

Thales
 10950 El Monte, Suite 110
 Overland Park, Kansas 66211
 Telephone: +1-913 422-2600

BULLETIN NO. MK10-14 Rev. B DATE: 28 October 2013
 704759-0300 released per ECN 05811
 APPLICABLE TO: Mark 10 Marker Beacon

SUBJECT: Mark 10 Marker Beacon

UNITS AFFECTED: Part Number 098577-tab

Mark 10 modulator/power amplifier (MOD/PA) 120076-0001 used in the Mark 10 marker beacon is being replaced on an as-needed basis with the 120301-0002 MOD/PA. These MOD/PAs are nearly identical. One difference is that the audio filters (U10B,C, and D) are adjustable. This service bulletin will provide instructions for adjusting the 120301 when it is used in the Mark 10 marker beacon.

120301-0002 Adjustments

Program the MOD/PA as the desired marker. This includes switch and jumper programming of the MOD/PA as indicated below.

The MOD/PA may be programmed for use as an outer, middle, or inner marker. The following table provides switch settings for each (see attached schematic 120301).

| SWITCH | Outer Marker | Middle Marker | Inner Marker |
|--------|--------------|---------------|--------------|
| S1-1 | CLOSED | CLOSED | OPEN |
| S1-2 | CLOSED | OPEN | OPEN |
| S1-3 | OPEN | CLOSED | CLOSED |
| S1-4 | OPEN | CLOSED | OPEN |
| S1-5 | CLOSED | CLOSED | OPEN |
| S1-6 | OPEN | OPEN | CLOSED |
| S1-7 | OPEN | CLOSED | CLOSED |
| S1-8 | CLOSED | CLOSED | CLOSED |

| SWITCH | Outer Marker | Middle Marker | Inner Marker |
|--------|--------------|---------------|--------------|
| S2-1 | OPEN | CLOSED | CLOSED |
| S2-2 | OPEN | CLOSED | CLOSED |
| S2-3 | CLOSED | OPEN | CLOSED |
| S2-4 | CLOSED | OPEN | OPEN |
| S2-5 | OPEN | CLOSED | CLOSED |
| S2-6 | OPEN | CLOSED | OPEN |
| S2-7 | CLOSED | CLOSED | OPEN |
| S2-8 | OPEN | CLOSED | CLOSED |

| | | | |
|----|-----|-----|-----|
| J2 | 1-2 | 3-4 | 5-6 |
|----|-----|-----|-----|

Back course markers and markers programmed with the Morse code letters R, K, P, X are programmed like the inner marker except for switches S1-6, S1-7 and S1-8. These are programmed as follows:

| TYPE | S1-8 | S1-7 | S1-6 |
|-------------|--------|--------|--------|
| Back Course | CLOSED | OPEN | CLOSED |
| Letter R | OPEN | CLOSED | OPEN |
| Letter K | OPEN | CLOSED | CLOSED |
| Letter P | OPEN | OPEN | OPEN |
| Letter X | OPEN | OPEN | CLOSED |

Power Output Adjustments

The MOD/PA assemblies are tuned to output 2.6W @ 95% maximum output power. All power levels referenced are for the carrier only at the transmitter output jack. It may not be necessary to adjust the Power output but the following checks should be made. Use a bird wattmeter or equivalent power measuring test equipment:

Mod/PA In-System Tuning: Using the PMDT set the transmitter to:

Normal
2.5 watts
95% modulation
ident off

Adjust Mod/PA R55 if necessary until the measured power output reads 2.5 watts.

Forward Power Detector: Using the PMDT set transmitter waveform 1 to:

Normal
2.6 watts
95% modulation
ident continuous

Adjust Mod/PA R80 until the voltage at U33 pin 24 on assembly 120199 reads 3.8 VDC. Read U33 pin 25 for equipment No. 2.

Reverse Power Detector: Load the transmitter with a 25 ohm load (parallel two 50 ohm loads) to simulate a 2:1 VSWR.

Adjust Mod/PA R76 until the voltage at U33 pin 22 on assembly 120199 reads 1.27 VDC. Read U33 pin 23 for equipment No. 2.

