1R11.	5-28
1A7A1R47		SAME AS 1A1A1R20.	5-28
1A7A1R48		SAME AS 1A1A1R13.	5-28
1A7A1R49		SAME AS 1A1A1R21.	5-28
1A7A1R50		SAME AS 1A1A1R13.	5-28
1A7A1R51		SAME AS 1A1A2R7.	5-28
1A7A1R52		SAME AS 1A1A1R4.	5-28
1A7A1R53		SAME AS 1A1A1R13.	5-28
1A7A1R54		SAME AS 1A1A2R7.	5-28
1A7A1R55		SAME AS 1A1A1R4.	5-28
1A7A1R56		SAME AS 1A1A1R21.	5-28
1A7A1R57		SAME AS 1A1A2R13.	5-28
1A7A1R58		SAME AS 1A1A2R7.	5-28
1A7A1R59		SAME AS 1A1A1R4.	5-28
1A7A1R60		SAME AS 1A1A1R21.	5-28
1A7A1R61		SAME AS 1A1A1R13.	5-28
1A7A1R62		SAME AS 1A1A2R7.	5-28
1A7A1R63		SAME AS 1A1A1R4.	5-28
1A7A1R64		SAME AS 1A3A1R64.	5-28
1A7A1R65		SAME AS 1A3A1R64.	5-28
1A7A1R66		SAME AS 1A1A1R20.	5-28
1A7A1R67		SAME AS 1A1A1R4.	5-28
1A7A1R68		SAME AS 1A7A1R11.	5-28
1A7A1R69		SAME AS 1A1A1R22.	5-28
1A7A1R70		SAME AS 1A1A1R13.	5-28
1A7A1R71		SAME AS 1A7A1R11.	5-28
1A7A1R72		SAME AS 1A5A1R26.	5-28
1A7A1R73		SAME AS 1A1A1R4.	5-28
1A7A1R74		SAME AS 1A5A1R64.	5-28

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A7A1R75		SAME AS 1A1A1R13.	5-28
1A7A1R76		SAME AS 1A1A1R3.	5-28
1A7A1R77		SAME AS 1A1A1R21.	5-28
1A7A1R78		SAME AS 1A3A1R7.	5-28
1A7A1R79		SAME AS 1A7A1R4.	5-28
1A7A1R80		SAME AS 1A1A1R22.	5-28
1A7A1R81		SAME AS 1A3A1R7.	5-28
1A7A1R82		SAME AS 1A1A1R21.	5-28
1A7A1R83		SAME AS 1A3A1R5.	5-28
1A7A1R84		SAME AS 1A3A1R7.	5-28
1A7A1R85		SAME AS 1A1A1R20.	5-28
1A7A1R86		SAME AS 1A1A1R21.	5-28
1A7A1R87		RESISTOR: MIL type RC07GF105J.	5-28
1A7A1R88		SAME AS 1A1A1R13.	5-28
1A7A1R89		SAME AS 1A1A1R13.	5-28
1A7A1R90		SAME AS 1A1A1R20.	5-28
1A7A1R91		NOT USED.	
1A7A1R92		SAME AS 1A1A1R4.	5-28
1A7A1R93		SAME AS 1A1A1R20.	5-28
1A7A1R94		SAME AS 1A1A1R20.	5-28
1A7A1R95		SAME AS 1A1A1R20.	5-28
1A7A1R96		SAME AS 1A7A1R41.	5-28
1A7A1R97		SAME AS 1A7A1R41.	5-28
1A7A1R98		RESISTOR: MIL type RC07GF183J.	5-28
1A7A1R99		NOT USED.	
1A7A1R100		SAME AS 1A1A1R4.	5-28
1A7A1R101		SAME AS 1A3A1R77.	5-28
1A7A1R102		RESISTOR: MIL type RC07GF392J.	5-28
1A7A1R103		SAME AS 1A1A1R9.	5-28
1A7A1R104		SAME AS 1A1A1R20.	5-28
1A7A1R105		SAME AS 1A1A1R22.	5-28
1A7A1R106		SAME AS 1A5A1R80.	5-28
1A7A1R107		SAME AS 1A1A1R20.	5-28
1A7A1R108		SAME AS 1A3A1R7.	5-28
1A7A1R109		SAME AS 1A3A1R7.	5-28
1A7A1R110		SAME AS 1A1A1R22.	5-28
1A7A1R111		SAME AS 1A1A2R7.	5-28
1A7A1R112		SAME AS 1A1A1R3.	5-28
1A7A1R113		SAME AS 1A3A1R7.	5-28
1A7A1R114		SAME AS 1A3A1R7.	5-28
1A7A1R115		SAME AS 1A1A1R20.	5-28
1A7A1R116		SAME AS 1A1A1R22.	5-28
1A7A1R117		SAME AS 1A1A2R7.	5-28
1A7A1R118		SAME AS 1A1A1R3.	5-28
1A7A1R119		SAME AS 1A3R7.	5-28
1A7A1R120		SAME AS 1A3R7.	5-28
1A7A1R121		SAME AS 1A1A1R20.	5-28
1A7A1R122		SAME AS 1A1A1R22.	5-28
1A7A1R123		SAME AS 1A1A1R3.	5-28
1A7A1R124		RESISTOR: MIL type RC20GF220J.	5-28
1A7A1R125		SAME AS 1A1A1R17.	5-28
1A7A1R126		SAME AS 1A3A1R5.	5-28
1A7A1R127		NOT USED.	
1A7A1R128		SAME AS 1A3A1R5.	5-28
1A7A1R129		SAME AS 1A1A1R13.	5-28
1A7A1R130		SAME AS 1A7A1R4.	5-28
1A7A1R131		SAME AS 1A3A1R44.	5-28

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A7A1R132		SAME AS 1A1A1R3.	5-28
1A7A1R133		SAME AS 1A3A1R77.	5-28
1A7A1R134		SAME AS 1A3A1R7.	5-28
1A7A1R135		SAME AS 1A1A1R9.	5-28
1A7A1R136		SAME AS 1A1A1R13.	5-28
1A7A1R137		SAME AS 1A1A1R3.	5-28
1A7A1R138		SAME AS 1A3A1R77.	5-28
1A7A1R139 thru 1A7A1R142		SAME AS 1A1A1R10.	5-28
1A7A1R143 thru 1A7A1R146		SAME AS 1A3A1R64.	5-28
1A7A1R147		SAME AS 1A1A1R10.	5-28
1A7A1R148		SAME AS 1A1A1R4.	5-28
1A7A1R149		SAME AS 1A1A1R17.	5-28
1A7A1R150		NOT USED.	
1A7A1R151		RESISTOR: MIL type RC07GF821J.	5-28
1A7A1T1		TRANSFORMER, PULSE: 0.5 uh, ±20% tol, wire leads. 0.650 in. lg by 0.425 in. wd by 0.350 in. hg. Dwg TF374-3, 90095 P/N 11KGB.	5-28
1A7A1T2		TRANSFORMER, PULSE: 750 uh ±20% tol, wire leads. 0.650 in. lg by 0.425 in. wd by 0.350 in. hg. Dwg TF374-1, 90095 P/N 21LHA.	5-28
1A7A1T3		SAME AS 1A7A1T2.	5-28
1A7A1T4		SAME AS 1A7A1T2.	5-28
1A7A1VR1		SAME AS 1A2A1VR2.	5-28
1A7A1VR2		SAME AS 1A5A1VR1.	5-28
1A7A1VR3		SAME AS 1A3A1VR1.	5-28
1A8		CIRCUIT CARD ASSEMBLY W/SHIELDS: 82679 P/N AX5065.	5-30
1A8E1		SAME AS 1A2E1.	5-30
1A8E2		SAME AS 1A3E2.	5-30
1A8A1		CIRCUIT CARD ASSEMBLY: 55 resistors, 75 capacitors, 21 coils, 4 integrated circuits, 19 transistors, 13 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4671.	5-30
1A8A1C1		SAME AS 1A1A1C17.	5-30
1A8A1C2		SAME AS 1A1A1C17.	5-30
1A8A1C3		SAME AS 1A1A1C17.	5-30
1A8A1C4		CAPACITOR, FIXED, MICA: 5 uuf, ±1/2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111C050D5S.	5-30
1A8A1C5		SAME AS 1A6A1C26.	5-30
1A8A1C6		SAME AS 1A1A1C17.	5-30
1A8A1C7		SAME AS 1A1A1C17.	5-30
1A8A1C8		SAME AS 1A1A1C17.	5-30
1A8A1C9		CAPACITOR, FIXED, MICA: 100 pf, ±5% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111C101J5S.	5-30
1A8A1C10		SAME AS 1A3A1C33.	5-30
1A8A1C11		SAME AS 1A1A1C17.	5-30
1A8A1C12		CAPACITOR, FIXED, MICA: 2 uuf, ±1/2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111C020D5S.	5-30

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A8A1C13		SAME AS 1A1A1C17.	5-30
1A8A1C14		SAME AS 1A1A1C17.	5-30
1A8A1C15		SAME AS 1A3A1C33.	5-30
1A8A1C16		SAME AS 1A1A1C17.	5-30
1A8A1C17 thru 1A8A1C20		SAME AS 1A3A1C33.	5-30
1A8A1C21		SAME AS 1A1A1C17.	5-30
1A8A1C22		SAME AS 1A1A1C17.	5-30
1A8A1C23		SAME AS 1A1A1C17.	5-30
1A8A1C24 thru 1A8A1C33		SAME AS 1A3A1C33.	5-30
1A8A1C34		SAME AS 1A6A1C26.	5-30
1A8A1C35		CAPACITOR, FIXED, MICA: 33 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111E330G5S.	5-30
1A8A1C36		SAME AS 1A3A1C33.	5-30
1A8A1C37		CAPACITOR, FIXED, MICA: 68 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F680G5S.	5-30
1A8A1C38		SAME AS 1A1A1C17.	5-30
1A8A1C39		SAME AS 1A3A1C33.	5-30
1A8A1C40		SAME AS 1A8A1C35.	5-30
1A8A1C41		SAME AS 1A6A1C26.	5-30
1A8A1C42		SAME AS 1A3A1C33.	5-30
1A8A1C43		SAME AS 1A6A1C19.	5-30
1A8A1C44		SAME AS 1A3A1C33.	5-30
1A8A1C45		SAME AS 1A3A1C33.	5-30
1A8A1C46		SAME AS 1A8A1C35.	5-30
1A8A1C47		SAME AS 1A6A1C26.	5-30
1A8A1C48		SAME AS 1A3A1C33.	5-30
1A8A1C49		SAME AS 1A3A1C32.	5-30
1A8A1C50		SAME AS 1A3A1C33.	5-30
1A8A1C51		SAME AS 1A3A1C33.	5-30
1A8A1C52		SAME AS 1A6A1C110.	5-30
1A8A1C53		CAPACITOR, FIXED, MICA: 18 uuf, ±5% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111G180J5S.	5-30
1A8A1C54 thru 1A8A1C62		SAME AS 1A3A1C33.	5-30
1A8A1C63		SAME AS 1A6A1C26.	5-30
1A8A1C64 thru 1A8A1C67		NOT USED.	
1A8A1C68 thru 1A8A1C70		SAME AS 1A3A1C33.	5-30
1A8A1C71		SAME AS 1A6A1C26.	5-30
1A8A1C72		SAME AS 1A3A1C33.	5-30
1A8A1C73		SAME AS 1A6A1C26.	5-30
1A8A1C74		SAME AS 1A3A1C33.	5-30
1A8A1C75		SAME AS 1A8A1C53.	5-30
1A8A1C76		SAME AS 1A3A1C33.	5-30
1A8A1CR1		NOT USED.	
1A8A1CR2		SAME AS 1A1A1CR1.	5-30
1A8A1CR3		NOT USED.	
1A8A1CR4 thru 1A8A1CR13		SAME AS 1A1A1CR1.	5-30

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A8A1L1		SAME AS 1A1A2L1.	5-30
1A8A1L2		SAME AS 1A6A1L10.	5-30
1A8A1L3		SAME AS 1A1A2L1.	5-30
1A8A1L4		SAME AS 1A1A2L1.	5-30
1A8A1L5		SAME AS 1A1A1L1.	5-30
1A8A1L6		SAME AS 1A6A1L11.	5-30
1A8A1L7		COIL, RF, FIXED: 0.47 uh, Q=44 at 25 mc. 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-0R47.	5-30
1A8A1L8		SAME AS 1A8A1L7.	5-30
1A8A1L9		COIL, RF, FIXED: 1.0 uh, Q=47 at 25 mc. 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-1R0.	5-30
1A8A1L10		SAME AS 1A8A1L9.	5-30
1A8A1L11		COIL, RF, FIXED: 0.68 uh, Q=42 at 25 mc. 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-0R68.	5-30
1A8A1L12		SAME AS 1A6A1L5.	5-30
1A8A1L13		SAME AS 1A6A1L5.	5-30
1A8A1L14		SAME AS 1A1A1L1.	5-30
1A8A1L15		SAME AS 1A1A1L1.	5-30
1A8A1L16		SAME AS 1A6A1L11.	5-30
1A8A1L17		SAME AS 1A6A1L11.	5-30
1A8A1L18		SAME AS 1A1A2L1.	5-30
1A8A1L19		SAME AS 1A6A1L10.	5-30
1A8A1L20		SAME AS 1A6A1L10.	5-30
1A8A1L21 thru 1A8A1L24		NOT USED.	
1A8A1L25		SAME AS 1A6A1L10.	5-30
1A8A1Q1		SAME AS 1A1A1Q1.	5-30
1A8A1Q2		SAME AS 1A1A1Q1.	5-30
1A8A1Q3		SAME AS 1A1A1Q1.	5-30
1A8A1Q4 thru 1A8A1Q7		SAME AS 1A1A2Q3.	5-30
1A8A1Q8		SAME AS 1A1A1Q1.	5-30
1A8A1Q9		SAME AS 1A1A1Q1.	5-30
1A8A1Q10		SAME AS 1A1A1Q1.	5-30
1A8A1Q11		SAME AS 1A1A1Q7.	5-30
1A8A1Q12		SAME AS 1A1A1Q1.	5-30
1A8A1Q13		SAME AS 1A1A1Q1.	5-30
1A8A1Q14		SAME AS 1A1A1Q1.	5-30
1A8A1Q15		SAME AS 1A1A1Q7.	5-30
1A8A1Q16		SAME AS 1A1A1Q7.	5-30
1A8A1Q17		SAME AS 1A1A1Q7.	5-30
1A8A1Q18		NOT USED.	
1A8A1Q19		SAME AS 1A1A1Q7.	5-30
1A8A1Q20		SAME AS 1A1A1Q7.	5-30
1A8A1R1		SAME AS 1A1A1R13.	5-30
1A8A1R2		SAME AS 1A1A1R22.	5-30
1A8A1R3		SAME AS 1A1A1R9.	5-30
1A8A1R4		SAME AS 1A1A1R2.	5-30
1A8A1R5		SAME AS 1A1A1R11.	5-30
1A8A1R6		SAME AS 1A1A1R11.	5-30
1A8A1R7		SAME AS 1A1A1R20.	5-30
1A8A1R8		NOT USED.	
1A8A1R9		NOT USED.	
1A8A1R10		SAME AS 1A1A1R9.	5-30
1A8A1R11		RESISTOR: MIL type RC32GF3R3J.	5-30

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A8A1R12		SAME AS 1A1A1R17.	5-30
1A8A1R13		SAME AS 1A1A1R21.	5-30
1A8A1R14		SAME AS 1A1A1R17.	5-30
1A8A1R15		SAME AS 1A3A1R64.	5-30
1A8A1R16		SAME AS 1A1A1R17.	5-30
1A8A1R17		SAME AS 1A3A1R64.	5-30
1A8A1R18		SAME AS 1A1A1R17.	5-30
1A8A1R19		SAME AS 1A3A1R64.	5-30
1A8A1R20		SAME AS 1A1A1R21.	5-30
1A8A1R21		NOT USED.	
1A8A1R22		SAME AS 1A1A1R20.	5-30
1A8A1R23		NOT USED.	
1A8A1R24		SAME AS 1A1A1R20.	5-30
1A8A1R25		SAME AS 1A1A1R6.	5-30
1A8A1R26		SAME AS 1A1A1R13.	5-30
1A8A1R27		SAME AS 1A1A1R21.	5-30
1A8A1R28		NOT USED.	
1A8A1R29		SAME AS 1A1A1R4.	5-30
1A8A1R30		SAME AS 1A1A1R5.	5-30
1A8A1R31		SAME AS 1A1A1R20.	5-30
1A8A1R32		SAME AS 1A1A1R13.	5-30
1A8A1R33		SAME AS 1A1A1R6.	5-30
1A8A1R34		SAME AS 1A1A1R21.	5-30
1A8A1R35		NOT USED.	
1A8A1R36		SAME AS 1A1A1R4.	5-30
1A8A1R37		SAME AS 1A2A1R6.	5-30
1A8A1R38		SAME AS 1A2A1R6.	5-30
1A8A1R39		SAME AS 1A1A1R13.	5-30
1A8A1R40		SAME AS 1A1A1R6.	5-30
1A8A1R41		SAME AS 1A1A1R21.	5-30
1A8A1R42		NOT USED.	
1A8A1R43		SAME AS 1A1A1R4.	5-30
1A8A1R44		SAME AS 1A2A1R6.	5-30
1A8A1R45		SAME AS 1A2A1R6.	5-30
1A8A1R46		SAME AS 1A1A1R13.	5-30
1A8A1R47		SAME AS 1A1A1R6.	5-30
1A8A1R48		SAME AS 1A1A1R11.	5-30
1A8A1R49		SAME AS 1A1A1R13.	5-30
1A8A1R50		SAME AS 1A1A1R20.	5-30
1A8A1R51		SAME AS 1A1A1R4.	5-30
1A8A1R52		SAME AS 1A1A1R4.	5-30
1A8A1R53		SAME AS 1A1A1R6.	5-30
1A8A1R54 thru 1A8A1R57		SAME AS 1A1A1R6.	5-30
1A8A1R58		SAME AS 1A1A1R5.	5-30
1A8A1R59		SAME AS 1A1A1R20.	5-30
1A8A1R60		SAME AS 1A1A1R20.	5-30
1A8A1VR1		NOT USED.	
1A8A1VR2		NOT USED.	
1A8A1VR3		SAME AS 1A5A1VR1.	5-30
1A8A1Z1		SAME AS 1A1A1Z1.	5-30
1A8A1Z2		SAME AS 1A1A1Z3.	5-30
1A8A1Z3		SAME AS 1A1A2Z9.	5-30
1A8A1Z4		SAME AS 1A1A2Z9.	5-30

TABLE 6-3. MAINTENANCE PARTS LIST (Continued`

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A9		CIRCUIT CARD ASSEMBLY W/SHIELDS: 82679 P/N AX5066.	5-32
1A9E1		SAME AS 1A2E1.	5-32
1A9E2		SAME AS 1A3E2.	5-32
1A9A1		CIRCUIT CARD ASSEMBLY: 102 resistors, 71 capacitors, 11 coils, 4 transformers, 4 filters, 24 transistors, 8 semiconductors, plug-in item; 10.031 in. lg by 5.969 in. wd by 1.000 in. hg. 82679 P/N A4672.	5-32
1A9A1C1		SAME AS 1A6A1C93.	5-32
1A9A1C2 thru 1A9A1C10		SAME AS 1A1A2C41.	5-32
1A9A1C11		SAME AS 1A1A1C1.	5-32
1A9A1C12		SAME AS 1A1A2C39.	5-32
1A9A1C13		CAPACITORS, FIXED, MICA: 24 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111E240G5S.	5-32
1A9A1C14		SAME AS 1A1A2C41.	5-32
1A9A1C15		SAME AS 1A1A2C39.	5-32
1A9A1C16		SAME AS 1A1A1C1.	5-32
1A9A1C17 thru 1A9A1C26		SAME AS 1A1A2C41.	5-32
1A9A1C27		SAME AS 1A1A1C1.	5-32
1A9A1C28		SAME AS 1A1A2C12.	5-32
1A9A1C29		CAPACITOR, FIXED, MICA: 100 uuf, ±2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111E101G5S.	5-32
1A9A1C30		SAME AS 1A1A2C41.	5-32
1A9A1C31		SAME AS 1A1A2C12.	5-32
1A9A1C32		SAME AS 1A1A1C1.	5-32
1A9A1C33		SAME AS 1A1A2C41.	5-32
1A9A1C34		SAME AS 1A1A2C41.	5-32
1A9A1C35		SAME AS 1A1A2C41.	5-32
1A9A1C36 thru 1A9A1C42		SAME AS 1A1A1C1.	5-32
1A9A1C43		SAME AS 1A1A2C41.	5-32
1A9A1C44		SAME AS 1A1A2C41.	5-32
1A9A1C45		SAME AS 1A1A1C1.	5-32
1A9A1C46		SAME AS 1A1A2C38.	5-32
1A9A1C47		CAPACITOR, FIXED, MICA: 12 uuf, ±5% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111C120J5S.	5-32
1A9A1C48		SAME AS 1A1A2C41.	5-32
1A9A1C49		SAME AS 1A1A2C38.	5-32
1A9A1C50 thru 1A9A1C60		SAME AS 1A1A1C1.	5-32
1A9A1C61		SAME AS 1A1A2C41.	5-32
1A9A1C62		SAME AS 1A1A1C1.	5-32
1A9A1C63		CAPACITOR, FIXED, MICA: 680 uuf, ±2% tol, 300 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F681G3S.	5-32
1A9A1C64		CAPACITOR, FIXED, MICA: 33 uuf, ±2% tol, 100 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F330G1S.	5-32
1A9A1C65		SAME AS 1A1A2C41.	5-32
1A9A1C66		SAME AS 1A9A1C63.	5-32

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A9A1C67 thru 1A9A1C70		SAME AS 1A1A1C1.	5-32
1A9A1C71		SAME AS 1A6A1C93.	5-32
1A9A1CR1 thru 1A9A1CR8		SAME AS 1A1A1CR1.	5-32
1A9A1FL1		FILTER, BANDPASS: 0.625 mc nom center frequency type; symmetrical, bal input, single ended output; hermetically sealed steel case, 3.500 in. lg by 0.670 in. hg by 1.100 in. wd. 82679 P/N FX271-0.625.	5-32
1A9A1FL2		FILTER, BANDPASS: 1.250 mc nom center frequency type; symmetrical, bal input, single ended output; hermetically sealed steel case, 3.500 in. lg by 0.670 in. hg by 1.100 in. wd. 82679 P/N FX271-1.250.	5-32
1A9A1FL3		FILTER, BANDPASS: 2.500 mc nom center frequency type; symmetrical, bal input, single ended output; hermetically sealed steel case, 3.500 in. lg by 0.670 in. hg by 1.100 in. wd. 82679 P/N FX271-2.500.	5-32
1A9A1FL4		FILTER, BANDPASS: 5.000 mc nom center frequency type; symmetrical, bal input, single ended output; hermetically sealed steel case, 2.300 in. lg by 0.670 in. hg by 1.000 in. wd. 82679 P/N FX271-5.000.	5-32
1A9A1L1		SAME AS 1L1.	5-32
1A9A1L2		SAME AS 1L1.	5-32
1A9A1L3		SAME AS 1L1.	5-32
1A9A1L4		COIL, RF, FIXED: 15 uh, Q=65 at 2.5 mc, 0.400 in. dia by 0.500 in. lg. Dwg CL430-3, 72259 P/N VIV-15.0.	5-32
1A9A1L5		SAME AS 1A9A1L4.	5-32
1A9A1L6		COIL, RF, FIXED: 3.30 uh, Q=45 at 7.9 mc, 0.400 in. dia by 0.500 in. lg. Dwg CL430-7, 72259 P/N VIV-3.30.	5-32
1A9A1L7		SAME AS 1A9A1L6.	5-32
1A9A1L8		COIL, RF, FIXED: 6.80 uh, Q=80 at 7.9 mc, 0.400 in. dia by 0.500 in. lg. Dwg CL430-5, 72259 P/N VIV-6.80.	5-32
1A9A1L9		SAME AS 1A9A1L8.	5-32
1A9A1L10		SAME AS 1L1.	5-32
1A9A1L11		COIL, RF, FIXED: 47 uh, ±10% tol, 10 ohms max dc res. 0.157 in. dia by 0.450 in. lg. 82679 P/N CL-275-470.	5-32
1A9A1Q1		SAME AS 1A1A1Q6.	5-32
1A9A1Q2		SAME AS 1A1A1Q7.	5-32
1A9A1Q3		SAME AS 1A3A1Q12.	5-32
1A9A1Q4		SAME AS 1A3A1Q12.	5-32
1A9A1Q5		SAME AS 1A3A1Q12.	5-32
1A9A1Q6		SAME AS 1A1A1Q7.	5-32
1A9A1Q7		SAME AS 1A1A1Q6.	5-32
1A9A1Q8		SAME AS 1A1A1Q7.	5-32
1A9A1Q9		SAME AS 1A3A1Q12.	5-32
1A9A1Q10		SAME AS 1A3A1Q12.	5-32
1A9A1Q11		SAME AS 1A3A1Q12.	5-32
1A9A1Q12		SAME AS 1A1A1Q7.	5-32
1A9A1Q13		SAME AS 1A1A1Q6.	5-32
1A9A1Q14		SAME AS 1A1A1Q7.	5-32
1A9A1Q15		SAME AS 1A3A1Q12.	5-32
1A9A1Q16		SAME AS 1A3A1Q12.	5-32
1A9A1Q17		SAME AS 1A3A1Q12.	5-32
1A9A1Q18		SAME AS 1A1A1Q7.	5-32

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A9A1Q19		SAME AS 1A1A1Q6.	5-32
1A9A1Q20		SAME AS 1A1A1Q7.	5-32
1A9A1Q21		SAME AS 1A3A1Q12.	5-32
1A9A1Q22		SAME AS 1A3A1Q12.	5-32
1A9A1Q23		SAME AS 1A3A1Q12.	5-32
1A9A1Q24		SAME AS 1A1A1Q7.	5-32
1A9A1R1		SAME AS 1A3A1R7.	5-32
1A9A1R2		SAME AS 1A1A1R3.	5-32
1A9A1R3		SAME AS 1A1A1R3.	5-32
1A9A1R4		SAME AS 1A1A1R20.	5-32
1A9A1R5		SAME AS 1A1A1R20.	5-32
1A9A1R6		SAME AS 1A1A1R10.	5-32
1A9A1R7		SAME AS 1A1A1R10.	5-32
1A9A1R8		SAME AS 1A1A1R6.	5-32
1A9A1R9		SAME AS 1A2A1R6.	5-32
1A9A1R10		SAME AS 1A1A1R6.	5-32
1A9A1R11		SAME AS 1A1A1R10.	5-32
1A9A1R12		SAME AS 1A1A1R10.	5-32
1A9A1R13		SAME AS 1A1A1R13.	5-32
1A9A1R14		SAME AS 1R3.	5-32
1A9A1R15		SAME AS 1R3.	5-32
1A9A1R16		SAME AS 1A1A1R6.	5-32
1A9A1R17		SAME AS 1A1A1R13.	5-32
1A9A1R18		RESISTOR: MIL type RC07GF182J.	5-32
1A9A1R19		SAME AS 1A1A1R20.	5-32
1A9A1R20		SAME AS 1A1A1R6.	5-32
1A9A1R21		SAME AS 1A3A1R77.	5-32
1A9A1R22		SAME AS 1A1A1R3.	5-32
1A9A1R23		SAME AS 1A1A1R4.	5-32
1A9A1R24		RESISTOR, VARIABLE, WIRE WOUND: 2,000 ohms ±20 tol; 0.250 in. dia by 0.250 in. hg. p.c. type mounting pins. Dwg RV126-61P202, 80740 P/N 61P202.	5-32
1A9A1R25		RESISTOR: MIL type RC07GF823J.	5-32
1A9A1R26		SAME AS 1A1A1R3.	5-32
1A9A1R27		SAME AS 1A1A1R3.	5-32
1A9A1R28		SAME AS 1A1A1R11.	5-32
1A9A1R29		SAME AS 1A1A1R11.	5-32
1A9A1R30		SAME AS 1A1A1R10.	5-32
1A9A1R31		SAME AS 1A1A1R10.	5-32
1A9A1R32		SAME AS 1A1A1R6.	5-32
1A9A1R33		SAME AS 1A2A1R26.	5-32
1A9A1R34		SAME AS 1A1A1R6.	5-32
1A9A1R35		SAME AS 1A1A1R10.	5-32
1A9A1R36		SAME AS 1A1A1R10.	5-32
1A9A1R37		SAME AS 1A1A1R13.	5-32
1A9A1R38		SAME AS 1R3.	5-32
1A9A1R39		SAME AS 1R3.	5-32
1A9A1R40		SAME AS 1A1A1R6.	5-32
1A9A1R41		SAME AS 1A1A1R13.	5-32
1A9A1R42		SAME AS 1A1A1R20.	5-32
1A9A1R43		SAME AS 1A1A1R6.	5-32
1A9A1R44		SAME AS 1A3A1R77.	5-32
1A9A1R45		SAME AS 1A1A1R3.	5-32
1A9A1R46		SAME AS 1A1A1R4.	5-32
1A9A1R47		SAME AS 1A9A1R24.	5-32
1A9A1R48		SAME AS 1A9A1R25.	5-32
1A9A1R49		SAME AS 1A3A1R7.	5-32
1A9A1R50		SAME AS 1A1A1R3.	5-32

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A9A1R51		SAME AS 1A1A1R3.	5-32
1A9A1R52		SAME AS 1A3A1R7.	5-32
1A9A1R53		SAME AS 1A1A1R11.	5-32
1A9A1R54		SAME AS 1A1A1R11.	5-32
1A9A1R55		SAME AS 1A1A1R10.	5-32
1A9A1R56		SAME AS 1A1A1R10.	5-32
1A9A1R57		SAME AS 1A1A1R6.	5-32
1A9A1R58		SAME AS 1A2A1R26.	5-32
1A9A1R59		SAME AS 1A1A1R6.	5-32
1A9A1R60		SAME AS 1A1A1R10.	5-32
1A9A1R61		SAME AS 1A1A1R10.	5-32
1A9A1R62		SAME AS 1A1A1R13.	5-32
1A9A1R63		SAME AS 1R3.	5-32
1A9A1R64		SAME AS 1R3.	5-32
1A9A1R65		SAME AS 1A7A1R41.	5-32
1A9A1R66		SAME AS 1A1A1R13.	5-32
1A9A1R67		SAME AS 1A1A1R20.	5-32
1A9A1R68		SAME AS 1A1A1R6.	5-32
1A9A1R69		SAME AS 1A3A1R77.	5-32
1A9A1R70		SAME AS 1A1A1R3.	5-32
1A9A1R71		SAME AS 1A1A1R4.	5-32
1A9A1R72		SAME AS 1A9A1R24.	5-32
1A9A1R73		SAME AS 1A9A1R25.	5-32
1A9A1R74		SAME AS 1A1A1R3.	5-32
1A9A1R75		SAME AS 1A1A1R3.	5-32
1A9A1R76		SAME AS 1A3A1R7.	5-32
1A9A1R77		SAME AS 1A1A1R11.	5-32
1A9A1R78		SAME AS 1A1A1R11.	5-32
1A9A1R79		SAME AS 1A1A1R10.	5-32
1A9A1R80		SAME AS 1A1A1R10.	5-32
1A9A1R81		SAME AS 1A1A1R6.	5-32
1A9A1R82		SAME AS 1A2A1R26.	5-32
1A9A1R83		SAME AS 1A1A1R6.	5-32
1A9A1R84		SAME AS 1A1A1R10.	5-32
1A9A1R85		SAME AS 1A1A1R10.	5-32
1A9A1R86		SAME AS 1A1A1R13.	5-32
1A9A1R87		SAME AS 1R3.	5-32
1A9A1R88		SAME AS 1R3.	5-32
1A9A1R89		SAME AS 1A1A1R6.	5-32
1A9A1R90		SAME AS 1A1A1R13.	5-32
1A9A1R91		SAME AS 1A1A1R20.	5-32
1A9A1R92		SAME AS 1A1A1R6.	5-32
1A9A1R93		SAME AS 1A3A1R77.	5-32
1A9A1R94		SAME AS 1A1A1R3.	5-32
1A9A1R95		SAME AS 1A1A1R4.	5-32
1A9A1R96		SAME AS 1A9A1R24.	5-32
1A9A1R97		SAME AS 1A9A1R25.	5-32
1A9A1R98		SAME AS 1A9A1R18.	5-32
1A9A1R99		SAME AS 1A2A1R6.	5-32
1A9A1R100		SAME AS 1A2A1R6.	5-32
1A9A1R101		SAME AS 1A2A1R27.	5-32
1A9A1R102		SAME AS 1A7A1R27.	5-32
1A9A1T1		SAME AS 1A7A1T1.	5-32
1A9A1T2		SAME AS 1A7A1T1.	5-32
1A9A1T3		TRANSFORMER, PULSE: 0.12 uh, ±20% tol, wire leads. 0.650 in. lg by 0.425 in. wd by 0.350 in. hg. Dwg TF374-2, 90095 P/N 11GGA.	5-32
1A9A1T4		SAME AS 1A9A1T3.	5-32

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

RADIO FREQUENCY TUNER, TN-511/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1A10		TUNER, RADIO FREQUENCY: Factory repairable; item 2-32 mc, with motor driven tuning section and circuit cards A4673, A4674, A4675, A4676; 16.500 in. lg by 6.500 in. wd by 6.500 in. hg. 82679 P/N AX5005-2.	5-33
1A10A1		OSCILLATOR ASSEMBLY: Non-repairable item, factory replaceable. 82679 P/N A0128.	5-33
1A10A3A1		CIRCUIT CARD ASSEMBLY: Non-repairable item, P/O AX5005; 5.062 in. lg by 2.375 in. wd by 0.750 in. hg. 82679 P/N A4673.	5-36
1A10A3A2		CIRCUIT CARD ASSEMBLY: Non-repairable item, P/O AX5005; 5.062 in. lg by 2.375 in. wd by 0.750 in. hg. 82679 P/N A4674.	5-38
1A10A3A3		CIRCUIT CARD ASSEMBLY: Non-repairable item, P/O AX5005; 5.062 in. lg by 2.375 in. wd by 0.750 in. hg. 82679 P/N A4675.	5-40
1A10A3A4		CIRCUIT CARD ASSEMBLY: Non-repairable item, P/O AX5005; 5.062 in. lg by 2.375 in. wd by 0.750 in. hg. 82679 P/N A4676.	5-42
1A11		ATTENUATOR ASSEMBLY: Non-repairable item; 3.526 in. lg by 2.000 in. wd by 1.125 in. hg. 82679 P/N AX5007.	5-43
1A12		SWITCH, STEPPING: Remote-controlled type, direct drive type, unidirectional drive, 4 sections, 12 positions, 26 wipers, 28 contacts, 10-15 amps, 28 vdc, bracket housed plug-in type; 4.000 in. lg by 2.250 in. hg.by 1.750 in. wd. 82679 P/N AX5008.	5-44
1A12A1		CIRCUIT CARD ASSEMBLY: 4 semiconductors, p/o AX5008; 3.500 in. lg by 1.625 in. wd by 0.500 in. hg. 82679 P/N A4595.	5-44
1A12A1CR1		ABSORBER, OVERVOLTAGE: Oper voltage, 28 v nom, 33 v max; max reverse 10 vdc. 0.438 in. lg by 0.500 in. wd by 0.219 in. thk. 82679 P/N DD111-1.	5-44
1A12A1CR2		SAME AS 1A1A1CR1.	5-44
1A12A1CR3		SAME AS 1A1A1CR1.	5-44
1A12A1CR4		SAME AS 1A1A1CR1.	5-44
1A13		CIRCUIT CARD ASSEMBLY: 3 capacitors, 4 resistors, 1 relay, 1 semiconductor, 1 transistor, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg. 82679 P/N A4794.	5-46
1A13C1		CAPACITOR, FIXED, ELECTROLYTIC: 40 uf, -10% + 150% at 125 cps, 25°C, 15 wvdc. 0.312 in. dia by 0.750 in. lg. Dwg CE105-40-15. 14655 P/N NLW 40-15.	5-46
1A13C2		CAPACITOR, FIXED, ELECTROLYTIC: 200 uf, -10% + 150% at 125 cps, 24°C, 15 wvdc. 0.312 in. dia by 0.750 in. lg. Dwg CE105-200-15, 14655 P/N NLW CE105-200-15.	5-46
1A13C3		SAME AS 1A13C2.	5-46
1A13CR1		SEMICONDUCTOR DEVICE: MIL type 1N4245.	5-46
1A13K1		RELAY, ARMATURE, DC: DPDT, 40 milliwatt sensitivity; coil data, 6.0 milliamps, 250 ohms; operate time, 10 milliseconds; hermatically sealed metal case, 1.281 in. hg by 0.800 in. wd by 0.400 in. thk; bracket mounted. 82679 P/N RL178-U6D4R0.	5-46
1A13Q1		TRANSISTOR: MIL type 2N697.	5-46
1A13R1		SAME AS 1A1A1R17.	5-46
1A13R2		SAME AS 1A1A1R20.	5-46
1A13R3		SAME AS 1A1A1R20.	5-46
1A13R4		RESISTOR: MIL type RC07GF123J.	5-46

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2		MSAR-4, DEMULTIPLEXER, TD-914/URR. A combined demultiplexer and ISB detector that converts a 250 kc composite IF signal to four independent sideband audio channels (A1, A2, B1, B2) or a symmetrical channel; demultiplexing of each independent sideband channel is accomplished with the aid of 250 kc and 1 mc injection frequencies. (Unit 2 in the AN/URR-63(V)1 and Units 2 and 6 in the AN/URR-63(V)2.)	5-47
2A1		CIRCUIT CARD ASSEMBLY: 36 resistors, 24 capacitors, 17 transistors, 16 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg, 82679 P/N A4627.	5-49
2A2		CIRCUIT CARD ASSEMBLY: 37 resistors, 13 capacitors, 1 integrated circuit, 16 transistors, 17 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg, 82679 P/N A4628.	5-49
2A3		CIRCUIT CARD ASSEMBLY: 79 resistors, 62 capacitors, 11 coils, 3 filters, 6 integrated circuits, 18 transistors, 4 semiconductors, plug-in item; 9.031 in. lg by 9.969 in. wd by 0.750 in. hg, 82679 P/N A4629.	5-49
2A4		CIRCUIT CARD ASSEMBLY: 77 resistors, 48 capacitors, 6 coils, 2 transformers, 16 transistors, 11 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg, 82679 P/N A4630.	5-49
2A5		CIRCUIT CARD ASSEMBLY: 99 resistors, 64 capacitors, 6 coils, 2 filters, 21 transistors, 7 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg, 82679 P/N A4631.	5-49
2A6		CIRCUIT CARD ASSEMBLY: 51 resistors, 34 capacitors, 5 coils, 3 transformers, 15 transistors, 6 semiconductors, plug-in item; 9,031 in. lg by 5.969 in. wd by 0.750 in. hg, 82679 P/N A4632.	5-49
2A7		CIRCUIT CARD ASSEMBLY: 84 resistors, 53 capacitors, 6 coils, 2 filters, 19 transistors, 7 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg, 82679 P/N A4633.	5-49
2A8		SAME AS 2A6.	5-49
2A9		CIRCUIT CARD ASSEMBLY: 84 resistors, 53 capacitors, 6 coils, 2 filters, 19 transistors, 7 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg, 82679 P/N A4635.	5-49
2A10		SAME AS 2A6.	5-49
2A11		CIRCUIT CARD ASSEMBLY: 84 resistors, 53 capacitors, 6 coils, 2 filters, 19 transistors, 7 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg, 82679 P/N A4637.	5-49
2A12		SAME AS 2A6.	5-49
2A13		CIRCUIT CARD ASSEMBLY: 84 resistors, 53 capacitors, 6 coils, 2 filters, 19 transistors, 7 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg, 82679 P/N A4638.	5-49
2A14		STEPPING SWITCH ASSEMBLY: 82679 P/N AX5002.	5-49
2A15		STEPPING SWITCH ASSEMBLY: 82679 P/N AX5000.	5-49
2A16		SAME AS 2A15.	5-49
2A17		SAME AS 2A15.	5-49
2A18		SAME AS 2A15.	5-49
2DS1		LAMP, INCANDESCENT: Single contact, T-1-3/4 base, 14 vac or vdc, 0.68 amps. Dwg BI110-10, 0.806 P/N 382.	5-47
2F1		FUSE, CARTRIDGE TYPE: 0.5 amp, 125 v, 0.250 in. dia by 1.250 in. lg, Dwg FU102, 71400 P/N MDL-1/2.	5-47
2F2		SAME AS 2F1.	5-47
2FL1		FILTER, RADIO INTERFERENCE: 1 amp current rating, 600 vdc, 250 vac at 60 cps, 1.000 in. dia by 2.688 in. lg. Dwg FI105-1, 80183 P/N 1JX130.	5-47

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2FL2		SAME AS 2FL1.	5-48
2J1		NOT USED.	
2J2		CONNECTOR: MIL type MS3102A14S1P.	5-49
2J3		CONNECTOR: MIL type UG625B/U.	5-49
2J4 thru 2J10		SAME AS 2J3.	5-49
2J11		CONNECTOR, RECEPTACLE, ELECTRICAL: 9 sockets, contacts rated at 7.5 amps, 0.718 in. dia by 0.781 in. lg, Dwg JJ193-9S, 07497 P/N 126-221.	5-49
2J12 thru 2J18		SAME AS 2J11.	5-49
2J19		CONNECTOR: MIL type MS3102A28-21P.	5-49
2J20		CONNECTOR, RECEPTACLE, ELECTRICAL: MIL type JJ034.	5-49
2M1		METER, SPECIAL SCALE: 500 microamp movement, molded phenolic case 1.750 in. by 1.750 in. by 1.500 in, 82679 P/N MR204.	5-48
2MP1		KNOB, INSTRUMENT TYPE: Molded plastic body with brass insert, 2 setscrews and white filled indicators, 0.750 in. dia by 0.438 in. hg, 82679 P/N MP123-1FB.	5-48
2MP2 thru 2MP4		SAME AS 2MP1.	5-48
2MP5		KNOB, INSTRUMENT TYPE: Molded plastic body with brass insert, 2 setscrews and white filled indicator depression, 0.750 in. dia by 0.438 in. hg, 82679 P/N MP123-3FB.	5-48
2MP6 thru 2MP12		SAME AS 2MP5.	5-48
2MP13		KNOB, INSTRUMENT TYPE: Molded plastic body with brass insert, 2 setscrews and white filled indicator lines, 0.750 in. dia by 0.438 in. hg, 82679 P/N MP123-3DB.	5-48
2MP14 thru 2MP16		SAME AS 2MP13.	5-48
2MP17		KNOB, INSTRUMENT TYPE: Molded plastic body with brass insert, 2 setscrews and white filled indicator line, 0.750 in. dia by 0.438 in. hg, 82679 P/N MP123-3SB.	5-48
2Q1		TRANSISTOR: MIL type 2N3442.	5-51
2Q2		SAME AS 2Q1.	5-51
2R1		RESISTOR, VARIABLE, COMPOSITION: 5000 ohms, ±10% tol, linear taper "A"; w/switch; bushing mounted, 1.094 in. dia, by 0.781 in. behind panel; 0.625 in. shaft length, 82679 P/N RV4NAYSA502AYY.	5-51
2R2		RESISTOR, VARIABLE, COMPOSITION: 5000 ohms, ±10% tol, "C" taper; w/switch; bushing mounted, 1.094 in. dia, by 0.781 in. behind panel; 0.625 in. shaft length, 82679 P/N RV4NATSC502CY.	5-51
2R3 thru 2R5		SAME AS 2R2.	5-51
2R6		SAME AS 2R1.	5-51
2R7		RESISTOR: MIL type RN60C6810F.	5-51
2R8		RESISTOR: MIL type RN60C2150F.	5-51
2R9		RESISTOR: MIL type RN60C1000F.	5-51
2R10		RESISTOR: MIL type RC42GF181J.	5-51

