



# TMC SPECIFICATION

NO. S 1063

REV:

Q A B C

COMPILED:

CHECKED:

APPD:

SHEET

2

OF

TITLE: PRODUCTION TEST PROCEDURE

CDN-3, CARRIER OPERATED DEVICE, ANTI-NOISE

\* MAKE ENTRY ON TEST DATA SHEET

## A. EQUIPMENT REQUIRED

1. High sensitivity oscilloscope with low capacity probe (10 pf or less)- TEKTRONIX 541A with Type "L" head, or equivalent.
2. Signal Generator - HP 606 or equivalent.
3. AC VTVM - Ballantine 314A or equivalent.
4. Frequency Counter - HP 5244L or equivalent.
5. VTVM - HP 410B or equivalent.
6. VOM - Simpson 260 or equivalent.

## B. POWER SUPPLY (Z1001) TEST

1. Remove cards Z1002 through Z1007.
2. Turn the power switch on, pilot light DS1001 should light.
- \*3. Set the HP-410B to read +DC on the 30V scale. Measure the voltage at pin 7 of Z1001. It should read +12V  $\pm 20\%$  (This voltage should also be present at pin 1 of Z1002 through Z1007).
- \*4. Set meter to read -DC and measure voltage at pin 12 of Z1001. It should be -12V  $\pm 20\%$  (This voltage should also be present at pin 2 of Z1002 through Z1007).
5. Replace the Z1002 through Z1007 cards now.

## C. INPUT CIRCUIT CARD (Z1007) TEST

1. Set signal generator output to 1 mv and to exactly 455 KC as read on the counter.
2. Connect output of signal generator to the IF input of the CDN-3 and set R1003 (variable attenuator), on the rear chassis, to its maximum CW position. Also set the fixed attenuator to the "out" position.
3. Disable conversion oscillator (card Z1006) by pulling crystal out of socket.
4. Connect scope probe to test point TP-4.
5. Short test point TP-5 to ground with a short jumper from TP-5 to TP-3.
- \* 6. Tune the slug in L1 for a peak indication on the scope.
- \* 7. Disconnect the shorting jumper from TP-5 and tune the slug in T1 to obtain a minimum reading at test point TP-4.

## D. BUFFER AMPLIFIER (Z1006) TEST

1. If the IF of the receiver to be used is other than 455 KC, insert the proper crystal (Y1) in its socket (See Table I). If receiver IF is 455 KC, omit steps C1, 2, 3 & 4. (Crystal will be 705 KC for use with STR-2C).

# TMC SPECIFICATION

NO. S 106?

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SHEET 3 OF

TITLE: PRODUCTION TEST PROCEDURE

CDN-3, CARRIER OPERATED DEVICE, ANTI-NOISE

typed by mtp

D. BUFFER AMPLIFIER (Z1006) TEST - Cont'd

TABLE I

IF Frequency KCS	Conversion Osc. Xtal Freq. (Y1) KCS
100	555
200	655
250	705
455	none required
500	955
1750	1,295

2. Connect counter to vertical output of scope and remove signal generator.
3. Connect scope probe to test point TP-4.
- \* 4. Adjust R14 for 400 mv PP at TP-4, and adjust C5 to obtain frequency required by Table I.
5. Remove 355 KC Xtal (Y1) from Z1005.
6. Reconnect and set signal generator to receiver IF crystal is used in Z1006.
- \* 7. Connect scope probe to test point TP-3 on Z1006 and tune L1 for maximum output signal.
8. Reinsert crystal (Y1) on Z1005.

E. MIXER-AMPLIFIER (Z1005) TEST

1. Connect scope probe to test point TP-2.
- \* 2. Connect counter to vertical output of scope, adjust R5 for clean wave form, and tune C3 to obtain 355.000 KC.
3. Tune 100 KC double tuned stage, Q<sub>4</sub> as follows:
  - a. Connect scope probe to test point TP-6 and short from TP-4 to TP-9 with a jumper.
  - \* b. Connect counter to vertical output of scope and observe that frequency is 100 KC. Adjust L1 for maximum output.