Adjust MOD/PA Modulation as follows:

Keying should be continuous.

Use the PIR (Thales/Wilcox model 70/10) or modulation analyzer to measure the modulation percentage. The PIR can be connected directly to the transmitter output through a 30dB attenuator.

CHANGE YOUR INSTRUCTION MANUAL TO CONFORM

Adjust R45 (OM) or R44 (MM) or R37 (IM) until the PIR reads 95% within .5% or less.

Set the transmitter keying to Keyed and check for the proper keying sequence. Use oscilloscope or high impedance headphones at TP1 on the MOD/PA assembly. Check data sheet. Proper ident keying is:

| | |
|---------------|----------------------------------------|
| INNER MARKER | continuous series of dots |
| MIDDLE MARKER | continuous alternating dots and dashes |
| OUTER MARKER | continuous series of dashes |

From the PMDT adjust the transmitter power output to that appropriate for your station.

Repeat the above procedure for transmitter No. 2.

NOTES:

- INTERPRET DRAWING PER DDD-STD-100.
- UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS AND INDUCTANCE VALUES ARE IN MICROHENRIES.
- ASSEMBLY MODULE CONTROL LETTER A ASSEMBLY SYSTEM REFERENCE DESIGNATOR: 20A2, 30A2, 40A2
- CONNECTOR PINS NOT USED: AS SHOWN
- IC CONNECTIONS NOT SHOWN:

| REFERENCE DESIGNATOR | VCC | GND |
|----------------------|-----|-----|
| U5 AND U6 | 24 | 12 |
| U8 AND U11 | 14 | 7 |
| U9 | 20 | 10 |

- HIGHEST REFERENCE DESIGNATORS USED: CR10, C89, G1, HY1, J4, L27, Q2, R81, S2, TP2, U21 AND Y1
- REFERENCE DESIGNATORS NOT USED: NONE
- THE FOLLOWING STATEMENTS ARE USED BY ORCAD TO LINK ALL SHEETS OF THE SCHEMATIC.

- PROGRAMMABLE LOGIC SETTINGS: (CLOSED = DN = LOGIC'0'; OPEN = DFF = LOGIC'1')
- | TYPE | S1-8 | S1-7 | S1-6 | PATTERN |
|--------------|--------|--------|--------|--------------------|
| INNER | CLOSED | CLOSED | CLOSED | CONSECUTIVE DOTS |
| MIDDLE | CLOSED | CLOSED | OPEN | DOT-DASH |
| OUTER | CLOSED | OPEN | OPEN | CONSECUTIVE DASHES |
| BACK-COURSE | CLOSED | OPEN | CLOSED | DOT PAIRS |
| MORSE CODE R | OPEN | CLOSED | OPEN | DOT-DASH-DOT |
| MORSE CODE K | OPEN | CLOSED | CLOSED | DASH-DOT-DASH |
| MORSE CODE P | OPEN | OPEN | OPEN | DOT-DASH-DASH-DOT |
| MORSE CODE X | OPEN | OPEN | CLOSED | DASH-DOT-DOT-DASH |

- TONE FREQUENCY GENERATOR
N = 52 FOR INNER MARKER
N = 120 FOR MIDDLE MARKER
N = 390 FOR OUTER MARKER
- KEY FREQUENCY GENERATOR
N = 375 FOR INNER MARKER
N = 163 FOR MIDDLE MARKER
N = 50 FOR OUTER MARKER