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2S1		NOT USED.	
2S2		SWITCH, ROTARY: 2 sections, 6 positions, 30° angle of throw, 2 poles. Non shorting contacts. Bakelite insulation. 0.250 in. dia shaft 0.750 in. lg from mtg surface. 3/8-32 and bushing mtd. 82679 P/N SW452.	5-51
2S3 thru 2S6		NOT USED.	
2S7		SWITCH: MIL type ST22K.	5-51
2S8		SWITCH, ROTARY: Single section, 3 position, 30° angle of throw, 1 pole. Non shorting contacts. Bakelite insulation. 0.250 in. dia shaft 0.750 in. lg from mounting surface. 3/8-32 thd bushing mounted. 82679 P/N SW449.	5-51
2S9		SWITCH, ROTARY: 1 section, 5 positions, 30° angle of throw, 2 poles. Non shorting contacts. Bakelite insulation. 0.250 in. dia shaft 0.750 in. lg from mtg surface. 3/8-32 thd bushing mtd. 82679 P/N SW454.	5-51
2S10		SWITCH, ROTARY: 1 section, 5 positions, 30° angle of throw, 1 pole. Non shorting contacts. Bakelite insulation. 0.250 in. dia shaft 0.750 in. lg from mtg surface. 3/8-32 thd bushing mtd. 82679 P/N SW455.	5-51
2S11		SAME AS 2S10.	5-51
2S12		SAME AS 2S10.	5-51
2T1		TRANSFORMER, STEP DOWN: Primary, 115/230 v, 50/60 cps, 1 phase. Secondary, 33.0 v, 22.8 v, 14.5 v, 28.2 v. Potted frame, solder type terminals. 3.562 in. lg by 3.000 in. wd by 2.625 in. hg. 82679 P/N TF363.	5-51
2XA1		CONNECTOR, RECEPTACLE, ELECTRICAL: 15 double sided female contacts rated at 5 amps and 1800 volts rms. Phenolic housing with floating bushing and eyelet terminals. Accepts printed circuit board thickness of 0.054 to 0.071 in. 82679 P/N JJ319A15DFE.	5-51
2XA2 thru 2XA13		SAME AS 2XA1.	5-51
2XA14		CONNECTOR, RECEPTACLE, ELECTRICAL: 30 phospher bronze gold plated contacts, solder lug terminals, phenolic body. 2.045 in. lg by 0.410 in. wd by 0.530 in. hg. 82679 P/N JJ340.	5-51
2XA15		SAME AS 2XA14.	5-51
2XA16		CONNECTOR, RECEPTACLE, ELECTRICAL: 30 gold plated phosper bronze contacts. 2.370 in. lg by 0.419 in. wd by 0.530 in. hg. Hole mounted. 82679 P/N JJ336.	5-51
2XA17		SAME AS 2XA16.	5-51
2XA18		SAME AS 2XA16.	5-51
2XDS1		LIGHT INDICATOR: Translucent white lens, 1.350 to 28 v, T-1-3/4 lamp base, 2 terminals. 0.437 in. dia by 1.500 in. lg. Dwg TS153-5. 72619 P/N 162-8430-0975-502.	5-51
2XF1		FUSEHOLDER, LAMP INDICATING: 90-250 v, 15 amps, neon lamp, clear knob, accommodates 1/2 in. dia x 1-1/4 in. lg fuse. Dwg FH104-3. 71400 P/N HKL-X.	5-51
2XF2		SAME AS 2XF1.	5-51

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A1		CIRCUIT CARD ASSEMBLY: 36 resistors, 24 capacitors, 17 transistors, 16 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg. 82679 P/N A4627.	5-53
2A1C1		CAPACITOR, FIXED, ELECTROLYTIC: 150 uf, 75 vdcw, 0.625 in. dia by 1.625 in. lg. Dwg CE119-150-75. 80183 P/N 39D157G075FJ4.	5-53
2A1C2		CAPACITOR, FIXED, ELECTROLYTIC: 200 uf, -10% +150% at 125 cps, 25°C, 15 vdcw, 0.437 in. dia by 1.625 in. lg. Dwg CE105-200-15. 14655 P/N NLW200-15.	5-53
2A1C3		CAPACITOR, FIXED, CERAMIC: 100,000 uuf, +80% -20% 100 vdcw, 0.690 in. dia by 0.156 in. thk, 0.375 in. lead spacing. 82679 P/N CC100-28.	5-53
2A1C4		CAPACITOR, FIXED, ELECTROLYTIC: 10 uf, -10% +150% at 125 cps, 25°C, 25 vdcw, 0.312 in. dia by 0.750 in. lg. Dwg CE105-10-25. 14655 P/N NLW10-25.	5-53
2A1C5		SAME AS 2A1C3.	5-53
2A1C6		CAPACITOR: MIL type CS13BE476K.	5-53
2A1C7		CAPACITOR, FIXED, ELECTROLYTIC: 350 uf, 75 vdcw, 0.750 in. dia by 2.125 in. lg. Dwg CE119-350-75. 80183 P/N 39D157G075FJ4.	5-53
2A1C8		SAME AS 2A1C2.	5-53
2A1C9		SAME AS 2A1C3.	5-53
2A1C10		SAME AS 2A1C4.	5-53
2A1C11		SAME AS 2A1C3.	5-53
2A1C12		SAME AS 2A1C6.	5-53
2A1C13		CAPACITOR, FIXED, ELECTROLYTIC: 150 uf, 30 vdcw, 0.500 in. dia by 1.625 in. lg. Dwg CE119-150-30. 80183 P/N 39D157G030EJ4.	5-53
2A1C14		SAME AS 2A1C2.	5-53
2A1C15		SAME AS 2A1C3.	5-53
2A1C16		SAME AS 2A1C4.	5-53
2A1C17		SAME AS 2A1C3.	5-53
2A1C18		CAPACITOR: MIL type CS13BC227K.	5-53
2A1C19		CAPACITOR, FIXED, ELECTROLYTIC: 500 uf, 50 vdcw, 0.875 in. dia by 2.125 in. lg. Dwg CE119-500-50. 80183 P/N 39D507G050HL4.	5-53
2A1C20		SAME AS 2A1C2.	5-53
2A1C21		SAME AS 2A1C3.	5-53
2A1C22		SAME AS 2A1C4.	5-53
2A1C23		SAME AS 2A1C3.	5-53
2A1C24		SAME AS 2A1C6.	5-53
2A1CR1		RECTIFIER, SEMICONDUCTOR DEVICE: 140 v input, dc output, 124 v resistive load, 200 v capacitive load. Wire leads. Corrosion resistant plastic case. 0.900 in. lg by 0.670 in. hg by 0.260 in. wd. 82679 P/N DD144-6.	5-53
2A1CR2		SEMICONDUCTOR DEVICE: MIL type 1N4370.	5-53
2A1CR3		SEMICONDUCTOR DEVICE: MIL type 1N754A.	5-53
2A1CR4		SAME AS 2A1CR1.	5-53
2A1CR5		SAME AS 2A1CR2.	5-53
2A1CR6		SAME AS 2A1CR3.	5-53
2A1CR7		SAME AS 2A1CR1.	5-53
2A1CR8		SAME AS 2A1CR2.	5-53
2A1CR9		SAME AS 2A1CR2.	5-53
2A1CR10		SAME AS 2A1CR1.	5-53
2A1CR11		SAME AS 2A1CR2.	5-53
2A1CR12		SAME AS 2A1CR3.	5-53
2A1CR13		SEMICONDUCTOR DEVICE: MIL type 1N914.	5-53

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A1CR14 thru 2A1CR16		SAME AS 2A1CR13.	5-53
2A1Q1		TRANSISTOR: MIL type 2N4036.	5-53
2A1Q2		TRANSISTOR: MIL type 2N2631.	5-53
2A1Q3		TRANSISTOR: MIL type 2N706.	5-53
2A1Q4		TRANSISTOR: MIL type 2N1711.	5-53
2A1Q5		SAME AS 2A1Q1.	5-53
2A1Q6		SAME AS 2A1Q2.	5-53
2A1Q7		SAME AS 2A1Q3.	5-53
2A1Q8		SAME AS 2A1Q4.	5-53
2A1Q9		TRANSISTOR: MIL type 2N1132.	5-53
2A1Q10		SAME AS 2A1Q4.	5-53
2A1Q11		SAME AS 2A1Q2.	5-53
2A1Q12		SAME AS 2A1Q3.	5-53
2A1Q13		SAME AS 2A1Q3.	5-53
2A1Q14		SAME AS 2A1Q2.	5-53
2A1Q15		SAME AS 2A1Q1.	5-53
2A1Q16		SAME AS 2A1Q9.	5-53
2A1Q17		SAME AS 2A1Q1.	5-53
2A1R1		RESISTOR: MIL type RC07GF682J.	5-53
2A1R2		RESISTOR: MIL type RC07GF331J.	5-53
2A1R3		RESISTOR: MIL type RC07GF151J.	5-53
2A1R4		RESISTOR, VARIABLE, WIREWOUND: 100 ohms, ±20% tol, 0.250 in. dia by 0.250 in. hg. PC type mounting pins. Dwg RV126-61P101. 80740 P/N 61P101.	5-53
2A1R5		RESISTOR: MIL type RW69V1R2J.	5-53
2A1R6		RESISTOR: MIL type RC07GF332J.	5-53
2A1R7		RESISTOR: MIL type RC07GF472J.	5-53
2A1R8		RESISTOR, VARIABLE, WIREWOUND: 1000 ohms, +20% tol. 0.250 in. dia by 0.250 in. hg. 82679 P/N RV124-1-102.	5-53
2A1R9		RESISTOR: MIL type RC07GF152J.	5-53
2A1R10		SAME AS 2A1R6.	5-53
2A1R11		RESISTOR: MIL type RC07GF681J.	5-53
2A1R12		SAME AS 2A1R3.	5-53
2A1R13		SAME AS 2A1R4.	5-53
2A1R14		RESISTOR: MIL type RC20GF3R9J.	5-53
2A1R15		SAME AS 2A1R9.	5-53
2A1R16		RESISTOR: MIL type RC07GF682J.	5-53
2A1R17		SAME AS 2A1R8.	5-53
2A1R18		SAME AS 2A1R16.	5-53
2A1R19		RESISTOR: MIL type RC07GF222J.	5-53
2A1R20		SAME AS 2A1R11.	5-53
2A1R21		SAME AS 2A1R3.	5-53
2A1R22		SAME AS 2A1R4.	5-53
2A1R23		RESISTOR: MIL type RC07GF100J.	5-53
2A1R24		RESISTOR: MIL type RC07GF101J.	5-53
2A1R25		SAME AS 2A1R24.	5-53
2A1R26		SAME AS 2A1R4.	5-53
2A1R27		RESISTOR: MIL type RC07GF2R7J.	5-53
2A1R28		SAME AS 2A1R7.	5-53
2A1R29		RESISTOR: MIL type RC07GF221J.	5-53
2A1R30		SAME AS 2A1R3.	5-53
2A1R31		SAME AS 2A1R8.	5-53
2A1R32		RESISTOR: MIL type RC07GF150J.	5-53
2A1R33		SAME AS 2A1R6.	5-53
2A1R34		RESISTOR: MIL type RC07GF153J.	5-53

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A1R35		RESISTOR, VARIABLE, WIREWOUND: 5000 ohms, ±20% tol. 0.250 in. dia, by 0.250 in. hg. 82679 P/N RV124-1-502.	5-53
2A1R36		SAME AS 2A1R16.	5-53
2A2		CIRCUIT CARD ASSEMBLY: 37 resistors, 13 capacitors, 1 integrated circuit, 16 transistors, 17 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg. 82679 P/N A4628.	5-55
2A2C1		CAPACITOR: MIL type CS13BE106K.	5-55
2A2C2 thru 2A2C4		SAME AS 2A2C1.	5-55
2A2C5		CAPACITOR: MIL type CS13BE225K.	5-55
2A2C6		SAME AS 2A2C5.	5-55
2A2C7		CAPACITOR, FIXED, CERAMIC: 10,000 uuf, ±20%, 100 vdcw, 0.344 in. dia by 0.125 in. thk, 0.250 in. lead spacing. 82679 P/N CC100-43.	5-55
2A2C8		SAME AS 2A2C7.	5-55
2A2C9		SAME AS 2A1C18.	5-55
2A2C10 thru 2A2C21		NOT USED.	
2A2C22		SAME AS 2A1C3.	5-55
2A2C23		CAPACITOR, FIXED, MICA: 100 uuf, ±5% tol, 500 vdcw, 0.400 in. lg by 0.403 in. wd by 0.170 in. thk. 82679 P/N CM111F101J5S.	5-55
2A2C24		CAPACITOR, FIXED, MICA: 3 uuf, ±1/2% tol, 500 vdcw, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111C030D5S.	5-55
2A2C25		SAME AS 2A1C3.	5-55
2A2CR1 thru 2A2CR5		SAME AS 2A1CR13.	5-55
2A2CR6		NOT USED.	
2A2CR7		NOT USED.	
2A2CR8		SAME AS 2A1CR13.	5-55
2A2CR9		NOT USED.	
2A2CR10		NOT USED.	
2A2CR11		SAME AS 2A1CR13.	5-55
2A2CR12		NOT USED.	
2A2CR13		NOT USED.	
2A2CR14		SAME AS 2A1CR13.	5-55
2A2CR15		NOT USED.	
2A2CR16		NOT USED.	
2A2CR17		SAME AS 2A1CR13.	5-55
2A2CR18		NOT USED.	
2A2CR19		SAME AS 2A1CR13.	5-55
2A2CR20		SAME AS 2A1CR13.	5-55
2A2CR21		SAME AS 2A1CR13.	5-55
2A2Q1		SAME AS 2A1Q3.	5-55
2A2Q2		SAME AS 2A1Q3.	5-55
2A2Q3		SAME AS 2A1Q4.	5-55
2A2Q4		SAME AS 2A1Q9.	5-55
2A2Q5		TRANSISTOR: MIL type 2N3766.	5-55
2A2Q6		TRANSISTOR: MIL type 2N3740.	5-55
2A2Q7 thru 2A2Q16		SAME AS 2A1Q3.	5-55
2A2R1		RESISTOR: MIL type RC07GF103J.	5-55

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2R2		SAME AS 2A1R16.	5-55
2A2R3		SAME AS 2A1R6.	5-55
2A2R4		RESISTOR: MIL type RC07GF102J.	5-55
2A2R5		SAME AS 2A2R1.	5-55
2A2R6		SAME AS 2A1R34.	5-55
2A2R7		SAME AS 2A2R1.	5-55
2A2R8		SAME AS 2A1R19.	5-55
2A2R9		SAME AS 2A1R29.	5-55
2A2R10		SAME AS 2A1R9.	5-55
2A2R11		SAME AS 2A1R34.	5-55
2A2R12		SAME AS 2A1R7.	5-55
2A2R13 thru 2A2R16		NOT USED.	
2A2R17		RESISTOR: MIL type RC07GF471J.	5-55
2A2R18 thru 2A2R26		NOT USED.	
2A2R27		SAME AS 2A2R17.	5-55
2A2R28 thru 2A2R39		NOT USED.	
2A2R40		SAME AS 2A2R17.	5-55
2A2R41 thru 2A2R52		NOT USED.	
2A2R53		SAME AS 2A2R17.	5-55
2A2R54 thru 2A2R64		NOT USED.	
2A2R65		RESISTOR, VARIABLE: 25k ohms, ±30%, 200 vdcw, 0.250 in. dia by 0.250 in. hg. 82679 P/N RV124-1-253.	5-55
2A2R66		SAME AS 2A1R7.	5-55
2A2R67		SAME AS 2A1R7.	5-55
2A2R68		SAME AS 2A1R7.	5-55
2A2R69		SAME AS 2A1R7.	5-55
2A2R70		SAME AS 2A2R65.	5-55
2A2R71		RESISTOR: MIL type RC07GF223J.	5-55
2A2R72		RESISTOR: MIL type RC07GF224J.	5-55
2A2R73		SAME AS 2A1R7.	5-55
2A2R74		SAME AS 2A1R24.	5-55
2A2R75		SAME AS 2A2R65.	5-55
2A2R76		SAME AS 2A1R24.	5-55
2A2R77		RESISTOR: MIL type RC07GF474J.	5-55
2A2R78		SAME AS 2A1R9.	5-55
2A2R79		SAME AS 2A1R24.	5-55
2A2R80		SAME AS 2A2R1.	5-55
2A2R81		SAME AS 2A2R4.	5-55
2A2R82		SAME AS 2A1R9.	5-55
2A2R83		RESISTOR: MIL type RC20GF102J.	5-55
2A2R84		SAME AS 2A2R83.	5-55
2A2R85		NOT USED.	
2A2R86		NOT USED.	
2A2R87		SAME AS 2A2R17.	5-55
2A2VR1		NOT USED.	
2A2VR2		NOT USED.	
2A2VR3		SEMICONDUCTOR DEVICE: MIL type 1N759A.	5-55
2A2VR4		SAME AS 2A2VR1.	5-55

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A2Z1 thru 2A2Z4		NOT USED.	
2A2Z5		INTEGRATED CIRCUIT, OPERATIONAL AMPLIFIER: 8 pins, metal case. Supply voltage ±18 v. 0.375 in. dia by 0.187 in. hg. 82679 P/N NW156.	5-55
2A3		CIRCUIT CARD ASSEMBLY: 79 resistors, 62 capacitors, 11 coils, 3 filters, 6 integrated circuits, 18 transistors, 4 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg. 82679 P/N A4629.	5-57
2A3C1		SAME AS 2A1C3.	5-57
2A3C2		CAPACITOR: MIL type CS13BF106K.	5-57
2A3C3		SAME AS 2A1C3.	5-57
2A3C4		SAME AS 2A2C23.	5-57
2A3C5		NOT USED.	
2A3C6		SAME AS 2A1C3.	5-57
2A3C7		CAPACITOR, FIXED, CERAMIC: 10,000 uuf, gmv, 600 vdcw, 0.600 in. dia by 0.156 in. thk, 0.375 in. lead spacking. 82679 P/N CC100-16.	5-57
2A3C8		SAME AS 2A1C3.	5-57
2A3C9		SAME AS 2A2C1.	5-57
2A3C10		SAME AS 2A1C3.	5-57
2A3C11		CAPACITOR, VARIABLE, CERAMIC: 5.5-18 uuf, 200 vdcw, min Q=500 at 1 mc. 0.375 in. dia by 0.375 in. hg. 82679 P/N CV112-7.	5-57
2A3C12		CAPACITOR, FIXED, MICA: 180 uuf, ±2% tol, 500 vdcw, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F181G5S.	5-57
2A3C13		CAPACITOR, FIXED, MICA: 150 uuf, ±1% tol, 500 vdcw. 0.400 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F121F5S.	5-57
2A3C14		CAPACITOR, FIXED, MICA: 10 uuf, ±5% tol, 500 vdcw, 0.400 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111C100J5S.	5-57
2A3C15 thru 2A3C18		SAME AS 2A3C7.	5-57
2A3C19		SAME AS 2A3C12.	5-57
2A3C20		SAME AS 2A3C7.	5-57
2A3C21		SAME AS 2A3C7.	5-57
2A3C22		SAME AS 2A1C3.	5-57
2A3C23		SAME AS 2A2C1.	5-57
2A3C24		CAPACITOR, FIXED, MICA: 10,000 uuf, ±1% tol, 500 vdcw, 0.790 in. lg by 0.570 in. wd by 0.340 in. thk. 82679 P/N CM112F103F1S.	5-57
2A3C25		SAME AS 2A3C24.	5-57
2A3C26		SAME AS 2A1C3.	5-57
2A3C27		SAME AS 2A3C7.	5-57
2A3C28		SAME AS 2A1C3.	5-57
2A3C29		SAME AS 2A3C7.	5-57
2A3C30		SAME AS 2A1C3.	5-57
2A3C31		SAME AS 2A3C7.	5-57
2A3C32		SAME AS 2A1C3.	5-57
2A3C33		SAME AS 2A3C7.	5-57
2A3C34		CAPACITOR, FIXED, MICA: 3300 uuf, ±2% tol, 500 vdcw, 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM112F332G5S.	5-57
2A3C35		SAME AS 2A3C7.	5-57
2A3C36		SAME AS 2A3C7.	5-57

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A3C37 thru 2A3C40		SAME AS 2A1C3.	5-57
2A3C41		SAME AS 2A2C1.	5-57
2A3C42 thru 2A3C45		SAME AS 2A1C3.	5-57
2A3C46		NOT USED.	
2A3C47		SAME AS 2A2C1.	5-57
2A3C48		SAME AS 2A1C3.	5-57
2A3C49		SAME AS 2A1C3.	5-57
2A3C50		SAME AS 2A1C3.	5-57
2A3C51		CAPACITOR, FIXED, MICA: 1800 uuf, ±2% tol, 500 vdcw, 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM112F182G5S.	5-57
2A3C52		SAME AS 2A1C3.	5-57
2A3C53		SAME AS 2A1C3.	5-57
2A3C54		SAME AS 2A3C51.	5-57
2A3C55		SAME AS 2A3C7.	5-57
2A3C56		SAME AS 2A3C7.	5-57
2A3C57 thru 2A3C62		SAME AS 2A1C3.	5-57
2A3C63		SAME AS 2A1C6.	5-57
2A3C64		SAME AS 2A2C1.	5-57
2A3CR1 thru 2A3CR4		SAME AS 2A1CR13.	5-57
2A3FL1		FILTER, BANDPASS: 6.290 mc center frequency; 3 v rms signal input. Wire leads, hermetically sealed metal case. 2.300 in. lg by 1.000 in. wd by 0.670 in. hg. 82679 P/N FX272-6.290.	5-57
2A3FL2		FILTER, BANDPASS: 0.24371 mc center frequency; 3 v rms signal input. Wire leads, hermetically sealed metal case. 2.300 in. lg by 1.000 in. wd by 0.670 in. hg. 82679 P/N FX272-.25692.	5-57
2A3FL3		FILTER, BANDPASS: 0.24371 mc center frequency; 3 v rms signal input. Wire leads, hermetically sealed metal case. 2.300 in. lg by 1.000 in. wd by 0.670 in. hg. 82679 P/N FX272-.24371.	5-57
2A3L1		COIL, RF, FIXED: 100 uh, Q=52 at 2.5 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-101.	5-57
2A3L2		COIL, RF, FIXED: 330 uh, Q=54 at 0.79 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-331.	5-57
2A3L3		COIL, RF, FIXED: 7.3 uh, Q=120 min at 7.9 mc, 0.530 in. dia by 0.220 in. lg. 82679 P/N CL436.	5-57
2A3L4		COIL, RF, FIXED: 2200 uh, Q=50 at 0.25 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-222.	5-57
2A3L5		COIL, RF, FIXED: 3.3 uh, Q=44 at 7.9 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-3R3.	5-57
2A3L6		SAME AS 2A3L2.	5-57
2A3L7		COIL, RF, FIXED: 100,000 uh, Q=18 at 0.79 mc, 0.157 in. dia 0.395 in. lg. 82679 P/N CL433-104.	5-57
2A3L8		COIL, RF, FIXED: 680 uh, Q=60 at 0.79 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-681.	5-57
2A3L9		COIL, RF, FIXED: 120 uh, Q=57 at 0.79 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-121.	5-57
2A3L10		COIL, RF, FIXED: 220 uh, Q=58 at 0.79 mc, 0.157 in. dia by 0.395 in. lg. 82679 P/N CL433-221.	5-57
2A3L11		SAME AS 2A3L10.	5-57
2A3Q1 thru 2A3Q6		SAME AS 2A1Q3.	5-57

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A3Q7		SAME AS 2A1Q9.	5-57
2A3Q8		SAME AS 2A1Q4.	5-57
2A3Q9 thru 2A3Q14		SAME AS 2A1Q3.	5-57
2A3Q15		SAME AS 2A1Q4.	5-57
2A3Q16		SAME AS 2A1Q4.	5-57
2A3Q17		SAME AS 2A1Q3.	5-57
2A3Q18		SAME AS 2A1Q3.	5-57
2A3R1		RESISTOR: MIL type RC020GF680J.	5-57
2A3R2		SAME AS 2A1R34.	5-57
2A3R3		NOT USED.	
2A3R4		SAME AS 2A1R7.	5-57
2A3R5		SAME AS 2A1R2.	5-57
2A3R6		SAME AS 2A2R4.	5-57
2A3R7		SAME AS 2A1R19.	5-57
2A3R8		SAME AS 2A2R4.	5-57
2A3R9		SAME AS 2A2R4.	5-57
2A3R10		SAME AS 2A1R11.	5-57
2A3R11		SAME AS 2A1R6.	5-57
2A3R12		SAME AS 2A2R1.	5-57
2A3R13		SAME AS 2A1R7.	5-57
2A3R14		SAME AS 2A2R17.	5-57
2A3R15		RESISTOR: MIL type RC07GF470J.	5-57
2A3R16		SAME AS 2A2R17.	5-57
2A3R17		SAME AS 2A1R34.	5-57
2A3R18		SAME AS 2A1R11.	5-57
2A3R19		SAME AS 2A1R9.	5-57
2A3R20		SAME AS 2A1R6.	5-57
2A3R21		SAME AS 2A2R4.	5-57
2A3R22		SAME AS 2A1R23.	5-57
2A3R23		SAME AS 2A2R17.	5-57
2A3R24		SAME AS 2A1R6.	5-57
2A3R25		SAME AS 2A1R6.	5-57
2A3R26		SAME AS 2A1R6.	5-57
2A3R27		SAME AS 2A1R34.	5-57
2A3R28		SAME AS 2A1R24.	5-57
2A3R29		SAME AS 2A2R71.	5-57
2A3R30		SAME AS 2A1R19.	5-57
2A3R31		SAME AS 2A1R34.	5-57
2A3R32		RESISTOR: MIL type RC07GF104J.	5-57
2A3R33		SAME AS 2A2R71.	5-57
2A3R34		SAME AS 2A2R4.	5-57
2A3R35		SAME AS 2A1R7.	5-57
2A3R36		SAME AS 2A1R3.	5-57
2A3R37		SAME AS 2A2R1.	5-57
2A3R38		SAME AS 2A1R34.	5-57
2A3R39		SAME AS 2A2R4.	5-57
2A3R40		SAME AS 2A2R1.	5-57
2A3R41		SAME AS 2A2R4.	5-57
2A3R42		SAME AS 2A2R1.	5-57
2A3R43		SAME AS 2A2R1.	5-57
2A3R44		SAME AS 2A1R34.	5-57
2A3R45		SAME AS 2A2R4.	5-57
2A3R46		SAME AS 2A1R9.	5-57
2A3R47		SAME AS 2A1R7.	5-57
2A3R48		SAME AS 2A1R7.	5-57
2A3R49		SAME AS 2A1R16.	5-57

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A3R50		SAME AS 2A1R3.	5-57
2A3R51		SAME AS 2A1R19.	5-57
2A3R52		RESISTOR: MIL type RC07GF333J.	5-57
2A3R53		SAME AS 2A1R6.	5-57
2A3R54		SAME AS 2A2R4.	5-57
2A3R55		SAME AS 2A3R15.	5-57
2A3R56		NOT USED.	
2A3R57		SAME AS 2A3R15.	5-57
2A3R58		SAME AS 2A2R4.	5-57
2A3R59		SAME AS 2A2R4.	5-57
2A3R60		SAME AS 2A1R16.	5-57
2A3R61		SAME AS 2A1R3.	5-57
2A3R62		SAME AS 2A1R9.	5-57
2A3R63		SAME AS 2A1R9.	5-57
2A3R64		SAME AS 2A2R71.	5-57
2A3R65		SAME AS 2A1R7.	5-57
2A3R66		SAME AS 2A1R7.	5-57
2A3R67		SAME AS 2A2R71.	5-57
2A3R68		SAME AS 2A1R19.	5-57
2A3R69		SAME AS 2A1R24.	5-57
2A3R70		SAME AS 2A1R19.	5-57
2A3R71		SAME AS 2A1R19.	5-57
2A3R72		SAME AS 2A1R24.	5-57
2A3R73		SAME AS 2A1R19.	5-57
2A3R74		SAME AS 2A2R1.	5-57
2A3R75		SAME AS 2A1R6.	5-57
2A3R76		SAME AS 2A1R6.	5-57
2A3R77		SAME AS 2A2R1.	5-57
2A3R78		SAME AS 2A1R24.	5-57
2A3R79		SAME AS 2A1R6.	5-57
2A3R80		SAME AS 2A1R6.	5-57
2A3R81		SAME AS 2A1R24.	5-57
2A3Z1		INTEGRATED CIRCUIT, DECADE COUNTER: 14 pins, plastic case. Supply voltage 4.75 v to 5.25 v. Case; 0.770 in. lg by 0.250 in. wd by 0.200 in. hg. 82679 P/N NW134.	5-57
2A3Z2 thru 2A3Z5		SAME AS 2A3Z1.	5-57
2A3Z6		INTEGRATED CIRCUIT, MASTER-SLAVE FLIP FLOP: 14 pins plastic case. Supply voltage 4.75 v to 5.25 v. 0.750 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW159.	5-57
2A4		CIRCUIT CARD ASSEMBLY: 77 resistors, 48 capacitors, 6 coils, 2 transformers, 16 transistors, 11 semiconductors, plug-in item; 0.031 in. lg by 5.969 in. wd by 0.750 in. hg. 82679 P/N A4630.	5-59
2A4C1		CAPACITOR, FIXED, MICA: 220 uuf, ±2% tol, 500 vdcw, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F221G5S.	5-59
2A4C2		CAPACITOR, FIXED, MICA: 150 uuf, ±1% tol, 500 vdcw, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F151F5S.	5-59
2A4C3		CAPACITOR, FIXED, MICA: 22 uuf, ±5% tol, 500 vdcw, 0.440 in. lg by 0.437 in. wd by 0.170 in. thk. 82679 P/N CM111E220J5S.	5-59
2A4C4 thru 2A4C7		SAME AS 2A1C3.	5-59
2A4C8		SAME AS 2A3C7.	5-59

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A4C9		SAME AS 2A3C7.	5-59
2A4C10		SAME AS 2A2C1.	5-59
2A4C11		SAME AS 2A2C1.	5-59
2A4C12 thru 2A4C16		SAME AS 2A1C3.	5-59
2A4C17		CAPACITOR, FIXED, MICA: 120 uuf, ±2% tol, 500 vdcw, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM111F121G5S.	5-59
2A4C18		SAME AS 2A1C3.	5-59
2A4C19		CAPACITOR, FIXED, MICA: 1500 uuf, ±1% tol, 500 vdcw, 0.640 in. lg by 0.591 in. thk. 82679 P/N CM112F152F5S.	5-59
2A4C20		CAPACITOR, FIXED, MICA: 4700 uuf, ±5% tol, 300 vdcw, 0.665 in. lg by 0.625 in. wd by 0.240 in. thk. 82679 P/N CM112F472J5S.	5-59
2A4C21		SAME AS 2A1C3.	5-59
2A4C22		SAME AS 2A1C3.	5-59
2A4C23		SAME AS 2A1C3.	5-59
2A4C24		SAME AS 2A3C51.	5-59
2A4C25 thru 2A4C29		SAME AS 2A1C3.	5-59
2A4C30		CAPACITOR, FIXED, MICA: 100 uuf, ±1% tol, 100 vdcw, 0.790 in. lg by 0.570 in. wd by 0.340 in. thk. 82679 P/N CM112F102F1S.	5-59
2A4C31		SAME AS 2A3C24.	5-59
2A4C32		SAME AS 2A2C1.	5-59
2A4C33		CAPACITOR: MIL type CS13BF226K.	5-59
2A4C34		SAME AS 2A1C6.	5-59
2A4C35		CAPACITOR, FIXED, CERAMIC: 1,000 uuf, gmv, 500 vdcw, 0.310 in. dia by 0.156 in. thk, 0.250 in. lead spacing. 82679 P/N CC100-29.	5-59
2A4C36		SAME AS 2A1C6.	5-59
2A4C37		SAME AS 2A1C6.	5-59
2A4C38		SAME AS 2A1C6.	5-59
2A4C39 thru 2A4C44		SAME AS 2A2C1.	5-59
2A4C45		SAME AS 2A3C2.	5-59
2A4C46		SAME AS 2A2C1.	5-59
2A4C47		SAME AS 2A2C1.	5-59
2A4C48		SAME AS 2A2C1.	5-59
2A4CR1		SEMICONDUCTOR DEVICE: MIL type 1N277.	5-59
2A4CR2 thru 2A4CR8		SAME AS 2A1CR13.	5-59
2A4CR9		SAME AS 2A2VR1.	5-59
2A4CR10		CAPACITOR, VOLTAGE VARIABLE: 100 uuf, at 4 vdc, approx range 57-250 uuf. Typical Q at 4 vdc = 11, 15 vdcw. 0.140 in. dia by 0.300 in. lg, wire leads. Dwg CX106-15, 01281 P/N Y100.	5-59
2A4CR11		SAME AS 2A2CR19.	5-59
2A4CR12		SAME AS 2A2CR19.	5-59
2A4L1		COIL, RF, FIXED: 3300 uh, ±10% tol, 10 ohms max dc res. 0.157 in. dia by 0.450 in. lg. 82679 P/N CL275-332.	5-59
2A4L2		SAME AS 2A4L1.	5-59
2A4L3		COIL, RF, FIXED: 1500 uh, ±10% tol, 10 ohms max dc res. 0.157 in. dia by 0.450 in. lg. 82679 P/N CL275-152.	5-59
2A4L4		COIL, RF, FIXED: 2200 uh, ±10% tol, 10 ohms max dc res. 0.157 in. dia by 0.450 in. lg. 82679 P/N CL275-222.	5-59
2A4L5		COIL, RF, FIXED: 220 uh, ±10% tol, 10 ohms max dc res. 0.157 in. dia by 0.450 in. lg. 82679 P/N CL275-221.	5-59

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A4L6		COIL, RF, FIXED: 6800 uh, ±10% tol, 10 ohms max dc res. 0.157 in. dia by 0.450 in. lg. 82679 P/N CL275-682.	5-59
2A4Q1 thru 2A4Q9		SAME AS 2A1Q3.	5-59
2A4Q10		SAME AS 2A1Q4.	5-59
2A4Q11		SAME AS 2A1Q3.	5-59
2A4Q12		SAME AS 2A1Q4.	5-59
2A4Q13 thru 2A4Q16		SAME AS 2A1Q3.	5-59
2A4R1		RESISTOR: MIL type RC07GF473J.	5-59
2A4R2		SAME AS 2A2R1.	5-59
2A4R3		SAME AS 2A2R1.	5-59
2A4R4		SAME AS 2A2R17.	5-59
2A4R5		SAME AS 2A1R19.	5-59
2A4R6		SAME AS 2A2R1.	5-59
2A4R7		SAME AS 2A3R52.	5-59
2A4R8		SAME AS 2A1R24.	5-59
2A4R9		SAME AS 2A1R24.	5-59
2A4R10		SAME AS 2A1R35.	5-59
2A4R11		SAME AS 2A2R71.	5-59
2A4R12		SAME AS 2A1R6.	5-59
2A4R13		SAME AS 2A1R16.	5-59
2A4R14		SAME AS 2A1R19.	5-59
2A4R15		SAME AS 2A2R1.	5-59
2A4R16		SAME AS 2A2R1.	5-59
2A4R17		SAME AS 2A2R1.	5-59
2A4R18		SAME AS 2A2R4.	5-59
2A4R19		SAME AS 2A1R2.	5-59
2A4R20		SAME AS 2A1R2.	5-59
2A4R21		SAME AS 2A1R2.	5-59
2A4R22		SAME AS 2A1R2.	5-59
2A4R23		SAME AS 2A1R35.	5-59
2A4R24		SAME AS 2A1R35.	5-59
2A4R25		SAME AS 2A1R7.	5-59
2A4R26		SAME AS 2A2R71.	5-59
2A4R27		SAME AS 2A2R1.	5-59
2A4R28		SAME AS 2A1R24.	5-59
2A4R29		SAME AS 2A2R1.	5-59
2A4R30		SAME AS 2A1R19.	5-59
2A4R31		SAME AS 2A2R71.	5-59
2A4R32		SAME AS 2A2R71.	5-59
2A4R33		SAME AS 2A1R6.	5-59
2A4R34		SAME AS 2A1R24.	5-59
2A4R35		SAME AS 2A1R16.	5-59
2A4R36		SAME AS 2A2R71.	5-59
2A4R37		SAME AS 2A2R71.	5-59
2A4R38		SAME AS 2A1R29.	5-59
2A4R39		SAME AS 2A2R1.	5-59
2A4R40		SAME AS 2A2R1.	5-59
2A4R41		SAME AS 2A2R71.	5-59
2A4R42		SAME AS 2A1R24.	5-59
2A4R43		SAME AS 2A1R24.	5-59
2A4R44		SAME AS 2A1R19.	5-59
2A4R45		SAME AS 2A2R71.	5-59
2A4R46		SAME AS 2A1R6.	5-59
2A4R47		SAME AS 2A1R6.	5-59
2A4R48		SAME AS 2A1R2.	5-59

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A4R49		SAME AS 2A2R71.	5-59
2A4R50		SAME AS 2A1R6.	5-59
2A4R51		SAME AS 2A1R19.	5-59
2A4R52		SAME AS 2A2R20.	5-59
2A4R53		SAME AS 2A1R2.	5-59
2A4R54		SAME AS 2A1R2.	5-59
2A4R55		SAME AS 2A1R34.	5-59
2A4R56		SAME AS 2A1R34.	5-59
2A4R57		SAME AS 2A1R11.	5-59
2A4R58		SAME AS 2A2R1.	5-59
2A4R59		SAME AS 2A1R29.	5-59
2A4R60		SAME AS 2A2R71.	5-59
2A4R61		SAME AS 2A2R1.	5-59
2A4R62		SAME AS 2A2R1.	5-59
2A4R63		SAME AS 2A2R17.	5-59
2A4R64		SAME AS 2A1R7.	5-59
2A4R65		SAME AS 2A4R1.	5-59
2A4R66		SAME AS 2A2R1.	5-59
2A4R67		SAME AS 2A1R16.	5-59
2A4R68		SAME AS 2A1R9.	5-59
2A4R69		SAME AS 2A2R17.	5-59
2A4R70		SAME AS 2A1R29.	5-59
2A4R71		SAME AS 2A2R1.	5-59
2A4R72		SAME AS 2A1R7.	5-59
2A4R73		SAME AS 2A1R19.	5-59
2A4R74		SAME AS 2A1R19.	5-59
2A4R75		SAME AS 2A1R24.	5-59
2A4R76		SAME AS 2A2R17.	5-59
2A4R77		SAME AS 2A2R17.	5-59
2A4T1		TRANSFORMER, PULSE: 2,500 uh, ±20% tol, wire leads 0.500 in. lg by 0.350 in. wd by 0.250 in. hg. Dwg TD374-5. 90095 P/N 21PHA.	5-59
2A4T2		SAME AS 2A4T1.	5-59
2A5		CIRCUIT CARD ASSEMBLY: 99 resistors, 64 capacitors, 6 coils, 2 filters, 21 transistors, 7 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg. 82679 P/N A4631.	5-61
2A5C1 thru 2A5C23		SAME AS 2A1C3.	5-61
2A5C24		SAME AS 2A4C3.	5-61
2A5C25		SAME AS 2A1C3.	5-61
2A5C26		SAME AS 2A1C3.	5-61
2A5C27		SAME AS 2A1C3.	5-61
2A5C28		SAME AS 2A4C3.	5-61
2A5C29 thru 2A5C32		SAME AS 2A1C3.	5-61
2A5C33		SAME AS 2A4C3.	5-61
2A5C34 thru 2A5C38		SAME AS 2A1C3.	5-61
2A5C39		SAME AS 2A4C3.	5-61
2A5C40 thru 2A5C51		SAME AS 2A1C3.	5-61

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A5C52		SAME AS 2A3C51.	5-61
2A5C53 thru 2A5C59		SAME AS 2A1C3.	5-61
2A5C60		SAME AS 2A2C5.	5-61
2A5C61		CAPACITOR, FIXED: MIL type C913BF475K.	5-61
2A5C62		CAPACITOR: MIL type CS13BF107K.	5-61
2A5C63		SAME AS 2A1C3.	5-61
2A5C64		SAME AS 2A1C3.	5-61
2A5CR1		SAME AS 2A1CR13.	5-61
2A5CR2		SAME AS 2A1CR13.	5-61
2A5CR3		SAME AS 2A1CR13.	5-61
2A5CR4		SAME AS 2A4CR1.	5-61
2A5CR5		SAME AS 2A4CR1.	5-61
2A5CR6		SAME AS 2A4CR1.	5-61
2A5FL1		FILTER, BANDPASS: 2.5 kc symmetrical, 3 v rms max signal input. 2.750 in. lg by 1.875 in. wd by 0.670 in. hg. 82679 P/N FX262.	5-61
2A5FL2		FILTER, BANDPASS: 6 kc symmetrical, 3 v rms max signal input. 2.750 in. lg by 1.875 in. wd by 0.670 in. hg. 82679 P/N FX259.	5-61
2A5L1		COIL, RF, FIXED: 10,000 uh, ±10% tol, 137 ohms max dc res, 0.157 in. dia by 0.450 in. lg. 82679 P/N CL275-103.	5-61
2A5L2 thru 2A5L4		SAME AS 2A5L1.	5-61
2A5L5		SAME AS 2A4L5.	5-61
2A5L6		COIL, RF, FIXED: 1000 uh, ±10%, 17.5 ohms max dc res, 0.157 in. dia by 0.450 in. lg. 82679 P/N CL275-102.	5-61
2A5Q1 thru 2A5Q4		SAME AS 2A1Q3.	5-61
2A5Q5		TRANSISTOR: MIL type 2N2369.	5-61
2A5Q6		SAME AS 2A5Q5.	5-61
2A5Q7		TRANSISTOR: MIL type 2N4223.	5-61
2A5Q8		TRANSISTOR: MIL type 2N4221.	5-61
2A5Q9		SAME AS 2A5Q5.	5-61
2A5Q10		SAME AS 2A5Q8.	5-61
2A5Q11		SAME AS 2A5Q8.	5-61
2A5Q12		SAME AS 2A1Q3.	5-61
2A5Q13		SAME AS 2A1Q3.	5-61
2A5Q14		SAME AS 2A1Q4.	5-61
2A5Q15 thru 2A5Q18		SAME AS 2A1Q3.	5-61
2A5Q19		SAME AS 2A5Q5.	5-61
2A5Q20		SAME AS 2A5Q5.	5-61
2A5Q21		SAME AS 2A5Q5.	5-61
2A5R1		SAME AS 2A2R71.	5-61
2A5R2		SAME AS 2A2R71.	5-61
2A5R3		SAME AS 2A1R24.	5-61
2A5R4		RESISTOR: MIL type RN60D5110F.	5-61
2A5R5		SAME AS 2A1R29.	5-61
2A5R6		SAME AS 2A1R19.	5-61
2A5R7		SAME AS 2A2R4.	5-61
2A5R8		SAME AS 2A2R71.	5-61
2A5R9		SAME AS 2A5R4.	5-61
2A5R10		SAME AS 2A2R71.	5-61
2A5R11		SAME AS 2A1R19.	5-61