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# TMC SPECIFICATION

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SHEET 4 OF

TITLE: PRODUCTION TEST PROCEDURE

CDN-3, CARRIER OPERATED DEVICE, ANTI-NOISE

## E. MIXER-AMPLIFIER (Z1005) TEST - Cont'd

3. \* c. Remove the jumper from TP-4 and adjust T2 for a minimum reading at TP-6.
4. Tune 355 KC, double-tuned stage, Q5 as follows:
  - a. Leave input connected, and signal generator set at 455 KC with 1 mv level or set to correct IF input, if other than 455 KC (250 KC for use with STR-2C).
  - \* b. Check at TP-3 for signal.
  - c. Connect scope probe to TP-7 with counter connected to vertical output of scope, as before.
  - \* d. Short TP-1 to TP-9 with a jumper and adjust L2 for maximum reading on TP-7. The frequency should be 355 KC, (if not, retune for 355 KC).
  - \* e. Remove the jumper from TP-1 and adjust T1 for minimum reading at TP-7.

## F. CARRIER CHANNEL CARD (Z1003) TEST

1. Connect signal generator to test point TP-1 of card Z1005 and Ballantine AC VTVM to TP-2 of card Z1003, set Ballantine to 1 volt scale.
  - a. Set signal generator to 355.000 KC, as read on the counter, and approximately 640 mv as read on Ballantine.
  - b. Deleted.
- \* 2. Adjust signal generator frequency to find center peak response as read on the VTVM, and adjust signal generator level to read +4 db on VTVM 1 volt scale. This center frequency response should be 355.000 KC  $\pm 10$  cps.
- \* 3. Check the -3 db bandwidth, which should be 35 cps  $\pm 10$  cps.
- \* 4. Adjust C13 to obtain symmetrical bandwidth at the two -20 db frequencies. (The frequency difference between the center frequency and the two -20 db frequencies should be within 5 cps.)
5. The adjustment of T1 has little effect and will normally need no change. It has slight effect on bandwidth and may be adjusted to meet tolerance specified in Step F3, above.
- \* 6. Repeat Steps F2 and F3.

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# TMC SPECIFICATION

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APPD:

SHEET

5

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TITLE: PRODUCTION TEST PROCEDURE

CDN-3, CARRIER OPERATED DEVICE, ANTI-NOISE

## F. CARRIER CHANNEL CARD (Z1003) TEST - Cont'd

7. Connect the signal generator to the IF input. Set at the IF frequency and at a level of 1 mv.

- a. Connect Ballantine to TP-2 and adjust C3 on Z1005 for maximum output. The setting of C3 is very important and should be set accurately.
- b. Connect scope and counter to TP-2 and measure frequency, should be within +10 cps of 355.000 KC.

\*8. Connect the scope probe to monitor DC voltage on 0.05 V/CM scale. Adjust T2 for maximum positive DC voltage at TP-3.

## G. NOISE CHANNEL CARD (Z1004) TEST

1. Connect the signal generator to the input of the unit. Adjust signal generator to 1 mv at the IF frequency. (See Table I).

\*2. Connect the oscilloscope to TP-4 and tune T1 for maximum indication.

\*3. Connect the oscilloscope to TP-1 and make the following adjustments:

- a. Adjust T3 for maximum indication.
- b. Adjust T2 for maximum indication.
- c. Adjust L3 and C20 for minimum indication.
- d. Repeat Steps b and c, above until no further change is noted.

## H. COMPARATOR CARD (Z1002) TEST

1. Connect the IF output of a communications receiver through a step attenuator to the input of the CDN-3. Connect the signal generator and AC VTVM in parallel with the receiver IF at the input to the CDN-3. Tune the receiver for noise input (no station). Adjust noise level output from the receiver for 100 mv RMS with a 0 db of attenuation in the attenuator. Reduce the noise source by inserting approximately 100 db attenuation. Tune the signal generator to the receiver IF and adjust generator output level to 1.0 mv RMS as seen on the AC VTVM. Modulate this signal 40% with 400 cps.