12. TONE FREQUENCY GENERATOR SWITCH SETTINGS:
(CLOSED = DN = LOGIC'0'; OPEN = DFF = LOGIC'1')

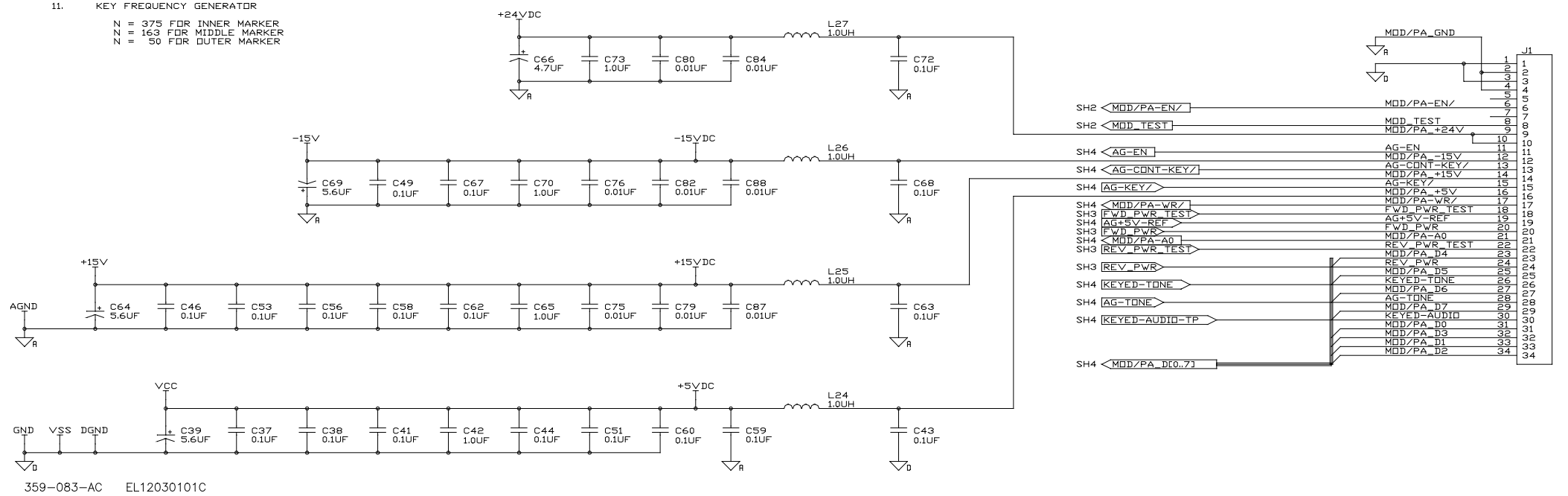
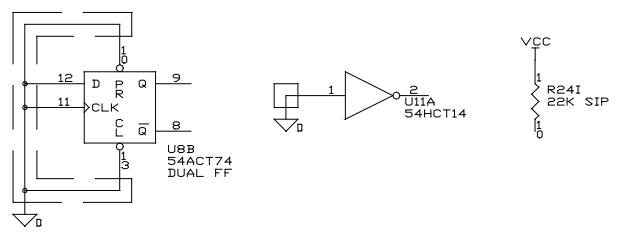
| | INNER MARKER | MIDDLE MARKER | OUTER MARKER |
|------|--------------|---------------|--------------|
| S2-8 | CLOSED | CLOSED | OPEN |
| S2-7 | OPEN | CLOSED | CLOSED |
| S2-6 | OPEN | CLOSED | OPEN |
| S2-5 | CLOSED | CLOSED | OPEN |
| S2-4 | OPEN | OPEN | CLOSED |
| S2-3 | CLOSED | OPEN | CLOSED |
| S2-2 | CLOSED | CLOSED | OPEN |
| S2-1 | CLOSED | CLOSED | OPEN |
| J2 | 5-6 | 3-4 | 1-2 |

13. KEY FREQUENCY GENERATOR SWITCH SETTINGS:
(CLOSED = DN = LOGIC'0'; OPEN = DFF = LOGIC'1')

| | INNER MARKER | MIDDLE MARKER | OUTER MARKER |
|------|--------------|---------------|--------------|
| S1-5 | OPEN | CLOSED | CLOSED |
| S1-4 | OPEN | CLOSED | OPEN |
| S1-3 | CLOSED | CLOSED | OPEN |
| S1-2 | OPEN | OPEN | CLOSED |
| S1-1 | OPEN | CLOSED | CLOSED |

SPARE GATES:

DASHED BOXES INDICATES SIGNAL TRACES WHICH ARE ACCESSIBLE.