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A5R12		SAME AS 2A2R17.	5-61
2A5R13		SAME AS 2A2R1.	5-61
2A5R14		SAME AS 2A2R71.	5-61
2A5R15		SAME AS 2A2R71.	5-61
2A5R16		SAME AS 2A1R24.	5-61
2A5R17		SAME AS 2A5R4.	5-61
2A5R18		SAME AS 2A1R19.	5-61
2A5R19		SAME AS 2A1R29.	5-61
2A5R20		SAME AS 2A2R4.	5-61
2A5R21		SAME AS 2A5R4.	5-61
2A5R22		SAME AS 2A2R71.	5-61
2A5R23		SAME AS 2A3R52.	5-61
2A5R24		SAME AS 2A1R19.	5-61
2A5R25		SAME AS 2A2R17.	5-61
2A5R26		SAME AS 2A2R1.	5-61
2A5R27		SAME AS 2A1R2.	5-61
2A5R28		SAME AS 2A1R7.	5-61
2A5R29		SAME AS 2A1R19.	5-61
2A5R30		SAME AS 2A4R1.	5-61
2A5R31		SAME AS 2A3R32.	5-61
2A5R32		SAME AS 2A1R7.	5-61
2A5R33		SAME AS 2A1R7.	5-61
2A5R34		SAME AS 2A3R32.	5-61
2A5R35		SAME AS 2A1R7.	5-61
2A5R36		SAME AS 2A3R32.	5-61
2A5R37		SAME AS 2A1R19.	5-61
2A5R38		SAME AS 2A3R32.	5-61
2A5R39		SAME AS 2A2R17.	5-61
2A5R40		SAME AS 2A1R7.	5-61
2A5R41		SAME AS 2A1R19.	5-61
2A5R42		NOT USED.	
2A5R43		SAME AS 2A2R71.	5-61
2A5R44		SAME AS 2A2R71.	5-61
2A5R45		SAME AS 2A2R17.	5-61
2A5R46		SAME AS 2A1R7.	5-61
2A5R47		SAME AS 2A2R4.	5-61
2A5R48		SAME AS 2A1R24.	5-61
2A5R49		SAME AS 2A2R77.	5-61
2A5R50		SAME AS 2A1R7.	5-61
2A5R51		SAME AS 2A2R17.	5-61
2A5R52		SAME AS 2A4R1.	5-61
2A5R53		SAME AS 2A2R71.	5-61
2A5R54		SAME AS 2A2R71.	5-61
2A5R55		SAME AS 2A1R19.	5-61
2A5R56		SAME AS 2A2R17.	5-61
2A5R57		SAME AS 2A1R7.	5-61
2A5R58		RESISTOR, VARIABLE: 10 k ohms, ±30% tol, 200 vdcw, 0.250 in. dia by 0.250 in. hg. 82679 P/N RV124-1-103.	5-61
2A5R59		SAME AS 2A3R15.	5-61
2A5R60		SAME AS 2A3R32.	5-61
2A5R61		SAME AS 2A3R32.	5-61
2A5R62		SAME AS 2A1R19.	5-61
2A5R63		SAME AS 2A2R17.	5-61
2A5R64		SAME AS 2A1R7.	5-61
2A5R65		SAME AS 2A2R71.	5-61
2A5R66		SAME AS 2A2R71.	5-61

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A5R67		SAME AS 2A1R19.	5-61
2A5R68		SAME AS 2A1R35.	5-61
2A5R69		SAME AS 2A3R15.	5-61
2A5R70		SAME AS 2A1R9.	5-61
2A5R71		SAME AS 2A2R71.	5-61
2A5R72		SAME AS 2A1R19.	5-61
2A5R73		SAME AS 2A2R71.	5-61
2A5R74		SAME AS 2A1R9.	5-61
2A5R75		SAME AS 2A2R4.	5-61
2A5R76		NOT USED.	
2A5R77		SAME AS 2A1R9.	5-61
2A5R78		SAME AS 2A2R4.	5-61
2A5R79		SAME AS 2A2R71.	5-61
2A5R80		SAME AS 2A2R71.	5-61
2A5R81		SAME AS 2A1R7.	5-61
2A5R82		SAME AS 2A2R4.	5-61
2A5R83		SAME AS 2A1R6.	5-61
2A5R84		SAME AS 2A1R24.	5-61
2A5R85		SAME AS 2A2R71.	5-61
2A5R86		SAME AS 2A2R71.	5-61
2A5R87		SAME AS 2A1R19.	5-61
2A5R88		SAME AS 2A1R29.	5-61
2A5R89		SAME AS 2A1R7.	5-61
2A5R90		SAME AS 2A2R71.	5-61
2A5R91		SAME AS 2A1R7.	5-61
2A5R92		SAME AS 2A2R1.	5-61
2A5R93		RESISTOR, VARIABLE: 100 k ohms, ±30% tol, 200 vdcw, 0.250 in. dia by 0.250 in. hg. 82679 P/N RV124-1-104.	5-61
2A5R94		SAME AS 2A5R98.	5-61
2A5R95		RESISTOR, VARIABLE: 500 k ohms, ±30% tol, 200 vdcw, 0.250 in. dia by 0.250 in. hg. 82679 P/N RV124-1-504.	5-61
2A5R96		RESISTOR, VARIABLE: 250 k ohms, ±30% tol, 200 vdcw, 0.250 in. dia by 0.250 in. hg. 82679 P/N RV124-1-254.	5-61
2A5R97		SAME AS 2A5R96.	5-61
2A5R98		SAME AS 2A5R93.	5-61
2A5R99		SAME AS 2A2R17.	5-61
2A5VR1		SAME AS 2A2VR3.	5-61
2A6		CIRCUIT CARD ASSEMBLY: 51 resistors, 34 capacitors, 5 coils, 3 transformers, 15 transistors, 6 semiconductors, plug-in item; 9.031 in. lg by 5.969 in. wd by 0.750 in. hg. 82679 P/N A4632.	5-63
2A6C1		SAME AS 2A4C1.	5-63
2A6C2		SAME AS 2A5C2.	5-63
2A6C3		SAME AS 2A4C1.	5-63
2A6C4 thru 2A6C7		SAME AS 2A1C3.	5-63
2A6C8		CAPACITOR, FIXED, MICA: 1800 uuf, ±2% tol, 500 vdcw, 0.640 in. lg by 0.570 in. wd by 0.198 in. thk. 82679 P/N CM112F182G5S.	5-63
2A6C9 thru 2A6C12		SAME AS 2A1C3.	5-63
2A6C13		CAPACITOR, FIXED, MICA: 1,000 uuf, ±5% tol, 100 vdcw, 0.790 in. lg by 0.570 in. wd by 0.198 in. thk. 82679 P/N CM112F102J1S.	5-63
2A6C14		CAPACITOR, FIXED, MICA: 2200 uuf, ±2% tol, 500 vdcw. 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM112F222F5S.	5-63

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A6C15		CAPACITOR, FIXED, MICA: 10,000 uuf, ±1% tol, 100 vdcw. 0.790 in. lg by 0.570 in. wd by 0.340 in. thk. 82679 P/N CM112F103F1S.	5-63
2A6C16		SAME AS 2A1C24.	5-63
2A6C17		SAME AS 2A1C3.	5-63
2A6C18		SAME AS 2A1C6.	5-63
2A6C19		SAME AS 2A1C24.	5-63
2A6C20		SAME AS 2A4C35.	5-63
2A6C21		SAME AS 2A1C24.	5-63
2A6C22		SAME AS 2A1C24.	5-63
2A6C23		SAME AS 2A2C1.	5-63
2A6C24		SAME AS 2A1C24.	5-63
2A6C25		SAME AS 2A4C35.	5-63
2A6C26		SAME AS 2A2C1.	5-63
2A6C27 thru 2A6C30		SAME AS 2A1C24.	5-63
2A6C31		SAME AS 2A4C35.	5-63
2A6C32		SAME AS 2A2C1.	5-63
2A6C33		SAME AS 2A2C1.	5-63
2A6C34		SAME AS 2A1C6.	5-63
2A6CR1 thru 2A6CR6		SAME AS 2A1CR13.	5-63
2A6L1		SAME AS 2A4L1.	5-63
2A6L2		SAME AS 2A4L1.	5-63
2A6L3		SAME AS 2A4L3.	5-63
2A6L4		SAME AS 2A4L5.	5-63
2A6L5		SAME AS 2A4L6.	5-63
2A6Q1		SAME AS 2A1Q3.	5-63
2A6Q2		SAME AS 2A1Q4.	5-63
2A6Q3		SAME AS 2A1Q4.	5-63
2A6Q4		SAME AS 2A1Q3.	5-63
2A6Q5		SAME AS 2A1Q4.	5-63
2A6Q6		SAME AS 2A1Q3.	5-63
2A6Q7		SAME AS 2A1Q4.	5-63
2A6Q8		SAME AS 2A1Q3.	5-63
2A6Q9 thru 2A6Q12		SAME AS 2A1Q4.	5-63
2A6Q13		SAME AS 2A1Q9.	5-63
2A6Q14		SAME AS 2A1Q3.	5-63
2A6Q15		SAME AS 2A1Q3.	5-63
2A6R1 thru 2A6R3		SAME AS 2A2R1.	5-63
2A6R4		SAME AS 2A2R4.	5-63
2A6R5 thru 2A6R8		SAME AS 2A1R2.	5-63
2A6R9		SAME AS 2A2R71.	5-63
2A6R10		SAME AS 2A2R71.	5-63
2A6R11		SAME AS 2A1R29.	5-63
2A6R12		SAME AS 2A1R6.	5-63
2A6R13		SAME AS 2A2R1.	5-63
2A6R14		SAME AS 2A2R71.	5-63
2A6R15		SAME AS 2A2R17.	5-63
2A6R16		SAME AS 2A1R19.	5-63

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A6R17		SAME AS 2A1R2.	5-63
2A6R18		SAME AS 2A2R71.	5-63
2A6R19		SAME AS 2A1R6.	5-63
2A6R20		SAME AS 2A1R2.	5-63
2A6R21		SAME AS 2A1R6.	5-63
2A6R22		SAME AS 2A1R2.	5-63
2A6R23		SAME AS 2A2R71.	5-63
2A6R24		SAME AS 2A1R6.	5-63
2A6R25		SAME AS 2A1R19.	5-63
2A6R26		SAME AS 2A2R65.	5-63
2A6R27		SAME AS 2A1R2.	5-63
2A6R28		SAME AS 2A1R34.	5-63
2A6R29		SAME AS 2A1R34.	5-63
2A6R30		SAME AS 2A1R11.	5-63
2A6R31		SAME AS 2A1R7.	5-63
2A6R32		SAME AS 2A2R71.	5-63
2A6R33		SAME AS 2A2R4.	5-63
2A6R34		SAME AS 2A2R1.	5-63
2A6R35		SAME AS 2A1R2.	5-63
2A6R36		NOT USED.	
2A6R37		SAME AS 2A4R1.	5-63
2A6R38		SAME AS 2A2R1.	5-63
2A6R39		SAME AS 2A2R71.	5-63
2A6R40		SAME AS 2A4R1.	5-63
2A6R41		NOT USED.	
2A6R42		NOT USED.	
2A6R43		SAME AS 2A2R4.	5-63
2A6R44		SAME AS 2A1R7.	5-63
2A6R45		SAME AS 2A1R19.	5-63
2A6R46		SAME AS 2A1R7.	5-63
2A6R47		SAME AS 2A1R29.	5-63
2A6R48		SAME AS 2A1R35.	5-63
2A6R49		SAME AS 2A2R71.	5-63
2A6R50		SAME AS 2A2R71.	5-63
2A6R51		SAME AS 2A1R6.	5-63
2A6R52		SAME AS 2A1R29.	5-63
2A6R53		SAME AS 2A1R29.	5-63
2A6R54		RESISTOR: MIL type RC07GF220J.	5-63
2A6T1		SAME AS 2A4T1.	5-63
2A6T2		SAME AS 2A4T1.	5-63
2A6T3		TRANSFORMER, AUDIO: Pri imp. 500 ct. ohms; sec imp. 600 ct. ohms; 175 vdcw, solder type terminals. 0. 875 in. lg by 0. 750 in. wd by 0. 562 in. hg. 82679 P/N TF358.	5-63
2A7		CIRCUIT CARD ASSEMBLY: 84 resistors, 53 capacitors, 6 coils, 2 filters, 19 transistors, 7 semiconductors, plug-in item; 9, 031 in. lg by 5. 969 in. wd by 0. 750 in. hg. 82679 P/N A4633.	5-65
2A7C1 thru 2A7C9		SAME AS 2A1C3.	5-65
2A7C10		NOT USED.	
2A7C11 thru 2A7C14		SAME AS 2A1C3.	5-65
2A7C15		SAME AS 2A4C3.	5-65
2A7C16		SAME AS 2A1C3.	5-65

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A7C17		SAME AS 2A1C3.	5-65
2A7C18		SAME AS 2A1C3.	5-65
2A7C19		SAME AS 2A4C3.	5-65
2A7C20 thru 2A7C24		SAME AS 2A1C3.	5-65
2A7C25		SAME AS 2A4C3.	5-65
2A7C26 thru 2A7C29		SAME AS 2A1C3.	5-65
2A7C30		SAME AS 2A4C3.	5-65
2A7C31 thru 2A7C41		SAME AS 2A1C3.	5-65
2A7C42		SAME AS 2A6C8.	5-65
2A7C43 thru 2A7C49		SAME AS 2A1C3.	5-65
2A7C50		SAME AS 2A2C5.	5-65
2A7C51		SAME AS 2A5C61.	5-65
2A7C52		CAPACITOR: MIL type CS13BE107K.	5-65
2A7C53		SAME AS 2A1C3.	5-65
2A7C54		SAME AS 2A1C3.	5-65
2A7CR1		SAME AS 2A1CR13.	5-65
2A7CR2		SAME AS 2A1CR13.	5-65
2A7CR3		SAME AS 2A1CR13.	5-65
2A7CR4		SAME AS 2A2CR19.	5-65
2A7CR5		SAME AS 2A2CR19.	5-65
2A7CR6		SAME AS 2A2CR19.	5-65
2A7FL1		FILTER, BANDPASS: Outer, lower sideband; 243.710 kc carrier frequency, 3 v rms max. signal input. 2.750 in. lg by 1.875 in. wd by 0.670 in. hg. 82679 P/N FX264.	5-65
2A7FL2		EQUALIZER, BANDPASS: Outer, lower sideband equalizer; source and load impedance, 500 ±5% ohms. 2.750 in. lg by 1.875 in. wd by 0.670 in. hg. 82679 P/N EQ264.	5-65
2A7L1 thru 2A7L4		SAME AS 2A5L1.	5-65
2A7L5		SAME AS 2A4L5.	5-65
2A7L6		SAME AS 2A5L6.	5-65
2A7Q1		SAME AS 2A1Q4.	5-65
2A7Q2		SAME AS 2A1Q4.	5-65
2A7Q3		SAME AS 2A5Q5.	5-65
2A7Q4		SAME AS 2A5Q5.	5-65
2A7Q5		SAME AS 2A5Q7.	5-65
2A7Q6		SAME AS 2A5Q8.	5-65
2A7Q7		SAME AS 2A5Q5.	5-65
2A7Q8		SAME AS 2A5Q8.	5-65
2A7Q9		SAME AS 2A5Q8.	5-65
2A7Q10		SAME AS 2A1Q3.	5-65
2A7Q11		SAME AS 2A1Q3.	5-65
2A7Q12		SAME AS 2A1Q4.	5-65
2A7Q13 thru 2A7Q16		SAME AS 2A1Q3.	5-65
2A7Q17		SAME AS 2A5Q5.	5-65
2A7Q18		SAME AS 2A5Q5.	5-65
2A7Q19		SAME AS 2A5Q5.	5-65
2A7R1		SAME AS 2A2R71.	5-65

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A7R2		SAME AS 2A2R71.	5-65
2A7R3		SAME AS 2A5R4.	5-65
2A7R4		SAME AS 2A1R29.	5-65
2A7R5		SAME AS 2A1R9.	5-65
2A7R6		SAME AS 2A2R4.	5-65
2A7R7		SAME AS 2A5R4.	5-65
2A7R8		SAME AS 2A2R71.	5-65
2A7R9		SAME AS 2A2R71.	5-65
2A7R10		SAME AS 2A5R4.	5-65
2A7R11		SAME AS 2A1R29.	5-65
2A7R12		SAME AS 2A1R9.	5-65
2A7R13		SAME AS 2A2R4.	5-65
2A7R14		SAME AS 2A5R4.	5-65
2A7R15		SAME AS 2A1R7.	5-65
2A7R16		SAME AS 2A1R19.	5-65
2A7R17		SAME AS 2A3R32.	5-65
2A7R18		SAME AS 2A3R32.	5-65
2A7R19		SAME AS 2A1R7.	5-65
2A7R20		SAME AS 2A1R7.	5-65
2A7R21		SAME AS 2A4R1.	5-65
2A7R22		SAME AS 2A1R7.	5-65
2A7R23		SAME AS 2A1R19.	5-65
2A7R24		SAME AS 2A3R32.	5-65
2A7R25		SAME AS 2A3R32.	5-65
2A7R26		SAME AS 2A2R17.	5-65
2A7R27		SAME AS 2A1R7.	5-65
2A7R28		SAME AS 2A1R19.	5-65
2A7R29		SAME AS 2A2R71.	5-65
2A7R30		SAME AS 2A2R71.	5-65
2A7R31		NOT USED.	
2A7R32		SAME AS 2A2R17.	5-65
2A7R33		SAME AS 2A1R7.	5-65
2A7R34		SAME AS 2A1R24.	5-65
2A7R35		SAME AS 2A2R4.	5-65
2A7R36		SAME AS 2A2R77.	5-65
2A7R37		SAME AS 2A1R7.	5-65
2A7R38		SAME AS 2A4R1.	5-65
2A7R39		SAME AS 2A2R17.	5-65
2A7R40		SAME AS 2A1R19.	5-65
2A7R41		SAME AS 2A2R71.	5-65
2A7R42		SAME AS 2A2R71.	5-65
2A7R43		SAME AS 2A2R17.	5-65
2A7R44		SAME AS 2A1R7.	5-65
2A7R45		SAME AS 2A5R58.	5-65
2A7R46		SAME AS 2A3R15.	5-65
2A7R47		SAME AS 2A1R19.	5-65
2A7R48		SAME AS 2A3R32.	5-65
2A7R49		SAME AS 2A3R32.	5-65
2A7R50		SAME AS 2A2R17.	5-65
2A7R51		SAME AS 2A1R7.	5-65
2A7R52		SAME AS 2A1R19.	5-65
2A7R53		SAME AS 2A2R71.	5-65
2A7R54		SAME AS 2A2R71.	5-65
2A7R55		SAME AS 2A1R35.	5-65
2A7R56		SAME AS 2A1R9.	5-65
2A7R57		SAME AS 2A3R15.	5-65
2A7R58		SAME AS 2A1R19.	5-65
2A7R59		SAME AS 2A2R71.	5-65

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A7R60		SAME AS 2A2R71.	5-65
2A7R61		SAME AS 2A1R9.	5-65
2A7R62		SAME AS 2A2R4.	5-65
2A7R63		NOT USED.	5-65
2A7R64		SAME AS 2A2R4.	5-65
2A7R65		SAME AS 2A1R9.	5-65
2A7R66		SAME AS 2A2R71.	5-65
2A7R67		SAME AS 2A2R71.	5-65
2A7R68		SAME AS 2A2R4.	5-65
2A7R69		SAME AS 2A1R6.	5-65
2A7R70		SAME AS 2A1R7.	5-65
2A7R71		SAME AS 2A1R24.	5-65
2A7R72		SAME AS 2A2R71.	5-65
2A7R73		SAME AS 2A2R71.	5-65
2A7R74		SAME AS 2A1R19.	5-65
2A7R75		SAME AS 2A1R29.	5-65
2A7R76		SAME AS 2A1R7.	5-65
2A7R77		SAME AS 2A1R71.	5-65
2A7R78		SAME AS 2A1R7.	5-65
2A7R79		SAME AS 2A2R1.	5-65
2A7R80		SAME AS 2A5R96.	5-65
2A7R81		SAME AS 2A5R93.	5-65
2A7R82		SAME AS 2A5R95.	5-65
2A7R83		SAME AS 2A5R96.	5-65
2A7R84		SAME AS 2A5R96.	5-65
2A7R85		SAME AS 2A5R93.	5-65
2A7R86		NOT USED.	
2A7R87		NOT USED.	
2A7R88		NOT USED.	
2A7R89		SAME AS 2A2R17.	5-65
2A7VR1		SAME AS 2A2VR3.	5-65
2A8		CIRCUIT CARD ASSEMBLY: SAME AS 2A6.	5-63
2A9		CIRCUIT CARD ASSEMBLY: Same as 2A7 except for FL1 and FL2.	5-65
2A9FL1		FILTER, BANDPASS: Inner, lower sideband; 250 kc carrier frequency, 3 v rms max signal input. 2. 750 in. lg, 1. 875 in. wd, 0. 670 in. hg. 82679 P/N FX260.	5-65
2A9FL2		EQUALIZER, BANDPASS: Inner, lower sideband equalizer; source and load impedance, 500 ±5% ohms. 2. 750 in. lg, 1. 875 in. wd, 0. 670 in. hg. 82679 P/N EQ260.	5-65
2A10		CIRCUIT CARD ASSEMBLY: SAME AS 2A6.	5-63
2A11		CIRCUIT CARD ASSEMBLY: Same as 2A7 except for FL1 and FL2.	5-65
2A11FL1		FILTER, BANDPASS: Inner, upper sideband; 250 kc carrier frequency, 3 v rms max signal input. 2. 750 in. lg, 1. 875 in. wd, 0. 670 in. hg. 82679 P/N FX263.	5-65
2A11FL2		EQUALIZER, BANDPASS: Inner, upper sideband equalizer; source and load impedance, 500 ±5% ohms, 2. 750 in. lg, 1. 875 in. wd, 0. 670 in. hg. 82679 P/N EQ263.	5-65

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

DEMULTIPLEXER, TD-914/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A12		CIRCUIT CARD ASSEMBLY: SAME AS 2A6.	5-63
2A13		CIRCUIT CARD ASSEMBLY: Same as 2A7 except for FL1 and FL2.	5-65
2A13FL1		FILTER, BANDPASS: Outer, upper sideband; 256.290 kc carrier frequency, 3 v rms max signal input. 2.750 in. lg, 1.875 in. wd, 0.670 in. hg. 82679 P/N FX261.	5-65
2A13FL2		EQUALIZER, BANDPASS: Outer, upper sideband equalizer; source and load impedance, 500 ±5% ohms. 2.750 in. lg, 1.875 in. wd, 0.670 in. hg. 82679 P/N EQ261.	5-65
2A14		STEPPING SWITCH ASSEMBLY, MODE: 82679 P/N AX5002.	5-66
2A14A1		CIRCUIT CARD ASSEMBLY: 10 semiconductors, P/O AX5002. 3.5 in. lg by 1.625 in. wd by 0.500 in. hg. 82679 P/N A4584.	5-66
2A14A1CR1		ABSORBER, OVERVOLTAGE: Operating voltage -28 v nom, 33 v max. Max reverse -10 vdc. 0.438 in. lg by 0.500 in. wd by 0.219 in. thk. 82679 P/N DD111-1.	5-66
2A14A1CR2 thru 2A14A1CR10		SAME AS 2A1CR13.	5-66
2A14S1		SWITCH, STEPPING: Remote controlled type, direct drive type, unidirectional drive 5 sections, 10-15 amps, 28 vdc; bracked housed plug-in type; 4 in. lg by 2.25 in. hg by 1.75 in. wd. 82679 P/N SW509.	5-66
2A15		STEPPING SWITCH ASSEMBLY, MODE: 82679 P/N AX5000.	5-67
2A15A1		CIRCUIT CARD ASSEMBLY: 6 semiconductors, p/o AX5000; 3.5 in. lg by 1.625 in. wd by 0.500 in. hg. 82679 P/N A4583.	5-67
2A15A1CR1		SAME AS 2A14A1CR1.	5-67
2A15A1CR2 thru 2A15A1CR6		SAME AS 2A1CR13.	5-67
2A15S1		SWITCH, STEPPING: Remote controlled type, direct drive type, unidirectional drive, 2 sections, 12 positions, 10 wipers, 34 contacts 10-15 amps, 28 vdc; bracket housed plug-in type; 4 in. lg by 2.5 in. hg by 1.75 in. wd. 82679 P/N SW508.	5-67
2A16		SAME AS 2A15.	5-67
2A17		SAME AS 2A15.	5-67
2A18		SAME AS 2A15.	5-67

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3		GENERATOR, REFERENCE SIGNAL 0-1510/URR: The TMC Model HFSR-4 is a remotely controlled frequency synthesizer for a 2 to 32.000 mc synthesized sideband transmission. (Unit 3 in the AN/URR-63(V)1 and Units 3 and 7 in the AN/URR-63(V)2.)	5-69
3A1		FREQUENCY STANDARD: 1 mc; stability 1 part in 10^8 per day, 5 parts 10^8 per month, 10,000 ft. altitude no change in stability, warm up 60 min. for 1 part 10^8 per day, hermetically sealed steel rectangular case 2.015 in. lg by 2.015 in. wd by 4.886 in. hg. 82679 P/N NF114.	5-71
3A2		CIRCUIT CARD ASSEMBLY: 27 resistors, 20 capacitors, 12 transistors, 13 semiconductors plug-in item; 10 in. lg by 4.375 in. wd by 0.750 in. hg. 82679 P/N A4687.	5-71
3A3		1 MHz DIST: 1 circuit card assembly, 2 RF shields; 10,000 in. lg by 4.562 in. wd by 1 in. hg. 82679 P/N AX5019.	5-71
3A4		1 MC SELECTOR: 1 circuit card assembly; 2 RF shields; 10.000 in. lg by 4.562 in. wd by 1 in. hg. 82679 P/N AX5020.	5-71
3A5		100 KC SELECTOR: 1 circuit card assembly, 2 RF shields; 10.000 in. lg by 4.562 in. wd by 1 in. hg. 82679 P/N AX5021.	5-71
3A6		MATRIX 1: 1 circuit card assembly, 2 RF shields; 10.000 in. lg by 4.562 in. wd by 1 in. hg. 82679 P/N AX5022.	5-71
3A7		SAME AS 3A6.	5-71
3A8		MATRIX 3: 1 circuit card assembly, 2 RF shields; 10.000 in. lg by 4.562 in. wd by 1 in. hg. 82679 P/N AX5023.	5-71
3A9		MIXER/AMPLIFIER 1: 1 circuit card assembly, 2 RF shields; 10.000 in. lg by 4.562 in. wd by 1 in. hg. 82679 P/N AX5024.	5-71
3A10		SAME AS 3A9.	5-71
3A11		SAME AS 3A9.	5-71
3A12		MIXER/AMPLIFIER 4: 1 circuit card assembly, 2 RF shields; 10.000 in. lg by 4.562 in. wd by 1 in. hg. 82679 P/N AX5025.	5-71
3A13		FINAL MIXER/AMPLIFIER: 1 circuit card assembly, 2 RF shields; 10.000 in. lg by 4.562 in. wd by 1 in. hg. 82679 P/N AX5026.	5-71
3A14 thru 3A19		SWITCH, STEPPING: Remote controlled type, direct drive type, unidirectional drive, 4 sections, 12 positions, 14 wipers, 33 contacts; 10-15 amps, 28 vdc, bracket housed plug-in type; 6 in. lg by 2.75 in. hg by 2 in. wd. 82679 P/N AX5006.	5-71
3B1		FAN, AXIAL: 115 vac, 50/60 cps, CMF-45 at 60 cps free delivery. Plastic blade, aluminum housing with black enamel finish. Housing size; 3.625 in. by 3.625 in. by 1.500 in. o/a. 82679 P/N BL131.	5-71
3DS1		LAMP, INCANDESCENT: Single contact, T-1-3/4 base, 14 vac or vdc, 0.08 amps. Dwg BI110-10, 08806 P/N 382.	5-71
3DS2		SAME AS 3DS1.	5-71
3DS3		SAME AS 3DS1.	5-71
3F1		FUSE, CARTRIDGE TYPE: 1 amp, 125 v, 0.250 in. dia by 1.250 in. lg. Dwg FU102-1. 71400 P/N MDL-1.	5-71
3F2		SAME AS 3F1.	5-71
3FL1		FILTER, RADIO INTERFERENCE: Current, lamp; voltage rating, 600 vdc, 250 vac at 60 cps. 1.000 in. dia, 2.688 in. lg. Dwg FI105-1, 80183 P/N 1JX130.	5-71
3FL2		SAME AS 3FL1.	5-71
3J1		CONNECTOR: MIL type MS3102A14S1P.	5-76
3J2		CONNECTOR: MIL type MS3102A28-21S.	5-76
3J3 thru 3J7		CONNECTOR: MIL type UG625B/U.	5-76
3J8		CONNECTOR: MIL type MS3102A28-21P.	5-76

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3M1		METER, SPECIAL SCALE: 50 microamp movement, 0 center. Case; molded phenolic, 1. 750 in. by 1. 750 in. by 1. 500 in. deep. 82679 P/N MR206.	5-71
3MP1 thru 3MP6		KNOB, INSTRUMENT TYPE: Molded plastic body with brass insert, 2 setscrews and unfilled indicator depression. 0. 750 in. dia, 0. 438 in. hg. 82679 P/N MP123-3UB.	5-71
3P1		CONNECTOR: MIL type MS3106A14S1S.	5-71
3P2		CONNECTOR, PLUG, ELECTRICAL: 3 prong polarized with removable ground connection, 250 v. Dwg PL218, 11136 P/N UP-121-M.	5-71
3Q1 thru 3Q3		TRANSISTOR: MIL type 2N3442.	5-71
3R1		RESISTOR: MIL type RC42GF181J.	5-71
3R2		SAME AS 3R1.	5-71
3R3		SAME AS 3R1.	5-71
3S1		SWITCH: MIL type ST22N.	5-71
3S2		SWITCH: MIL type ST22K.	5-71
3T1		TRANSFORMER, POWER, STEP DOWN: Primary; 115/230 v. 50/60 cps, 1 phase: secondary; 15 v, 1. 3 adc; 25 v, 1. 0 adc; 35 v, 0. 9 adc. 82679 P/N TF372.	5-71
3TB1		TERMINAL BOARD: Barrier type; 2 double screw terminals, 6-32 thread; phenolic body, 1. 25 in. lg by 0. 875 in. wd by 0. 406 in. hg. 82679 P/N TM102-2.	5-71
3XA1		NOT USED.	
3XA2 thru 3XA19		CONNECTOR, RECEPTACLE, ELECTRICAL: 22 double sided female contacts rated at 5 amps and 1800 volts rms. Phenolic housing with floating bushing and eyelet terminals. Accepts printed circuits board thickness of 0. 054 in. to 0. 071 in. 82679 P/N JJ319-22-DFE.	5-71
3XDS1		LIGHT, INDICATOR: Red lens, 1. 35 to 28 v, T=1-3/4 lamp base. 2 terminals, 0. 437 in. dia by 1. 500 in. lg. Dwg TS153-8, 72619 P/N 162-8430-1471-502.	5-71
3XDS2		SAME AS 3XDS1.	5-71
3XDS3		LIGHT, INDICATOR: Translucent white lens, 1. 35 to 28 v. T-1-3/4 lamp base. 2 terminals, 0. 437 in. dia by 1. 500 in. lg. Dwg TS153-12, 72619 P/N 162-8430-1475-502.	5-71
3XF1		FUSEHOLDER, LAMP INDICATING: 90-250 v, 15 amps, neon lamp, clear knob; accommodates 0. 250 in. dia by 1. 250 in. lg fuse. Dwg FH104-3, 71400 P/N HKLX.	5-71
3XF2		SAME AS 3XF1.	5-71
3A2		CIRCUIT CARD ASSEMBLY: 27 resistors, 21 capacitors, 12 transistors, plug-in item; 10 in. lg by 4. 375 in. wd by 0. 750 in. hg. 82679 P/N A4687.	5-74
3A2C1		CAPACITOR, FIXED, ELECTROLYTIC: 700 uf, 75 vdcw, 0. 813 in. dia, 2. 250 in. lg. Dwg CE119-700-75, 80183 P/N 39D707G075HP4.	5-74
3A2C2		CAPACITOR, FIXED, ELECTROLYTIC: 200 uf, -10% +150% at 125 cps, 25°C, 15 vdcw, 0. 437 in. dia, 1. 625 in. lg. Dwg CE105-200-15, 14655 P/N NLW200-15.	5-74
3A2C3		CAPACITOR, FIXED, CERAMIC: 100, 000 uuf, +80% -20%, 100 vdcw, 0. 690 in. dia, 0. 156 in. thk; 0. 375 in. lead spacing, 82679 P/N CC100-28.	5-74

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2C4		CAPACITOR, FIXED, ELECTROLYTIC: 10 uf, -10% +150% at 125 cps 25°C, 25 vdcw, 0.312 in. dia, 0.750 in. lg. Dwg CE105-10-25, 14655 P/N NLW10-25.	5-74
3A2C5		SAME AS 3A2C3.	5-74
3A2C6		CAPACITOR, FIXED, SOLID ELECTROLYTIC: 47 uf ±10%, 35 vdcw; 0.341 dia. by 0.750 lg; 82679 P/N CE123-476-35S2; 80183 P/N 150D476X9035S2.	5-74
3A2C7		CAPACITOR, FIXED, CERAMIC: 10,000 uuf, gmv, 600 vdcw, 0.600 in. dia, 0.156 in. thk; 0.375 in. lead spacing. 82679 P/N CC100-16.	5-74
3A2C8		SAME AS 3A2C1.	5-74
3A2C9		SAME AS 3A2C2.	5-74
3A2C10		SAME AS 3A2C3.	5-74
3A2C11		SAME AS 3A2C4.	5-74
3A2C12		SAME AS 3A2C3.	5-74
3A2C13		SAME AS 3A2C6.	5-74
3A2C14		SAME AS 3A2C7.	5-74
3A2C15		CAPACITOR, FIXED, ELECTROLYTIC: 1,000 uf, 25 vdcw. 0.813 in. dia by 2.250 in. lg. Dwg CE119-1000-25, 14655 P/N 39D108G025GL4.	5-74
3A2C16		SAME AS 3A2C2.	5-74
3A2C17		SAME AS 3A2C3.	5-74
3A2C18		SAME AS 3A2C4.	5-74
3A2C19		SAME AS 3A2C3.	5-74
3A2C20		CAPACITOR: MIL type CS18BC227K.	5-74
3A2C21		SAME AS 3A2C7.	5-74
3A2CR1		RECTIFIER, SEMICONDUCTOR DEVICE: Single-phase full-wave bridge, 1.5 vdc output current, 200 vrms volts. Corrosion resistant plastic case, wire leads. 82679 P/N DD145.	5-74
3A2CR2		SAME AS 3A2CR1.	5-74
3A2CR3		RECTIFIER, SEMICONDUCTOR DEVICE: Input voltage 140 v, dc output, 124 v res load, 200 v cap. load. Corrosion resistant plastic case, wire leads, 0.900 in. lg by 0.670 in. hg x 0.260 in. wd. 82679 P/N DD144-6.	5-74
3A2CR4		SEMICONDUCTOR DEVICE: MIL type 1N914.	5-74
3A2CR5		SAME AS 3A2CR4.	5-74
3A2CR6		SAME AS 3A2CR4.	5-74
3A2CR7		SAME AS 3A2CR4.	5-74
3A2Q1		TRANSISTOR: MIL type 2N4036.	5-74
3A2Q2		TRANSISTOR: MIL type 2N2631.	5-74
3A2Q3		TRANSISTOR: MIL type 2N706.	5-74
3A2Q4		TRANSISTOR: MIL type 2N1711.	5-74
3A2Q5		SAME AS 3A2Q1.	5-74
3A2Q6		SAME AS 3A2Q2.	5-74
3A2Q7		SAME AS 3A2Q3.	5-74
3A2Q8		SAME AS 3A2Q4.	5-74
3A2Q9		SAME AS 3A2Q1.	5-74
3A2Q10		SAME AS 3A2Q2.	5-74
3A2Q11		SAME AS 3A2Q3.	5-74
3A2Q12		SAME AS 3A2Q3.	5-74
3A2R1		RESISTOR: MIL type RC20GF472J.	5-74
3A2R2		RESISTOR: MIL type RC07GF331J.	5-74
3A2R3		RESISTOR: MIL type RW69G1R0J.	5-74
3A2R4		RESISTOR, VARIABLE, WIRE WOUND: 100 ohms, ±30% tol, 0.250 in. dia by 0.250 in. hg. PC type mounting pins. 82679 P/N RV124-1-101.	5-74
3A2R5		RESISTOR: MIL type RC07GF152J.	5-74
3A2R6		RESISTOR: MIL type RC07GF153J.	5-74
3A2R7		RESISTOR, VARIABLE, WIRE WOUND: 5000 ohms ±30% tol, 0.250 in. dia, by 0.250 in. hg. 82679 P/N RV124-1-502.	5-74

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2R8		RESISTOR: MIL type RC07GF682J.	5-74
3A2R9		RESISTOR: MIL type RC20GF332J.	5-74
3A2R10		RESISTOR: MIL type RC07GF221J.	5-74
3A2R11		RESISTOR: MIL type RC07GF151J.	5-74
3A2R12		RESISTOR: MIL type RW69G1R2J.	5-74
3A2R13		SAME AS 3A2R4.	5-74
3A2R14		RESISTOR: MIL type RC07GF471J.	5-74
3A2R15		RESISTOR: MIL type RC07GF332J.	5-74
3A2R16		RESISTOR, VARIABLE, WIRE WOUND: 1000 ohms, ±3% tol, 0.250 in. dia by 0.250 in. hg. 82679 P/N RV124-1-102.	5-74
3A2R17		SAME AS 3A2R15.	5-74
3A2R18		RESISTOR: MIL type RC07GF222J.	5-74
3A2R19		SAME AS 3A2R11.	5-74
3A2R20		SAME AS 3A2R11.	5-74
3A2R21		SAME AS 3A2R3.	5-74
3A2R22		SAME AS 3A2R4.	5-74
3A2R23		RESISTOR: MIL type RC07GF101J.	5-74
3A2R24		SAME AS 3A2R2.	5-74
3A2R25		SAME AS 3A2R4.	5-74
3A2R26		RESISTOR: MIL type RC07GF270J.	5-74
3A2R27		SAME AS 3A2R11.	5-74
3A2VR1		SEMICONDUCTOR DEVICE: MIL type 1N4370A.	5-74
3A2VR2		SEMICONDUCTOR DEVICE: MIL type 1N754A.	5-74
3A2VR3		SAME AS 3A2VR1.	5-74
3A2VR4		SAME AS 3A2VR2.	5-74
3A2VR5		SAME AS 3A2VR1.	5-74
3A2VR6		SAME AS 3A2VR1.	5-74
3A3		1 MC DIST: 1 circuit card assembly, 2 RF shields, 10.000 in. lg by 4.562 in. wd by 1 in. hg. 82679 P/N AX5019.	5-76
3A3E1		SHIELD, CIRCUIT CARD ASSEMBLY: "L" shaped, aluminum; 9.875 in. by 4.406 in. by 0.719 in. o/a dim. 82679 P/N MS5360.	5-76
3A3E2		SHIELD, CIRCUIT CARD ASSEMBLY: "L" shaped, aluminum; 9.875 in. by 4.459 in. by 1.000 in. o/a dim. 82679 P/N MS5361.	5-76
3A3A1		CIRCUIT CARD ASSEMBLY: 109 resistors, 44 capacitors, 12 coils, 8 integrated circuits, 27 transistors, 1 semiconductor, plug-in item, p/o AX5019, 10.000 in. lg by 4.375 in. wd by 0.750 in. hg. 82679 P/N A4688.	5-76
3A3A1C1		SAME AS 3A2C7.	5-76
3A3A1C2		SAME AS 3A2C3.	5-76
3A3A1C3		SAME AS 3A2C7.	5-76
3A3A1C4		SAME AS 3A2C7.	5-76
3A3A1C5		SAME AS 3A2C7.	5-76
3A3A1C6		SAME AS 3A2C3.	5-76
3A3A1C7		SAME AS 3A2C7.	5-76
3A3A1C8		SAME AS 3A2C7.	5-76
3A3A1C9		SAME AS 3A2C3.	5-76
3A3A1C10		CAPACITOR, FIXED, MICA: 2700 uuf, ±5% tol, 300 vdcw, 0.640 in. lg, 0.591 in. wd, 0.198 in. thk, 82679 P/N CM112F272J3S.	5-76
3A3A1C11		CAPACITOR, FIXED, MICA: 100 uuf, ±5% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk. 82679 P/N CM111F101J5S.	5-76
3A3A1C12		SAME AS 3A2C7.	5-76
3A3A1C13		SAME AS 3A2C7.	5-76
3A3A1C14		CAPACITOR, FIXED, ELECTROLYTIC: 47 uf, 125 vdcw, 0.218 in. dia by 0.468 in. lg, two wire leads 1.500 in. lg. Dwg CE120-1, 26769 P/N RML47EF1.	5-76

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A3A1C15		SAME AS 3A2C7.	5-76
3A3A1C16		SAME AS 3A3A1C10.	5-76
3A3A1C17		SAME AS 3A3A1C11.	5-76
3A3A1C18		SAME AS 3A2C7.	5-76
3A3A1C19		CAPACITOR: MIL type CS13BE476K.	5-76
3A3A1C20		SAME AS 3A2C7.	5-76
3A3A1C21		SAME AS 3A2C3.	5-76
3A3A1C22		SAME AS 3A2C7.	5-76
3A3A1C23		SAME AS 3A2C7.	5-76
3A3A1C24		SAME AS 3A3C3.	5-76
3A3A1C25		SAME AS 3A2C3.	5-76
3A3A1C26		SAME AS 3A2C7.	5-76
3A3A1C27		SAME AS 3A2C3.	5-76
3A3A1C28		SAME AS 3A2C3.	5-76
3A3A1C29		CAPACITOR, FIXED, MICA: 3,900 uuf, ±1%, 500 vdcw, 0.680 lg, 0.540 in. wd, 0.270 in. thk, 82679 P/N CM112F392F5S.	5-76
3A3A1C30		SAME AS 3A3A1C29.	5-76
3A3A1C31		SAME AS 3A2C3.	5-76
3A3A1C32		SAME AS 3A2C7.	5-76
3A3A1C33		NOT USED.	
3A3A1C34		SAME AS 3A2C3.	5-76
3A3A1C35		SAME AS 3A2C7.	5-76
3A3A1C36		NOT USED.	
3A3A1C37		SAME AS 3A2C3.	5-76
3A3A1C38		SAME AS 3A2C7.	5-76
3A3A1C39		NOT USED.	
3A3A1C40		SAME AS 3A2C3.	5-76
3A3A1C41		SAME AS 3A2C3.	5-76
3A3A1C42		CAPACITOR: MIL type CS13BE106K.	5-76
3A3A1C43		SAME AS 3A2C3.	5-76
3A3A1C44		SAME AS 3A2C3.	5-76
3A3A1C45		SAME AS 3A3A1C42.	5-76
3A3A1C46		SAME AS 3A2C3.	5-76
3A3A1C47		CAPACITOR: MIL type CS13BE225K.	5-76
3A3A1L1		COIL, RF, FIXED: 1000 uh, Q=65 at 0.79 mc. 0.157 in. dia, 0.395 in. lg. 82679 P/N CL433-102.	5-76
3A3A1L2		SAME AS 3A3A1L1.	5-76
3A3A1L3		SAME AS 3A3A1L1.	5-76
3A3A1L4		SAME AS 3A3A1L1.	5-76
3A3A1L5		COIL, RF, FIXED: 100 uh, Q=52 at 2.5 mc. 0.157 in. dia, 0.395 in. lg. 82679 P/N CL433-101.	5-76
3A3A1L6		COIL, RF, FIXED: 330 uh, Q=54 at 0.79 mc. 0.157 in. dia, 0.395 in. lg. 82679 P/N CL433-331.	5-76
3A3A1L7		SAME AS 3A3A1L1.	5-76
3A3A1L8		SAME AS 3A3A1L1.	5-76
3A3A1L9		SAME AS 3A3A1L1.	5-76
3A3A1L10		SAME AS 3A3A1L1.	5-76
3A3A1L11		COIL, RF, FIXED: 15 uh, Q=65 at 2.5 mc, 0.400 in. dia, 0.500 in. lg. Dwg CL430-3, 72259 P/N VIV-15.0.	5-76
3A3A1L12		NOT USED.	
3A3A1L13		SAME AS 3A3A1L5.	5-76
3A3A1Q1 thru 3A3A1Q7		TRANSISTOR: MIL type 2N706A.	5-76
3A3A1Q8		TRANSISTOR: MIL type 2N4352.	5-76
3A3A1Q9		SAME AS 3A3A1Q1.	5-76
3A3A1Q10		SAME AS 3A2Q4.	5-76
3A3A1Q11		SAME AS 3A3A1Q1.	5-76
3A3A1Q12		SAME AS 3A3A1Q1.	5-76