2. Set the oscilloscope on a high sensitivity DC range and connect to TP-4.

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# TMC SPECIFICATION

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SHEET 6 OF

TITLE: PRODUCTION TEST PROCEDURE

CDN-3, CARRIER OPERATED DEVICE, ANTI-NOISE

## H. COMPARATOR CARD (Z1002) TEST - Cont'd

\* 3. Connect a short jumper from TP-2 to TP-5 and tune T1 for a maximum negative voltage at TP-4. Remove the jumper.

4. Connect a short jumper from TP-3 to TP-5 and tune T2 for a maximum positive voltage at TP-4. Remove the jumper. Go back and repeat L1, T1 on Z1007, L1 on Z1006, L1, T2, L2, T1 on Z1005, T1 on Z1003, and T2 on Z1002. It is important that these adjustments be made in this order and done very precisely.

\* 5. Connect the scope probe to TP-6 and check for approx. 45 volts PP as seen on the scope.

\* 6. Connect scope probe to TP-3. Vary the percent modulation of the signal generator. The signal should disappear (at TP-3) with about 50% modulation. If not, adjust R3 on Z1004 until it does.

## I. THRESHOLD CONTROL ALIGNMENT

1. Disconnect signal generator.

2. Set front panel "threshold control" maximum CW. Set R27 to maximum CW.

3. Adjust R15 until "carrier on" light just goes out.

4. Set front panel "threshold control" to the center of its range. Connect signal generator to IF input frequency and set to 1 mv.

5. Back off R27 until "carrier on" light just goes out; then bring it back until the light just comes on. (If the light will not go out when R27 is varied over its entire range, set R27 to maximum CCW and back off R15 until the light just goes out, then bring it back until it just comes on again.)

\* 6. By varying the signal generator output, the unit should trigger on at 1 mv as the output is increased from 0 to 1 mv.

\* 7. With the signal generator set at 1 mv, the unit should un-trigger when the threshold control is varied from its mid-position to maximum CCW and trigger on again when returned to mid-position.

8. Back the front panel "threshold control" down as far as possible in the CCW direction and still have the unit triggered.

\* 9. Remove the 100 db of attenuation in series with the noise source. The unit should un-trigger.

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APPD:

SHEET

7

OF

TITLE:

PRODUCTION TEST PROCEDURE

CDN-3, CARRIER OPERATED DEVICE, ANTI-NOISE

## I. THRESHOLD CONTROL ALIGNMENT - Cont'd

10. Remove noise source and set generator output so unit is triggered.
11. With the Simpson 260 measure continuity from:
  - \* (a) E1001-5 to E1001-10
  - \* (b) E1001-6 to E1001-11
  - \* (c) E1001-14 to E1001-13
12. Remove generator input so unit is untriggered and measure continuity from:
  - \* (a) E1001-14 to E1001-15
- \* 13. With the HP410 set to read + volts on the 30V scale, measure the voltage at E1001-2. It should be +12V  $\pm 20\%$  (same as in step B3)
- \* 14. Measure the voltage at E1001-1 with the meter set to read -DC volts. It should be -12V  $\pm 20\%$  (same as in step B4)
- \* 15. Measure continuity from E1001-8 to ground. You should have continuity.
- \* 16. Remove the Ac power plug and measure continuity from E1001-8 to ground. You should have no continuity.
- \* 17. Measure continuity from the plate side of CR1003 to pin 2 of J1002. You should have continuity.
18. This completes the testing of the unit.