359-083-AC EL12030101C

Figure 1. Marker Beacon Modulator/Power Amplifier Assembly 20A2/30A2/40A2, Schematic Diagram (Sheet 1 of 4)

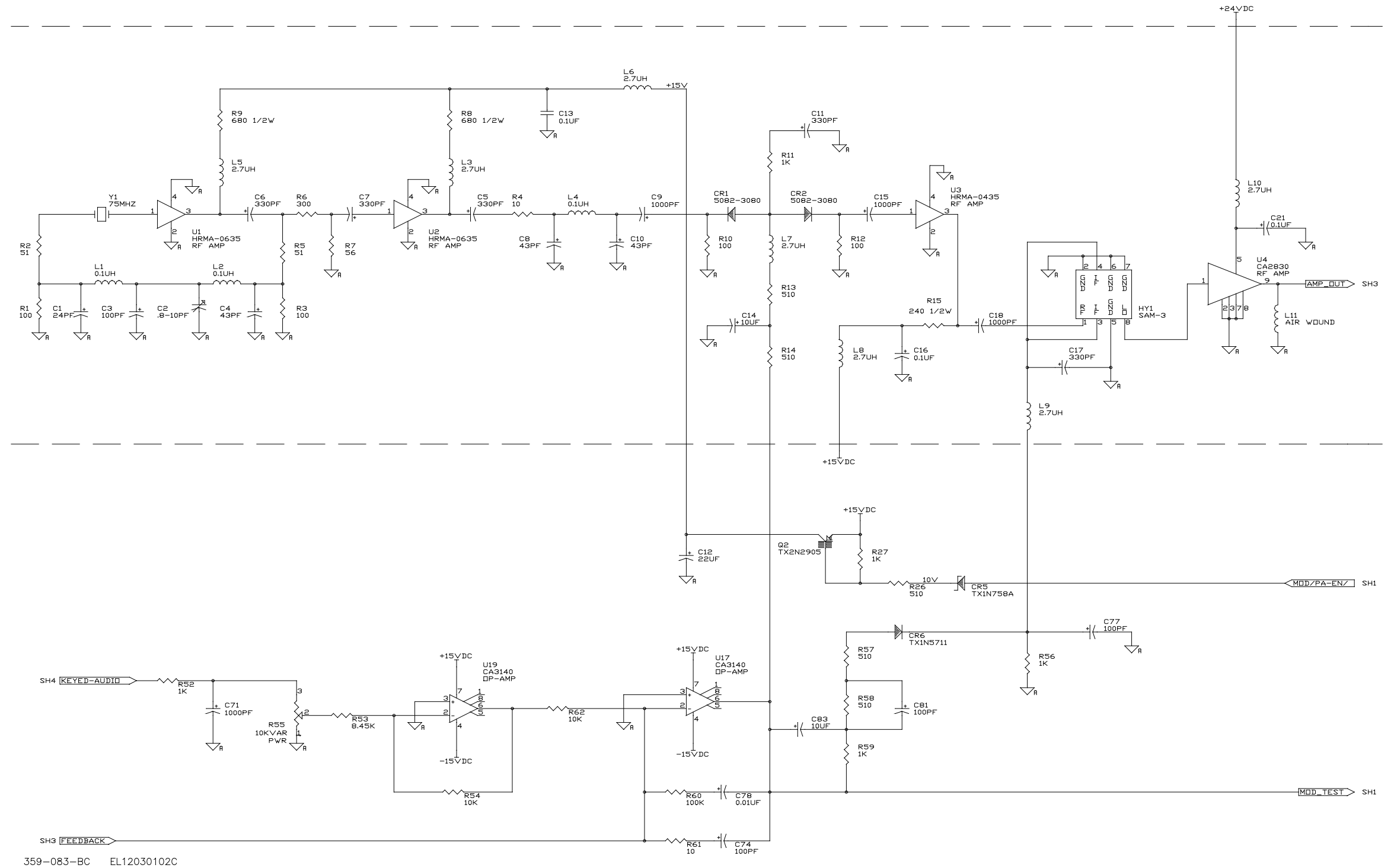


Figure 1. Marker Beacon Modulator/Power Amplifier Assembly 20A2/30A2/40A2, Schematic Diagram (Sheet 2 of 4)