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A3A1Q13		SAME AS 3A3A1Q1.	5-76
3A3A1Q14		SAME AS 3A2Q4.	5-76
3A3A1Q15		SAME AS 3A3A1Q1.	5-76
3A3A1Q16		SAME AS 3A3A1Q1.	5-76
3A3A1Q17		SAME AS 3A2Q4.	5-76
3A3A1Q18		SAME AS 3A3A1Q1.	5-76
3A3A1Q19		SAME AS 3A3A1Q1.	5-76
3A3A1Q20		SAME AS 3A3A1Q1.	5-76
3A3A1Q21		SAME AS 3A2Q4.	5-76
3A3A1Q22		SAME AS 3A3A1Q1.	5-76
3A3A1Q23		SAME AS 3A3A1Q1.	5-76
3A3A1Q24		SAME AS 3A2Q4.	5-76
3A3A1Q25		SAME AS 3A3A1Q1.	5-76
3A3A1Q26		SAME AS 3A3A1Q1.	5-76
3A3A1Q27		TRANSISTOR: MIL type 3N128.	5-76
3A3A1R1		RESISTOR: MIL type RC07GF470J.	5-76
3A3A1R2		SAME AS 3A2R23.	5-76
3A3A1R3		RESISTOR: MIL type RC07GF103J.	5-76
3A3A1R4		RESISTOR: MIL type RC07GF472J.	5-76
3A3A1R5		SAME AS 3A2R18.	5-76
3A3A1R6		RESISTOR: MIL type RC07GF102J.	5-76
3A3A1R7		SAME AS 3A3A1R3.	5-76
3A3A1R8		SAME AS 3A2R18.	5-76
3A3A1R9		SAME AS 3A3A1R4.	5-76
3A3A1R10		SAME AS 3A3A1R6.	5-76
3A3A1R11		SAME AS 3A3A1R3.	5-76
3A3A1R12		SAME AS 3A3A1R6.	5-76
3A3A1R13		SAME AS 3A3A1R6.	5-76
3A3A1R14		SAME AS 3A2R23.	5-76
3A3A1R15		SAME AS 3A3A1R3.	5-76
3A3A1R16		SAME AS 3A3A1R4.	5-76
3A3A1R17		SAME AS 3A3A1R1.	5-76
3A3A1R18		SAME AS 3A2R18.	5-76
3A3A1R19		SAME AS 3A3A1R6.	5-76
3A3A1R20		SAME AS 3A3A1R3.	5-76
3A3A1R21		SAME AS 3A3A1R4.	5-76
3A3A1R22		SAME AS 3A2R18.	5-76
3A3A1R23		SAME AS 3A3A1R6.	5-76
3A3A1R24		SAME AS 3A3A1R3.	5-76
3A3A1R25		SAME AS 3A3A1R6.	5-76
3A3A1R26		SAME AS 3A3A1R6.	5-76
3A3A1R27		SAME AS 3A3A1R3.	5-76
3A3A1R28		SAME AS 3A3A1R3.	5-76
3A3A1R29		SAME AS 3A3A1R3.	5-76
3A3A1R30		RESISTOR, VARIABLE, WIRE WOUND: 10, 000 ohms, ±20% tol. 0. 250 in. dia by 0. 250 in. hg. PC type mounting pins. 82679 P/N RV124-1-103.	5-76
3A3A1R31		SAME AS 3A3A1R4.	5-76
3A3A1R32		SAME AS 3A3A1R4.	5-76
3A3A1R33		SAME AS 3A3A1R3.	5-76
3A3A1R34		RESISTOR: MIL type RC07GF473J.	5-76
3A3A1R35		SAME AS 3A2R5.	5-76
3A3A1R36		RESISTOR: MIL type RC07GF104J.	5-76
3A3A1R37		RESISTOR, VARIABLE, WIRE WOUND: 50, 000 ohms, ±20% tol. 0. 250 in. dia by 0. 250 in. hg. PC type mounting pins. 82679 P/N RV124-1-503.	5-76
3A3A1R38		SAME AS 3A3A1R3.	5-76
3A3A1R39		SAME AS 3A3A1R3.	5-76
3A3A1R40		SAME AS 3A3A1R6.	5-76

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A3A1R41		SAME AS 3A3A1R3.	5-76
3A3A1R42		RESISTOR: MIL type RC07GF105J.	5-76
3A3A1R43		SAME AS 3A3A1R42.	5-76
3A3A1R44		RESISTOR: MIL type RC07GF223J.	5-76
3A3A1R45		SAME AS 3A2R5.	5-76
3A3A1R46		SAME AS 3A3A1R34.	5-76
3A3A1R47		SAME AS 3A3A1R44.	5-76
3A3A1R48		RESISTOR, VARIABLE, WIRE WOUND: 100,000 ohms, +20% tol. 0.250 in. dia by 0.250 in. hg. PC type mounting pins. 82679 P/N RV124-1-104.	5-76
3A3A1R49		RESISTOR: MIL type RC07GF333J.	5-76
3A3A1R50		SAME AS 3A3A1R4.	5-76
3A3A1R51		SAME AS 3A3A1R3.	5-76
3A3A1R52		SAME AS 3A2R5.	5-76
3A3A1R53		SAME AS 3A3A1R3.	5-76
3A3A1R54		SAME AS 3A3A1R44.	5-76
3A3A1R55		RESISTOR: MIL type RC07GF681J.	5-76
3A3A1R56		SAME AS 3A3A1R48.	5-76
3A3A1R57		SAME AS 3A3A1R36.	5-76
3A3A1R58		SAME AS 3A3A1R3.	5-76
3A3A1R59		SAME AS 3A3A1R4.	5-76
3A3A1R60		SAME AS 3A3A1R6.	5-76
3A3A1R61		SAME AS 3A2R7.	5-76
3A3A1R62		SAME AS 3A2R14.	5-76
3A3A1R63		SAME AS 3A3A1R3.	5-76
3A3A1R64		SAME AS 3A3A1R3.	5-76
3A3A1R65		SAME AS 3A3A1R3.	5-76
3A3A1R66		SAME AS 3A3A1R4.	5-76
3A3A1R67		SAME AS 3A3A1R4.	5-76
3A3A1R68		SAME AS 3A3A1R4.	5-76
3A3A1R69		SAME AS 3A3A1R4.	5-76
3A3A1R70		SAME AS 3A2R18.	5-76
3A3A1R71		SAME AS 3A3A1R3.	5-76
3A3A1R72		SAME AS 3A3A1R55.	5-76
3A3A1R73		SAME AS 3A3A1R3.	5-76
3A3A1R74		SAME AS 3A3A1R4.	5-76
3A3A1R75		SAME AS 3A3A1R6.	5-76
3A3A1R76		SAME AS 3A2R7.	5-76
3A3A1R77		SAME AS 3A2R14.	5-76
3A3A1R78		SAME AS 3A3A1R3.	5-76
3A3A1R79		SAME AS 3A3A1R3.	5-76
3A3A1R80		SAME AS 3A3A1R55.	5-76
3A3A1R81		SAME AS 3A3A1R3.	5-76
3A3A1R82		SAME AS 3A3A1R4.	5-76
3A3A1R83		SAME AS 3A3A1R4.	5-76
3A3A1R84		SAME AS 3A3A1R4.	5-76
3A3A1R85		SAME AS 3A3A1R44.	5-76
3A3A1R86		SAME AS 3A2R18.	5-76
3A3A1R87		SAME AS 3A3A1R3.	5-76
3A3A1R88		RESISTOR: MIL type RC07GF390J.	5-76
3A3A1R89		SAME AS 3A2R7.	5-76
3A3A1R90		SAME AS 3A3A1R4.	5-76
3A3A1R91		SAME AS 3A3A1R4.	5-76
3A3A1R92		SAME AS 3A3A1R55.	5-76
3A3A1R93		SAME AS 3A2R5.	5-76
3A3A1R94		SAME AS 3A2R15.	5-76
3A3A1R95		RESISTOR: MIL type RC20GF221J.	5-76
3A3A1R96		SAME AS 3A3A1R3.	5-76

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A3A1R97		SAME AS 3A3A1R3.	5-76
3A3A1R98		SAME AS 3A2R5.	5-76
3A3A1R99		SAME AS 3A3A1R3.	5-76
3A3A1R100		SAME AS 3A3A1R3.	5-76
3A3A1R101		SAME AS 3A3A1R55.	5-76
3A3A1R102		SAME AS 3A2R23.	5-76
3A3A1R103		SAME AS 3A2R23.	5-76
3A3A1R104		SAME AS 3A2R23.	5-76
3A3A1R105		SAME AS 3A3A1R4.	5-76
3A3A1R106		SAME AS 3A3A1R4.	5-76
3A3A1R107		SAME AS 3A3A1R3.	5-76
3A3A1R108		RESISTOR: MIL type RC07GF391J.	5-76
3A3A1R109		RESISTOR: MIL type RC20GF180J.	5-76
3A3A1VR1		SEMICONDUCTOR DEVICE: MIL type 1N751A.	5-76
3A3A1Z1		INTEGRATED CIRCUIT, POSITIVE NAND GATE: 14 pins, plastic case. 4.75 to 5.25 supply v. 0.770 in. lg by 0.250 in. wd by 0.220 in. hg. 82679 P/N NW176.	5-76
3A3A1Z2 thru 3A3A1Z5		SAME AS 3A3A1Z1.	5-76
3A3A1Z6		INTEGRATED CIRCUIT, MASTER - SLAVE FLIP FLOP: 14 pins, plastic case. Supply voltage 4.75 v to 5.25 v. 0.750 in. lg by 0.187 in. wd by 0.125 in. hg. 82679 P/N NW159.	5-76
3A3A1Z7		INTEGRATED CIRCUIT, OPERATIONAL AMPLIFIER: 8 pins metal case. Supply voltage ±18 v, 0.375 in. dia by 0.187 in. hg. 82679 P/N NW 156.	5-76
3A3A1Z8		SAME AS 3A3A1Z7.	5-76
3A4		1 MC SELECTOR: 1 circuit card assembly, 2 RF shields, 10.000 in. lg by 4.562 in. wd by 1 in. hg. 82679 P/N AX5020.	5-78
3A4E1		SAME AS 3A3E1.	5-78
3A4E2		SAME AS 3A3E2.	5-78
3A4A1		CIRCUIT CARD ASSEMBLY: 143 resistors, 124 capacitors, 28 coils, 6 integrated circuits, 12 crystals, 34 transistors, plug-in item, p/o AX5020; 10.000 in. lg by 4.375 in. wd by 0.750 in. hg, 82679 P/N A4689.	5-78
3A4A1C1		SAME AS 3A2C3.	5-78
3A4A1C2		SAME AS 3A2C3.	5-78
3A4A1C3		SAME AS 3A3C3.	5-78
3A4A1C4		SAME AS 3A2C3.	5-78
3A4A1C5		SAME AS 3A2C7.	5-78
3A4A1C6		SAME AS 3A2C7.	5-78
3A4A1C7		SAME AS 3A2C7.	5-78
3A4A1C8		SAME AS 3A2C3.	5-78
3A4A1C9		SAME AS 3A2C7.	5-78
3A4A1C10		SAME AS 3A2C3.	5-78
3A4A1C11		CAPACITOR, FIXED, MICA: 510 uuf, ±2%, 500 vdcw, 0.490 in. lg, 0.420 in. wd, 0.250 in. thk, 82679 P/N CM111F511G5S.	5-78
3A4A1C12		CAPACITOR, FIXED, MICA: 330 uuf, ±2% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk. 82679 P/N CM111F331G5S.	5-78
3A4A1C13		CAPACITOR, FIXED, CERAMIC: 10,000 uuf, ±20%, 100 vdcw, 0.344 in. dia, 0.125 in. thk, 0.250 in. lead spacing. 82679 P/N CC100-43.	5-78
3A4A1C14		SAME AS 3A4A1C13.	5-78
3A4A1C15		CAPACITOR, FIXED, MICA: 470 uuf, ±2%, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk. 82679 P/N CM111F471G5S.	5-78

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A4A1C16		CAPACITOR, FIXED, MICA: 820 uuf, +2%, 300 vdcw. 0.640 in. lg, 0.591 in. wd, 0.198 in. thk, 82679 P/N CM111F821G3S.	5-78
3A4A1C17		SAME AS 3A4A1C13.	5-78
3A4A1C18		SAME AS 3A4A1C11.	5-78
3A4A1C19		SAME AS 3A4A1C12.	5-78
3A4A1C20		SAME AS 3A4A1C13.	5-78
3A4A1C21		SAME AS 3A4A1C13.	5-78
3A4A1C22		SAME AS 3A4A1C15.	5-78
3A4A1C23		SAME AS 3A4A1C16.	5-78
3A4A1C24		SAME AS 3A4A1C13.	5-78
3A4A1C25		SAME AS 3A4A1C13.	5-78
3A4A1C26		SAME AS 3A4A1C12.	5-78
3A4A1C27		SAME AS 3A4A1C13.	5-78
3A4A1C28		SAME AS 3A4A1C13.	5-78
3A4A1C29		CAPACITOR, FIXED, MICA: 680 uuf, ±2%, 300 vdcw, 0.640 in. lg, 0.591 in. wd, 0.198 in. thk. 82679 P/N CM111F681G3S.	5-78
3A4A1C30		SAME AS 3A4A1C12.	5-78
3A4A1C31		SAME AS 3A4A1C13.	5-78
3A4A1C32		SAME AS 3A4A1C11.	5-78
3A4A1C33		SAME AS 3A4A1C12.	5-78
3A4A1C34		SAME AS 3A4A1C13.	5-78
3A4A1C35		SAME AS 3A4A1C13.	5-78
3A4A1C36		SAME AS 3A4A1C29.	5-78
3A4A1C37		SAME AS 3A4A1C12.	5-78
3A4A1C38		SAME AS 3A4A1C13.	5-78
3A4A1C39		SAME AS 3A4A1C13.	5-78
3A4A1C40		SAME AS 3A4A1C13.	5-78
3A4A1C41		CAPACITOR, FIXED, MICA: 910 uuf, ±2% tol, 100 vdcw, 0.640 in. lg, 0.591 in. wd, 0.198 in. thk. 82679 P/N CM111F911G1S.	5-78
3A4A1C42		CAPACITOR, FIXED, MICA: 8200 uuf ±1% tol, 300 vdcw, 0.790 in. lg, 0.570 in. wd, 0.340 in. thk, 82679 P/N CM112F822F1S.	5-78
3A4A1C43		SAME AS 3A4A1C41.	5-78
3A4A1C44		SAME AS 3A4A1C13.	5-78
3A4A1C45		SAME AS 3A2C3.	5-78
3A4A1C46		SAME AS 3A4A1C13.	5-78
3A4A1C47		CAPACITOR, FIXED, CERAMIC: 1,000 uuf gmv 500 vdcw, 0.310 in. dia, 0.156 in. thk, 0.250 in. lead spacing. 82679 P/N CC100-29	5-78
3A4A1C48		SAME AS 3A4A1C12.	5-78
3A4A1C49		SAME AS 3A4A1C13.	5-78
3A4A1C50		SAME AS 3A4A1C13.	5-78
3A4A1C51		SAME AS 3A4A1C29.	5-78
3A4A1C52		SAME AS 3A4A1C29.	5-78
3A4A1C53		SAME AS 3A4A1C13.	5-78
3A4A1C54		SAME AS 3A4A1C11.	5-78
3A4A1C55		SAME AS 3A4A1C12.	5-78
3A4A1C56		SAME AS 3A4A1C13.	5-78
3A4A1C57		SAME AS 3A4A1C13.	5-78
3A4A1C58		SAME AS 3A4A1C29.	5-78
3A4A1C59		SAME AS 3A4A1C29.	5-78
3A4A1C60		SAME AS 3A4A1C13.	5-78
3A4A1C61		SAME AS 3A4A1C13.	5-78
3A4A1C62		SAME AS 3A2C3.	5-78
3A4A1C63		SAME AS 3A4A1C12.	5-78
3A4A1C64		SAME AS 3A4A1C13.	5-78
3A4A1C65		SAME AS 3A4A1C13.	5-78
3A4A1C66		SAME AS 3A4A1C29.	5-78
3A4A1C67		SAME AS 3A4A1C12.	5-78
3A4A1C68		SAME AS 3A4A1C13.	5-78
3A4A1C69		SAME AS 3A4A1C11.	5-78

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A4A1C70		SAME AS 3A4A1C12.	5-78
3A4A1C71		SAME AS 3A4A1C13.	5-78
3A4A1C72		SAME AS 3A4A1C13.	5-78
3A4A1C73		SAME AS 3A4A1C29.	5-78
3A4A1C74		SAME AS 3A4A1C12.	5-78
3A4A1C75		SAME AS 3A4A1C13.	5-78
3A4A1C76		SAME AS 3A2C3.	5-78
3A4A1C77		SAME AS 3A4A1C13.	5-78
3A4A1C78		SAME AS 3A4A1C12.	5-78
3A4A1C79		SAME AS 3A4A1C13.	5-78
3A4A1C80		SAME AS 3A4A1C13.	5-78
3A4A1C81		SAME AS 3A4A1C16.	5-78
3A4A1C82		CAPACITOR, FIXED, MICA: 270 uuf, ±5% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk. 82679 P/N CM111F271G3S.	5-78
3A4A1C83		SAME AS 3A4A1C13.	5-78
3A4A1C84		SAME AS 3A4A1C11.	5-78
3A4A1C85		SAME AS 3A4A1C12.	5-78
3A4A1C86		SAME AS 3A4A1C13.	5-78
3A4A1C87		SAME AS 3A4A1C13.	5-78
3A4A1C88		SAME AS 3A4A1C16.	5-78
3A4A1C89		SAME AS 3A4A1C82.	5-78
3A4A1C90		SAME AS 3A4A1C13.	5-78
3A4A1C91		SAME AS 3A2C3.	5-78
3A4A1C92		SAME AS 3A4A1C13.	5-78
3A4A1C93		SAME AS 3A4A1C13.	5-78
3A4A1C94		SAME AS 3A4A1C12.	5-78
3A4A1C95		SAME AS 3A4A1C13.	5-78
3A4A1C96		SAME AS 3A4A1C13.	5-78
3A4A1C97		SAME AS 3A4A1C29.	5-78
3A4A1C98		SAME AS 3A4A1C12.	5-78
3A4A1C99		SAME AS 3A4A1C13.	5-78
3A4A1C100		SAME AS 3A4A1C11.	5-78
3A4A1C101		SAME AS 3A4A1C12.	5-78
3A4A1C102		SAME AS 3A4A1C13.	5-78
3A4A1C103		SAME AS 3A4A1C13.	5-78
3A4A1C104		SAME AS 3A4A1C29.	5-78
3A4A1C105		SAME AS 3A4A1C12.	5-78
3A4A1C106 thru 3A4A1C111		SAME AS 3A4A1C13.	5-78
3A4A1C112		CAPACITOR, FIXED, MICA: 22 uuf, ±5%, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk. 82679 P/N CM111E220J5S.	5-78
3A4A1C113		CAPACITOR, FIXED, MICA: 68 uuf, ±1% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk. 82679 P/N CM111E680F5S.	5-78
3A4A1C114		SAME AS 3A4A1C112.	5-78
3A4A1C115		SAME AS 3A4A1C13.	5-78
3A4A1C116		SAME AS 3A2C3.	5-78
3A4A1C117		SAME AS 3A2C7.	5-78
3A4A1C118		CAPACITOR, FIXED, MICA: 10 uuf, ±5% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk. 82679 P/N CM111C100J5S.	5-78
3A4A1C119		CAPACITOR, FIXED, MICA: 39 uuf, ±5% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk. 82679 P/N CM111E390J5S.	5-78
3A4A1C120		SAME AS 3A4A1C118.	5-78
3A4A1C121		SAME AS 3A4A1C13.	5-78
3A4A1C122		SAME AS 3A2C3.	5-78
3A4A1C123		SAME AS 3A4A1C13.	5-78
3A4A1C124		SAME AS 3A4A1C13.	5-78
3A4A1L1		COIL, RF, FIXED: 68 uf, Q=51 at 2.5 mc, 0.157 in. dia, 0.395 in. lg. 82679 P/N CL433-680.	5-78

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A4A1L2		SAME AS 3A4A1L1.	5-78
3A4A1L3		COIL, RF, FIXED: 0.68 uh, Q=100 at 25 mc, 0.400 in. dia, 0.500 in. lg. Dwg CL430-2, 72259 P/N VIV-0.68.	5-78
3A4A1L4		SAME AS 3A4A1L3.	5-78
3A4A1L5		SAME AS 3A4A1L3.	5-78
3A4A1L6		SAME AS 3A4A1L3.	5-78
3A4A1L7		NOT USED.	
3A4A1L8		SAME AS 3A4A1L1.	5-78
3A4A1L9		SAME AS 3A4A1L3.	5-78
3A4A1L10		SAME AS 3A4A1L3.	5-78
3A4A1L11		SAME AS 3A4A1L1.	5-78
3A4A1L12		SAME AS 3A4A1L1.	5-78
3A4A1L13		SAME AS 3A4A1L3.	5-78
3A4A1L14		SAME AS 3A4A1L3.	5-78
3A4A1L15		SAME AS 3A4A1L1.	5-78
3A4A1L16		COIL, RF, FIXED: 0.47 uh, 0-100 at 25 mc, 0.400 in. dia, 0.500 in. lg, Dwg CL430-1, 72259 P/N VIV-0.47.	5-78
3A4A1L17		SAME AS 3A4A1L16.	5-78
3A4A1L18		SAME AS 3A4A1L1.	5-78
3A4A1L19		SAME AS 3A4A1L16.	5-78
3A4A1L20		SAME AS 3A4A1L16.	5-78
3A4A1L21 thru 3A4A1L25		SAME AS 3A4A1L1.	5-78
3A4A1L26		COIL, RF, FIXED: 33 uh, Q=46 at 25 mc, 0.157 in. dia, 0.395 in. lg, 82679 P/N CL433-330.	5-78
3A4A1L27		SAME AS 3A4A1L26.	5-78
3A4A1L28		COIL, RF, FIXED: 15 uh, Q=44 at 2.5 mc, 0.157 in. dia, 0.395 in. lg, 82679 P/N CL433-150.	5-78
3A4A1L29		SAME AS 3A4A1L28.	5-78
3A4A1Q1		SAME AS 3A2Q3.	5-78
3A4A1Q2 thru 3A4A1Q12		TRANSISTOR: MIL type 2N918.	5-78
3A4A1Q13		SAME AS 3A2Q3.	5-78
3A4A1Q14		SAME AS 3A4A1Q2.	5-78
3A4A1Q15 thru 3A4A1Q20		SAME AS 3A4A1Q2.	5-78
3A4A1Q21 thru 3A4A1Q32		SAME AS 3A4A1Q2.	5-78
3A4A1Q33		SAME AS 3A2Q3.	5-78
3A4A1Q34		SAME AS 3A2Q3.	5-78
3A4A1R1		SAME AS 3A3A1R3.	5-78
3A4A1R2		SAME AS 3A3A1R6.	5-78
3A4A1R3		SAME AS 3A3A1R6.	5-78
3A4A1R4		SAME AS 3A2R15.	5-78
3A4A1R5		SAME AS 3A2R14.	5-78
3A4A1R6		SAME AS 3A3A1R36.	5-78
3A4A1R7		SAME AS 3A2R15.	5-78
3A4A1R8		SAME AS 3A3A1R6.	5-78
3A4A1R9		SAME AS 3A3A1R6.	5-78
3A4A1R10		SAME AS 3A3A1R6.	5-78
3A4A1R11		SAME AS 3A3A1R3.	5-78
3A4A1R12		SAME AS 3A3A1R4.	5-78
3A4A1R13		SAME AS 3A2R10.	5-78
3A4A1R14		SAME AS 3A2R10.	5-78
3A4A1R15		SAME AS 3A3A1R1.	5-78

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A4A1R16		SAME AS 3A3A1R6.	5-78
3A4A1R17		SAME AS 3A2R15.	5-78
3A4A1R18		SAME AS 3A3A1R3.	5-78
3A4A1R19		SAME AS 3A3A1R3.	5-78
3A4A1R20		SAME AS 3A3A1R4.	5-78
3A4A1R21		SAME AS 3A3A1R6.	5-78
3A4A1R22		SAME AS 3A2R14.	5-78
3A4A1R23		SAME AS 3A3A1R1.	5-78
3A4A1R24		SAME AS 3A3A1R6.	5-78
3A4A1R25		SAME AS 3A2R15.	5-78
3A4A1R26		SAME AS 3A3A1R3.	5-78
3A4A1R27		SAME AS 3A3A1R4.	5-78
3A4A1R28		SAME AS 3A3A1R4.	5-78
3A4A1R29		SAME AS 3A2R14.	5-78
3A4A1R30		SAME AS 3A2R14.	5-78
3A4A1R31		SAME AS 3A2R23.	5-78
3A4A1R32		SAME AS 3A3A1R1.	5-78
3A4A1R33		SAME AS 3A3A1R6.	5-78
3A4A1R34		SAME AS 3A3A1R3.	5-78
3A4A1R35		SAME AS 3A2R15.	5-78
3A4A1R36		SAME AS 3A3A1R3.	5-78
3A4A1R37		SAME AS 3A3A1R4.	5-78
3A4A1R38		SAME AS 3A2R14.	5-78
3A4A1R39		SAME AS 3A3A1R1.	5-78
3A4A1R40		SAME AS 3A3A1R6.	5-78
3A4A1R41		SAME AS 3A3A1R3.	5-78
3A4A1R42		SAME AS 3A2R15.	5-78
3A4A1R43		SAME AS 3A3A1R4.	5-78
3A4A1R44		SAME AS 3A3A1R4.	5-78
3A4A1R45		SAME AS 3A2R14.	5-78
3A4A1R46		SAME AS 3A2R14.	5-78
3A4A1R47		SAME AS 3A3A1R4.	5-78
3A4A1R48		SAME AS 3A2R14.	5-78
3A4A1R49		SAME AS 3A2R14.	5-78
3A4A1R50		SAME AS 3A3A1R6.	5-78
3A4A1R51		SAME AS 3A2R5.	5-78
3A4A1R52		SAME AS 3A3A1R6.	5-78
3A4A1R53		SAME AS 3A3A1R4.	5-78
3A4A1R54		SAME AS 3A3A1R4.	5-78
3A4A1R55		SAME AS 3A2R14.	5-78
3A4A1R56		SAME AS 3A3A1R1.	5-78
3A4A1R57		SAME AS 3A3A1R6.	5-78
3A4A1R58		SAME AS 3A3A1R3.	5-78
3A4A1R59		SAME AS 3A2R15.	5-78
3A4A1R60		SAME AS 3A3A1R3.	5-78
3A4A1R61		SAME AS 3A3A1R4.	5-78
3A4A1R62		SAME AS 3A3A1R6.	5-78
3A4A1R63		SAME AS 3A2R14.	5-78
3A4A1R64		SAME AS 3A3A1R1.	5-78
3A4A1R65		SAME AS 3A3A1R6.	5-78
3A4A1R66		SAME AS 3A3A1R3.	5-78
3A4A1R67		SAME AS 3A2R15.	5-78
3A4A1R68		SAME AS 3A3A1R4.	5-78
3A4A1R69		SAME AS 3A3A1R4.	5-78
3A4A1R70		SAME AS 3A2R14.	5-78
3A4A1R71		SAME AS 3A2R10.	5-78
3A4A1R72		SAME AS 3A3A1R4.	5-78
3A4A1R73		SAME AS 3A2R14.	5-78
3A4A1R74		SAME AS 3A2R14.	5-78

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A4A1R75		SAME AS 3A3A1R6.	5-78
3A4A1R76		SAME AS 3A3A1R3.	5-78
3A4A1R77		SAME AS 3A2R15.	5-78
3A4A1R78		SAME AS 3A3A1R3.	5-78
3A4A1R79		SAME AS 3A3A1R4.	5-78
3A4A1R80		SAME AS 3A3A1R6.	5-78
3A4A1R81		SAME AS 3A2R14.	5-78
3A4A1R82		SAME AS 3A3A1R1.	5-78
3A4A1R83		SAME AS 3A3A1R6.	5-78
3A4A1R84		SAME AS 3A3A1R3.	5-78
3A4A1R85		SAME AS 3A2R15.	5-78
3A4A1R86		SAME AS 3A3A1R4.	5-78
3A4A1R87		SAME AS 3A3A1R4.	5-78
3A4A1R88		SAME AS 3A2R14.	5-78
3A4A1R89		SAME AS 3A2R10.	5-78
3A4A1R90		SAME AS 3A3A1R4.	5-78
3A4A1R91		SAME AS 3A2R14.	5-78
3A4A1R92		SAME AS 3A2R14.	5-78
3A4A1R93		SAME AS 3A3A1R1.	5-78
3A4A1R94		SAME AS 3A3A1R6.	5-78
3A4A1R95		SAME AS 3A3A1R3.	5-78
3A4A1R96		SAME AS 3A2R15.	5-78
3A4A1R97		SAME AS 3A3A1R3.	5-78
3A4A1R98		SAME AS 3A3A1R4.	5-78
3A4A1R99		SAME AS 3A3A1R6.	5-78
3A4A1R100		SAME AS 3A2R14.	5-78
3A4A1R101		SAME AS 3A3A1R1.	5-78
3A4A1R102		SAME AS 3A3A1R6.	5-78
3A4A1R103		SAME AS 3A3A1R3.	5-78
3A4A1R104		SAME AS 3A2R15.	5-78
3A4A1R105		SAME AS 3A3A1R4.	5-78
3A4A1R106		SAME AS 3A3A1R4.	5-78
3A4A1R107		SAME AS 3A2R10.	5-78
3A4A1R108		SAME AS 3A2R14.	5-78
3A4A1R109		SAME AS 3A3A1R4.	5-78
3A4A1R110		SAME AS 3A2R14.	5-78
3A4A1R111		SAME AS 3A2R14.	5-78
3A4A1R112		SAME AS 3A3A1R1.	5-78
3A4A1R113		SAME AS 3A3A1R6.	5-78
3A4A1R114		SAME AS 3A3A1R3.	5-78
3A4A1R115		SAME AS 3A2R15.	5-78
3A4A1R116		SAME AS 3A3A1R3.	5-78
3A4A1R117		SAME AS 3A3A1R4.	5-78
3A4A1R118		SAME AS 3A3A1R6.	5-78
3A4A1R119		SAME AS 3A2R14.	5-78
3A4A1R120		SAME AS 3A3A1R1.	5-78
3A4A1R121		SAME AS 3A3A1R6.	5-78
3A4A1R122		SAME AS 3A3A1R3.	5-78
3A4A1R123		SAME AS 3A2R15.	5-78
3A4A1R124		SAME AS 3A3A1R4.	5-78
3A4A1R125		SAME AS 3A3A1R4.	5-78
3A4A1R126		SAME AS 3A2R14.	5-78
3A4A1R127		SAME AS 3A2R14.	5-78
3A4A1R128		SAME AS 3A2R23.	5-78
3A4A1R129		SAME AS 3A3A1R6.	5-78
3A4A1R130		SAME AS 3A2R18.	5-78
3A4A1R131		SAME AS 3A2R18.	5-78
3A4A1R132		SAME AS 3A2R14.	5-78
3A4A1R133		SAME AS 3A2R14.	5-78

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A4A1R134		SAME AS 3A2R23.	5-78
3A4A1R135		SAME AS 3A3A1R6.	5-78
3A4A1R136		SAME AS 3A2R18.	5-78
3A4A1R137		SAME AS 3A2R18.	5-78
3A4A1R138		SAME AS 3A2R14.	5-78
3A4A1R139		SAME AS 3A2R14.	5-78
3A4A1R140		SAME AS 3A2R23.	5-78
3A4A1R141		SAME AS 3A2R23.	5-78
3A4A1R142		SAME AS 3A3A1R6.	5-78
3A4A1R143		SAME AS 3A3A1R1.	5-78
3A4A1Y1		CRYSTAL UNIT, QUARTZ: 11.0 mc, 0.150 in. hg by 0.400 in. wd, 0.150 in. thk. 82679 P/N CR119-11R0.	5-78
3A4A1Y2		SAME AS 3A4A1Y1.	5-78
3A4A1Y3		CRYSTAL UNIT, QUARTZ: 14.0 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk. 82679 P/N CR119-14R0.	5-78
3A4A1Y4		SAME AS 3A4A1Y3.	5-78
3A4A1Y5		CRYSTAL UNIT, QUARTZ: 10.0 mc, 0.150 in. thk, 82679 P/N CR119-10R0.	5-78
3A5A1Y6		SAME AS 3A4A1Y5.	5-78
3A4A1Y7		CRYSTAL UNIT, QUARTZ: 12.0 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-12R0.	5-78
3A4A1Y8		SAME AS 3A4A1Y7.	5-78
3A4A1Y9		CRYSTAL UNIT, QUARTZ: 16.0 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-16R0.	5-78
3A4A1Y10		SAME AS 3A4A1Y9.	5-78
3A4A1Y11		CRYSTAL UNIT, QUARTZ: 17.0 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-17R0.	5-78
3A4A1Y12		SAME AS 3A4A1Y11.	5-78
3A4A1Z1		INTEGRATED CIRCUIT, LOGIC: 14 pins, plastic case; 82679 P/N NW180-3.	5-78
3A4A1Z2		INTEGRATED CIRCUIT, DECADE COUNTER: 14 pins, plastic case. Supply voltage 4.75 v to 5.25 v, 0.770 in. lg by 0.250 in. wd by 0.200 in. hg, 82679 P/N NW134.	5-78
3A4A1Z3		SAME AS 3A3A1Z1.	5-78
3A4A1Z4		SAME AS 3A3A1Z1.	5-78
3A4A1Z5		INTEGRATED CIRCUIT, J-K FLIP FLOP: 14 pins, plastic case. Supply voltage 4.75 v to 5.25 v, 0.750 in. lg by 0.188 in. wd by 0.125 in. hg, 82679 P/N NW157.	5-78
3A4A1Z6		SAME AS 3A3A1Z6.	5-78
3A5		100 KC SELECTOR: 1 circuit card assembly 2 RF shields; 10.000 in. lg by 4.562 in. wd by 1 in. hg, 82679 P/N AX5021.	5-80
3A5E1		SAME AS 3A3E1.	5-80
3A5E2		SAME AS 3A3E2.	5-80
3A5A1		CIRCUIT CARD ASSEMBLY: 167 resistors, 149 capacitors, 20 coils, 18 crystals, 1 integrated circuit, 39 transistors, 1 semiconductor, plug-in item; 10.031 in. lg by 5.969 in. wd by 1 in. hg, 82679 P/N A4669.	5-80
3A5A1C1		SAME AS 3A2C3.	5-80
3A5A1C2		SAME AS 3A2C7.	5-80
3A5A1C3		SAME AS 3A2C3.	5-80
3A5A1C4		SAME AS 3A2C7.	5-80
3A5A1C5		SAME AS 3A2C7.	5-80
3A5A1C6		SAME AS 3A2C7.	5-80
3A5A1C7		SAME AS 3A4A1C15.	5-80
3A5A1C8		SAME AS 3A2C3.	5-80
3A5A1C9		SAME AS 3A4A1C11.	5-80

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A5A1C10		SAME AS 3A4A1C12.	5-80
3A5A1C11		SAME AS 3A4A1C13.	5-80
3A5A1C12		SAME AS 3A4A1C13.	5-80
3A5A1C13		SAME AS 3A4A1C29.	5-80
3A5A1C14		SAME AS 3A4A1C12.	5-80
3A5A1C15		SAME AS 3A4A1C13.	5-80
3A5A1C16		SAME AS 3A4A1C11.	5-80
3A5A1C17		SAME AS 3A4A1C12.	5-80
3A5A1C18		SAME AS 3A4A1C13.	5-80
3A5A1C19		SAME AS 3A4A1C13.	5-80
3A5A1C20		SAME AS 3A4A1C29.	5-80
3A5A1C21		SAME AS 3A4A1C12.	5-80
3A5A1C22		SAME AS 3A4A1C13.	5-80
3A5A1C23		SAME AS 3A4A1C13.	5-80
3A5A1C24		SAME AS 3A4A1C12.	5-80
3A5A1C25		SAME AS 3A4A1C13.	5-80
3A5A1C26		SAME AS 3A4A1C13.	5-80
3A5A1C27		SAME AS 3A4A1C29.	5-80
3A5A1C28		SAME AS 3A4A1C12.	5-80
3A5A1C29		SAME AS 3A4A1C13.	5-80
3A5A1C30		SAME AS 3A4A1C11.	5-80
3A5A1C31		SAME AS 3A4A1C12.	5-80
3A5A1C32		SAME AS 3A4A1C13.	5-80
3A5A1C33		SAME AS 3A4A1C13.	5-80
3A5A1C34		SAME AS 3A4A1C29.	5-80
3A5A1C35		SAME AS 3A4A1C12.	5-80
3A5A1C36		SAME AS 3A4A1C13.	5-80
3A5A1C37		SAME AS 3A4A1C13.	5-80
3A5A1C38		SAME AS 3A4A1C12.	5-80
3A5A1C39		SAME AS 3A4A1C13.	5-80
3A5A1C40		SAME AS 3A4A1C13.	5-80
3A5A1C41		SAME AS 3A4A1C29.	5-80
3A5A1C42		SAME AS 3A4A1C12.	5-80
3A5A1C43		SAME AS 3A4A1C13.	5-80
3A5A1C44		SAME AS 3A4A1C11.	5-80
3A5A1C45		SAME AS 3A4A1C12.	5-80
3A5A1C46		SAME AS 3A4A1C13.	5-80
3A5A1C47		SAME AS 3A4A1C13.	5-80
3A5A1C48		SAME AS 3A4A1C29.	5-80
3A5A1C49		SAME AS 3A4A1C12.	5-80
3A5A1C50		SAME AS 3A4A1C13.	5-80
3A5A1C51		SAME AS 3A4A1C13.	5-80
3A5A1C52		SAME AS 3A4A1C12.	5-80
3A5A1C53		SAME AS 3A4A1C13.	5-80
3A5A1C54		SAME AS 3A4A1C13.	5-80
3A5A1C55		SAME AS 3A4A1C29.	5-80
3A5A1C56		SAME AS 3A4A1C12.	5-80
3A5A1C57		SAME AS 3A4A1C13.	5-80
3A5A1C58		SAME AS 3A4A1C11.	5-80
3A5A1C59		SAME AS 3A4A1C12.	5-80
3A5A1C60		SAME AS 3A4A1C13.	5-80
3A5A1C61		SAME AS 3A4A1C13.	5-80
3A5A1C62		SAME AS 3A4A1C29.	5-80
3A5A1C63		SAME AS 3A4A1C12.	5-80
3A5A1C64		SAME AS 3A4A1C13.	5-80
3A5A1C65		SAME AS 3A4A1C13.	5-80
3A5A1C66		SAME AS 3A4A1C12.	5-80
3A5A1C67		SAME AS 3A4A1C13.	5-80
3A5A1C68		SAME AS 3A4A1C13.	5-80

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A5A1C69		SAME AS 3A4A1C29.	5-80
3A5A1C70		SAME AS 3A4A1C12.	5-80
3A5A1C71		SAME AS 3A4A1C13.	5-80
3A5A1C72		SAME AS 3A4A1C11.	5-80
3A5A1C73		SAME AS 3A4A1C12.	5-80
3A5A1C74		SAME AS 3A4A1C13.	5-80
3A5A1C75		SAME AS 3A4A1C13.	5-80
3A5A1C76		SAME AS 3A4A1C29.	5-80
3A5A1C77		SAME AS 3A4A1C12.	5-80
3A5A1C78		SAME AS 3A4A1C13.	5-80
3A5A1C79		SAME AS 3A4A1C13.	5-80
3A5A1C80		SAME AS 3A4A1C12.	5-80
3A5A1C81		SAME AS 3A4A1C13.	5-80
3A5A1C82		SAME AS 3A4A1C13.	5-80
3A5A1C83		SAME AS 3A4A1C29.	5-80
3A5A1C84		SAME AS 3A4A1C12.	5-80
3A5A1C85		SAME AS 3A4A1C13.	5-80
3A5A1C86		SAME AS 3A4A1C11.	5-80
3A5A1C87		SAME AS 3A4A1C12.	5-80
3A5A1C88		SAME AS 3A4A1C13.	5-80
3A5A1C89		SAME AS 3A4A1C13.	5-80
3A5A1C90		SAME AS 3A4A1C29.	5-80
3A5A1C91		SAME AS 3A4A1C12.	5-80
3A5A1C92		SAME AS 3A4A1C13.	5-80
3A5A1C93		SAME AS 3A4A1C13.	5-80
3A5A1C94		SAME AS 3A4A1C12.	5-80
3A5A1C95		SAME AS 3A4A1C13.	5-80
3A5A1C96		SAME AS 3A4A1C13.	5-80
3A5A1C97		SAME AS 3A4A1C29.	5-80
3A5A1C98		SAME AS 3A4A1C12.	5-80
3A5A1C99		SAME AS 3A4A1C13.	5-80
3A5A1C100		SAME AS 3A4A1C11.	5-80
3A5A1C101		SAME AS 3A4A1C12.	5-80
3A5A1C102		SAME AS 3A4A1C13.	5-80
3A5A1C103		SAME AS 3A4A1C13.	5-80
3A5A1C104		SAME AS 3A4A1C29.	5-80
3A5A1C105		SAME AS 3A4A1C12.	5-80
3A5A1C106		SAME AS 3A4A1C13.	5-80
3A5A1C107		SAME AS 3A4A1C13.	5-80
3A5A1C108		SAME AS 3A4A1C12.	5-80
3A5A1C109		SAME AS 3A4A1C13.	5-80
3A5A1C110		SAME AS 3A4A1C13.	5-80
3A5A1C111		SAME AS 3A4A1C29.	5-80
3A5A1C112		SAME AS 3A4A1C12.	5-80
3A5A1C113		SAME AS 3A4A1C13.	5-80
3A5A1C114		SAME AS 3A4A1C11.	5-80
3A5A1C115		SAME AS 3A4A1C12.	5-80
3A5A1C116		SAME AS 3A4A1C13.	5-80
3A5A1C117		SAME AS 3A4A1C13.	5-80
3A5A1C118		SAME AS 3A4A1C29.	5-80
3A5A1C119		SAME AS 3A4A1C12.	5-80
3A5A1C120		SAME AS 3A4A1C13.	5-80
3A5A1C121		SAME AS 3A4A1C13.	5-80
3A5A1C122		SAME AS 3A4A1C12.	5-80
3A5A1C123		SAME AS 3A4A1C13.	5-80
3A5A1C124		SAME AS 3A4A1C13.	5-80
3A5A1C125		SAME AS 3A4A1C29.	5-80
3A5A1C126		SAME AS 3A4A1C12.	5-80
3A5A1C127		SAME AS 3A4A1C13.	5-80