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APPD:

SHEET 8 OF

TITLE: PRODUCTION TEST PROCEDURE

CDN-3, CARRIER OPERATED DEVICE, ANTI-NOISE

THE TECHNICAL MATERIEL CORP.  
MAMARONECK, N.Y.TEST DATA SHEET NO. 1  
for  
CDN-3

SERIAL NO.: \_\_\_\_\_

MFG. NO.: \_\_\_\_\_

**B. POWER SUPPLY, Z1001**

B3. +12V +20%..... \_\_\_\_\_

B4. -12V +20%..... \_\_\_\_\_

**C. INPUT CIRCUIT CARD, Z1007**

C6. L1 tune for peak at TP-4..... \_\_\_\_\_

C7. L2 tune for min. at TP-4..... \_\_\_\_\_

**D. BUFFER AMPLIFIER, Z1006**

D4. Y1 crystal frequency..... \_\_\_\_\_

D4. R14 adjust (400 mv at TP-4)..... \_\_\_\_\_

D7. L1 tune for max. at TP-3..... \_\_\_\_\_

**E. MIXER-AMPLIFIER, Z1005**

E2. Tune C3 for 355.000 KC at TP-2..... \_\_\_\_\_

E3b. 100 KC at TP-6..... \_\_\_\_\_

L1 tune for max. output..... \_\_\_\_\_

E3c. T2 adjust for min. at TP-6..... \_\_\_\_\_

E4b. 100.000 KC at TP-3..... \_\_\_\_\_

E4d. L2 tune for max. on TP-7..... \_\_\_\_\_

Check frequency at 355.000 KC..... \_\_\_\_\_

E4e. T1 adjust for min. on TP-7..... \_\_\_\_\_

**F. CARRIER CHANNEL Z1003**F2. Center freq. response  
(355 KC +10 cps)..... \_\_\_\_\_

F3. -3db bandwidth..... \_\_\_\_\_

F6. (35 cps +10 cps)..... \_\_\_\_\_

F4. -20 db frequencies (E<sub>2</sub>+5cps max).. \_\_\_\_\_F6. (E<sub>2</sub>-5cps min).. \_\_\_\_\_

F7b. Carrier Freq. (355.000KC)..... \_\_\_\_\_

(+10 cps)..... \_\_\_\_\_

F8. T2 adjust. for max. positive voltage  
at TP-3..... \_\_\_\_\_



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SHEET

9

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PRODUCTION TEST PROCEDURE

CDN-3, CARRIER OPERATED DEVICE, ANTI-NOISE

## TEST DATA SHEET NO. 2 for CDN-3

### G. NOISE CHANNEL CARD, Z1004

- G2. Tune T1 for max. at TP-4..... \_\_\_\_\_  
G3a. Adjust T3 for max. at TP-1..... \_\_\_\_\_  
G3b. Adjust T2 for max. at TP-1..... \_\_\_\_\_  
G3c. Adjust L3,C20 for min. at TP-1..... \_\_\_\_\_

### H. COMPARATOR CARD, Z1002

- H3. Tune T1 for max. negative voltage  
at TP-4..... \_\_\_\_\_  
H5. Voltage at TP-6 (45V)..... \_\_\_\_\_  
H6. % modulation at which signal on  
TP-3 disappears (50% approx.)..... \_\_\_\_\_

### I. THRESHOLD CONTROL ALIGNMENT

- I6. Input level for trigger (1 mv)..... \_\_\_\_\_  
I7. "THRESHOLD CONTROL" setting for  
un-trigger (max. CCW)..... \_\_\_\_\_  
I9. Unit un-triggers with addition  
of noise..... \_\_\_\_\_  
I11a. Continuity E1001-5 to E1001-10..... \_\_\_\_\_  
I11b. Continuity E1001-6 to E1001-11..... \_\_\_\_\_  
I11c. Continuity E1001-14 to E1001-13..... \_\_\_\_\_  
I12a. Continuity E1001-14 to E1001-15..... \_\_\_\_\_  
I13. +12V  $\pm 20\%$ ..... \_\_\_\_\_  
I14. -12V  $\pm 20\%$ ..... \_\_\_\_\_  
I15. Continuity E1001-8 to gnd..... \_\_\_\_\_  
I16. Open ckt E1001-8 to gnd..... \_\_\_\_\_  
I17. Continuity CR1003 plate to J1002-2... \_\_\_\_\_

TESTER: \_\_\_\_\_

DATE: \_\_\_\_\_