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A5A1C128		SAME AS 3A4A1C11.	5-80
3A5A1C129		SAME AS 3A4A1C12.	5-80
3A5A1C130		SAME AS 3A4A1C13.	5-80
3A5A1C131		SAME AS 3A4A1C13.	5-80
3A5A1C132		SAME AS 3A4A1C29.	5-80
3A5A1C133		SAME AS 3A4A1C12.	5-80
3A5A1C134		SAME AS 3A4A1C13.	5-80
3A5A1C135 thru 3A5A1C145		SAME AS 3A4A1C13.	5-80
3A5A1C146		SAME AS 3A3A1C19.	5-80
3A5A1C147		SAME AS 3A3A1C42.	5-80
3A5A1C148		SAME AS 3A4A1C13.	5-80
3A5A1C149		SAME AS 3A3A1C19.	5-80
3A5A1L1		COIL, RF, FIXED: 4700 uh, Q=44 at 0.25 mc, 0.157 in. dia, 0.395 in. lg, 82679 P/N CL433-472.	5-80
3A5A1L2		SAME AS 3A4A1L26.	5-80
3A5A1L3 thru 3A5A1L20		SAME AS 3A4A1L16.	5-80
3A5A1Q1		SAME AS 3A2Q3.	5-80
3A5A1Q2		SAME AS 3A2Q3.	5-80
3A5A1Q3 thru 3A5A1Q39		SAME AS 3A4A1Q2.	5-80
3A5A1R1		SAME AS 3A3A1R3.	5-80
3A5A1R2		SAME AS 3A3A1R6.	5-80
3A5A1R3		SAME AS 3A3A1R6.	5-80
3A5A1R4		SAME AS 3A2R15.	5-80
3A5A1R5		SAME AS 3A2R10.	5-80
3A5A1R6		SAME AS 3A3A1R6.	5-80
3A5A1R7		SAME AS 3A3A1R6.	5-80
3A5A1R8		SAME AS 3A3A1R95.	5-80
3A5A1R9		SAME AS 3A2R18.	5-80
3A5A1R10		SAME AS 3A2R23.	5-80
3A5A1R11		SAME AS 3A2R8.	5-80
3A5A1R12		SAME AS 3A3A1R6.	5-80
3A5A1R13		SAME AS 3A3A1R6.	5-80
3A5A1R14		SAME AS 3A2R23.	5-80
3A5A1R15		SAME AS 3A3A1R1.	5-80
3A5A1R16		SAME AS 3A3A1R6.	5-80
3A5A1R17		SAME AS 3A3A1R3.	5-80
3A5A1R18		SAME AS 3A2R15.	5-80
3A5A1R19		SAME AS 3A3A1R3.	5-80
3A5A1R20		SAME AS 3A3A1R4.	5-80
3A5A1R21		SAME AS 3A2R14.	5-80
3A5A1R22		SAME AS 3A3A1R6.	5-80
3A5A1R23		SAME AS 3A3A1R1.	5-80
3A5A1R24		SAME AS 3A3A1R6.	5-80
3A5A1R25		SAME AS 3A3A1R3.	5-80
3A5A1R26		SAME AS 3A2R15.	5-80
3A5A1R27		SAME AS 3A3A1R4.	5-80
3A5A1R28		SAME AS 3A3A1R4.	5-80
3A5A1R29		SAME AS 3A2R14.	5-80
3A5A1R30		SAME AS 3A2R14.	5-80
3A5A1R31		SAME AS 3A3A1R1.	5-80
3A5A1R32		SAME AS 3A3A1R6.	5-80
3A5A1R33		SAME AS 3A3A1R3.	5-80
3A5A1R34		SAME AS 3A2R15.	5-80

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A5A1R35		SAME AS 3A3A1R3.	5-80
3A5A1R36		SAME AS 3A3A1R4.	5-80
3A5A1R37		SAME AS 3A3A1R6.	5-80
3A5A1R38		SAME AS 3A2R14.	5-80
3A5A1R39		SAME AS 3A3A1R1.	5-80
3A5A1R40		SAME AS 3A3A1R6.	5-80
3A5A1R41		SAME AS 3A3A1R3.	5-80
3A5A1R42		SAME AS 3A2R15.	5-80
3A5A1R43		SAME AS 3A3A1R4.	5-80
3A5A1R44		SAME AS 3A3A1R4.	5-80
3A5A1R45		SAME AS 3A2R14.	5-80
3A5A1R46		SAME AS 3A2R14.	5-80
3A5A1R47		SAME AS 3A3A1R1.	5-80
3A5A1R48		SAME AS 3A3A1R6.	5-80
3A5A1R49		SAME AS 3A3A1R3.	5-80
3A5A1R50		SAME AS 3A2R15.	5-80
3A5A1R51		SAME AS 3A3A1R3.	5-80
3A5A1R52		SAME AS 3A3A1R4.	5-80
3A5A1R53		SAME AS 3A2R14.	5-80
3A5A1R54		SAME AS 3A3A1R6.	5-80
3A5A1R55		SAME AS 3A3A1R1.	5-80
3A5A1R56		SAME AS 3A3A1R6.	5-80
3A5A1R57		SAME AS 3A3A1R3.	5-80
3A5A1R58		SAME AS 3A2R15.	5-80
3A5A1R59		SAME AS 3A3A1R4.	5-80
3A5A1R60		SAME AS 3A3A1R4.	5-80
3A5A1R61		SAME AS 3A2R14.	5-80
3A5A1R62		SAME AS 3A2R14.	5-80
3A5A1R63		SAME AS 3A3A1R1.	5-80
3A5A1R64		SAME AS 3A3A1R6.	5-80
3A5A1R65		SAME AS 3A3A1R3.	5-80
3A5A1R66		SAME AS 3A2R15.	5-80
3A5A1R67		SAME AS 3A3A1R3.	5-80
3A5A1R68		SAME AS 3A3A1R4.	5-80
3A5A1R69		SAME AS 3A3A1R6.	5-80
3A5A1R70		SAME AS 3A2R14.	5-80
3A5A1R71		SAME AS 3A3A1R1.	5-80
3A5A1R72		SAME AS 3A3A1R6.	5-80
3A5A1R73		SAME AS 3A3A1R3.	5-80
3A5A1R74		SAME AS 3A2R15.	5-80
3A5A1R75		SAME AS 3A3A1R4.	5-80
3A5A1R76		SAME AS 3A3A1R4.	5-80
3A5A1R77		SAME AS 3A2R14.	5-80
3A5A1R78		SAME AS 3A2R14.	5-80
3A5A1R79		SAME AS 3A3A1R1.	5-80
3A5A1R80		SAME AS 3A3A1R6.	5-80
3A5A1R81		SAME AS 3A3A1R3.	5-80
3A5A1R82		SAME AS 3A2R15.	5-80
3A5A1R83		SAME AS 3A3A1R3.	5-80
3A5A1R84		SAME AS 3A3A1R4.	5-80
3A5A1R85		SAME AS 3A3A1R6.	5-80
3A5A1R86		SAME AS 3A2R14.	5-80
3A5A1R87		SAME AS 3A3A1R1.	5-80
3A5A1R88		SAME AS 3A3A1R6.	5-80
3A5A1R89		SAME AS 3A3A1R3.	5-80
3A5A1R90		SAME AS 3A2R15.	5-80
3A5A1R91		SAME AS 3A3A1R4.	5-80
3A5A1R92		SAME AS 3A3A1R4.	5-80
3A5A1R93		SAME AS 3A2R14.	5-80

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A5A1R94		SAME AS 3A2R14.	5-80
3A5A1R95		SAME AS 3A3A1R1.	5-80
3A5A1R96		SAME AS 3A3A1R6.	5-80
3A5A1R97		SAME AS 3A3A1R3.	5-80
3A5A1R98		SAME AS 3A2R15.	5-80
3A5A1R99		SAME AS 3A3A1R3.	5-80
3A5A1R100		SAME AS 3A3A1R4.	5-80
3A5A1R101		SAME AS 3A2R14.	5-80
3A5A1R102		SAME AS 3A3A1R6.	5-80
3A5A1R103		SAME AS 3A3A1R1.	5-80
3A5A1R104		SAME AS 3A3A1R6.	5-80
3A5A1R105		SAME AS 3A3A1R3.	5-80
3A5A1R106		SAME AS 3A2R15.	5-80
3A5A1R107		SAME AS 3A3A1R4.	5-80
3A5A1R108		SAME AS 3A3A1R4.	5-80
3A5A1R109		SAME AS 3A2R14.	5-80
3A5A1R110		SAME AS 3A2R14.	5-80
3A5A1R111		SAME AS 3A3A1R1.	5-80
3A5A1R112		SAME AS 3A3A1R6.	5-80
3A5A1R113		SAME AS 3A3A1R3.	5-80
3A5A1R114		SAME AS 3A2R15.	5-80
3A5A1R115		SAME AS 3A3A1R3.	5-80
3A5A1R116		SAME AS 3A3A1R4.	5-80
3A5A1R117		SAME AS 3A2R14.	5-80
3A5A1R118		SAME AS 3A3A1R6.	5-80
3A5A1R119		SAME AS 3A3A1R1.	5-80
3A5A1R120		SAME AS 3A3A1R6.	5-80
3A5A1R121		SAME AS 3A3A1R3.	5-80
3A5A1R122		SAME AS 3A2R15.	5-80
3A5A1R123		SAME AS 3A3A1R4.	5-80
3A5A1R124		SAME AS 3A3A1R4.	5-80
3A5A1R125		SAME AS 3A2R14.	5-80
3A5A1R126		SAME AS 3A2R14.	5-80
3A5A1R127		SAME AS 3A3A1R1.	5-80
3A5A1R128		SAME AS 3A3A1R6.	5-80
3A5A1R129		SAME AS 3A3A1R3.	5-80
3A5A1R130		SAME AS 3A2R15.	5-80
3A5A1R131		SAME AS 3A3A1R3.	5-80
3A5A1R132		SAME AS 3A3A1R4.	5-80
3A5A1R133		SAME AS 3A2R14.	5-80
3A5A1R134		SAME AS 3A3A1R6.	5-80
3A5A1R135		SAME AS 3A3A1R1.	5-80
3A5A1R136		SAME AS 3A3A1R6.	5-80
3A5A1R137		SAME AS 3A3A1R3.	5-80
3A5A1R138		SAME AS 3A2R15.	5-80
3A5A1R139		SAME AS 3A3A1R4.	5-80
3A5A1R140		SAME AS 3A3A1R4.	5-80
3A5A1R141		SAME AS 3A2R14.	5-80
3A5A1R142		SAME AS 3A2R14.	5-80
3A5A1R143		SAME AS 3A3A1R1.	5-80
3A5A1R144		SAME AS 3A3A1R6.	5-80
3A5A1R145		SAME AS 3A3A1R3.	5-80
3A5A1R146		SAME AS 3A2R15.	5-80
3A5A1R147		SAME AS 3A3A1R3.	5-80
3A5A1R148		SAME AS 3A3A1R4.	5-80
3A5A1R149		SAME AS 3A2R14.	5-80
3A5A1R150		SAME AS 3A3A1R6.	5-80
3A5A1R151		SAME AS 3A3A1R1.	5-80
3A5A1R152		SAME AS 3A3A1R6.	5-80

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A5A1R153		SAME AS 3A3A1R3.	5-80
3A5A1R154		SAME AS 3A2R15.	5-80
3A5A1R155		SAME AS 3A3A1R4.	5-80
3A5A1R156		SAME AS 3A3A1R4.	5-80
3A5A1R157		SAME AS 3A2R14.	5-80
3A5A1R158		SAME AS 3A2R14.	5-80
3A5A1R159		SAME AS 3A2R23.	5-80
3A5A1R160 thru 3A5A1R167		SAME AS 3A2R23.	5-80
3A5A1VR1		SAME AS 3A3A1VR1.	5-80
3A5A1Y1		CRYSTAL UNIT, QUARTZ: 16.2 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-16R2.	5-80
3A5A1Y2		SAME AS 3A5A1Y1.	5-80
3A5A1Y3		CRYSTAL UNIT, QUARTZ: 16.6 mc, 0.510 in. lg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-16R6.	5-80
3A5A1Y4		SAME AS 3A5A1Y3.	5-80
3A5A1Y5		CRYSTAL UNIT, QUARTZ: 16.9 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-16R9.	5-80
3A5A1Y6		SAME AS 3A5A1Y5.	5-80
3A5A1Y7		CRYSTAL UNIT, QUARTZ: 16.4 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-16R4.	5-80
3A5A1Y8		SAME AS 3A5A1Y7.	5-80
3A5A1Y9		CRYSTAL UNIT, QUARTZ: 16.1 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-16R1.	5-80
3A5A1Y10		SAME AS 3A5A1Y9.	5-80
3A5A1Y11		CRYSTAL UNIT, QUARTZ: 16.5 mc, 0.510 in. lg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-16R5.	5-80
3A5A1Y12		SAME AS 3A5A1Y11.	5-80
3A5A1Y13		CRYSTAL UNIT, QUARTZ: 16.8 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-16R8.	5-80
3A5A1Y14		SAME AS 3A5A1Y13.	5-80
3A5A1Y15		CRYSTAL UNIT, QUARTZ: 16.3 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-16R3.	5-80
3A5A1Y16		SAME AS 3A5A1Y15.	5-80
3A5A1Y17		CRYSTAL UNIT, QUARTZ: 16.7 mc, 0.510 in. hg, 0.400 in. wd, 0.150 in. thk, 82679 P/N CR119-16R7.	5-80
3A5A1Y18		SAME AS 3A5A1Y17.	5-80
3A5A1Z1		SAME AS 3A4A1Z2.	5-80
3A6		MATRIX 1: 1 circuit card assembly, 2 RF shields, 10.000 in. lg by 4.562 in. wd by 1 in. hg, 82679 P/N AX5022.	5-82
3A6E1		SAME AS 3A3E1.	5-82
3A6E2		SAME AS 3A3E2.	5-82
3A6A1		CIRCUIT CARD ASSEMBLY: 104 resistors, 94 capacitors, 25 coils, 22 integrated circuits, 24 transistors, plug-in item, p/o AX5022; 10.00 in. lg by 4.375 in. wd by 0.750 in. hg, 82679 P/N A4691.	5-82
3A6A1C1		SAME AS 3A4A1C13.	5-82
3A6A1C2 thru 3A6A1C61		SAME AS 3A5A1C13.	5-82
3A6A1C62		SAME AS 3A4A1C119.	5-82
3A6A1C63		SAME AS 3A4A1C13.	5-82
3A6A1C64		SAME AS 3A3A1C11.	5-82
3A6A1C65		SAME AS 3A2C3.	5-82
3A6A1C66		SAME AS 3A4A1C13.	5-82
3A6A1C67		SAME AS 3A4A1C13.	5-82

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A6A1C68		SAME AS 3A4A1C13.	5-82
3A6A1C69		SAME AS 3A4A1C119.	5-82
3A6A1C70		SAME AS 3A4A1C13.	5-82
3A6A1C71		SAME AS 3A3A1C11.	5-82
3A6A1C72		SAME AS 3A2C3.	5-82
3A6A1C73		SAME AS 3A4A1C13.	5-82
3A6A1C74 thru 3A6A1C91		SAME AS 3A4A1C13.	5-82
3A6A1C92		SAME AS 3A2C7.	5-82
3A6A1C93		SAME AS 3A2C3.	5-82
3A6A1C94		SAME AS 3A3A1C42.	5-82
3A6A1L1		SAME AS 3A4A1L1.	5-82
3A6A1L2		COIL, RF, FIXED: 2.2 uh, Q=47 at 25 mc, 0.147 in. dia, 0.395 in. lg, 82679 P/N CL433-2R2.	5-82
3A6A1L3		SAME AS 3A4A1L1.	5-82
3A6A1L4		SAME AS 3A6A1L2.	5-82
3A6A1L5 thru 3A6A1L22		SAME AS 3A4A1L1.	5-82
3A6A1L23		COIL, RF, FIXED: 3.3 uh, Q=44 at 7.9 mc, 0.157 in. dia, 0.395 in. lg, 82679 P/N CL433-3R3.	5-82
3A6A1L24		COIL, RF, FIXED: 1.0 uh, Q=47 at 25 mc, 0.157 in. dia, 0.395 in. lg, 82679 P/N CL433-1R0.	5-82
3A6A1L25		SAME AS 3A6A1L24.	5-82
3A6A1Q1 thru 3A6A1Q24		SAME AS 3A4A1Q2.	5-82
3A6A1R1		SAME AS 3A3A1R1.	5-82
3A6A1R2		SAME AS 3A3A1R6.	5-82
3A6A1R3		SAME AS 3A2R15.	5-82
3A6A1R4		SAME AS 3A3A1R6.	5-82
3A6A1R5		SAME AS 3A2R23.	5-82
3A6A1R6		SAME AS 3A3A1R3.	5-82
3A6A1R7		SAME AS 3A3A1R6.	5-82
3A6A1R8		SAME AS 3A2R14.	5-82
3A6A1R9		SAME AS 3A3A1R1.	5-82
3A6A1R10		SAME AS 3A3A1R1.	5-82
3A6A1R11		SAME AS 3A3A1R6.	5-82
3A6A1R12		SAME AS 3A2R15.	5-82
3A6A1R13		SAME AS 3A3A1R6.	5-82
3A6A1R14		SAME AS 3A2R23.	5-82
3A6A1R15		SAME AS 3A3A1R3.	5-82
3A6A1R16		SAME AS 3A3A1R6.	5-82
3A6A1R17		SAME AS 3A2R14.	5-82
3A6A1R18		SAME AS 3A3A1R1.	5-82
3A6A1R19		SAME AS 3A3A1R1.	5-82
3A6A1R20		SAME AS 3A3A1R6.	5-82
3A6A1R21		SAME AS 3A2R15.	5-82
3A6A1R22		SAME AS 3A3A1R6.	5-82
3A6A1R23		SAME AS 3A2R23.	5-82
3A6A1R24		SAME AS 3A3A1R3.	5-82
3A6A1R25		SAME AS 3A3A1R6.	5-82
3A6A1R26		SAME AS 3A2R14.	5-82
3A6A1R27		SAME AS 3A3A1R1.	5-82
3A6A1R28		SAME AS 3A3A1R1.	5-82
3A6A1R29		SAME AS 3A3A1R6.	5-82
3A6A1R30		SAME AS 3A2R15.	5-82
3A6A1R31		SAME AS 3A3A1R6.	5-82

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A6A1R32		SAME AS 3A2R23.	5-82
3A6A1R33		SAME AS 3A3A1R3.	5-82
3A6A1R34		SAME AS 3A3A1R6.	5-82
3A6A1R35		SAME AS 3A2R14.	5-82
3A6A1R36		SAME AS 3A3A1R1.	5-82
3A6A1R37		SAME AS 3A3A1R1.	5-82
3A6A1R38		SAME AS 3A2R15.	5-82
3A6A1R39		SAME AS 3A3A1R6.	5-82
3A6A1R40		SAME AS 3A2A1R6.	5-82
3A6A1R41		SAME AS 3A2R23.	5-82
3A6A1R42		SAME AS 3A3A1R3.	5-82
3A6A1R43		SAME AS 3A3A1R6.	5-82
3A6A1R44		SAME AS 3A2R14.	5-82
3A6A1R45		SAME AS 3A3A1R1.	5-82
3A6A1R46		SAME AS 3A3A1R1.	5-82
3A6A1R47		SAME AS 3A2R15.	5-82
3A6A1R48		SAME AS 3A3A1R6.	5-82
3A6A1R49		SAME AS 3A3A1R6.	5-82
3A6A1R50		SAME AS 3A2R23.	5-82
3A6A1R51		SAME AS 3A3A1R3.	5-82
3A6A1R52		SAME AS 3A3A1R6.	5-82
3A6A1R53		SAME AS 3A2R14.	5-82
3A6A1R54		SAME AS 3A3A1R1.	5-82
3A6A1R55		SAME AS 3A3A1R1.	5-82
3A6A1R56		SAME AS 3A2R15.	5-82
3A6A1R57		SAME AS 3A3A1R6.	5-82
3A6A1R58		SAME AS 3A3A1R6.	5-82
3A6A1R59		SAME AS 3A2R23.	5-82
3A6A1R60		SAME AS 3A3A1R3.	5-82
3A6A1R61		SAME AS 3A3A1R6.	5-82
3A6A1R62		SAME AS 3A2R14.	5-82
3A6A1R63		SAME AS 3A3A1R1.	5-82
3A6A1R64		SAME AS 3A3A1R1.	5-82
3A6A1R65		SAME AS 3A2R15.	5-82
3A6A1R66		SAME AS 3A3A1R6.	5-82
3A6A1R67		SAME AS 3A3A1R6.	5-82
3A6A1R68		SAME AS 3A2R23.	5-82
3A6A1R69		SAME AS 3A3A1R3.	5-82
3A6A1R70		SAME AS 3A3A1R6.	5-82
3A6A1R71		SAME AS 3A2R14.	5-82
3A6A1R72		SAME AS 3A3A1R1.	5-82
3A6A1R73		SAME AS 3A3A1R1.	5-82
3A6A1R74		SAME AS 3A2R15.	5-82
3A6A1R75		SAME AS 3A3A1R6.	5-82
3A6A1R76		SAME AS 3A3A1R6.	5-82
3A6A1R77		SAME AS 3A2R23.	5-82
3A6A1R78		SAME AS 3A2A1R3.	5-82
3A6A1R79		SAME AS 3A3A1R6.	5-82
3A6A1R80		SAME AS 3A2R14.	5-82
3A6A1R81		SAME AS 3A3A1R1.	5-82
3A6A1R82		SAME AS 3A3A1R1.	5-82
3A6A1R83		SAME AS 3A2R15.	5-82
3A6A1R84		SAME AS 3A3A1R6.	5-82
3A6A1R85		SAME AS 3A3A1R6.	5-82
3A6A1R86		SAME AS 3A2R23.	5-82
3A6A1R87		SAME AS 3A3A1R3.	5-82
3A6A1R88		SAME AS 3A3A1R6.	5-82
3A6A1R89		SAME AS 3A2R14.	5-82
3A6A1R90		SAME AS 3A3A1R1.	5-82

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A6A1R91		SAME AS 3A3A1R6.	5-82
3A6A1R92		SAME AS 3A3A1R6.	5-82
3A6A1R93		SAME AS 3A2R6.	5-82
3A6A1R94		SAME AS 3A3R15.	5-82
3A6A1R95		SAME AS 3A2R23.	5-82
3A6A1R96		SAME AS 3A3A1R4.	5-82
3A6A1R97		SAME AS 3A3A1R4.	5-82
3A6A1R98		SAME AS 3A2R10.	5-82
3A6A1R99		SAME AS 3A2R6.	5-82
3A6A1R100		SAME AS 3A2R15.	5-82
3A6A1R101		SAME AS 3A2R23.	5-82
3A6A1R102		SAME AS 3A3A1R4.	5-82
3A6A1R103		SAME AS 3A3A1R4.	5-82
3A6A1R104		SAME AS 3A2R10.	5-82
3A6A1Z1		INTEGRATED CIRCUIT, LOGIC: 14 pins, plastic case, 82679 P/N NW180-1.	5-82
3A6A1Z2		INTEGRATED CIRCUIT, LOGIC: 14 pins, plastic case, 82679 P/N NW180-2.	5-82
3A6A1Z3		SAME AS 3A6A1Z1.	5-82
3A6A1Z4		SAME AS 3A6A1Z2.	5-82
3A6A1Z5 thru 3A6A1Z14		SAME AS 3A3A1Z1.	5-82
3A6A1Z15		INTEGRATED CIRCUIT, QUAD 2 INPUT NAND GATE: 12 pins, plastic case. Propagation delay; 35 nsec. Power dissipation; 88 mw. 0.750 in. lg by 0.187 in. wd by 0.125 in. hg, 82679 P/N NW167.	5-82
3A6A1Z16		SAME AS 3A6A1Z15.	5-82
3A6A1Z17		SAME AS 3A6A1Z15.	5-82
3A6A1Z18 thru 3A6A1Z20		SAME AS 3A5A1Z15.	5-82
3A6A1Z21		SAME AS 3A3A1Z1.	5-82
3A6A1Z22		SAME AS 3A3A1Z1.	5-82
3A7		SAME AS 3A6.	5-82
3A8		MATRIX 3: 1 circuit card assembly, 2 RF shields, 10.000 in. lg by 4.562 in. wd by 1 in. hg, 82679 P/N AX5023.	5-84
3A8E1		SAME AS 3A3E1.	5-84
3A8E2		SAME AS 3A3E2.	5-84
3A8A1		CIRCUIT CARD ASSEMBLY: 156 resistors, 101 capacitors, 8 coils, 13 integrated circuits, 10 crystals, 30 transistors, plug-in item; p/o AX5023; 10.000 in. lg by 4.375 in. wd by 0.750 in hg, 82679 P/N A4692.	5-84
3A8A1C1		SAME AS 3A5A1C13.	5-84
3A8A1C2		SAME AS 3A4A1C13.	5-84
3A8A1C3		SAME AS 3A4A1C12.	5-84
3A8A1C4		CAPACITOR, FIXED, MICA: 220 uuf, ±5%, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk, 82679 P/N CM111F221G5S.	5-84
3A8A1C5		SAME AS 3A4A1C13.	5-84
3A8A1C6 thru 3A8A1C10		SAME AS 3A4A1C13.	5-84
3A8A1C11		SAME AS 3A4A1C12.	5-84
3A8A1C12		SAME AS 3A8A1C4.	5-84

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A8A1C13 thru 3A8A1C18		SAME AS 3A4A1C13.	5-84
3A8A1C19		SAME AS 3A4A1C12.	5-84
3A8A1C20		SAME AS 3A8A1C4.	5-84
3A8A1C21 thru 3A8A1C26		SAME AS 3A4A1C13.	5-84
3A8A1C27		SAME AS 3A4A1C12.	5-84
3A8A1C28		SAME AS 3A8A1C4.	5-84
3A8A1C29 thru 3A8A1C34		SAME AS 3A4A1C13.	5-84
3A8A1C35		SAME AS 3A4A1C12.	5-84
3A8A1C36		SAME AS 3A8A1C4.	5-84
3A8A1C37		SAME AS 3A4A1C13.	5-84
3A8A1C38 thru 3A8A1C42		SAME AS 3A4A1C13.	5-84
3A8A1C43		SAME AS 3A4A1C12.	5-84
3A8A1C44		SAME AS 3A8A1C4.	5-84
3A8A1C45		SAME AS 3A4A1C13.	5-84
3A8A1C46 thru 3A8A1C50		SAME AS 3A4A1C13.	5-84
3A8A1C51		SAME AS 3A4A1C12.	5-84
3A8A1C52		SAME AS 3A8A1C4.	5-84
3A8A1C53		SAME AS 3A4A1C13.	5-84
3A8A1C54 thru 3A8A1C58		SAME AS 3A4A1C13.	5-84
3A8A1C59		SAME AS 3A5A1C12.	5-84
3A8A1C60		SAME AS 3A8A1C4.	5-84
3A8A1C61 thru 3A8A1C66		SAME AS 3A4A1C13.	5-84
3A8A1C67		SAME AS 3A4A1C12.	5-84
3A8A1C68		SAME AS 3A8A1C4.	5-84
3A8A1C69 thru 3A8A1C74		SAME AS 3A4A1C13.	5-84
3A8A1C75		SAME AS 3A4A1C12.	5-84
3A8A1C76		SAME AS 3A8A1C4.	5-84
3A8A1C77 thru 3A8A1C80		SAME AS 3A4A1C13.	5-84
3A8A1C81		SAME AS 3A4A1C119.	5-84
3A8A1C82		SAME AS 3A4A1C13.	5-84
3A8A1C83		SAME AS 3A4A1C13.	5-84
3A8A1C84		SAME AS 3A2C3.	5-84
3A8A1C85		SAME AS 3A4A1C13.	5-84
3A8A1C86		SAME AS 3A3A1C11.	5-84
3A8A1C87		SAME AS 3A3A1C42.	5-84
3A8A1C88		SAME AS 3A2C3.	5-84
3A8A1C89		SAME AS 3A2C3.	5-84
3A8A1C90 thru 3A8A1C98		SAME AS 3A4A1C13.	5-84
3A8A1C99		SAME AS 3A3A1C42.	5-84

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A8A1C100		SAME AS 3A2C3.	5-84
3A8A1C101		SAME AS 3A2C3.	5-84
3A8A1L1		SAME AS 3A6A1L2.	5-84
3A8A1L2		SAME AS 3A4A1L1.	5-84
3A8A1L3 thru 3A8A1L7		SAME AS 3A4A1L1.	5-84
3A8A1L8		COIL, RF, FIXED: 10 uh, 0.157 in. dia by 0.395 in. lg, 82679 P/N CL433-100.	5-84
3A8A1Q1		SAME AS 3A4A1Q2.	5-84
3A8A1Q2 thru 3A8A1Q11		SAME AS 3A4A1Q2.	5-84
3A8A1Q12		NOT USED.	
3A8A1Q13		SAME AS 3A4A1Q2.	5-84
3A8A1Q14 thru 3A8A1Q31		SAME AS 3A4A1Q2.	5-84
3A8A1R1		SAME AS 3A3A1R6.	5-84
3A8A1R2		SAME AS 3A3A1R6.	5-84
3A8A1R3		SAME AS 3A3A1R6.	5-84
3A8A1R4		SAME AS 3A3A1R1.	5-84
3A8A1R5		SAME AS 3A3A1R1.	5-84
3A8A1R6		SAME AS 3A2R2.	5-84
3A8A1R7		SAME AS 3A3A1R1.	5-84
3A8A1R8		SAME AS 3A2R14.	5-84
3A8A1R9		SAME AS 3A3A1R3.	5-84
3A8A1R10		SAME AS 3A3A1R6.	5-84
3A8A1R11		SAME AS 3A3A1R6.	5-84
3A8A1R12		SAME AS 3A2R23.	5-84
3A8A1R13		SAME AS 3A2R15.	5-84
3A8A1R14		SAME AS 3A3A1R6.	5-84
3A8A1R15		SAME AS 3A3A1R1.	5-84
3A8A1R16		SAME AS 3A3A1R6.	5-84
3A8A1R17		SAME AS 3A3A1R6.	5-84
3A8A1R18		SAME AS 3A3A1R6.	5-84
3A8A1R19		SAME AS 3A3A1R1.	5-84
3A8A1R20		SAME AS 3A3A1R1.	5-84
3A8A1R21		SAME AS 3A2R2.	5-84
3A8A1R22		SAME AS 3A3A1R1.	5-84
3A8A1R23		SAME AS 3A2R14.	5-84
3A8A1R24		SAME AS 3A3A1R3.	5-84
3A8A1R25		SAME AS 3A3A1R6.	5-84
3A8A1R26		SAME AS 3A3A1R6.	5-84
3A8A1R27		SAME AS 3A2R23.	5-84
3A8A1R28		SAME AS 3A2R15.	5-84
3A8A1R29		SAME AS 3A3A1R6.	5-84
3A8A1R30		SAME AS 3A3A1R1.	5-84
3A8A1R31		SAME AS 3A3A1R6.	5-84
3A8A1R32		SAME AS 3A3A1R6.	5-84
3A8A1R33		SAME AS 3A3A1R6.	5-84
3A8A1R34		SAME AS 3A3A1R1.	5-84
3A8A1R35		SAME AS 3A3A1R1.	5-84
3A8A1R36		SAME AS 3A2R2.	5-84
3A8A1R37		SAME AS 3A3A1R1.	5-84
3A8A1R38		SAME AS 3A2R14.	5-84
3A8A1R39		SAME AS 3A3A1R3.	5-84
3A8A1R40		SAME AS 3A3A1R6.	5-84
3A8A1R41		SAME AS 3A3A1R6.	5-84

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A8A1R42		SAME AS 3A2R23.	5-84
3A8A1R43		SAME AS 3A2R15.	5-84
3A8A1R44		SAME AS 3A3A1R6.	5-84
3A8A1R45		SAME AS 3A3A1R1.	5-84
3A8A1R46		SAME AS 3A3A1R6.	5-84
3A8A1R47		SAME AS 3A3A1R6.	5-84
3A8A1R48		SAME AS 3A3A1R6.	5-84
3A8A1R49		SAME AS 3A3A1R1.	5-84
3A8A1R50		SAME AS 3A3A1R1.	5-84
3A8A1R51		SAME AS 3A2R2.	5-84
3A8A1R52		SAME AS 3A3A1R1.	5-84
3A8A1R53		SAME AS 3A2R14.	5-84
3A8A1R54		SAME AS 3A3A1R3.	5-84
3A8A1R55		SAME AS 3A3A1R6.	5-84
3A8A1R56		SAME AS 3A3A1R6.	5-84
3A8A1R57		SAME AS 3A2R23.	5-84
3A8A1R58		SAME AS 3A2R15.	5-84
3A8A1R59		SAME AS 3A3A1R6.	5-84
3A8A1R60		SAME AS 3A3A1R1.	5-84
3A8A1R61		SAME AS 3A3A1R6.	5-84
3A8A1R62		SAME AS 3A3A1R6.	5-84
3A8A1R63		SAME AS 3A3A1R6.	5-84
3A8A1R64		SAME AS 3A3A1R1.	5-84
3A8A1R65		SAME AS 3A3A1R1.	5-84
3A8A1R66		SAME AS 3A2R2.	5-84
3A8A1R67		SAME AS 3A3A1R1.	5-84
3A8A1R68		SAME AS 3A2R14.	5-84
3A8A1R69		SAME AS 3A3A1R3.	5-84
3A8A1R70		SAME AS 3A3A1R6.	5-84
3A8A1R71		SAME AS 3A3A1R6.	5-84
3A8A1R72		SAME AS 3A2R23.	5-84
3A8A1R73		SAME AS 3A2R15.	5-84
3A8A1R74		SAME AS 3A3A1R6.	5-84
3A8A1R75		SAME AS 3A3A1R1.	5-84
3A8A1R76		SAME AS 3A3A1R6.	5-84
3A8A1R77		SAME AS 3A3A1R6.	5-84
3A8A1R78		SAME AS 3A3A1R6.	5-84
3A8A1R79		SAME AS 3A3A1R1.	5-84
3A8A1R80		SAME AS 3A3A1R1.	5-84
3A8A1R81		SAME AS 3A2R2.	5-84
3A8A1R82		SAME AS 3A3A1R1.	5-84
3A8A1R83		SAME AS 3A2R14.	5-84
3A8A1R84		SAME AS 3A3A1R3.	5-84
3A8A1R85		SAME AS 3A3A1R6.	5-84
3A8A1R86		SAME AS 3A3A1R6.	5-84
3A8A1R87		SAME AS 3A2R23.	5-84
3A8A1R88		SAME AS 3A2R15.	5-84
3A8A1R89		SAME AS 3A3A1R6.	5-84
3A8A1R90		SAME AS 3A3A1R1.	5-84
3A8A1R91		SAME AS 3A3A1R6.	5-84
3A8A1R92		SAME AS 3A3A1R6.	5-84
3A8A1R93		SAME AS 3A3A1R6.	5-84
3A8A1R94		SAME AS 3A3A1R1.	5-84
3A8A1R95		SAME AS 3A3A1R1.	5-84
3A8A1R96		SAME AS 3A2R2.	5-84
3A8A1R97		SAME AS 3A3A1R1.	5-84
3A8A1R98		SAME AS 3A2R14.	5-84
3A8A1R99		SAME AS 3A3A1R3.	5-84
3A8A1R100		SAME AS 3A3A1R6.	5-84
3A8A1R101		SAME AS 3A3A1R6.	5-84

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A8A1R102		SAME AS 3A2R23.	5-84
3A8A1R103		SAME AS 3A2R15.	5-84
3A8A1R104		SAME AS 3A3A1R6.	5-84
3A8A1R105		SAME AS 3A3A1R1.	5-84
3A8A1R106		SAME AS 3A3A1R6.	5-84
3A8A1R107		SAME AS 3A3A1R6.	5-84
3A8A1R108		SAME AS 3A3A1R6.	5-84
3A8A1R109		SAME AS 3A3A1R1.	5-84
3A8A1R110		SAME AS 3A3A1R1.	5-84
3A8A1R111		SAME AS 3A2R2.	5-84
3A8A1R112		SAME AS 3A3A1R1.	5-84
3A8A1R113		SAME AS 3A2R14.	5-84
3A8A1R114		SAME AS 3A3A1R3.	5-84
3A8A1R115		SAME AS 3A3A1R6.	5-84
3A8A1R116		SAME AS 3A3A1R6.	5-84
3A8A1R117		SAME AS 3A2R23.	5-84
3A8A1R118		SAME AS 3A2R15.	5-84
3A8A1R119		SAME AS 3A3A1R6.	5-84
3A8A1R120		SAME AS 3A3A1R1.	5-84
3A8A1R121		SAME AS 3A3A1R6.	5-84
3A8A1R122		SAME AS 3A3A1R6.	5-84
3A8A1R123		SAME AS 3A3A1R6.	5-84
3A8A1R124		SAME AS 3A3A1R1.	5-84
3A8A1R125		SAME AS 3A3A1R1.	5-84
3A8A1R126		SAME AS 3A2R2.	5-84
3A8A1R127		SAME AS 3A3A1R1.	5-84
3A8A1R128		SAME AS 3A2R14.	5-84
3A8A1R129		SAME AS 3A3A1R3.	5-84
3A8A1R130		SAME AS 3A3A1R6.	5-84
3A8A1R131		SAME AS 3A3A1R6.	5-84
3A8A1R132		SAME AS 3A2R23.	5-84
3A8A1R133		SAME AS 3A2R15.	5-84
3A8A1R134		SAME AS 3A3A1R6.	5-84
3A8A1R135		SAME AS 3A3A1R1.	5-84
3A8A1R136		SAME AS 3A3A1R6.	5-84
3A8A1R137		SAME AS 3A3A1R6.	5-84
3A8A1R138		SAME AS 3A3A1R6.	5-84
3A8A1R139		SAME AS 3A3A1R1.	5-84
3A8A1R140		SAME AS 3A3A1R1.	5-84
3A8A1R141		SAME AS 3A2R2.	5-84
3A8A1R142		SAME AS 3A3A1R1.	5-84
3A8A1R143		SAME AS 3A2R14.	5-84
3A8A1R144		SAME AS 3A3A1R14.	5-84
3A8A1R145		SAME AS 3A3A1R6.	5-84
3A8A1R146		SAME AS 3A3A1R6.	5-84
3A8A1R147		SAME AS 3A2R23.	5-84
3A8A1R148		SAME AS 3A2R15.	5-84
3A8A1R149		SAME AS 3A3A1R6.	5-84
3A8A1R150		SAME AS 3A3A1R1.	5-84
3A8A1R151		SAME AS 3A3A1R6.	5-84
3A8A1R152		SAME AS 3A2R18.	5-84
3A8A1R153		SAME AS 3A2R14.	5-84
3A8A1R154		SAME AS 3A3A1R4.	5-84
3A8A1R155		SAME AS 3A3A1R4.	5-84
3A8A1R156		SAME AS 3A2R10.	5-84
3A8A1Y1		SAME AS 3A5A1Y17.	5-84
3A8A1Y2		SAME AS 3A5A1Y13.	5-84
3A8A1Y3		SAME AS 3A5A1Y1.	5-84
3A8A1Y4		SAME AS 3A5A1Y5.	5-84

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A8A1Y5		SAME AS 3A4A1Y11.	5-84
3A8A1Y6		SAME AS 3A5A1Y3.	5-84
3A8A1Y7		SAME AS 3A5A1Y9.	5-84
3A8A1Y8		SAME AS 3A5A1Y11.	5-84
3A8A1Y9		SAME AS 3A5A1Y7.	5-84
3A8A1Y10		SAME AS 3A5A1Y15.	5-84
3A8A1Z1		SAME AS 3A3A1Z1.	5-84
3A8A1Z2 thru 3A8A1Z10		SAME AS 3A3A1Z1.	5-84
3A9A1Z11		SAME AS 3A6A1Z1.	5-84
3A8A1Z12		SAME AS 3A6A1Z2.	5-84
3A8A1Z13		SAME AS 3A3A1Z1.	5-84
3A9		MIXER/AMPLIFIER 1: 1 circuit card assembly, 2 RF shields; 10.000 in. lg by 4.562 in. wd by 1 in. hg, 82679 P/N AX5024.	5-86
3A9E1		SAME AS 3A3E1.	5-86
3A9E2		SAME AS 3A3E2.	5-86
3A9A1		CIRCUIT CARD ASSEMBLY: 76 resistors, 79 capacitors, 16 coils, 4 transformers, 2 integrated circuits, 20 transistors, plug-in item; p/o AX5024; 10.000 in. lg by 4.375 in. wd by 0.750 in. hg, 82679 P/N A4695.	5-86
3A9A1C1		SAME AS 3A2C3.	5-86
3A9A1C2		SAME AS 3A4A1C13.	5-86
3A9A1C3		CAPACITOR, FIXED, MICA: 4700 uuf, ±5% tol, 500 vdcw, 0.665 in. lg, 0.625 in. wd by 0.240 in. thk, 82679 P/N CM112F472J5S.	5-86
3A9A1C4		SAME AS 3A9A1C3.	5-86
3A9A1C5		SAME AS 3A2C3.	5-86
3A9A1C6		SAME AS 3A4A1C13.	5-86
3A9A1C7		SAME AS 3A4A1C13.	5-86
3A9A1C8		SAME AS 3A4A1C13.	5-86
3A9A1C9		SAME AS 3A4A1C47.	5-86
3A9A1C10		SAME AS 3A4A1C13.	5-86
3A9A1C11		CAPACITOR, VAR: 15-60 pf, 100 vdcw, 0.375 in. dia by 0.093 in. hg, 82679 P/N CV112-9.	5-86
3A9A1C12		CAPACITOR, FIXED, MICA: 200 uuf, ±2% tol, 300 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk, 82679 P/N CM111F201G3S.	5-86
3A9A1C13		SAME AS 3A9A1C3.	5-86
3A9A1C14		SAME AS 3A9A1C12.	5-86
3A9A1C15		SAME AS 3A4A1C13.	5-86
3A9A1C16		SAME AS 3A4A1C13.	5-86
3A9A1C17		SAME AS 3A4A1C13.	5-86
3A9A1C18		SAME AS 3A8A1C4.	5-86
3A9A1C19		CAPACITOR, FIXED, MICA: 180 uuf, ±2% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk, 82679 P/N CM111F181G5S.	5-86
3A9A1C20		SAME AS 3A4A1C13.	5-86
3A9A1C21		SAME AS 3A4A1C13.	5-86
3A9A1C22		SAME AS 3A4A1C82.	5-86
3A9A1C23		CAPACITOR, FIXED, MICA: 10,000 pf, ±1% tol, 100 vdcw, 0.790 in. lg, 0.570 in. wd, 0.340 in. thk, 82679 P/N CM112F103F1S.	5-86
3A9A1C24		SAME AS 3A4A1C13.	5-86
3A9A1C25		SAME AS 3A4A1C82.	5-86
3A9A1C26		SAME AS 3A3A1C11.	5-86
3A9A1C27		SAME AS 3A4A1C13.	5-86
3A9A1C28		SAME AS 3A4A1C13.	5-86
3A9A1C29		SAME AS 3A4A1C15.	5-86
3A9A1C30		SAME AS 3A4A1C15.	5-86

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A9A1C31		SAME AS 3A4A1C13.	5-86
3A9A1C32		SAME AS 3A3A1C11.	5-86
3A9A1C33		SAME AS 3A4A1C13.	5-86
3A9A1C34		SAME AS 3A4A1C13.	5-86
3A9A1C35		SAME AS 3A4A1C13.	5-86
3A9A1C36		SAME AS 3A9A1C11.	5-86
3A9A1C37		CAPACITOR, FIXED, MICA: 160 pf ±2% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk, 82679 P/N CM111F161G5S.	5-86
3A9A1C38		SAME AS 3A9A1C3.	5-86
3A9A1C39		SAME AS 3A9A1C37.	5-86
3A9A1C40		SAME AS 3A4A1C13.	5-86
3A9A1C41		SAME AS 3A4A1C13.	5-86
3A9A1C42		SAME AS 3A4A1C13.	5-86
3A9A1C43		SAME AS 3A8A1C4.	5-86
3A9A1C44		SAME AS 3A9A1C19.	5-86
3A9A1C45		SAME AS 3A2C3.	5-86
3A9A1C46		SAME AS 3A4A1C13.	5-86
3A9A1C47		SAME AS 3A9A1C19.	5-86
3A9A1C48		SAME AS 3A9A1C23.	5-86
3A9A1C49		SAME AS 3A4A1C19.	5-86
3A9A1C50		SAME AS 3A4A1C13.	5-86
3A9A1C51		SAME AS 3A4A1C13.	5-86
3A9A1C52		SAME AS 3A4A1C13.	5-86
3A9A1C53		SAME AS 3A3A1C11.	5-86
3A9A1C54		SAME AS 3A4A1C13.	5-86
3A9A1C55		SAME AS 3A2C3.	5-86
3A9A1C56		SAME AS 3A4A1C41.	5-86
3A9A1C57		SAME AS 3A4A1C41.	5-86
3A9A1C58		SAME AS 3A4A1C42.	5-86
3A9A1C59		SAME AS 3A4A1C13.	5-86
3A9A1C60		SAME AS 3A2C3.	5-86
3A9A1C61		SAME AS 3A4A1C13.	5-86
3A9A1C62		SAME AS 3A4A1C47.	5-86
3A9A1C63		SAME AS 3A4A1C13.	5-86
3A9A1C64		SAME AS 3A2C3.	5-86
3A9A1C65		SAME AS 3A4A1C13.	5-86
3A9A1C66		CAPACITOR, FIXED, MICA: 47 uuf ±2% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk, 82679 P/N CM111E470G5S.	5-86
3A9A1C67		CAPACITOR, FIXED, MICA: 150 pf ±1% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk, 82679 P/N CM111F151F5S.	5-86
3A9A1C68		SAME AS 3A9A1C66.	5-86
3A9A1C69		SAME AS 3A4A1C13.	5-86
3A9A1C70		SAME AS 3A2C3.	5-86
3A9A1C71		SAME AS 3A4A1C13.	5-86
3A9A1C72		SAME AS 3A4A1C47.	5-86
3A9A1C73		SAME AS 3A2C3.	5-86
3A9A1C74		SAME AS 3A2C3.	5-86
3A9A1C75		SAME AS 3A2C3.	5-86
3A9A1C76		SAME AS 3A4A1C13.	5-86
3A9A1C77		SAME AS 3A4A1C13.	5-86
3A9A1C78		SAME AS 3A9A1C11.	5-86
3A9A1C79		SAME AS 3A9A1C11.	5-86
3A9A1L1		COIL, RF, FIXED: 6.80 uh, Q=80 at 7.9 mc, 0.400 in. dia, 0.500 in. lg. Dwg CL430-5, 72259 P/N VIV-6.80.	5-86
3A9A1L2		SAME AS 3A4A1L3.	5-86
3A9A1L3 thru 3A9A1L8		SAME AS 3A4A1L3.	5-86
3A9A1L9		SAME AS 3A4A1L28.	5-86

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A9A1L10		SAME AS 3A4A1L28.	5-86
3A9A1L11		SAME AS 3A3A1L5.	5-86
3A9A1L12		COIL, RF, FIXED: 120 uh, Q=57 at 0.79 mc, 0.157 in. dia, 0.395 in. lg, 82679 P/N CL433-121.	5-86
3A9A1L13		SAME AS 3A9A1L12.	5-86
3A9A1L14		SAME AS 3A3A1L6.	5-86
3A9A1L15		SAME AS 3A3A1L6.	5-86
3A9A1L16		SAME AS 3A3A1L5.	5-86
3A9A1Q1		SAME AS 3A4A1Q2.	5-86
3A9A1Q2		SAME AS 3A4A1Q2.	5-86
3A9A1Q3		SAME AS 3A3A1Q27.	5-86
3A9A1Q4		SAME AS 3A3A1Q27.	5-86
3A9A1Q5		SAME AS 3A4A1Q2.	5-86
3A9A1Q6 thru 3A9A1Q9		SAME AS 3A4A1Q2.	5-86
3A9A1Q10		SAME AS 3A3A1Q27.	5-86
3A9A1Q11		SAME AS 3A3A1Q27.	5-86
3A9A1Q12		SAME AS 3A4A1Q2.	5-86
3A9A1Q13 thru 3A9A1Q19		SAME AS 3A4A1Q2.	5-86
3A9A1Q20		SAME AS 3A2Q3.	5-86
3A9A1R1		RESISTOR, VARIABLE: 500 ohms, ±30% tol, 200 vdcw, 0.250 in. dia by 0.250 in. hg, 82679 P/N RV124-1-501.	5-86
3A9A1R2		SAME AS 3A3A1R6.	5-86
3A9A1R3		SAME AS 3A3A1R3.	5-86
3A9A1R4		SAME AS 3A3A1R6.	5-86
3A9A1R5		SAME AS 3A2R2.	5-86
3A9A1R6		SAME AS 3A3A1R6.	5-86
3A9A1R7		SAME AS 3A3A1R3.	5-86
3A9A1R8		SAME AS 3A3A1R4.	5-86
3A9A1R9		SAME AS 3A2R14.	5-86
3A9A1R10		SAME AS 3A3A1R3.	5-86
3A9A1R11		SAME AS 3A3A1R37.	5-86
3A9A1R12		SAME AS 3A3A1R4.	5-86
3A9A1R13		SAME AS 3A9A1R1.	5-86
3A9A1R14		SAME AS 3A3A1R6.	5-86
3A9A1R15		SAME AS 3A3A1R3.	5-86
3A9A1R16		SAME AS 3A3A1R6.	5-86
3A9A1R17		SAME AS 3A2R2.	5-86
3A9A1R18		SAME AS 3A3A1R6.	5-86
3A9A1R19		SAME AS 3A3A1R3.	5-86
3A9A1R20		SAME AS 3A3A1R4.	5-86
3A9A1R21		SAME AS 3A2R14.	5-86
3A9A1R22		SAME AS 3A3A1R6.	5-86
3A9A1R23		SAME AS 3A3A1R3.	5-86
3A9A1R24		SAME AS 3A3A1R4.	5-86
3A9A1R25		SAME AS 3A2R14.	5-86
3A9A1R26		SAME AS 3A9A1R1.	5-86
3A9A1R27		SAME AS 3A3A1R1.	5-86
3A9A1R28		SAME AS 3A2R15.	5-86
3A9A1R29		SAME AS 3A3A1R3.	5-86
3A9A1R30		SAME AS 3A3A1R6.	5-86
3A9A1R31		SAME AS 3A3A1R6.	5-86
3A9A1R32		SAME AS 3A3A1R3.	5-86
3A9A1R33		SAME AS 3A3A1R4.	5-86
3A9A1R34		SAME AS 3A2R14.	5-86
3A9A1R35		SAME AS 3A3A1R3.	5-86

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A9A1R36		SAME AS 3A3A1R4.	5-86
3A9A1R37		SAME AS 3A3A1R37.	5-86
3A9A1R38		NOT USED.	
3A9A1R39		SAME AS 3A2R15.	5-86
3A9A1R40		SAME AS 3A3A1R6.	5-86
3A9A1R41		SAME AS 3A3A1R6.	5-86
3A9A1R42		SAME AS 3A2R23.	5-86
3A9A1R43		SAME AS 3A3A1R3.	5-86
3A9A1R44		SAME AS 3A3A1R6.	5-86
3A9A1R45		SAME AS 3A3A1R6.	5-86
3A9A1R46		SAME AS 3A3A1R6.	5-86
3A9A1R47		SAME AS 3A2R16.	5-86
3A9A1R48		SAME AS 3A3A1R6.	5-86
3A9A1R49		SAME AS 3A3A1R3.	5-86
3A9A1R50		SAME AS 3A3A1R4.	5-86
3A9A1R51		SAME AS 3A2R14.	5-86
3A9A1R52		SAME AS 3A3A1R6.	5-86
3A9A1R53		SAME AS 3A3A1R3.	5-86
3A9A1R54		SAME AS 3A3A1R4.	5-86
3A9A1R55		SAME AS 3A2R14.	5-86
3A9A1R56		SAME AS 3A9A1R1.	5-86
3A9A1R57		SAME AS 3A3A1R1.	5-86
3A9A1R58		SAME AS 3A3A1R6.	5-86
3A9A1R59		SAME AS 3A3A1R3.	5-86
3A9A1R60		SAME AS 3A2R15.	5-86
3A9A1R61		SAME AS 3A3A1R6.	5-86
3A9A1R62		SAME AS 3A3A1R3.	5-86
3A9A1R63		SAME AS 3A3A1R4.	5-86
3A9A1R64		SAME AS 3A2R14.	5-86
3A9A1R65		SAME AS 3A2R15.	5-86
3A9A1R66		SAME AS 3A3A1R6.	5-86
3A9A1R67		SAME AS 3A2R23.	5-86
3A9A1R68		SAME AS 3A3A1R6.	5-86
3A9A1R69		SAME AS 3A3A1R6.	5-86
3A9A1R70		SAME AS 3A3A1R3.	5-86
3A9A1R71		SAME AS 3A2R14.	5-86
3A9A1R72		SAME AS 3A3A1R6.	5-86
3A9A1R73		SAME AS 3A2R5.	5-86
3A9A1R74		SAME AS 3A2R14.	5-86
3A9A1R75		SAME AS 3A3A1R4.	5-86
3A9A1R76		SAME AS 3A3A1R4.	5-86
3A9A1R77		SAME AS 3A2R14.	5-86
3A9A1T1		TRANSFORMER, RF, ADJUSTABLE: Q=50 at 12 mc. Metal case. 0.614 in. dia by 0.532 in. hg, 82679 P/N TT301.	5-86
3A9A1T2		SAME AS 3A9A1T1.	5-86
3A9A1T3		TRANSFORMER, PULSE: 0.5 uh, ±20% tol, wire leads, 0.650 in. lg, 0.425 in. wd, 0.350 in. hg, Dwg TF374-3; 90095 P/N 11KGB.	5-86
3A9A1T4		SAME AS 3A9A1T3.	5-86
3A9A1Z1		INTEGRATED CIRCUIT, DECADE DIVIDER: 8 pins plastic case. Digital input dc to 30 mc, analog input 5 cps to 30 mc. 0.438 in. lg by 0.187 in. wd by 0.125 in. hg, 82679 P/N NW171.	5-86
3A9A1Z2		SAME AS 3A4A1Z2.	5-86
3A10		SAME AS 3A9.	5-86
3A11		SAME AS 3A9.	5-86

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A12		MIXER/AMPLIFIER 4: 1 circuit card assembly, 2 RF shields, 10.000 in. lg by 4.562 in. wd, by 1 in. hg, 82679 P/N AX5025.	5-88
3A12E1		SAME AS 3A3E1.	5-88
3A12E2		SAME AS 3A3E2.	5-88
3A12A1		CIRCUIT CARD ASSEMBLY: 75 resistors, 81 capacitors, 16 coils, 4 transformers, 2 integrated circuits, 20 transistors, plug-in item; p/o AX5025; 10.000 in. lg by 4.375 in. wd by 0.750 in. hg, 82679 P/N A4694.	5-88
3A12A1C1		SAME AS 3A2C3.	5-88
3A12A1C2		SAME AS 3A4A1C13.	5-88
3A12A1C3		SAME AS 3A9A1C3.	5-88
3A12A1C4		SAME AS 3A9A1C3.	5-88
3A12A1C5		SAME AS 3A2C3.	5-88
3A12A1C6		SAME AS 3A4A1C13.	5-88
3A12A1C7		SAME AS 3A4A1C13.	5-88
3A12A1C8		SAME AS 3A4A1C13.	5-88
3A12A1C9		SAME AS 3A4A1C47.	5-88
3A12A1C10		SAME AS 3A4A1C13.	5-88
3A12A1C11		SAME AS 3A9A1C11.	5-88
3A12A1C12		SAME AS 3A9A1C12.	5-88
3A12A1C13		SAME AS 3A9A1C3.	5-88
3A12A1C14		SAME AS 3A9A1C12.	5-88
3A12A1C15		SAME AS 3A4A1C13.	5-88
3A12A1C16		SAME AS 3A4A1C13.	5-88
3A12A1C17		SAME AS 3A4A1C13.	5-88
3A12A1C18		SAME AS 3A8A1C4.	5-88
3A12A1C19		SAME AS 3A9A1C19.	5-88
3A12A1C20		SAME AS 3A4A1C13.	5-88
3A12A1C21		SAME AS 3A4A1C13.	5-88
3A12A1C22		SAME AS 3A4A1C82.	5-88
3A12A1C23		SAME AS 3A9A1C23.	5-88
3A12A1C24		SAME AS 3A4A1C13.	5-88
3A12A1C25		SAME AS 3A4A1C82.	5-88
3A12A1C26		SAME AS 3A3A1C11.	5-88
3A12A1C27		SAME AS 3A4A1C13.	5-88
3A12A1C28		SAME AS 3A4A1C13.	5-88
3A12A1C29		SAME AS 3A4A1C15.	5-88
3A12A1C30		SAME AS 3A4A1C15.	5-88
3A12A1C31		SAME AS 3A4A1C13.	5-88
3A12A1C32		SAME AS 3A3A1C11.	5-88
3A12A1C33		SAME AS 3A4A1C13.	5-88
3A12A1C34		SAME AS 3A4A1C13.	5-88
3A12A1C35		SAME AS 3A4A1C13.	5-88
3A12A1C36		SAME AS 3A9A1C11.	5-88
3A12A1C37		SAME AS 3A9A1C37.	5-88
3A12A1C38		SAME AS 3A9A1C3.	5-88
3A12A1C39		SAME AS 3A9A1C37.	5-88
3A12A1C40		SAME AS 3A4A1C13.	5-88
3A12A1C41		SAME AS 3A4A1C13.	5-88
3A12A1C42		SAME AS 3A4A1C13.	5-88
3A12A1C43		SAME AS 3A8A1C4.	5-88
3A12A1C44		SAME AS 3A9A1C19.	5-88
3A12A1C45		SAME AS 3A2C3.	5-88
3A12A1C46		SAME AS 3A4A1C13.	5-88
3A12A1C47		SAME AS 3A9A1C19.	5-88
3A12A1C48		SAME AS 3A9A1C23.	5-88
3A12A1C49		SAME AS 3A9A1C19.	5-88
3A12A1C50		SAME AS 3A4A1C13.	5-88
3A12A1C51		SAME AS 3A4A1C13.	5-88

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A12A1C52		SAME AS 3A4A1C13.	5-88
3A12A1C53		SAME AS 3A3A1C11.	5-88
3A12A1C54		SAME AS 3A4A1C13.	5-88
3A12A1C55		SAME AS 3A2C3.	5-88
3A12A1C56		CAPACITOR, FIXED, MICA: 91 uuf ±2% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk, 82679 P/N CM111F910G5S.	5-88
3A12A1C57		SAME AS 3A12A1C56.	5-88
3A12A1C58		CAPACITOR, FIXED, MICA: 820 pf ±1% tol, 300 vdcw, 0.640 in. lg, 0.591 in. wd, 0.198 in. thk, 82679 P/N CM111F821F3S.	5-88
3A12A1C59		SAME AS 3A4A1C13.	5-88
3A12A1C60		SAME AS 3A2C3.	5-88
3A12A1C61		SAME AS 3A2C7.	5-88
3A12A1C62		SAME AS 3A4A1C47.	5-88
3A12A1C63		SAME AS 3A4A1C13.	5-88
3A12A1C64		SAME AS 3A2C3.	5-88
3A12A1C65		SAME AS 3A4A1C13.	5-88
3A12A1C66		SAME AS 3A9A1C66.	5-88
3A12A1C67		SAME AS 3A9A1C67.	5-88
3A12A1C68		SAME AS 3A9A1C66.	5-88
3A12A1C69		SAME AS 3A4A1C13.	5-88
3A12A1C70		SAME AS 3A2C3.	5-88
3A12A1C71		SAME AS 3A4A1C13.	5-88
3A12A1C72		SAME AS 3A4A1C47.	5-88
3A12A1C73		SAME AS 3A2C3.	5-88
3A12A1C74		SAME AS 3A2C3.	5-88
3A12A1C75		SAME AS 3A2C3.	5-88
3A12A1C76		SAME AS 3A4A1C13.	5-88
3A12A1C77		SAME AS 3A4A1C13.	5-88
3A12A1C78		SAME AS 3A9A1C11.	5-88
3A12A1C79		SAME AS 3A9A1C11.	5-88
3A12A1C80		SAME AS 3A4A1C3.	5-88
3A12A1C81		SAME AS 3A4A1C3.	5-88
3A12A1L1		SAME AS 3A9A1L1.	5-88
3A12A1L2		SAME AS 3A4A1L3.	5-88
3A12A1L3 thru 3A12A1L8		SAME AS 3A4A1L3.	5-88
3A12A1L9		COIL, RF, FIXED: 1.5 uh, ±10% tol, 3.12 ohms max dc res. 0.157 in. dia by 0.450 in. lg, 82679 P/N CL275-1R5.	5-88
3A12A1L10		SAME AS 3A12A1L9.	5-88
3A12A1L11		COIL, RF, FIXED: 100 uh, ±10% tol, 3.12 ohms max dc res. 0.157 in. dia by 0.450 in. lg, 82679 P/N CL275-101.	5-88
3A12A1L12		COIL, RF, FIXED: 120 uh, ±10% tol, 3.12 ohms max dc res. 0.157 in. dia by 0.450 in. lg, 82679 P/N CL275-121.	5-88
3A12A1L13		SAME AS 3A12A1L12.	5-88
3A12A1L14		COIL, RF, FIXED: 330 uh, ±10% tol, 3.12 ohms max dc res. 0.157 in. dia by 0.450 in. lg, 82679 P/N CL275-331.	5-88
3A12A1L15		SAME AS 3A12A1L14.	5-88
3A12A1L16		SAME AS 3A12A1L11.	5-88
3A12A1Q1		SAME AS 3A4A1Q2.	5-88
3A12A1Q2		SAME AS 3A4A1Q2.	5-88
3A12A1Q3		SAME AS 3A3A1Q27.	5-88
3A12A1Q4		SAME AS 3A3A1Q27.	5-88
3A12A1Q5		SAME AS 3A4A1Q2.	5-88
3A12A1Q6		SAME AS 3A4A1Q2.	5-88
3A12A1Q7 thru 3A12A1Q9		SAME AS 3A4A1Q2.	5-88

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A12A1Q10		SAME AS 3A3A1Q27.	5-88
3A12A1Q11		SAME AS 3A3A1Q27.	5-88
3A12A1Q12		SAME AS 3A4A1Q2.	5-88
3A12A1Q13 thru 3A12A1Q19		SAME AS 3A4A1Q2.	5-88
3A12A1Q20		SAME AS 3A2Q3.	5-88
3A12A1R1		SAME AS 3A9A1R1.	5-88
3A12A1R2		SAME AS 3A3A1R6.	5-88
3A12A1R3		SAME AS 3A3A1R3.	5-88
3A12A1R4		SAME AS 3A3A1R6.	5-88
3A12A1R5		SAME AS 3A2R2.	5-88
3A12A1R6		SAME AS 3A3A1R6.	5-88
3A12A1R7		SAME AS 3A3A1R3.	5-88
3A12A1R8		SAME AS 3A3A1R4.	5-88
3A12A1R9		SAME AS 3A2R14.	5-88
3A12A1R10		SAME AS 3A3A1R3.	5-88
3A12A1R11		SAME AS 3A3A1R37.	5-88
3A12A1R12		SAME AS 3A3A1R4.	5-88
3A12A1R13		SAME AS 3A9A1R1.	5-88
3A12A1R14		SAME AS 3A3A1R6.	5-88
3A12A1R15		SAME AS 3A3A1R3.	5-88
3A12A1R16		SAME AS 3A3A1R6.	5-88
3A12A1R17		SAME AS 3A2R2.	5-88
3A12A1R18		SAME AS 3A3A1R6.	5-88
3A12A1R19		SAME AS 3A3A1R3.	5-88
3A12A1R20		SAME AS 3A3A1R4.	5-88
3A12A1R21		SAME AS 3A2R14.	5-88
3A12A1R22		SAME AS 3A3A1R6.	5-88
3A12A1R23		SAME AS 3A3A1R3.	5-88
3A12A1R24		SAME AS 3A3A1R4.	5-88
3A12A1R25		SAME AS 3A2R14.	5-88
3A12A1R26		SAME AS 3A9A1R1.	5-88
3A12A1R27		SAME AS 3A3A1R1.	5-88
3A12A1R28		SAME AS 3A2R15.	5-88
3A12A1R29		SAME AS 3A3A1R3.	5-88
3A12A1R30		SAME AS 3A3A1R6.	5-88
3A12A1R31		SAME AS 3A3A1R6.	5-88
3A12A1R32		SAME AS 3A3A1R3.	5-88
3A12A1R33		SAME AS 3A3A1R4.	5-88
3A12A1R34		SAME AS 3A2R14.	5-88
3A12A1R35		SAME AS 3A3A1R3.	5-88
3A12A1R36		SAME AS 3A3A1R4.	5-88
3A12A1R37		SAME AS 3A3A1R37.	5-88
3A12A1R38		NOT USED.	
3A12A1R39		SAME AS 3A2R15.	5-88
3A12A1R40		SAME AS 3A3A1R6.	5-88
3A12A1R41		SAME AS 3A3A1R6.	5-88
3A12A1R42		SAME AS 3A2R23.	5-88
3A12A1R43		SAME AS 3A3A1R3.	5-88
3A12A1R44		SAME AS 3A3A1R6.	5-88
3A12A1R45		SAME AS 3A3A1R6.	5-88
3A12A1R46		SAME AS 3A3A1R6.	5-88
3A12A1R47		SAME AS 3A2R16.	5-88
3A12A1R48		SAME AS 3A3A1R6.	5-88
3A12A1R49		SAME AS 3A3A1R3.	5-88
3A12A1R50		SAME AS 3A3A1R4.	5-88
3A12A1R51		SAME AS 3A2R14.	5-88
3A12A1R52		SAME AS 3A3A1R6.	5-88

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A12A1R53		SAME AS 3A3A1R3.	5-88
3A12A1R54		SAME AS 3A3A1R4.	5-88
3A12A1R55		SAME AS 3A2R14.	5-88
3A12A1R56		SAME AS 3A9A1R1.	5-88
3A12A1R57		SAME AS 3A3A1R1.	5-88
3A12A1R58		SAME AS 3A3A1R6.	5-88
3A12A1R59		SAME AS 3A3A1R3.	5-88
3A12A1R60		SAME AS 3A2R15.	5-88
3A12A1R61		SAME AS 3A3A1R6.	5-88
3A12A1R62		SAME AS 3A3A1R3.	5-88
3A12A1R63		SAME AS 3A3A1R4.	5-88
3A12A1R64		SAME AS 3A2R14.	5-88
3A12A1R65		SAME AS 3A2R15.	5-88
3A12A1R66		SAME AS 3A3A1R6.	5-88
3A12A1R67		SAME AS 3A2R23.	5-88
3A12A1R68		SAME AS 3A3A1R6.	5-88
3A12A1R69		SAME AS 3A3A1R6.	5-88
3A12A1R70		SAME AS 3A3A1R3.	5-88
3A12A1R71		SAME AS 3A2R14.	5-88
3A12A1R72		SAME AS 3A3A1R6.	5-88
3A12A1R73		SAME AS 3A2R5.	5-88
3A12A1R74		SAME AS 3A2R14.	5-88
3A12A1R75		SAME AS 3A3A1R4.	5-88
3A12A1R76		SAME AS 3A3A1R4.	5-88
3A12A1R77		SAME AS 3A2R14.	5-88
3A12A1T1		SAME AS 3A9A1T1.	5-88
3A12A1T2		SAME AS 3A9A1T1.	5-88
3A12A1T3		SAME AS 3A9A1T3.	5-88
3A12A1T4		SAME AS 3A9A1T3.	5-88
3A12A1Z1		SAME AS 3A9A1Z1.	5-88
3A12A1Z2		SAME AS 3A3A1Z1.	5-88
3A13		FINAL MIXER/AMPLIFIER: 1 circuit card assembly, 2 RF shields, 10. 000 in. lg, 4. 562 in. wd by 1 in. wd by 1 in. hg, 82679 P/N AX5026.	5-90
3A13E1		SAME AS 3A3E1.	5-90
3A13E2		SAME AS 3A3E2.	5-90
3A13A1		CIRCUIT CARD ASSEMBLY: 97 resistors, 98 capacitors, 20 coils, 2 transformers, 3 integrated circuits, 28 transistors, 9 semiconductors, plug-in item, p/o AX5026; 10. 000 in. lg by 4. 375 in. wd by 0. 750 in. hg, 82679 P/N A4695.	5-90
3A13A1C1		SAME AS 3A2C3.	5-90
3A13A1C2		SAME AS 3A2C3.	5-90
3A13A1C3		SAME AS 3A3A1C42.	5-90
3A13A1C4		SAME AS 3A2C3.	5-90
3A13A1C5		SAME AS 3A3C3.	5-90
3A13A1C6		CAPACITOR, FIXED, MICA: 22 uuf, ±5% tol, 500 vdcw, 0. 440 in. lg, 0. 473 in. wd, 0. 170 in. thk, 82679 P/N CM111C220J5S.	5-90
3A13A1C7		CAPACITOR, FIXED, CERAMIC: 10, 000 pf +80 -20% tol, 25 vdcw, 0. 385 in. dia, 0. 156 in. thk, 0. 250 in. lead spacing. 82679 P/N CC100-41.	5-90
3A13A1C8		SAME AS 3A13A1C6.	5-90
3A13A1C9		SAME AS 3A2C3.	5-90
3A13A1C10		SAME AS 3A13A1C7.	5-90
3A13A1C11		SAME AS 3A4A1C13.	5-90
3A13A1C12		SAME AS 3A4A1C13.	5-90
3A13A1C13		SAME AS 3A13A1C7.	5-90

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A13A1C14		SAME AS 3A4A1C13.	5-90
3A13A1C15		CAPACITOR, VARIABLE, CERAMIC: 5.5 -18 uuf, 200 vdcw, min Q=500 at 1 mc, 0.375 in. dia, 0.300 in. hg, 82679 P/N CV112-7.	5-90
3A13A1C16		SAME AS 3A3A1C15.	5-90
3A13A1C17		SAME AS 3A4A1C113.	5-90
3A13A1C18		SAME AS 3A4A1C113.	5-90
3A13A1C19		SAME AS 3A9A1C3.	5-90
3A13A1C20		SAME AS 3A4A1C13.	5-90
3A13A1C21		SAME AS 3A4A1C13.	5-90
3A13A1C22		SAME AS 3A8A1C4.	5-90
3A13A1C23		SAME AS 3A4A1C13.	5-90
3A13A1C24		SAME AS 3A4A1C13.	5-90
3A13A1C25		SAME AS 3A9A1C19.	5-90
3A13A1C26		SAME AS 3A4A1C13.	5-90
3A13A1C27		SAME AS 3A2C3.	5-90
3A13A1C28		SAME AS 3A4A1C13.	5-90
3A13A1C29		SAME AS 3A4A1C13.	5-90
3A13A1C30		SAME AS 3A13A1C15.	5-90
3A13A1C31		SAME AS 3A13A1C15.	5-90
3A13A1C32		SAME AS 3A4A1C113.	5-90
3A13A1C33		SAME AS 3A4A1C113.	5-90
3A13A1C34		SAME AS 3A9A1C23.	5-90
3A13A1C35		SAME AS 3A4A1C13.	5-90
3A13A1C36		SAME AS 3A4A1C13.	5-90
3A13A1C37		SAME AS 3A3A1C11.	5-90
3A13A1C38		SAME AS 3A3A1C47.	5-90
3A13A1C39		SAME AS 3A4A1C13.	5-90
3A13A1C40		SAME AS 3A4A1C13.	5-90
3A13A1C41		SAME AS 3A2C3.	5-90
3A13A1C42		SAME AS 3A3A1C47.	5-90
3A13A1C43		CAPACITOR, FIXED, MICA: 15 uuf, ±5% tol, 500 vdcw, 0.440 in. lg, 0.473 in. wd, 0.170 in. thk, 82679 P/N CM111C150J5S.	5-90
3A13A1C44		SAME AS 3A13A1C43.	5-90
3A13A1C45		SAME AS 3A3A1C47.	5-90
3A13A1C46		SAME AS 3A2C3.	5-90
3A13A1C47		SAME AS 3A3A1C47.	5-90
3A13A1C48		SAME AS 3A2C3.	5-90
3A13A1C49		SAME AS 3A3A1C47.	5-90
3A13A1C50		SAME AS 3A13A1C43.	5-90
3A13A1C51		SAME AS 3A13A1C43.	5-90
3A13A1C52		SAME AS 3A3A1C42.	5-90
3A13A1C53		SAME AS 3A3A1C42.	5-90
3A13A1C54		SAME AS 3A3A1C47.	5-90
3A13A1C55		SAME AS 3A3A1C47.	5-90
3A13A1C56		SAME AS 3A2C3.	5-90
3A13A1C57		SAME AS 3A3A1C47.	5-90
3A13A1C58		SAME AS 3A3A1C42.	5-90
3A13A1C59		SAME AS 3A3A1C42.	5-90
3A13A1C60		SAME AS 3A4A1C119.	5-90
3A13A1C61		SAME AS 3A4A1C119.	5-90
3A13A1C62		SAME AS 3A3A1C47.	5-90
3A13A1C63		SAME AS 3A3A1C42.	5-90
3A13A1C64		SAME AS 3A3A1C42.	5-90
3A13A1C65		SAME AS 3A3A1C19.	5-90
3A13A1C66		SAME AS 3A3A1C19.	5-90
3A13A1C67		SAME AS 3A2C3.	5-90
3A13A1C68		SAME AS 3A3A1C47.	5-90
3A13A1C69		SAME AS 3A3A1C42.	5-90

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A13A1C70		SAME AS 3A3A1C19.	5-90
3A13A1C71		SAME AS 3A3A1C19.	5-90
3A13A1C72		SAME AS 3A2C3.	5-90
3A13A1C73		SAME AS 3A2C3.	5-90
3A13A1C74		SAME AS 3A2C3.	5-90
3A13A1C75		SAME AS 3A4A1C13.	5-90
3A13A1C76		SAME AS 3A5A1C13.	5-90
3A13A1C77		SAME AS 3A4A1C29.	5-90
3A13A1C78		SAME AS 3A4A1C12.	5-90
3A13A1C79		SAME AS 3A4A1C13.	5-90
3A13A1C80		SAME AS 3A3A1C11.	5-90
3A13A1C81		SAME AS 3A4A1C13.	5-90
3A13A1C82		CAPACITOR: MIL type CS13BF106K.	5-90
3A13A1C83		SAME AS 3A4A1C13.	5-90
3A13A1C84		SAME AS 3A4A1C13.	5-90
3A13A1C85		SAME AS 3A4A1C13.	5-90
3A13A1C86		SAME AS 3A4A1C13.	5-90
3A13A1C87		SAME AS 3A2C3.	5-90
3A13A1C88		SAME AS 3A2C3.	5-90
3A13A1C89		SAME AS 3A2C3.	5-90
3A13A1C90		SAME AS 3A2C3.	5-90
3A13A1C91		SAME AS 3A4A1C13.	5-90
3A13A1C92		SAME AS 3A4A1C13.	5-90
3A13A1C93		CAPACITOR, FIXED, MICA: 560 pf, ±2%, 300 vdcw, 0. 640 in. lg, 0. 591 in. lg, 0. 591 in. wd, 0. 198 in. thk, 82679 P/N CM111F561G3S.	5-90
3A13A1C94		SAME AS 3A9A1C19.	5-90
3A13A1C95		SAME AS 3A4A1C13.	5-90
3A13A1C96		SAME AS 3A3A1C11.	5-90
3A13A1C97		SAME AS 3A4A1C13.	5-90
3A13A1C98		SAME AS 3A13A1C7.	5-90
3A13A1CR1		SAME AS 3A2CR4.	5-90
3A13A1CR2		SAME AS 3A2CR4.	5-90
3A13A1CR3		SAME AS 3A2CR4.	5-90
3A13A1L1		COIL, RF, FIXED: 47 uh, Q=52 at 2.5 mc, 0. 157 in. dia, 0. 395 in. lg, 82679 P/N CL433-470.	5-90
3A13A1L2		SAME AS 3A4A1L3.	5-90
3A13A1L3		SAME AS 3A4A1L16.	5-90
3A13A1L4		SAME AS 3A4A1L16.	5-90
3A13A1L5		SAME AS 3A4A1L16.	5-90
3A13A1L6		SAME AS 3A3A1L5.	5-90
3A13A1L7		SAME AS 3A3A1L5.	5-90
3A13A1L8		COIL, RF, FIXED: 10,000 uh, Q=39 at 0.25 mc, 0. 157 in. dia, 0. 395 in. lg, 82679 P/N CL433-103.	5-90
3A13A1L9		SAME AS 3A13A1L8.	5-90
3A13A1L10		SAME AS 3A13A1L1.	5-90
3A13A1L11		SAME AS 3A13A1L8.	5-90
3A13A1L12		SAME AS 3A13A1L8.	5-90
3A13A1L13		SAME AS 3A3A1L1.	5-90
3A13A1L14		SAME AS 3A13A1L8.	5-90
3A13A1L15		SAME AS 3A3A1L1.	5-90
3A13A1L16		SAME AS 3A3A1L6.	5-90
3A13A1L17		SAME AS 3A3A1L6.	5-90
3A13A1L18		SAME AS 3A3A1L6.	5-90
3A13A1L19		COIL, RF, FIXED: 0. 68 uh, Q=42 at 25 mc, 0. 157 in. dia, 0. 395 in. lg, 82679 P/N CL433-0R68.	5-90
3A13A1L20		SAME AS 3A13A1L8.	5-90
3A13A1Q1		SAME AS 3A2Q3.	5-90
3A13A1Q2		SAME AS 3A2Q3.	5-90

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A13A1Q3		SAME AS 3A3A1Q27.	5-90
3A13A1Q4		SAME AS 3A3A1Q27.	5-90
3A13A1Q5		SAME AS 3A4A1Q2.	5-90
3A13A1Q6 thru 3A13A1Q9		SAME AS 3A4A1Q2.	5-90
3A13A1Q10		SAME AS 3A3A1Q27.	5-90
3A13A1Q11 thru 3A13A1Q15		SAME AS 3A4A1Q2.	5-90
3A13A1Q16		TRANSISTOR: MIL type 2N2219.	5-90
3A13A1Q17		SAME AS 3A4A1Q2.	5-90
3A13A1Q18		SAME AS 3A13A1Q16.	5-90
3A13A1Q19		SAME AS 3A4A1Q2.	5-90
3A13A1Q20		SAME AS 3A2Q4.	5-90
3A13A1Q21		TRANSISTOR: MIL type 2N1132.	5-90
3A13A1Q22		SAME AS 3A2Q4.	5-90
3A13A1Q23		SAME AS 3A2Q3.	5-90
3A13A1Q24		SAME AS 3A2Q3.	5-90
3A13A1Q25		SAME AS 3A2Q3.	5-90
3A13A1Q26		SAME AS 3A2Q3.	5-90
3A13A1Q27		SAME AS 3A4A1Q2.	5-90
3A13A1Q28		SAME AS 3A4A1Q2.	5-90
3A13A1R1		SAME AS 3A9A1R1.	5-90
3A13A1R2		SAME AS 3A3A1R3.	5-90
3A13A1R3		SAME AS 3A3A1R6.	5-90
3A13A1R4		SAME AS 3A3A1R6.	5-90
3A13A1R5		SAME AS 3A3A1R6.	5-90
3A13A1R6		SAME AS 3A2R2.	5-90
3A13A1R7		SAME AS 3A3A1R3.	5-90
3A13A1R8		SAME AS 3A3A1R6.	5-90
3A13A1R9		SAME AS 3A3A1R6.	5-90
3A13A1R10		SAME AS 3A2R14.	5-90
3A13A1R11		SAME AS 3A3A1R3.	5-90
3A13A1R12		SAME AS 3A3A1R37.	5-90
3A13A1R13		SAME AS 3A3A1R4.	5-90
3A13A1R14		SAME AS 3A3A1R3.	5-90
3A13A1R15		SAME AS 3A3A1R3.	5-90
3A13A1R16		SAME AS 3A3A1R3.	5-90
3A13A1R17		SAME AS 3A3A1R4.	5-90
3A13A1R18		SAME AS 3A3A1R6.	5-90
3A13A1R19		SAME AS 3A2R14.	5-90
3A13A1R20		SAME AS 3A2R4.	5-90
3A13A1R21		SAME AS 3A3A1R4.	5-90
3A13A1R22		SAME AS 3A2R23.	5-90
3A13A1R23		SAME AS 3A3A1R6.	5-90
3A13A1R24		SAME AS 3A3A1R3.	5-90
3A13A1R25		SAME AS 3A3A1R6.	5-90
3A13A1R26		SAME AS 3A2R15.	5-90
3A13A1R27		SAME AS 3A3A1R3.	5-90
3A13A1R28		SAME AS 3A3A1R3.	5-90
3A13A1R29		SAME AS 3A3A1R3.	5-90
3A13A1R30		SAME AS 3A3A1R4.	5-90
3A13A1R31		SAME AS 3A3A1R6.	5-90
3A13A1R32		SAME AS 3A2R14.	5-90
3A13A1R33		SAME AS 3A3A1R4.	5-90
3A13A1R34		SAME AS 3A2R5.	5-90
3A13A1R35		SAME AS 3A2R23.	5-90
3A13A1R36		SAME AS 3A3A1R4.	5-90

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A13A1R37		SAME AS 3A3A1R4.	5-90
3A13A1R38		SAME AS 3A3A1R3.	5-90
3A13A1R39		SAME AS 3A2R18.	5-90
3A13A1R40		SAME AS 3A3A1R4.	5-90
3A13A1R41		SAME AS 3A2R5.	5-90
3A13A1R42		SAME AS 3A2R23.	5-90
3A13A1R43		SAME AS 3A3A1R6.	5-90
3A13A1R44		SAME AS 3A3A1R3.	5-90
3A13A1R45		SAME AS 3A2R18.	5-90
3A13A1R46		SAME AS 3A3A1R6.	5-90
3A13A1R47		SAME AS 3A2R10.	5-90
3A13A1R48		SAME AS 3A3A1R3.	5-90
3A13A1R49		SAME AS 3A2R15.	5-90
3A13A1R50		SAME AS 3A3A1R6.	5-90
3A13A1R51		SAME AS 3A2R2.	5-90
3A13A1R52		SAME AS 3A2R8.	5-90
3A13A1R53		SAME AS 3A2R5.	5-90
3A13A1R54		SAME AS 3A3A1R6.	5-90
3A13A1R55		SAME AS 3A2R2.	5-90
3A13A1R56		SAME AS 3A2R8.	5-90
3A13A1R57		SAME AS 3A3A1R95.	5-90
3A13A1R58		SAME AS 3A2R6.	5-90
3A13A1R59		SAME AS 3A3A1R34.	5-90
3A13A1R60		SAME AS 3A3A1R36.	5-90
3A13A1R61		SAME AS 3A3A1R3.	5-90
3A13A1R62		SAME AS 3A2R18.	5-90
3A13A1R63		SAME AS 3A3A1R30.	5-90
3A13A1R64		SAME AS 3A2R8.	5-90
3A13A1R65		SAME AS 3A3A1R95.	5-90
3A13A1R66		SAME AS 3A9A1R1.	5-90
3A13A1R67		SAME AS 3A3A1R3.	5-90
3A13A1R68		SAME AS 3A3A1R6.	5-90
3A13A1R69		SAME AS 3A3A1R6.	5-90
3A13A1R70		SAME AS 3A2R2.	5-90
3A13A1R71		SAME AS 3A3A1R3.	5-90
3A13A1R72		SAME AS 3A3A1R4.	5-90
3A13A1R73		SAME AS 3A3A1R6.	5-90
3A13A1R74		SAME AS 3A2R14.	5-90
3A13A1R75		SAME AS 3A3A1R4.	5-90
3A13A1R76		SAME AS 3A3A1R55.	5-90
3A13A1R77		SAME AS 3A2R15.	5-90
3A13A1R78		SAME AS 3A3A1R4.	5-90
3A13A1R79		SAME AS 3A2R8.	5-90
3A13A1R80		SAME AS 3A2R7.	5-90
3A13A1R81		SAME AS 3A2R8.	5-90
3A13A1R82		SAME AS 3A3A1R44.	5-90
3A13A1R83		SAME AS 3A3A1R44.	5-90
3A13A1R84		SAME AS 3A3A1R44.	5-90
3A13A1R85		SAME AS 3A3A1R30.	5-90
3A13A1R86		SAME AS 3A2R7.	5-90
3A13A1R87		RESISTOR, VARIABLE: 25,000 ohms, ±30% tol, 0.250 in. dia by 0.250 in. hg, 82679 P/N RV124-1-253.	5-90
3A13A1R88		SAME AS 3A9A1R1.	5-90
3A13A1R89		SAME AS 3A2R6.	5-90
3A13A1R90		SAME AS 3A3A1R6.	5-90
3A13A1R91		SAME AS 3A3A1R6.	5-90
3A13A1R92		SAME AS 3A3A1R55.	5-90
3A13A1R93		SAME AS 3A2R23.	5-90
3A13A1R94		SAME AS 3A3A1R4.	5-90

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

REFERENCE SIGNAL GENERATOR, 0-1510/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A13A1R95		SAME AS 3A3A1R4.	5-87
3A13A1R96		SAME AS 3A2R14.	5-87
3A13A1R97		SAME AS 3A2R14.	5-87
3A13A1T1		TRANSFORMER, RF ADJUSTABLE: Q=50 at 16 mc, 0. 614 in. dia by 0. 532 in. hg, 82679 P/N TT302.	5-87
3A13A1T2		SAME AS 3A9A1T3.	5-87
3A13A1VC1		CAPACITOR, VOLTAGE VARIABLE: 100 uuf at 4 vdc, approx range 57-260 uuf, typical Q at 4 vdc,= 11, 15 vdcw, 0. 140 in. dia by 0. 3000 lg by 0. 300 lg, wire leads. Dwg CX106-14, 01281 P/N V100.	5-87
3A13A1VC2 thru 3A13A1VC4		SAME AS 3A13A1VC1.	5-87
3A13A1VR1		SEMICONDUCTOR DEVICE: MIL type 1N746.	5-87
3A13A1VR2		SEMICONDUCTOR DEVICE: MIL type 1N959.	5-87
3A13A1Z1		INTEGRATED CIRCUIT: Diode matrix, 14-pin dual inline flat pack. 82679 P/N NW180-3.	5-87
3A13A1Z2		SAME AS 3A3A1Z1.	5-87
3A13A1Z3		SAME AS 3A3A1Z1.	5-87
3A14		SWITCH, STEPPING: Remote controlled type, direct drive type, unidirectional drive, 4 sections, 12 positions, 14 wipers, 33 contacts, 10-15 amps, 28 vdc, bracket housed plug-in type; 6. 000 in. lg by 2. 750 in. hg by 2. 000 in. wd; 82679 P/N AX5006.	5-91
3A14A1		CIRCUIT CARD ASSEMBLY: 15 semiconductors, 1 capacitor, p/o AX5006; 3. 500 in. lg by 1. 625 in. wd by . 500 in. hg; 82679 P/N A4596.	5-91
3A14A1C1		CAPACITOR, FIXED, PLASTIC: 470, 000 uuf, ±10% tol, 100 vdcw. 0. 515 in. dia by 1. 064 in. lg, 82679 P/N CN112B474K1.	5-91
3A14A1CR1		SEMICONDUCTOR DEVICE: MIL type 1N914A.	5-91
3A14A1CR2 thru 3A14A1CR14		SAME AS 3A14A1CR1.	5-91
3A14A1CR15		ABSORBER, OVERVOLTAGE: Oper voltage, 28 v nom, 33 v max. Max reverse 10vdc, 0. 438 in. lg, 0. 500 in. wd, 0. 219 in. thk. 82679 P/N DD111-1.	5-91
		NOTE: The following is an unsymbolized "Printed Wiring Board" colloquially known as "Riser Card, Extender Card" etc. It is used in the testing of "Circuit Card Assemblies".	
		PRINTED WIRING BOARD: 82679 P/N A4740.	5-91
3A15 thru 3A19		SAME AS 3A14.	5-91

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4		RTTD-4, DECODER, COMMAND SIGNAL, KY-661/URR: The RTTD-4 as used in a remote controlled receiver has three basic functions as follows: (1) decoding remote instructions (2) digital servo tuning (3) readback to remote operator. (Unit 4 in the AN/URR-63(V)1 and Units 4 and 8 in the AN/URR-63(V)2.)	5-93

4A1		CIRCUIT CARD ASSEMBLY: 7 resistors, 2 capacitors, 1 relay, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4516.	5-95
4A2		CIRCUIT CARD ASSEMBLY: 7 resistors, 2 capacitors, 1 relay, 2 semiconductors, plug-in item; 4.375 in. by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4517.	5-95
4A3		CIRCUIT CARD ASSEMBLY: 2 resistors, 2 capacitors, 9 integrated circuits, 1 coil, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4518.	5-95
4A4		CIRCUIT CARD ASSEMBLY: 14 resistors, 5 capacitors, 5 coils, 11 integrated circuits, 1 transistor, 9 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4571.	5-95
4A5		CIRCUIT CARD ASSEMBLY: 14 resistors, 6 capacitors, 5 coils, 7 integrated circuits, 4 transistors, 12 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4572.	5-95
4A6		CIRCUIT CARD ASSEMBLY: 22 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4580.	5-95
4A7		SAME AS 4A6.	5-95
4A8		SAME AS 4A6.	5-95
4A9		CIRCUIT CARD ASSEMBLY: 12 resistors, 12 integrated circuits, 8 transistors, 8 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4582.	5-95
4A10		CIRCUIT CARD ASSEMBLY: 29 resistors, 4 capacitors, 9 transistors, 9 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4613.	5-95
4A11		CIRCUIT CARD ASSEMBLY: 22 resistors, 12 capacitors, 2 integrated circuits, 4 transistors, 5 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4614.	5-95
4A12		CIRCUIT CARD ASSEMBLY: 9 resistors, 3 capacitors, 6 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. lg. 82679 P/N A4602.	5-95
4A13		CIRCUIT CARD ASSEMBLY: 22 resistors, 7 capacitors, 2 integrated circuits, 3 transistors, 2 semiconductors, plug-in item; 4.375 in. hg. 82679 P/N A4601.	5-95
4A14		CIRCUIT CARD ASSEMBLY: 18 resistors, 5 capacitors, 2 integrated circuits, 4 transistors, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4599.	5-95
4A15		SWITCH, STEPPING: Remote-controlled type, direct drive type, unidirectional drive, 7 sections, 18 positions, 14 wipers, 66 contacts, bracket housed plug-in type; 5.625 in. lg by 4.250 in. hg. by 4.250 in. wd. 82679 P/N AX5027.	5-95

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4B1		FAN, AXIAL: 115 vac, 50/60 Hz, 3300 rpm, CMF-45 at 60 Hz free delivery. Plastic blade, aluminum housing with black enamel finish. Housing size; 3.625 in. by 3.625 in. by 1.500 in. o/a. 82679 P/N BL131.	5-95
4C1 thru 4C6		CAPACITOR, FIXED, ELECTROLYTIC: 2600 uf, 50 vdcw, 1.375 in. dia 2.063 in. lg. Dwg 82679 P/N CE112-6P.	5-95
4C7		CAPACITOR, FIXED, ELECTROLYTIC: 950 uf, 75 vdcw, 1.375 in. dia by 1.500 in. lg. 82679 P/N CE112-14P.	5-95
4C8		CAPACITOR, FIXED, PLASTIC: 3 uf, 200 vdcw, 20% tol; solder lug terminals; hole mounted. 2.000 in. lg. by 2.000 in. wd by 1.250 in. hg. Dwg CX117-12-2X20, 99120 P/N AB2-306X20.	5-95
4C9		CAPACITOR, FIXED, OIL FILLED: 4 uf, 236 vac. 2.160 in. lg by 1.310 in. wd by 2.060 in. hg. 82679 P/N CP120-4-236-QC.	5-95
4C10		CAPACITOR, FIXED, CERAMIC: 100,000 uuf, +80% -20% tol, 500 vdcw, 0.920 in. dia, 0.220 in. thk, 0.375 in. lead spacing. 82679 P/N CC100-32.	5-95
4C11		SAME AS 4C10.	5-95
4CR1		SEMICONDUCTOR DEVICE: MIL type 1N2989RB.	5-95
4CR2		RECTIFIER: MIL type 2N1776A.	5-95
4CR3		SAME AS 4CR2.	5-95
4DS1		LAMP, INCANDESCENT: 14 volts ac/dc, 0.08 amps. Single contact, miniature T-1-3/4 base. 0.219 in. dia by 0.563 in. lg. Dwg BI110-10, 08806 P/N 382.	5-95
4DS2		LAMP, INCANDESCENT: Single contact, T-1-3/4 base, 28 v ac or dc, 0.04 amps. Dwg BI110-7, 08806 P/N 327.	5-95
4F1		FUSE, CARTRIDGE TYPE: 3 amps, 125 v. 0.250 in. dia, 1.250 in. lg. Dwg FU102-3, 71400 P/N MDL-3.	5-94
4F2		SAME AS 4F1.	5-94
4FL1		FILTER, RADIO INTERFERENCE: Current, 5 amps; voltage rating, 600 vdc, 250 vac at 60 cps. 1.000 in. dia, 2.688 in. lg. Dwg FI105-2, 80183 P/N 5JX100.	5-94
4FL2		SAME AS 4FL1.	5-94
4J1		CONNECTOR: MIL type MS3102A14S1P.	5-94
4J2		CONNECTOR: MIL type MS3102A20-27P.	5-94
4J3		CONNECTOR: MIL type MS3102A20-29P.	5-94
4J4		NOT USED.	
4J5		CONNECTOR, RECEPTACLE, ELECTRICAL: 48 socket type contacts rated at 7.5 amps, 500 v rms. 1.562 in. sq by 0.835 in. thk. 82679 P/N JJ200-11.	5-94
4J6		CONNECTOR, RECEPTACLE, ELECTRICAL: 37 socket type contacts rated at 7.5 amps, 500 v rms. 1.437 in. sq by 0.835 in. thk. 82679 P/N JJ200-9.	5-94
4J7		CONNECTOR, RECEPTACLE, ELECTRICAL: 37 pin type contacts rated at 7.5 amps, 500 v rms. 1.437 in. sq by 0.835 in. thk. 82679 P/N JJ200-10.	5-94
4K1		RELAY, ARMATURE, DPDT: Coil data; 12 vdc, 0.074 amps, 160 ohms. Hermetically sealed metal case with hook type terminals, bracket mounted. 0.312 in. wd by 1.160 in. lg by 0.875 in. hg. Dwg RL181-1, 70309 P/N WJPB-H1-01D.	5-95
4K2		SAME AS 4K1.	5-95
4K3		SAME AS 4K1.	5-95
4K4		RELAY, ARMATURE: 4 PDT, non coil data; 26.5 v, 0.132 amp, 200 ohms. Hermetically sealed metal case. Dwg RL182, 70309 P/N MHY0-12D-26.5VDC.	5-95
4Q1		TRANSISTOR: MIL type 2N3055.	5-95
4Q2		TRANSISTOR: MIL type 2N3790.	5-95
4R1		RESISTOR: MIL type RC32GF330J.	5-95
4R2		SAME AS 4R1.	5-95

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4S1		SWITCH, PUSH, ILLUMINATED: SPDT, 125 vac, 3 amps, round lens cap. 0. 750 in. dia by 1. 906 in. lg. 82679 P/N SW503-3B1.	5-95
4S2		SWITCH, MIL type ST22K.	5-95
4T1		TRANSFORMER, POWER, SERVO: Frequency 60 Hz; breakdown voltage 500 v; hermetically sealed metal case stud mtd; 2. 313 in. lg by 1. 063 in. wd by 2. 500 in. hg; solder stud terminals. 82679 P/N TF379.	5-95
4T2		TRANSFORMER, POWER, S/D: Primary, 115/230 v, 50/60 Hz, 1 phase; secondary, 30 v, 1 adc; 18 v, 600 madc; 35 v, 2 adc; 18 v, 2 adc; 12 v, 600 madc; 6. 3 v, 0. 150 aac, 26 v, . 150 aac; 26 v, 0. 150 aac; 64 ctv, 0. 100 aac. Hermetically sealed metal case, stud mtd. 5. 875 in. lg. by 4. 750 in. wd by 3. 875 in. Solder stud terminals. 82679 P/N TF377.	5-95
4TB1		TERMINAL BOARD: Barrier type; two 6-32 thk single screw terminals and feedthru solder lugs. Phenolic body 0. 406 in. by 0. 875 in. by 1. 500 in. Dwg TM100-2, 86168 P/N 2-164YD.	5-95
4XA1		CONNECTOR, RECEPTACLE, ELECTRICAL: 22 double sided female contacts rated at 5 amps and 1800 volts rms. Phenolic housing with floating bushing and eyelet terminals. Accepts printed circuit board thickness of 0. 054 in. to 0. 071 in. 82679 P/N JJ319-22-DFE.	5-95
4XA2 thru 4XA15		SAME AS 4XA1.	5-95
4XDS1		NOT USED.	
4XDS2		LIGHT, INDICATOR: Translucent white lens. 1. 35 to 28 v. T-1-3/4 lamp base. 2 terminals. 0. 437 in. dia by 1. 500 in. lg. Dwg TS153-12, 72619 P/N 162-8430-1475-502.	5-95
4XF1		FUSEHOLDER, LAMP INDICATING: 90-250 v, 15 amps, neon lamp, clear knob, accommodates 1/4 in. dia x 1-1/4 in. lg fuse. Dwg FH104-3, 71400 P/N HKL-X.	5-95
4XF2		SAME AS 4XF1.	5-95
4XK1		SOCKET, RELAY: 3 amp current rating; 10 gold plated phosphor bronze solder cup terminals. 1. 125 in. lg by 0. 390 in. wd by 0. 281 in. thk. Dwg TS191S2, 19663 P/N HRT-2.	5-95
4XK2		SAME AS 4XK1.	5-95
4XK3		SAME AS 4XK1.	5-95
4XK4		SOCKET, RELAY: 13 amp current rating; 14 gold plated phosphor bronze solder cup terminals. 1. 562 in. lg. by 1. 250 in. wd by 0. 576 in. thk. Dwg TS190S1, 19663 P/N HRP-1.	5-95
4XQ1		SOCKET, SEMICONDUCTOR DEVICE: 2 pin contact accommodation, 0. 040 in. or 0. 050 in. dia; polarized; 1 term. lug grounding strap; 1. 578 in. lg, 1. 00 in. wd, 0. 172 in. thk. Dwg TS166-1, 91506 P/N 8038-1G1.	5-95
4XQ2		SAME AS 4XQ1.	5-95
4A1		CIRCUIT CARD ASSEMBLY: 7 resistors, 2 capacitors, 1 relay, 2 semiconductors, plug-in item; 4. 375 in. lg by 4. 125 in. wd by 0. 750 in. hg. 82679 P/N A4516.	5-98
4A1C1		CAPACITOR, FIXED, MICA: 1, 000 uuf, ±1% tol, 500 vdcw, 0. 640 in. lg. 0. 591 in. wd, 0. 198 in. thk. 82679 P/N CM111F102F5S.	5-98
4A1C2		SAME AS 4A1C1.	5-98
4A1CR1		SEMICONDUCTOR DEVICE: MIL type 1N4245.	5-98
4A1CR2		SAME AS 4A1CR1.	5-98

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4A1K1		RELAY, ARMATURE: Mercury wetted contacts rated at 2 amps max, 500 v max. 2 windings rated at 250 ohms each ±10%. 2.063 in. lg by 0.625 in. hg by 0.625 in. wd, wire lead mounted. 82679 P/N RL167-1.	5-98
4A1R1		RESISTOR: MIL type RC20GF471J.	5-98
4A1R2		RESISTOR: MIL type RC20GF681J.	5-98
4A1R3		SAME AS 4A1R2.	5-98
4A1R4		RESISTOR: MIL type RC20GF4R7J.	5-98
4A1R5		SAME AS 4A1R4.	5-98
4A1R6		RESISTOR: MIL type RC42GF101J.	5-98
4A1R7		SAME AS 4A1R6.	5-98
4A2		CIRCUIT CARD ASSEMBLY: 6 resistors, 13 integrated circuits, 10 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4517.	5-100
4A2CR1		SEMICONDUCTOR DEVICE: MIL type 1N914.	5-100
4A2CR2 thru 4A2CR10		SAME AS 4A2CR1.	5-100
4A2R1		RESISTOR: MIL type RC07GF122J.	5-100
4A2R2		RESISTOR: MIL type RC07GF104J.	5-100
4A2R3 thru 4A2R6		SAME AS 4A2R2.	5-100
4A2Z1		INTEGRATED CIRCUIT, DIGITAL FLIP-FLOP: 11 pins, plastic case; -4.5 v input, -9.5 v output. 0.895 in. lg by 0.678 in. wd by 0.495 in. hg. 82679 P/N NW151.	5-100
4A2Z2 thru 4A2Z5		SAME AS 4A2Z1.	5-100
4A2Z6		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; -12 v supply voltage. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg, 82679 P/N NW142-44.	5-100
4A2Z7 thru 4A2Z9		SAME AS 4A2Z6.	5-100
4A2Z10		INTEGRATED CIRCUIT, DIGITAL INVERTER: 11 pins, plastic case; supply voltage variable by usage. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg, 82679 P/N NW150-4.	5-100
4A2Z11 thru 4A2Z13		SAME AS 4A2Z10.	5-100
4A3		CIRCUIT CARD ASSEMBLY: 2 resistors, 2 capacitors, 9 integrated circuits, 1 coil, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4518.	5-102
4A3C1		CAPACITOR, FIXED, PLASTIC: 18,000 pf, ±5% tol, 0.250 in. dia by 0.438 in. lg, 82679 P/N CN112A185J.	5-102
4A3C2		SAME AS 4A3C1.	5-102
4A3CR1		SAME AS 4A2CR1.	5-102
4A3CR2		SAME AS 4A2CR1.	5-102
4A3L1		COIL, RF, FIXED: 1,000 uh, ±10%, 17.5 ohms max dc res. 0.157 dia, 0.450 in. lg, 82679 P/N CL275-102.	5-102

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4A3R1		RESISTOR, VARIABLE, WIRE WOUND: 500 ohms, ±10% tol, 1/2 watt. 1.250 in. lg by 0.250 in. wd by 0.313 in. hg, wire lead mounted. 82679 P/N RV121-1-501.	5-102
4A3R2		SAME AS 4A2R1.	5-102
4A3Z1		INTEGRATED CIRCUIT, DIGITAL TIMING GENERATOR: 11 pins, plastic case; -8 v output. 0.895 in. lg by 0.678 in. wd by 0.495 in. hg, 82679 P/N NW152.	5-102
4A3Z2 thru 4A3Z5		SAME AS 4A2Z1.	5-102
4A3Z6		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage, -12 v, 0.875 in. lg by 0.625 in. wd by 0.438 in. hg, 82679 P/N NW141-42.	5-102
4A3Z7		SAME AS 4A3Z6.	5-102
4A3Z8		SAME AS 4A3Z6.	5-102
4A3Z9		INTEGRATED CIRCUIT, DIGITAL NOR GATE: 11 pins, plastic case; supply voltage, + and -12 v, 0.875 in. hg, 82679 P/N NW145-61.	5-102
4A4		CIRCUIT CARD ASSEMBLY: 14 resistors, 5 capacitors, 5 coils, 11 integrated circuits, 1 transistor, 9 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4571.	5-104
4A4C1		CAPACITOR, FIXED, CERAMIC: 10,000 uuf, +80% -20% tol, 25 vdcw, 0.385 in. dia, 0.156 in. thk, 0.250 in. lead spacing, 82679 P/N CC100-41.	5-104
4A4C2 thru 4A4C5		SAME AS 4A4C1.	5-104
4A4CR1 thru 4A4CR8		SAME AS 4A2CR1.	5-104
4A4CR9		SEMICONDUCTOR DEVICE: MIL type 1N965B.	5-104
4A4L1		COIL, RF, FIXED: 470 uh, ±10% tol, 10 ohms max, dc res, 0.157 in. dia, 0.450 in. lg, 82679 P/N CL275-471.	5-104
4A4L2 thru 4A4L5		SAME AS 4A4L1.	5-104
4A4Q1		TRANSISTOR: MIL type 2N3013.	5-104
4A4R1 thru 4A4R6		SAME AS 4A2R1.	5-104
4A4R7		RESISTOR: MIL type RC07GF103J.	5-104
4A4R8		SAME AS 4A4R7.	5-104
4A4R9		SAME AS 4A4R7.	5-104
4A4R10		SAME AS 4A4R7.	5-104
4A4R11		SAME AS 4A2R1.	5-104
4A4R12		SAME AS 4A2R1.	5-104
4A4R13		RESISTOR: MIL type RC07GF223J.	5-104
4A4R14		SAME AS 4A2R1.	5-104
4A4Z1		INTEGRATED CIRCUIT, COMPLEMENTARY EMITTER FOLLOWER: 11 pins, plastic case; supply voltage, -12 v, 0.875 in. lg by 0.438 in. hg, 82679 P/N NW147-2.	5-104 5-104
4A4Z2		SAME AS 4A4Z1.	5-104
4A4Z3		SAME AS 4A2Z10.	5-104

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4A4Z4		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage, -12 v, 0.875 in. lg by 0.625 in. wd by 0.125 in. hg, 82679 P/N NW142-24.	5-104
4A4Z5		SAME AS 4A4Z4.	5-104
4A4Z6		SAME AS 4A3Z9.	5-104
4A4Z7		SAME AS 4A2Z10.	5-104
4A4Z8 thru 4A4Z11		SAME AS 4A2Z6.	5-104
4A5		CIRCUIT CARD ASSEMBLY: 14 resistors, 6 capacitors, 5 coils, 7 integrated circuits, 4 transistors, 12 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4572.	5-106
4A5C1		CAPACITOR, FIXED, ELECTROLYTIC: 4.7 uf, ±10% tol, 35 vdcw, 0.175 in. dia by 0.438 in. lg, 82679 P/N CE123-475-35B2.	5-106
4A5C2		SAME AS 4A5C1.	5-106
4A5C3		SAME AS 4A4C1.	5-106
4A5C4		CAPACITOR, FIXED, ELECTROLYTIC: 100 uf, ±10% tol, 20 vdcw, 0.175 in. dia by 0.438 in. lg, 82679 P/N CE123-107-20S2.	5-106
4A5C5		SAME AS 4A4C1.	5-106
4A5C6		SAME AS 4A4C1.	5-106
4A5CR1 thru 4A5CR7		SAME AS 4A2CR1.	5-106
4A5CR8		SAME AS 4A1CR1.	5-106
4A5CR9		SAME AS 4A2CR1.	5-106
4A5CR10		SAME AS 4A1CR1.	5-106
4A5CR11		SAME AS 4A2CR1.	5-106
4A5CR12		SAME AS 4A2CR1.	5-106
4A5L1 thru 4A5L5		SAME AS 4A4L1.	5-106
4A5Q1		SAME AS 4A4Q1.	5-106
4A5Q2		SAME AS 4A4Q1.	5-106
4A5Q3		SAME AS 4A4Q1.	5-106
4A5Q4		TRANSISTOR: MIL type 2N492A.	5-106
4A5R1		SAME AS 4A2R1.	5-106
4A5R2		SAME AS 4A2R1.	5-106
4A5R3		RESISTOR: MIL type RC07GF222J.	5-106
4A5R4		SAME AS 4A5R3.	5-106
4A5R5		RESISTOR, VARIABLE: 1 megohm, ±20% tol, printed circuit type pins, 0.312 by 0.250 by 1.250 in. o/a dim. 82679 P/N RV127-1-105.	5-106
4A5R6		RESISTOR: MIL type RC07GF332J.	5-106
4A5R7		RESISTOR: MIL type RC07GF153J.	5-106
4A5R8		RESISTOR: MIL type RC07GF272J.	5-106
4A5R9		SAME AS 4A2R1.	5-106
4A5R10		SAME AS 4A5R8.	5-106
4A5R11		RESISTOR: MIL type RC07GF102J.	5-106
4A5R12		RESISTOR: MIL type RC07GF221J.	5-106
4A5R13		SAME AS 4A2R1.	5-106
4A5R15		SAME AS 4A2R1.	5-106
4A5Z1		SAME AS 4A2Z10.	5-106
4A5Z2		SAME AS 4A3Z6.	5-106
4A5Z3		SAME AS 4A2Z10.	5-106
4A5Z4		SAME AS 4A2Z10.	5-106

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4A5Z5		SAME AS 4A3Z6.	5-106
4A5Z6		INTEGRATED CIRCUIT, DIGITAL NAND GATE AMPLIFIER: 11 pins, plastic case; supply voltage, + and -12 v, 0.875 in. lg by 0.625 in. wd by 0.438 in. hg, 82679 P/N NW144-22.	5-106
4A5Z7		SAME AS 4A4Z1.	5-106
4A6		CIRCUIT CARD ASSEMBLY: 22 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4580.	5-108
4A6Z1 thru 4A6Z22		INTEGRATED CIRCUIT, NAND/NOR: 14 pins, plastic case; +8 vdc supply voltage, 0.750 in. lg by 0.250 in. wd by 0.200 in. lg, 82679 P/N NW173.	5-108
4A7		SAME AS 4A6.	5-108
4A8		SAME AS 4A6.	5-108
4A9		CIRCUIT CARD ASSEMBLY: 12 resistors, 12 integrated circuits, 8 transistors, 8 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4582.	5-110
4A9CR1 thru 4A9CR8		SAME AS 4A2CR1.	5-110
4A9Q1 thru 4A9Q8		SAME AS 4A4Q1.	5-110
4A9R1 thru 4A9R4		RESISTOR: MIL type RC07GF822J.	5-110
4A9R5		SAME AS 4A5R12.	5-110
4A9R6		SAME AS 4A5R12.	5-110
4A9R7		SAME AS 4A5R12.	5-110
4A9R8		RESISTOR: MIL type RC07GF393J.	5-110
4A9R9		SAME AS 4A9R8.	5-110
4A9R10		SAME AS 4A9R8.	5-110
4A9R11		SAME AS 4A5R12.	5-110
4A9R12		SAME AS 4A9R8.	5-110
4A9Z1 thru 4A9Z11		SAME AS 4A6Z1.	5-110
4A9Z12		INTEGRATED CIRCUIT, NAND/NOR: 14 pins, plastic case; +8 vdc supply voltage, 0.750 in. lg by 0.250 in. wd by 0.200 in. hg, 82679 P/N NW172.	5-110

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4A10		CIRCUIT CARD ASSEMBLY: 29 resistors, 4 capacitors, 9 transistors, 9 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4613.	5-112
4A10C1		CAPACITOR, FIXED, ELECTROLYTIC: 2 uf, -15% +50% tol, 50 vdcw, 0.145 in. dia by 0.656 in. lg, wire lead mtd. Dwg CE107-6, 01002 P/N 62F305.	5-112
4A10C2		CAPACITOR, FIXED, ELECTROLYTIC: 2 uf, +50% -15% tol, 60 vdcw, non-polarized, 0.187 in. dia by 0.688 in. lg; wire leads. Dwg CX118E2N60C1, 05079 P/N TEF2-60C1N.	5-112
4A10C3		SAME AS 4A10C1.	5-112
4A10C4		SAME AS 4A10C1.	5-112
4A10CR1		NOT USED.	
4A10CR2 thru 4A10CR5		SAME AS 4A1CR1.	5-112
4A10CR6		SEMICONDUCTOR DEVICE: MIL type 1N277.	5-112
4A10CR7		SAME AS 4A2CR1.	5-112
4A10CR8		RECTIFIER: MIL type 2N2323.	5-112
4A10CR9		SAME AS 4A10CR6.	5-112
4A10CR10		SAME AS 4A2CR1.	5-112
4A10Q1		TRANSISTOR: MIL type 2N2222.	5-112
4A10Q2		SAME AS 4A10Q1.	5-112
4A10Q2		SAME AS 4A10Q1.	5-112
4A10Q3		SAME AS 4A10Q1.	5-112
4A10Q4		TRANSISTOR: MIL type 2N2219.	5-112
4A10Q5		SAME AS 4A10Q4.	5-112
4A10Q6		SAME AS 4A10Q1.	5-112
4A10Q7		SAME AS 4A10Q1.	5-112
4A10Q8		SAME AS 4A10Q1.	5-112
4A10Q9		SAME AS 4A5Q4.	5-112
4A10R1		SAME AS 4A5R12.	5-112
4A10R2		SAME AS 4A5R3.	5-112
4A10R3		RESISTOR: MIL type RC07GF562J.	5-112
4A10R4		SAME AS 4A5R11.	5-112
4A10R5		SAME AS 4A5R11.	5-112
4A10R6		SAME AS 4A9R8.	5-112
4A10R7		RESISTOR: MIL type RC07GF181J.	5-112
4A10R8		SAME AS 4A9R8.	5-112
4A10R9		SAME AS 4A9R8.	5-112
4A10R10		SAME AS 4A10R7.	5-112
4A10R11		SAME AS 4A5R12.	5-112
4A10R12		SAME AS 4A5R12.	5-112
4A10R13		SAME AS 4A5R12.	5-112
4A10R14		RESISTOR: MIL type RC07GF473J.	5-112
4A10R15		RESISTOR: MIL type RC32GF151J.	5-112
4A10R16		SAME AS 4A5R11.	5-112
4A10R17		SAME AS 4A5R12.	5-112
4A10R18		SAME AS 4A5R11.	5-112
4A10R19		RESISTOR: MIL type RC07GF472J.	5-112
4A10R20		RESISTOR: MIL type RC32GF101J.	5-112
4A10R21		SAME AS 4A5R11.	5-112
4A10R22		SAME AS 4A5R11.	5-112
4A10R23		SAME AS 4A10R14.	5-112
4A10R24		SAME AS 4A9R8.	5-112
4A10R25		SAME AS 4A10R19.	5-112
4A10R26		SAME AS 4A5R12.	5-112
4A10R27		SAME AS 4A4R7.	5-112
4A10R28		SAME AS 4A2R1.	5-112
4A10R29		RESISTOR: MIL type RC07GF331J.	5-112

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4A11		CIRCUIT CARD ASSEMBLY: 22 resistors, 12 capacitors, 2 integrated circuits, 4 transistors, 5 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4614.	5-114
4A11C1		CAPACITOR: MIL type CL27BH4R5UN3.	5-114
4A11C2		SAME AS 4A10C2.	5-114
4A11C3		CAPACITOR, FIXED, CERAMIC: 220 uuf, ±10% tol, 500 vdcw, 0.310 in. dia, 0.156 in. thk, 0.250 in. lead spacing, 82679 P/N CC100-6.	5-114
4A11C4		SAME AS 4A4C1.	5-114
4A11C5		SAME AS 4A10C2.	5-114
4A11C6		CAPACITOR, FIXED, ELECTROLYTIC: 1.5 uf, +75% -15% tol, 75 vdcw, non-polarized, 0.187 in. dia by 0.688 in. lg wire leads. Dwg CX118E1RSN75C1, 05079 P/N TEF1.5-75C1N.	5-114
4A11C7		CAPACITOR, FIXED, ELECTROLYTIC: 10 uf, +75% -15% tol, 15 vdcw, non-polarized, 0.187 in. dia by 0.688 in. lg; wire leads. Dwg CX118E10N15C1, 05079 P/N TEF10-15V1N.	5-114
4A11C8		SAME AS 4A4C1.	5-114
4A11C9		SAME AS 4A11C3.	5-114
4A11C10		CAPACITOR: MIL type, CL65BF101KP3.	5-114
4A11C11		CAPACITOR, FIXED, CERAMIC: 470 uuf, ±10% tol, 500 vdcw, 0.310 in. dia, 0.156 in. thk, 0.310 in. dia, 0.156 in. thk, 0.250 in. lead spacing, 82679 P/N CC100-7.	5-114
4A11C12		CAPACITOR, FIXED, PLASTIC: 0.068 uf, ±5% tol, 50 vdcw; 0.200 in. dia, by 0.500 in. lg; wire leads, 82679 P/N CN114-0R68-5J.	5-114
4A11CR1		SAME AS 4A2CR1.	5-114
4A11CR2		SAME AS 4A2CR1.	5-114
4A11CR3		SAME AS 4A10CR6.	5-114
4A11CR4		SAME AS 4A10CR6.	5-114
4A11CR5		SAME AS 4A1CR1.	5-114
4A11Q1		TRANSISTOR: MIL type 2N1485.	5-114
4A11Q2		SAME AS 4A11Q1.	5-114
4A11Q3		SAME AS 4A10Q1.	5-114
4A11Q4		TRANSISTOR: MIL type 2N3499.	5-114
4A11R1		RESISTOR: MIL type RC07GF225J.	5-114
4A11R2		RESISTOR: MIL type RC07GF682J.	5-114
4A11R3		SAME AS 4A5R11.	5-114
4A11R4		SAME AS 4A5R11.	5-114
4A11R5		SAME AS 4A5R6.	5-114
4A11R6		RESISTOR: MIL type RC07GF273J.	5-114
4A11R7		SAME AS 4A4R7.	5-114
4A11R8		RESISTOR: MIL type RC07GF152J.	5-114
4A11R9		RESISTOR: MIL type RC07GF563J.	5-114
4A11R10		SAME AS 4A5R8.	5-114
4A11R11		SAME AS 4A4R7.	5-114
4A11R12		RESISTOR: MIL type RC07GF123J.	5-114
4A11R13		SAME AS 4A11R8.	5-114
4A11R14		RESISTOR: MIL type RC32GF511J.	5-114
4A11R15		SAME AS 4A5R6.	5-114
4A11R16		SAME AS 4A4R13.	5-114
4A11R17		RESISTOR: MIL type RC07GF471J.	5-114
4A11R18		RESISTOR: MIL type RC20GF431J.	5-114
4A11R19		RESISTOR: MIL type RC20GF222J.	5-114
4A11R20		RESISTOR: MIL type RC32GF222J.	5-114
4A11R21		RESISTOR: MIL type RC20GF1R0J.	5-114
4A11R22		SAME AS 4A11R21.	5-114
4A11Z1		INTEGRATED CIRCUIT, OPERATIONAL AMPLIFIER: 8 pins, metal case. Supply voltage ±18 v. Case; 0.375 in. dia by 0.187 in. hg, 82679 P/N NW156.	5-114
4A11Z2		SAME AS 4A11Z1.	5-114

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4A12		CIRCUIT CARD ASSEMBLY: 9 resistors, 3 capacitors, 6 semiconductors, plug-in item; 3.75 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4602.	5-116
4A12C1		CAPACITOR, FIXED, ELECTROLYTIC: 20 uf, -10% +150% at 125 cps, 25°C, 50 vdcw, 0.312 in. dia, 0.750 in. lg. Dwg CE105-20-50, 14655 P/N NLW20-50.	5-116
4A12C2		CAPACITOR, FIXED, CERAMIC: 100,000 uuf, gmv, 500 vdcw, 0.310 in. dia, 0.156 in. thk, 0.250 in. lead spacing. 82679 P/N CC100-28.	5-116
4A12C3		SAME AS 4A12C2.	5-116
4A12CR1		SAME AS 4A1CR1.	5-116
4A12CR2		SAME AS 4A1CR1.	5-116
4A12CR3		SAME AS 4A1CR1.	5-116
4A12CR4		RECTIFIER, SEMICONDUCTOR DEVICE: 200 piv; plastic case, 4 wire lead mounted, 0.750 in. lg by 0.750 in. wd by 0.438 in. hg. 82679 P/N DD143-27.	5-116
4A12CR5		SEMICONDUCTOR DEVICE: MIL type 1N4721.	5-116
4A12CR6		SAME AS 4A1CR1.	5-116
4A12R1		RESISTOR: MIL type RC42GF122J.	5-116
4A12R2		RESISTOR, FIXED, WIRE WOUND: 1 ohm, ±5% tol, 5 watts, 0.250 in. dia, by 1.000 in. lg, wire lead mounted, 82679 P/N RR114-1W.	5-116
4A12R3		SAME AS 4A12R2.	5-116
4A12R4		SAME AS 4A12R2.	5-116
4A12R5		RESISTOR, FIXED, WIRE WOUND: 500 ohms, ±5% tol, 5 watts, 0.250 in. dia by 1.000 in. lg wire lead mounted, 82679 P/N RR114-500W.	5-116
4A12R6		SAME AS 4A12R5.	5-116
4A12R7		SAME AS 4A12R2.	5-116
4A12R8		SAME AS 4A12R2.	5-116
4A12R9		RESISTOR: MIL type RC32GF100J.	5-116
4A13		CIRCUIT CARD ASSEMBLY: 22 resistors, 7 capacitors, 2 integrated circuits, 3 transistors, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4601.	5-118
4A13C1		SAME AS 4A5C1.	5-118
4A13C2		SAME AS 4A5C1.	5-118
4A13C3		SAME AS 4A5C4.	5-118
4A13C4		CAPACITOR, FIXED, MICA: 47 uuf, ±2% tol, 300 vdcw, 0.440 in. lg by 0.472 in. wd by 0.170 in. thk, 82679 P/N CM111E470G5S.	5-118
4A13C5		SAME AS 4A13C4.	5-118
4A13C6		SAME AS 4A4C1.	5-118
4A13C7		SAME AS 4A4C1.	5-118
4A13CR1		RECTIFIER, SEMICONDUCTOR DEVICE: Peak reverse volts 260 v, 1.5 vdc output current, 0.688 in. wd by 0.469 in. hg by 0.250 in. thk, 82679 P/N DD130-200-1.5.	5-118
4A13CR2		SAME AS 4A12CR4.	5-118
4A13Q1		SAME AS 4A11Q1.	5-118
4A13Q2		TRANSISTOR: MIL type 2N4036.	5-118
4A13Q3		SAME AS 4A13Q2.	5-118
4A13R1		RESISTOR: MIL type RC20GF680J.	5-118
4A13R2		RESISTOR: MIL type RC20GF560J.	5-118
4A13R3		RESISTOR: MIL type RC20GF561J.	5-118
4A13R4		RESISTOR: MIL type RN60D2711D.	5-118
4A13R5		RESISTOR: MIL type RN60D1802D.	5-118

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4A13R6		RESISTOR, FIXED, WIRE WOUND: 3 ohms, ±5% tol, 5 watts, 0.250 in. dia by 1.000 in. lg, wire lead mounted, 82679 P/N RR114-3W.	5-118
4A13R7		SAME AS 4A11R21.	5-118
4A13R8		SAME AS 4A11R21.	5-118
4A13R9		RESISTOR: MIL type RC32GF271J.	5-118
4A13R10		RESISTOR: MIL type RC20GF272J.	5-118
4A13R11		RESISTOR: MIL type RC20GF122J.	5-118
4A13R12		SAME AS 4A13R5.	5-118
4A13R13		SAME AS 4A13R4.	5-118
4A13R14		SAME AS 4A12R2.	5-118
4A13R15		SAME AS 4A13R1.	5-118
4A13R16		SAME AS 4A13R2.	5-118
4A13R17		RESISTOR: MIL type RC20GF361J.	5-118
4A13R18		RESISTOR: MIL type RC42GF271J.	5-118
4A13R19		SAME AS 4A11R21.	5-118
4A13R20		SAME AS 4A11R21.	5-118
4A13R21		SAME AS 4A11R21.	5-118
4A13R22		SAME AS 4A11R21.	5-118
4A13Z1		VOLTAGE REGULATOR: Input voltage -40 v; output voltage -30 v; power dissipation 400 mw. 0.330 in. dia by 0.175 in. deep. 8 pin leads 0.500 in. lg, 82679 P/N VR104.	5-118
4A13Z2		SAME AS 4A13Z1.	5-118
4A14		CIRCUIT CARD ASSEMBLY: 18 resistors, 5 capacitors, 2 integrated circuits, 4 transistors, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4599.	5-120
4A14C1		SAME AS 4A5C1.	5-120
4A14C2		CAPACITOR, FIXED, ELECTROLYTIC: 4.7 uf, ±10% tol, 50 vdcw, 0.175 in. wd by 0.438 in. lg, 82679 P/N CE123-475-50B2.	5-120
4A14C3		SAME AS 4A13C4.	5-120
4A14C4		NOT USED.	
4A14C5		SAME AS 4A13C4.	5-120
4A14C6		CAPACITOR, FIXED, CERAMIC: 100,000 uuf, ±80% -20% tol, 25 vdcw, 0.593 in. dia by 0.156 in. thk, 82679 P/N CC100-44.	5-120
4A14CR1		SAME AS 4A13CR1.	5-120
4A14CR2		SAME AS 4A12CR4.	5-120
4A14Q1		SAME AS 4A11Q1.	5-120
4A14Q2		SAME AS 4A13Q2.	5-120
4A14Q3		SAME AS 4A11Q1.	5-120
4A14Q4		SAME AS 4A13Q2.	5-120
4A14R1		RESISTOR: MIL type RC42GF102J.	5-120
4A14R2		SAME AS 4A13R1.	5-120
4A14R3		SAME AS 4A13R2.	5-120
4A14R4		RESISTOR: MIL type RC20GF181J.	5-120
4A14R5		RESISTOR: MIL type RC20GF101J.	5-120
4A14R6		RESISTOR: MIL type RN60D3921D.	5-120
4A14R7		SAME AS 4A13R6.	5-120
4A14R8		RESISTOR: MIL type RN60D8251D.	5-120
4A14R9		SAME AS 4A11R21.	5-120
4A14R10		SAME AS 4A11R21.	5-120
4A14R11		SAME AS 4A13R1.	5-120
4A14R12		SAME AS 4A13R2.	5-120
4A14R13		RESISTOR: MIL type RC20GF242J.	5-120
4A14R14		RESISTOR: MIL type RN60D2401D.	5-120
4A14R15		RESISTOR: MIL type RN60D3922D.	5-120

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

COMMAND SIGNAL DECODER, KY-661/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
4A14R16		SAME AS 4A12R2.	5-120
4A14R17		SAME AS 4A11R21.	5-120
4A14R18		SAME AS 4A11R21.	5-120
4A14Z1		SAME AS 4A13Z1.	5-120
4A14Z2		SAME AS 4A13Z1.	5-120
4A15		SWITCH, STEPPING: Remote-controlled type, direct drive type, unidirectional drive, 7 sections, 18 positions, 14 wipers, 66 contacts, bracket housed plug-in type; 5.625 in. lg by 4.250 in. hg by 4.250 in. wd, 82679 P/N AX5027.	5-122
4A15J1 thru 4A15J3		NOT USED.	
4A15J4		SAME AS 4J7.	5-122
4A15A1		CIRCUIT CARD ASSEMBLY: 2 capacitors, 19 semiconductor devices, part of AX5027 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4485.	5-122
4A15A1C1		NOT USED.	
4A15A1C2		SAME AS 4A10C2.	5-122
4A15A1C3		SAME AS 4A10C2.	5-122
4A15A1CR1 thru 4A15A1CR16		SAME AS 4A2CR1.	5-122
4A15A1CR17		ABSORBER, OVERVOLTAGE: Oper voltage, 28 v nom, 33 v maximum. Maximum reverse 10 vdc. 0.438 in. lg by 0.500 in. wd, by 0.219 in. thk, 82679 P/N DD111-1.	5-122
4A15A1CR18		SAME AS 4A1CR1.	5-122
4A15A1CR19		SAME AS 4A1CR1.	5-122
		NOTE: The following is an unsymbolized "Printed Wiring Board" colloquially known as riser card, extender card etc. It is used in the testing of "Circuit Card Assemblies".	
		A4552 Qty. 1.	

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

SIGNAL DATA, CONVERTER-STORER, CV-2520(V)/URC

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5		RTMU-41, CONVERTER-STORER, SIGNAL DATA, DV-2520(V)/URC, a combination serial-to-parallel converter and temporary storage (memory) device for information transmitted in teletype code. The converter section receives teletype codes in serial pulse form from standard teletype receiving equipment and converts the bits of the codes into a parallel form for introduction into the memory section. The memory section receives and stores the code bits for further processing by a decoder to move the automated transmitter or receiver controls. (Unit 5 in the AN/URR-63(V)1 only.)	5-124
5A1		CIRCUIT CARD ASSEMBLY: 6 resistors, 3 capacitors, 1 relay, 1 transistor, 4 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.375 in. hg, 82679 P/N A4494.	5-126
5A2		CIRCUIT CARD ASSEMBLY: 6 resistors, 3 capacitors, 1 coil, 12 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4565.	5-126
5A3		CIRCUIT CARD ASSEMBLY: 1 capacitor, 11 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4566.	5-126
5A4		CIRCUIT CARD ASSEMBLY: 3 resistors, 11 integrated circuits; 8 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4567.	5-126
5A5		NOT USED.	
5A6		CIRCUIT CARD ASSEMBLY: 7 resistors, 6 capacitors, 11 integrated circuits, 4 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4569.	5-126
5A7		CIRCUIT CARD ASSEMBLY: 5 resistors, 11 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4710.	5-126
5A8		NOT USED.	
5A9		NOT USED.	
5A10		CIRCUIT CARD ASSEMBLY: 28 resistors, 9 capacitors, 3 integrated circuits, 5 transistors, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4549.	5-126
5B1		FAN, AXIAL: 115 vac, 50/60 cps, plastic blade, aluminum housing with black enamel finish. Housing size; 3.625 in. by 3.625 in. by 1.500 in. o/a, 82679 P/N BL131.	5-126
5C1		CAPACITOR, FIXED, ELECTROLYTIC: 2600 uf, 50 vdcw, 1.438 in. dia by 3.500 in. lg, Dwg CE112-6, 80183 P/N 35D262G050AB6B.	5-126
5C2		SAME AS 5C1.	5-126
5C3		SAME AS 5C1.	5-126
5CR1		SEMICONDUCTOR DEVICE: MIL type 1N2989RB.	5-126
5CR2		RECTIFIER, SEMICONDUCTOR DEVICE: 100 piv per leg dc or recurrent volts; full wave rectification, 1.125 in. lg by 1.125 in. wd by 0.206 in. hg, solder lug terminals, 82679 P/N RX108-2.	5-126
5DS1		LAMP, INCANDESCENT: Single contact, T=1-3/4 base, 28 vac or dc, 0.04 amps, Dwg BI110-10, 08806 P/N 327.	5-126
5DS2		SAME AS 5DS1.	5-126
5F1		FUSE, CARTRIDGE TYPE: 1 amp, 125 v 0.250 in. dia, 1.250 in. lg, Dwg FU102-1, 71400 P/N MDL-1.	5-126
5F2		SAME AS 5F1.	5-126

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

SIGNAL DATA, CONVERTER-STORER, CV-2520(V)/URC

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5FL1		FILTER, RADIO INTERFERENCE: Current, 1 amp; voltage rating, 600 vdc, 250 vac, at 60 cps; 1.000 in. dia, 2.688 in. lg, Dwg FI105-1, 80183 P/N 1JX130.	5-125
5FL2		SAME AS 5FL1.	5-125
5J1		CONNECTOR: MIL type MS3102A14S1P.	5-125
5J2		NOT USED.	
5J3		CONNECTOR: MIL type MS3102A32-414S.	5-125
5J4		CONNECTOR: MIL type MS3102A20-27P.	5-125
5K1		RELAY ARMATURE, DC: Dpdt, 40 milliwatt sensitivity, coil data: 7.8 milliamps, 1500 ohms, operate time; 15 milliseconds, release time; 10 milliseconds, hermetically sealed metal case 1.281 in. hg by 0.800 in. wd by 0.400 in. thk, bracket mounted, 82679 P/N RL178-06D5R2.	5-126
5Q1		TRANSISTOR: MIL type 2N3055.	5-126
5S1		SWITCH: MIL type ST22K.	5-126
5T1		TRANSFORMER, POWER, S/D: Primary, 115/230 v, 50/60 Hz, 1 phase; secondary, 20 v, 100 madc; 27 v, 140 madc; 18 v, 190 madc; 18 v, 1.8 adc, hermetically sealed metal case, stud mtd, 3.563 in. lg, by 1.063 in. wd by 3.875 in. hg, solder stud terminals, 82679 P/N TF378.	5-126
5TB1		TERMINAL BOARD: Barrier type; two 6.32 thd single screw terminals and feedthru solder lugs, phenolic body 0.406 in. by 0.875 in. by 1.500 in. Dwg TM100-2, 86168 P/N 2-164YD.	5-126
5XA1 thru 5XA11		CONNECTOR, RECEPTACLE, ELECTRICAL: 22 double sided female contacts rated at 5 amps and 1800 volts RMS, phenolic housing with floating bushing and eyelet terminals, accepts printed circuit board thickness of 0.054 in. to 0.071 in. 82679 P/N JJ319-22-DFE.	5-126
5XDS1		LIGHT, INDICATOR: Blue lens, 1.35 to 28 v, T=1-3/4 lamp base, 2 terminals, 0.437 in. dia by 1.500 in. lg, Dwg TS153-11, 72619 P/N 162-8430-1474-502.	5-126
5XDS2		LIGHT, INDICATOR: Translucent white lens, 1.35 to 28 v, T=1-3/4 lamp base, 2 terminals, 0.437 in. dia by 1.500 in. lg, Dwg TS153-5, 72619 P/N 152-8430-0975-502.	5-126
5XF1		FUSEHOLDER, LAMP INDICATING: 90-250 volts, 15 amps, clear knob, accommodates 1/4 in. dia x 1-1/4 in. lg fuse. Dwg FH104-3, 71400 P/N HKL-X.	5-126
5XF2		SAME AS 5XF1.	5-126
5XK1		SOCKET, RELAY: 8 pins, phenolic body, 0.375 in. wd by 2.000 in. lg by 0.281 in. hg, Dwg TS195, 91663 P/N HRC-1.	5-126
5XQ1		SOCKET, SEMICONDUCTOR DEVICE: 2 pin contact accommodation, 0.040 in. or 0.050 in. dia; polarized; 1 terminal lug grounding strap; 1.578 in. lg, 1.000 in. wd, 0.172 in. thk, Dwg TS166-1, 91506 P/N 8038-1G1.	5-126
5A1		CIRCUIT CARD ASSEMBLY: 6 resistors, 3 capacitors, 1 relay, 1 transistor, 4 semiconductors, plug-in type; 0.640 in. lg, 0.591 in. wd, 0.198 in. thk, 82679 P/N A4494.	5-130
5A1C1		82679 P/N CM111F102F1S.	
5A1C2		CAPACITOR: MIL type CL65BG101KP3.	5-130
5A1C3		SAME AS 5A1C2.	5-130
5A1CR1		SEMICONDUCTOR DEVICE: MIL type 1N4245.	5-130
5A1CR2		SAME AS 5A1CR1.	5-130
5A1CR3		SAME AS 5A1CR1.	5-130

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

SIGNAL DATA, CONVERTER-STORER, CV-2520(V)/URC

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5A1CR4		RECTIFIER, SEMICONDUCTOR, DEVICE: Peak reverse v, 260 v, 1.5 vdc output current; 0.688 in. wd, 0.469 in. hg, 0.250 in. thk, 82679 P/N DD130-200-1.5.	5-130
5A1K1		RELAY, ARMATURE: Mercury wetted contacts rated at 2 amps max, 500 v, max, 2 windings rated at 250 ohms each ±10%, 2.063 in. lg by 0.625 in. wide, wire lead mounted, 82679 P/N RL167-1.	5-130
5A1Q1		TRANSISTOR: MIL type 2N3013.	5-130
5A1R1		RESISTOR: MIL type RC20GF472J.	5-130
5A1R2		RESISTOR: MIL type RC32GF271J.	5-130
5A1R3		SAME AS 5A1R1.	5-130
5A1R4		RESISTOR, VARIABLE, COMPOSITION: 100 ohms, ±10% tol, clockwise modified log taper, 0.500 in. dia by 0.563 in. hg, wire lead mounted, 82679 P/N RV111-U-102A.	5-130
5A1R5		RESISTOR: MIL type RC32GF101J.	5-130
5A1R6		RESISTOR: MIL type RC32GF221J.	5-130
5A2		CIRCUIT CARD ASSEMBLY: 6 resistors, 3 capacitors, 1 coil, 12 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4565.	5-132
5A2C1		CAPACITOR, FIXED, PLASTIC: 18,000 pf, ±5% tol, 0.250 in. dia by 0.438 in. lg, 82679 P/N CN112A185J.	5-132
5A2C2		SAME AS 5A2C1.	5-132
5A2C3		CAPACITOR, FIXED, MICA: 1300 uuf, ±2% tol, 500 vdcw, 0.640 in. lg, 0.591 in. wd, 0.198 in. thk, 82679 P/N CM112F152D5S.	5-132
5A2L1		COIL, RF, FIXED: 100 uh, ±10%, 17.5 ohms max dc res., 0.157 dia by 0.450 in. lg, 82679 P/N CL275-102.	5-132
5A2R1		RESISTOR: MIL type RC07GF472J.	5-132
5A2R2		RESISTOR, VARIABLE, WIRE WOUND: 500 ohms, ±10% tol, 1/2 watt, 1.250 in. lg by 1.250 in. wd by 0.313 in. hg, wire lead mounted, 82679 P/N RV121-1-501.	5-132
5A2R3		RESISTOR: MIL type RC32GF331J.	5-132
5A2R4		RESISTOR: MIL type RC07GF122J.	5-132
5A2R5		RESISTOR: MIL type RC07GF392J.	5-132
5A2R6		SAME AS 5A2R4.	5-132
5A2Z1		INTEGRATED CIRCUIT, DIGITAL FLIP-FLOP: 11 pins, plastic case; -4.5 v input, -9.5 v output, 0.895 in. lg by 0.678 in. wd by 0.495 in. hg, 82679 P/N NW151.	5-132
5A2Z2		INTEGRATED CIRCUIT, DIGITAL TIMING GENERATOR: 11 pins, plastic case; -8 v output, 0.895 in. lg by 0.678 in. wd by 0.495 in. hg, 82679 P/N NW152.	5-132
5A2Z3		INTEGRATED CIRCUIT, DIGITAL, SINGLE SHOT GENERATOR: 11 pins, plastic case; supply voltage + and -12 v, 0.875 in. lg by 0.625 in. wd by 0.438 in. hg, 82679 P/N NW153.	5-132
5A2Z4		INTEGRATED CIRCUIT, DIGITAL GATE: 11 pins, plastic case; supply voltage, -12 v, 0.875 in. lg by 0.625 in. wd by 0.125 in. hg, 82679 P/N NW142-24.	5-132
5A2Z5		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage, -12 v, 0.875 in. lg by 0.625 in. wd by 0.438 in. hg, 82679 P/N NW142-43.	5-132
5A2Z6		SAME AS 5A2Z5.	5-132
5A2Z7		SAME AS 5A2Z4.	5-132
5A2Z8		INTEGRATED CIRCUIT, DIGITAL INVERTER: 11 pins, plastic case; supply voltage variable by usage, 0.875 in. lg by 0.625 in. wd by 0.438 in. hg, 82679 P/N NW150-4.	5-132

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

SIGNAL DATA, CONVERTER-STORER, CV-2520(V)/URC

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5A2Z9		SAME AS 5A2Z1.	5-132
5A2Z10		SAME AS 5A2Z1.	5-132
5A2Z11		SAME AS 5A2Z1.	5-132
5A2Z12		INTEGRATED CIRCUIT, COMPLEMENTARY EMITTER FOLLOWER: 11 pins, plastic case; supply voltage -12 v, 0.875 in. lg by 0.625 in. wd by 0.438 in. hg, 82679 P/N NW147-2.	5-132
5A3		CIRCUIT CARD ASSEMBLY: 1 capacitor, 11 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.740 in. hg, 82679 P/N A4566.	5-134
5A3C1		CAPACITOR, FIXED, MICA: 470 uuf, ±1% tol, 500 vdcw, 0.640 in. lg by 0.591 in. wd by 0.198 in. thk, 82679 P/N CM111F471F5S.	5-134
5A3Z1 thru 5A3Z6		SAME AS 5A2Z1.	5-134
5A3Z7		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; -12 v supply, 0.875 in. lg by 0.625 in. wd by 0.438 in. hg, 82679 P/N NW141-91.	5-134
5A3Z8		SAME AS 5A2Z1.	5-134
5A3Z9		INTEGRATED CIRCUIT, DIGITAL GATE: 11 pins, plastic case; -12 v supply, 0.875 in. lg by 0.625 in. wd by 0.438 in. lg, 82679 P/N NW141-42.	5-134
5A3Z10		SAME AS 5A2Z4.	5-134
5A3Z11		SAME AS 5A2Z4.	5-134
5A4		CIRCUIT CARD ASSEMBLY: 3 resistors, 11 integrated circuits, 8 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4567.	5-136
5A4CR1		SEMICONDUCTOR DEVICE: MIL type, 1N914.	5-136
5A4CR2 thru 5A4CR8		SAME AS 5A4CR1.	5-136
5A4R1		RESISTOR: MIL type RC07GF102J.	5-136
5A4R2		SAME AS 5A4R1.	5-136
5A4R3		SAME AS 5A4R1.	5-136
5A4Z1 thru 5A4Z5		SAME AS 5A2Z1.	5-136
5A4Z6		SAME AS 5A2Z8.	5-136
5A4Z7		SAME AS 5A3Z9.	5-136
5A4Z8		SAME AS 5A2Z8.	5-136
5A4Z9		SAME AS 5A2Z4.	5-136
5A4Z10		SAME AS 5A2Z5.	5-136
5A4Z11		SAME AS 5A2Z5.	5-136
5A5		NOT USED.	
5A6		CIRCUIT CARD ASSEMBLY: 7 resistors, 6 capacitors, 11 integrated circuits, 4 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4569.	5-138

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

SIGNAL DATA, CONVERTER-STORER, CV-2520(V)/URC

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5A6C1		CAPACITOR, FIXED, PLASTIC: 4 uf, ±5% tol, 50 vdcw, 0.625 in. dia by 1.063 in. lg; wire leads, 82679 P/N CN114-4R0-5J.	5-138
5A6C2		SAME AS 5A6C1.	5-138
5A6C3		CAPACITOR, FIXED, MICA: 6200 uuf, ±2% tol, 300 vdcw, 0.690 in. lg, 0.560 in. wd, 0.320 in. thk, 82679 P/N CM112F622G3S.	5-138
5A6C4		SAME AS 5A6C3.	5-138
5A6C5		CAPACITOR, FIXED, MICA: 200 uuf, ±2% tol, 500 vdcw, 0.400 in. lg by 0.473 in. wd by 0.170 in. thk, 82679 P/N CM111F221G5S.	5-138
5A6C6		CAPACITOR, FIXED, MICA: 1000 uuf, ±1/2% tol, 500 vdcw, 0.790 in. lg by 0.570 in. wd by 0.340 in. thk, 82679 P/N CM112F102D5S.	5-138
5A6CR1		SAME AS 5A1CR1.	5-138
5A6CR2		SAME AS 5A4CR1.	5-138
5A6CR3		SAME AS 5A4CR1.	5-138
5A6CR4		SAME AS 5A4CR1.	5-138
5A6R1		SAME AS 5A4R1.	5-138
5A6R2		RESISTOR: MIL type RC07GF473J.	5-138
5A6R3		SAME AS 5A4R1.	5-138
5A6R4		RESISTOR: MIL type RC07GF182J.	5-138
5A6R5		SAME AS 5A2R4.	5-138
5A6R6		SAME AS 5A2R4.	5-138
5A6R7		SAME AS 5A4R1.	5-138
5A6Z1		SAME AS 5A2Z2.	5-138
5A6Z2		SAME AS 5A2Z2.	5-138
5A6Z3		SAME AS 5A2Z8.	5-138
5A6Z4		SAME AS 5A2Z8.	5-138
5A6Z5		SAME AS 5A3Z9.	5-138
5A6Z6		SAME AS 5A2Z4.	5-138
5A6Z7		SAME AS 5A2Z3.	5-138
5A6Z8		SAME AS 5A2Z1.	5-138
5A6Z9		SAME AS 5A2Z8.	5-138
5A6Z10		SAME AS 5A2Z12.	5-138
5A6Z11		SAME AS 5A3Z9.	5-138
5A7		CIRCUIT CARD ASSEMBLY: 5 resistors, 11 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4710.	5-140
5A7R1 thru 5A7R5		SAME AS 5A4R1.	5-140
5A7Z1 thru 5A7Z5		INTEGRATED CIRCUIT, SHIFT REGISTER, 32 BIT: 8 pins, metal case, -30 to ±0.3 v input, 0.370 in. dia by 0.175 in. hg, 82679 P/N NW175.	5-140
5A7Z6		SAME AS 5A3Z9.	5-140
5A7Z7 thru 5A7Z10		SAME AS 5A2Z8.	5-140
5A7Z11		SAME AS 5A2Z4.	5-140
5A8		SAME AS 5A7.	5-140

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

SIGNAL DATA, CONVERTER-STORER, CV-2520(V)/URC

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5A9		CIRCUIT CARD ASSEMBLY: 5 resistors, 6 capacitors, 12 integrated circuits, 3 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4570.	5-138
5A9C1		SAME AS 5A6C3.	5-138
5A9C2		SAME AS 5A6C3.	5-138
5A9C3		SAME AS 5A6C1.	5-138
5A9C4		SAME AS 5A6C1.	5-138
5A9C5		CAPACITOR, FIXED, MICA: 1000 uuf, ±2% tol, 500 vdcw, 0.640 in. lg by 0.591 in. wd by 0.198 in. thk, 82679 P/N CM111F102G5S.	5-138
5A9C6		SAME AS 5A6C5.	5-138
5A9CR1		SAME AS 5A4CR1.	5-138
5A9CR2		SAME AS 5A4CR1.	5-138
5A9CR3		SAME AS 5A4CR1.	5-138
5A9R1		SAME AS 5A4R1.	5-138
5A9R2		SAME AS 5A6R4.	5-138
5A9R3		SAME AS 5A6R2.	5-138
5A9R4		SAME AS 5A2R4.	5-138
5A9R5		SAME AS 5A4R1.	5-138
5A9Z1		SAME AS 5A2Z2.	5-138
5A9Z2		SAME AS 5A2Z2.	5-138
5A9Z3		SAME AS 5A2Z8.	5-138
5A9Z4		SAME AS 5A2Z3.	5-138
5A9Z5		SAME AS 5A2Z8.	5-138
5A9Z6		SAME AS 5A2Z4.	5-138
5A9Z7		SAME AS 5A2Z4.	5-138
5A9Z8		SAME AS 5A2Z1.	5-138
5A9Z9		SAME AS 5A3Z9.	5-138
5A9Z10		SAME AS 5A2Z8.	5-138
5A9Z11		SAME AS 5A3Z9.	5-138
5A9Z12		SAME AS 5A2Z1.	5-138
5A10		CIRCUIT CARD ASSEMBLY: 28 resistors, 9 capacitors, 3 integrated circuits, 5 transistors, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4549.	5-142
5A10C1		CAPACITOR, FIXED, ELECTROLYTIC: 4.7 uf, ±10% tol, 50 vdcw, 0.175 in. dia by 0.438 in. dia by 0.438 in. lg, 82679 P/N CE123-475-50B2.	5-142
5A10C2		CAPACITOR, FIXED, CERAMIC: 100,000 uuf, +80% -20% tol, 25 vdcw, 0.593 in. dia by 0.156 in. thk, 82679 P/N CC100-44.	5-142
5A10C3		CAPACITOR, FIXED, MICA: 4 uuf, ±2% tol, vdcw, 0.440 in. lg by 0.473 in. wd by 0.170 in. thk, 82679 P/N CM111E470G5S.	5-142
5A10C4		CAPACITOR, FIXED, ELECTROLYTIC: 47 uf, ±10% tol, 35 vdcw, 0.175 in. dia by 0.438 in. lg, 82679 P/N CE123-475-35B2.	5-142
5A10C5		CAPACITOR, FIXED, ELECTROLYTIC: 100 uf, 20 vdcw, ±10% tol, 0.341 in. dia by 0.750 in. lg, 82679 P/N CE123-107-20S2.	5-142
5A10C6		SAME AS 5A10C3.	5-142
5A10C7		SAME AS 5A10C4.	5-142
5A10C8		SAME AS 5A10C3.	5-142
5A10C9		SAME AS 5A10C2.	5-142
5A10CR1		SAME AS 5A1CR4.	5-142
5A10CR2		SAME AS 5A1CR4.	5-142
5A10Q1		TRANSISTOR: MIL type 2N1485.	5-142
5A10Q2		TRANSISTOR: MIL type 2N4036.	5-142
5A10Q3		SAME AS 5A10Q2.	5-142
5A10Q4		SAME AS 5A10Q1.	5-142
5A10Q5		SAME AS 5A10Q2.	5-142

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

SIGNAL DATA, CONVERTER-STORER, CV-2520(V)/URC

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
5A10R1		RESISTOR: MIL type RC32GF222J.	5-142
5A10R2		RESISTOR: MIL type RC07GF6R8J.	5-142
5A10R3		RESISTOR: MIL type RC20GF680J.	5-142
5A10R4		RESISTOR: MIL type RC20GF560J.	5-142
5A10R5		RESISTOR: MIL type RN60D3922D.	5-142
5A10R6		RESISTOR: MIL type RC20GF122J.	5-142
5A10R7		RESISTOR: MIL type RC20GF361J.	5-142
5A10R8		SAME AS 5A10R4.	5-142
5A10R9		SAME AS 5A10R3.	5-142
5A10R10		RESISTOR: MIL type RN60D1802D.	5-142
5A10R11		SAME AS 5A10R3.	5-142
5A10R12		SAME AS 5A10R4.	5-142
5A10R13		RESISTOR: MIL type RC20GF821J.	5-142
5A10R14		RESISTOR: MIL type RC07GF470J.	5-142
5A10R15		RESISTOR: MIL type RC20GF101J.	5-142
5A10R16		RESISTOR: MIL type RC20GF242J.	5-142
5A10R17		RESISTOR: MIL type RN60D2401D.	5-142
5A10R18		RESISTOR: MIL type RN60D2711D.	5-142
5A10R19		RESISTOR: MIL type RC20GF1R0J.	5-142
5A10R20 thru 5A10R22		SAME AS 5A10R19.	5-142
5A10R23		SAME AS 5A10R10.	5-142
5A10R24		RESISTOR: MIL type RC20GF4R7J.	5-142
5A10R25		SAME AS 5A10R18.	5-142
5A10R26		RESISTOR: MIL type RC20GF102J.	5-142
5A10R27		RESISTOR, FIXED, WIRE WOUND: 1 ohm, ±5% tol, 5 watts, 0.250 in. dia by 1.000 in. lg, wire lead mounted, 82679 P/N RR114-1W.	5-142
5A10R28		RESISTOR: MIL type RC20GF272J.	5-142
5A10R29		SAME AS 5A10R19.	5-142
5A10Z1		VOLTAGE REGULATOR: Input voltage -40 v; output voltage -20 v; power dissipation 400 mw, 0.330 in. dia by 0.175 in. deep, 8 pin leads, 0.500 in. lg, 82679 P/N VR104.	5-142
5A10Z2		SAME AS 5A10Z1.	5-142
5A10Z3		SAME AS 5A10Z1.	5-142

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

TMC MODEL RAK127-2D, CY-6536/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
6		The TMC Model RAK127-2D is a modified CY-597A/G for use with the TMC Model DDRR-10K (Receiving Set, Radio AN/URR-63(V)1.) (Unit 6 in the AN/URR-63(V)1 only.)	5-1
6B1		FAN, AXIAL: 115 vac, 50/60 cps, aluminum housing with black enamel finish, 3.625 in. sq by 1.500 in. thk, 82679 P/N BL131.	5-1
6B2		SAME AS 6B1.	5-1
6W1		WIRING HARNESS, BRANCHED: Intraconnect cable for AN/URR-63(V)1, 82679 P/N CA1450-1.	5-1
6W1J1 thru 6W1J4		NOT USED.	
6W1J5		CONNECTOR: MIL type MS3102A14S-2S.	5-1
6W1J6		CONNECTOR: MIL type MS3102A20-27S.	5-1
6W1J7		CONNECTOR: MIL type MS3102A24-28S.	5-1
6W1J8		CONNECTOR: MIL type UG-556/U.	5-1
6W1P1		CONNECTOR: MIL type UG-536/U.	5-1
6W1P2		CONNECTOR, PLUG, ELECTRICAL: BNC type, one contact, brass silver plated shell, 0.563 in. dia by 1.063 in. lg, Dwg PL144-1, 95712 P/N 30220-13.	5-1
6W1P3		SAME AS 6W1P2.	5-1
6W1P4		SAME AS 6W1P2.	5-1
6W1P5		SAME AS 6W1P2.	5-1
6W1P6		SAME AS 6W1P2.	5-1
6W1P7		SAME AS 6W1P2.	5-1
6W1P8		SAME AS 6W1P2.	5-1
6W1P9		SAME AS 6W1P2.	5-1
6W1P10		SAME AS 6W1P2.	5-1
6W1P11		SAME AS 6W1P2.	5-1
6W1P12		SAME AS 6W1P2.	5-1
6W1P13		SAME AS 6W1P2.	5-1
6W1P14		CONNECTOR, RECEPTACLE, ELECTRICAL: BNC type, one contact, brass silver plated shell, 0.687 in. dia by 1.156 in. lg, 82679 P/N JJ172.	5-1
6W1P15		SAME AS 6W1P14.	5-1
6W1P16		CONNECTOR, PLUG, ELECTRICAL: 9 contacts, 7.5 amp current rating, 0.750 in. dia by 1.250 in. lg, Dwg PL189-9P, 02660 P/N 126-220.	5-1
6W1P17		SAME AS 6W1P16.	5-1
6W1P18		SAME AS 6W1P16.	5-1
6W1P19		SAME AS 6W1P16.	5-1
6W1P20		SAME AS 6W1P16.	5-1
6W1P21		SAME AS 6W1P16.	5-1
6W1P22		SAME AS 6W1P16.	5-1
6W1P23		SAME AS 6W1P16.	5-1
6W1P24		SAME AS 6W1P16.	5-1
6W2		WIRING HARNESS, BRANCHED: Intraconnect cable for AN/URR-63(V)1 receiver, 82679 P/N CA1451-1.	5-1
6W2P1		CONNECTOR: MIL type MS3106B28-21S.	5-1
6W2P2		CONNECTOR: MIL type MS3106B32-414S.	5-1
6W2P3		SAME AS 6W1P1.	5-1
6W2P4		CONNECTOR: MIL type MS3106B28-21P.	5-1
6W2P5		SAME AS 6W1P1.	5-1
6W2P6		CONNECTOR, PLUG, ELECTRICAL: 37 socket type contacts rated at 7.5 amps and 500 v rms. 1.480 in. dia by 1.970 in. lg, Dwg PL212-10, 02660 P/N 67-06C20-37S.	5-1
6W2P7		CONNECTOR, PLUG, ELECTRICAL: 48 pin type contacts rated at 7.5 amps and 500 v rms. 1.606 in. dia by 1.970 in. lg, Dwg PL212-11, 02660 P/N 67-06C20-48P.	5-1

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

TMC MODEL RAK127-2D, CY-6536/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
6W2P8		SAME AS 6A2P6.	5-1
6W2P9		CONNECTOR, PLUG, ELECTRICAL: 37 pin type contacts rated at 7.5 amps and 500 v rms, 1.480 in. dia by 1.970 in. lg, Dwg PL212-9, 02660 P/N 67-06C20-37P.	5-1
6W3		WIRING HARNESS, BRANCHED: Intraconnect cable for AN/URR-63(V)1 receiver, 82679 P/N CA1453-1.	5-1
6W3J1		NOT USED.	
6W3J2		CONNECTOR: MIL type MS3102A28-21S.	5-1
6W3J3		NOT USED.	
6W3J4		CONNECTOR: MIL type MS3102A14S-2P.	5-1
6W3P1		CONNECTOR: MIL type MS3106B20-29S.	5-1
6W3P2		CONNECTOR: MIL type MS3106B32-414P.	5-1
6W3P3		CONNECTOR: MIL type MS3106B20-27S.	5-1
6W4		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: 2 conductors shielded cable, MIL type connector MS3102A16S-1S at one end, MS3106B20-27S at other end, 82679 P/N CA1452-1.	5-1
6W4J1		NOT USED.	
6W4J2		NOT USED.	
6W4J3		CONNECTOR: MIL type MS3102A16S-1S.	5-1
6W4P1		SAME AS 6W3P3.	5-1
6W5		CABLE ASSEMBLY, POWER, ELECTRICAL: Coiled ac power cable, 12 in. lg retracted, 4 ft, lg extended, MIL type connector MS3106A14S-1S at one end, TMC P/N PL218 at other end. TMC P/N CA1068-1-12.	5-1
6W5P1		CONNECTOR: MIL type MS3106A14S-1S.	5-1
6W5P2		CONNECTOR, PLUG, ELECTRICAL: 3 prong polarized with removable ground connection, 2.000 in. lg by 1.500 in. wd by 1.000 in. thk, Dwg PL218, 11136 P/N UP-121-M.	5-1
6W6		SAME AS 6W5.	5-1
6W6P1		SAME AS 6W5P1.	5-1
6W6P2		SAME AS 6W5P2.	5-1
6W7		SAME AS 6W5.	5-1
6W7P1		SAME AS 6W5P1.	5-1
6W7P2		SAME AS 6W5P2.	5-1
6W8		SAME AS 6W5.	5-1
6W8P1		SAME AS 6W5P1.	5-1
6W8P2		SAME AS 6W5P2.	5-1
6W9		SAME AS 6W5.	5-1
6W9P1		SAME AS 6W5P1.	5-1
6W9P2		SAME AS 6W5P2.	5-1

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

SIGNAL DATA, CONVERTER-STORER, CV-2521(V)/URC

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
9		RTMU-42 CONVERTER-STORER, SIGNAL DATA, CV-2521(V)/URC, a combination serial-to-parallel converter and temporary storage (memory) device for information transmitter in teletype code. The converter sections received teletype receiving equipment and converts the bits of the codes into a parallel form for introduction into the 2 memory sections (one for each diversity half). A memory section receives and stores the code bits for further processing by a decoder to move the automated transmitter or receiver controls. (Unit 9 in the AN/URR-63(V)2 only.)	5-144
9A1		CIRCUIT CARD ASSEMBLY: 6 resistors, 3 capacitors, 1 relay, 1 transistor, 4 semiconductors, plug-in type; 4.375 in. lg by 4.125 in. wd by 0.375 in. hg, 82679 P/N A4494.	5-144
9A2		CIRCUIT CARD ASSEMBLY: 6 resistors, 3 capacitors, 1 coil, 12 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4565.	5-144
9A3		CIRCUIT CARD ASSEMBLY: 1 capacitor, 11 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4566.	5-144
9A4		CIRCUIT CARD ASSEMBLY: 3 resistors, 11 integrated circuits, 8 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. lg by 0.750 in. hg, 82679 P/N A4567.	5-144
9A5		NOT USED.	
9A6		CIRCUIT CARD ASSEMBLY: 7 resistors, 6 capacitors, 11 integrated circuits, 4 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4569.	5-144
9A7		CIRCUIT CARD ASSEMBLY: 5 resistors, 11 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4710.	5-144
9A8		SAME AS 9A7.	5-144
9A9		CIRCUIT CARD ASSEMBLY: 5 resistors, 6 capacitors, 12 integrated circuits, 3 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4570.	5-144
9A10		CIRCUIT CARD ASSEMBLY: 29 resistors, 9 capacitors, 3 integrated circuits, 5 transistors, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg, 82679 P/N A4549.	5-144
9B1		FAN, AXIAL: 115 vac, 50/60 cps, plastic blade, aluminum housing with black enamel finish, housing size; 3.625 in. by 3.625 in. by 1.500 in. o/a, 82679 P/N BL131.	5-144
9C1		CAPACITOR, FIXED, ELECTROLYTIC: 2600 uf, 50 vdcw, 1.438 in. dia by 3.500 in. lg, Dwg CE112-6, 80183 P/N 35D262G050AB6B.	5-144
9C2		SAME AS 9C1.	5-144
9C3		SAME AS 9C1.	5-144
9CR1		SEMICONDUCTOR DEVICE: MIL type 1N2989RB.	5-144
9CR2		RECTIFIER, SEMICONDUCTOR DEVICE: 100 piv per leg dc or recurrent volts; full wave rectification, 1.125 in. lg by 1.125 in. wd by 0.206 in. hg, solder lug terminals, 82679 P/N RX108-2.	5-144
9DS1		LAMP, INCANDESCENT: Single contact, T=1-3/4 base, 28 vac or dc, 0.04 amps, Dwg BI110-7, 08806 P/N 327.	5-144
9DS2		SAME AS 9DS1.	5-144
9F1		FUSE, CARTRIDGE TYPE: 1 amp, 125 v 0.250 in. dia, 1.250 in. lg, Dwg FU102-1, 71400 P/N MDL-1.	5-144
9F2		SAME AS 9F1.	5-144

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

TMC MODEL RAK127-2E, CY-6537/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
10		The TMC Model RAK127-2E is a modified CY-597A/G for use with the TMC Model DDRR-10M. (Receiving Set, Radio AN/URR-63(V)2.) (Unit 10 in the AN/URR-63(V)2 only.)	5-2
10B1		FAN, AXIAL: 115 vac, 50/60 cps, aluminum housing with black enamel finish, 3.625 in. sq by 1.500 in. thk, 82679 P/N BL131.	5-2
10B2		SAME AS 10B1.	5-2
10W1		WIRING HARNESS, BRANCHED: Intraconnect cable for AN/URR-63(V)2, 82679 P/N CA1450-1.	5-2
10W1J1 thru 10W1J4		NOT USED.	
10W1J5		CONNECTOR: MIL type MS3102A14S-2S.	5-2
10W1J6		CONNECTOR: MIL type MS3102A20-27S.	5-2
10W1J7		CONNECTOR: MIL type MS3102A24-28S.	5-2
10W1J8		CONNECTOR: MIL type UG-556/U.	5-2
10W1P1		CONNECTOR: MIL type UG-536/U.	5-2
10W1P2		CONNECTOR, PLUG, ELECTRICAL: BNC type, one contact, brass silver plated shell, 0.563 in. dia by 1.063 in. lg, Dwg PL144-1, 95712 P/N 30220-13.	5-2
10W1P3		SAME AS 10W1P2.	5-2
10W1P4		SAME AS 10W1P2.	5-2
10W1P5		SAME AS 10W1P2.	5-2
10W1P6		SAME AS 10W1P2.	5-2
10W1P7		SAME AS 10W1P2.	5-2
10W1P8		SAME AS 10W1P2.	5-2
10W1P9		SAME AS 10W1P2.	5-2
10W1P10		SAME AS 10W1P2.	5-2
10W1P11		SAME AS 10W1P2.	5-2
10W1P12		SAME AS 10W1P2.	5-2
10W1P13		SAME AS 10W1P2.	5-2
10W1P14		CONNECTOR, RECEPTACLE, ELECTRICAL: BNC type, one contact, brass silver plated shell, 0.687 in. dia by 1.156 in. lg, 82679 P/N JJ172.	5-2
10W1P15		SAME AS 10W1P14.	5-2
10W1P16		CONNECTOR, PLUG, ELECTRICAL: 9 contacts, 7.5 amp current rating, 0.750 in. dia by 1.250 in. lg, Dwg PL189-9P, 02660 P/N 126-220.	5-2
10W1P17		SAME AS 10W1P16.	5-2
10W1P18		SAME AS 10W1P16.	5-2
10W1P19		SAME AS 10W1P16.	5-2
10W1P20		SAME AS 10W1P16.	5-2
10W1P21		SAME AS 10W1P16.	5-2
10W1P22		SAME AS 10W1P16.	5-2
10W1P23		SAME AS 10W1P16.	5-2
10W1P24		SAME AS 10W1P16.	5-2
10W2		WIRING HARNESS, BRANCHED: Intraconnect cable for AN/URR-63(V)2 receiver, 82679 P/N CA1451-1.	5-2
10W2P1		CONNECTOR: MIL type MS3106B28-21S.	5-2
10W2P2		CONNECTOR: MIL type MS3106B32-414S.	5-2
10W2P3		SAME AS 10W2P1.	5-2
10W2P4		CONNECTOR: MIL type MS3106B28-21P.	5-2
10W2P5		SAME AS 10W2P1.	
10W2P6		CONNECTOR, PLUG, ELECTRICAL: 37 socket type contacts rated at 7.5 amps and 500 v rms, 1.480 in. dia by 1.970 in. lg, Dwg PL212-10, 02660 P/N 67-06C20-37S.	5-2

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

TMC MODEL RAK127-2E, CY-6537/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
10W2P7		CONNECTOR, PLUG, ELECTRICAL: 38 pin type contacts rated at 7.5 amps and 500 v rms, 1.606 in. dia by 1.970 in. lg, Dwg PL212-11, 02660 P/N 67-06C20-48P.	5-2
10W2P8		SAME AS 10W2P6.	5-2
10W2P9		CONNECTOR, PLUG, ELECTRICAL: 37 pin type contacts rated at 7.5 amps and 500 v rms, 1.480 in. dia by 1.970 in. lg, Dwg PL212-9, 02660 P/N 67-06C20-37P.	5-2
10W3		WIRING HARNESS, BRANCHED: Intraconnect cable for AN/URR-63(V)2 receiver, 82679 P/N CA1454-1.	5-2
10W3J1		NOT USED.	
10W3J2		CONNECTOR: MIL type MS3102A28-21S.	5-2
10W3J3		NOT USED.	
10W3J4		CONNECTOR: MIL type MS3102A14S-2P.	5-2
10W3P1		CONNECTOR: MIL type MS3106B20-29S.	5-2
10W3P2		CONNECTOR: MIL type MS3106B32-414P.	5-2
10W3P3		CONNECTOR: MIL type MS3106B20-27S.	5-2
10W3P4		SAME AS 10W3P1.	5-2
10W4		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: 2 conductor shielded cable, MIL type connector MS3102A16S-1S at one end, MS3106B20-27S at other end, 82679 P/N CA1452-1.	5-2
10W4J1		NOT USED.	
10W4J2		NOT USED.	
10W4J3		CONNECTOR, MIL type MS3102A16S-1S.	5-2
10W4P1		SAME AS 10W3P3.	5-2
10W5		WIRING HARNESS BRANCHED: Intraconnect cable for AN/URR-63(V)2 receiver, 82679 P/N CA1450-3.	5-2
10W5J1 thru 10W5J4		NOT USED.	
10W5J5		SAME AS 10W1J5.	5-2
10W5J6		SAME AS 10W1J6.	5-2
10W5J7		SAME AS 10W1J7.	5-2
10W5J8		SAME AS 10W1J8.	5-2
10W5P1		SAME AS 10W1P1.	5-2
10W5P2		SAME AS 10W1P2.	5-2
10W5P3		SAME AS 10W1P2.	5-2
10W5P4		SAME AS 10W1P2.	5-2
10W5P5		SAME AS 10W1P2.	5-2
10W5P6		SAME AS 10W1P2.	5-2
10W5P7		SAME AS 10W1P2.	5-2
10W5P8		SAME AS 10W1P2.	5-2
10W5P9		SAME AS 10W1P2.	5-2
10W5P10		SAME AS 10W1P2.	5-2
10W5P11		SAME AS 10W1P2.	5-2
10W5P12		SAME AS 10W1P2.	5-2
10W5P13		SAME AS 10W1P2.	5-2
10W5P14		SAME AS 10W1P14.	5-2
10W5P15		SAME AS 10W1P14.	5-2
10W5P16		SAME AS 10W1P16.	5-2
10W5P17		SAME AS 10W1P16.	5-2
10W5P18		SAME AS 10W1P16.	5-2
10W5P19		SAME AS 10W1P16.	5-2
10W5P20		SAME AS 10W1P16.	5-2
10W5P21		SAME AS 10W1P16.	5-2
10W5P22		SAME AS 10W1P16.	5-2
10W5P23		SAME AS 10W1P16.	5-2
10W5P24		SAME AS 10W1P16.	5-2

TABLE 6-3. MAINTENANCE PARTS LIST (Continued)

TMC MODEL RAK127-2E, CY-6537/URR

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
10W6		WIRING HARNESS, BRANCHED: Intraconnect cable for AN/URR-63(V)2 receiver, 82679 P/N CA1451-2.	5-2
10W6P1		SAME AS 10W2P1.	5-2
10W6P2		SAME AS 10W2P2.	5-2
10W6P3		SAME AS 10W2P1.	5-2
10W6P4		SAME AS 10W2P4.	5-2
10W6P5		SAME AS 10W2P1.	5-2
10W6P6		SAME AS 10W2P6.	5-2
10W6P7		SAME AS 10W2P7.	5-2
10W6P8		SAME AS 10W2P6.	5-2
10W6P9		SAME AS 10W2P9.	5-2
10W7		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: 2 conductor shielded cable, MIL type connector MS3102A16S-1S at one end, MS3106B20-27S at other end, 81 in. lg, 82679 P/N CA1452-1.	5-2
10W7J1		NOT USED.	
10W7J2		NOT USED.	
10W7J3		SAME AS 10W4J3.	5-2
10W7P1		SAME AS 10W4P1.	5-2
10W8		CABLE ASSEMBLY, POWER, ELECTRICAL: Coiled ac power cable, 12 in. lg retracted, 4 ft, lg extended, MIL type connector MS3106A14S-1S at one end, TMC P/N PL218 at other end, 82679 P/N CA1068-1-12.	5-2
10W8P1		CONNECTOR: MIL type MS3106A14S-1S.	5-2
10W8P2		CONNECTOR, PLUG, ELECTRICAL: 3 prong polarized with removable ground connection, 2.000 in. lg by 1.500 in. wd by 1.000 in. thk. Dwg PL218, 11136 P/N UP-121-M.	5-2
10W9		SAME AS 10W8.	5-2
10W9P1		SAME AS 10W8P1.	5-2
10W9P2		SAME AS 10W8P2.	5-2
10W10		SAME AS 10W8.	5-2
10W10P1		SAME AS 10W8P1.	5-2
10W10P2		SAME AS 10W8P2.	5-2
10W11		SAME AS 10W8.	5-2
10W11P1		SAME AS 10W8P1.	5-2
10W11P2		SAME AS 10W8P2.	5-2
10W12		SAME AS 10W8.	5-2
10W12P1		SAME AS 10W8P1.	5-2
10W12P2		SAME AS 10W8P2.	5-2
10W13		SAME AS 10W8.	5-2
10W13P1		SAME AS 10W8P1.	5-2
10W13P2		SAME AS 10W8P2.	5-2
10W14		SAME AS 10W8.	5-2
10W14P1		SAME AS 10W8P1.	5-2
10W14P2		SAME AS 10W8P2.	5-2
10W15		SAME AS 10W8.	5-2
10W15P1		SAME AS 10W8P1.	5-2
10W15P2		SAME AS 10W8P2.	5-2
10W16		SAME AS 10W8.	5-2
10W16P1		SAME AS 10W8P1.	5-2
10W16P2		SAME AS 10W8P2.	5-2

TABLE 6-4. LIST OF MANUFACTURERS

MFR CODE	NAME	ADDRESS
08806	General Electric Company Miniature Lamp. Dept.	Nela Park Cleveland, Ohio 44112
14655	Cornell-Dublier Electronics Div. Federal Pacific Electric Co.	50 Paris Street Newark, New Jersey 07105
71400	Bussmann Mfg. Division of McGraw & Edison Co.	2536 W. University St. St. Louis, Mo. 63017
72619	Dialight Corp.	60 Steward Avenue Brooklyn, N. Y. 11237
72983	Essex Wire Corp.	1601 Wall Street Fort Wayne, Ind. 46804
75382	Kulka Electric Corp.	520 S. Fulton Ave. Mt. Vernon, N. Y. 10550
80183	Sprague Products Co.	North Adams Massachusetts
81349	Military Specifications Promulgated By Standardization Div.	Directorate of Logistic Services DSA
82679	The Technical Materiel Corp.	700 Fenimore Road Mamaroneck, N. Y. 10543
83594	Burroughs Corp. Electronic Components Div.	P. O. Box 1226 Plainfield, N. J. 07061
91506	Augat Inc.	33 Perry Avenue Attleboro, Mass. 02703

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