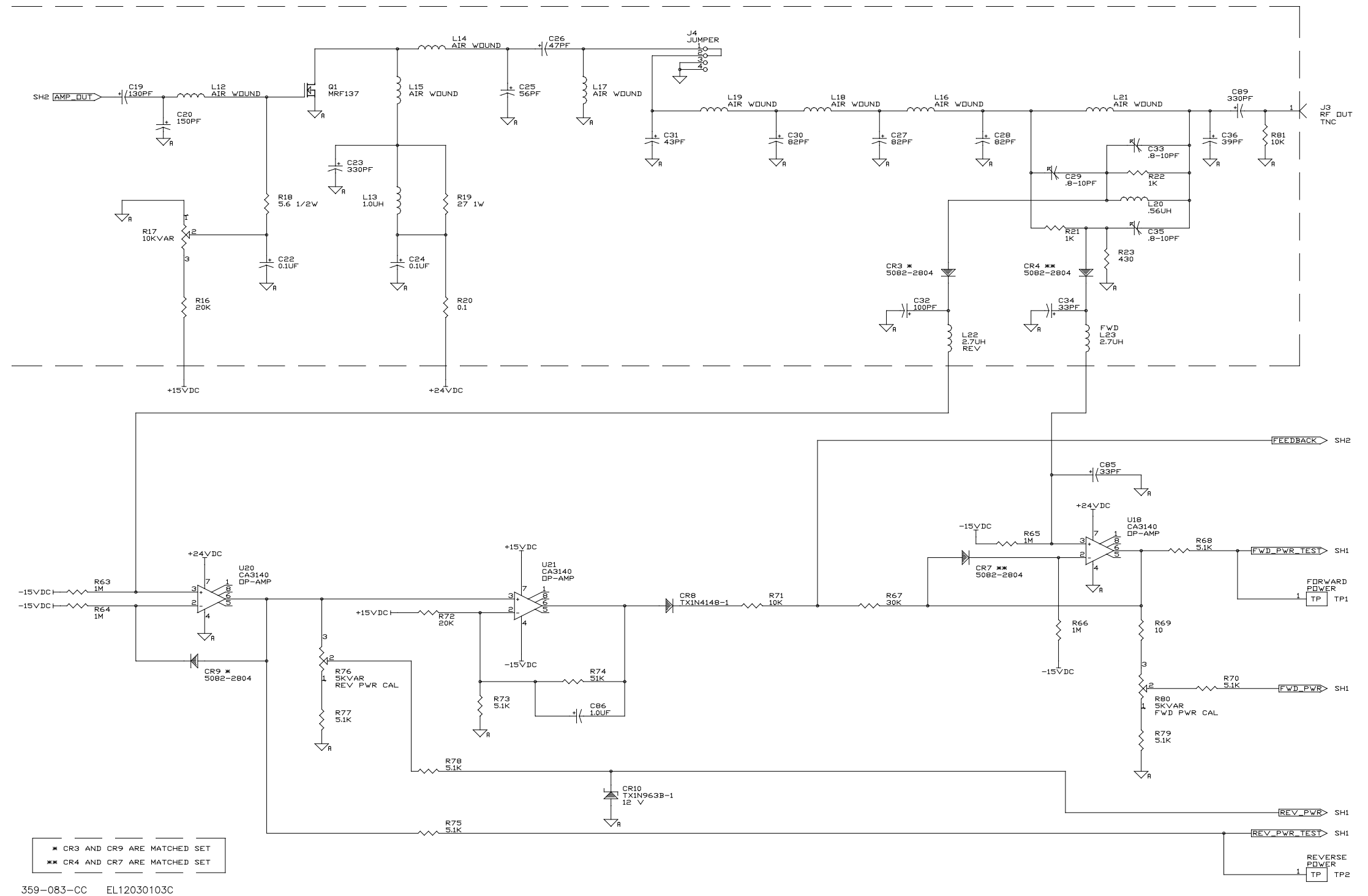
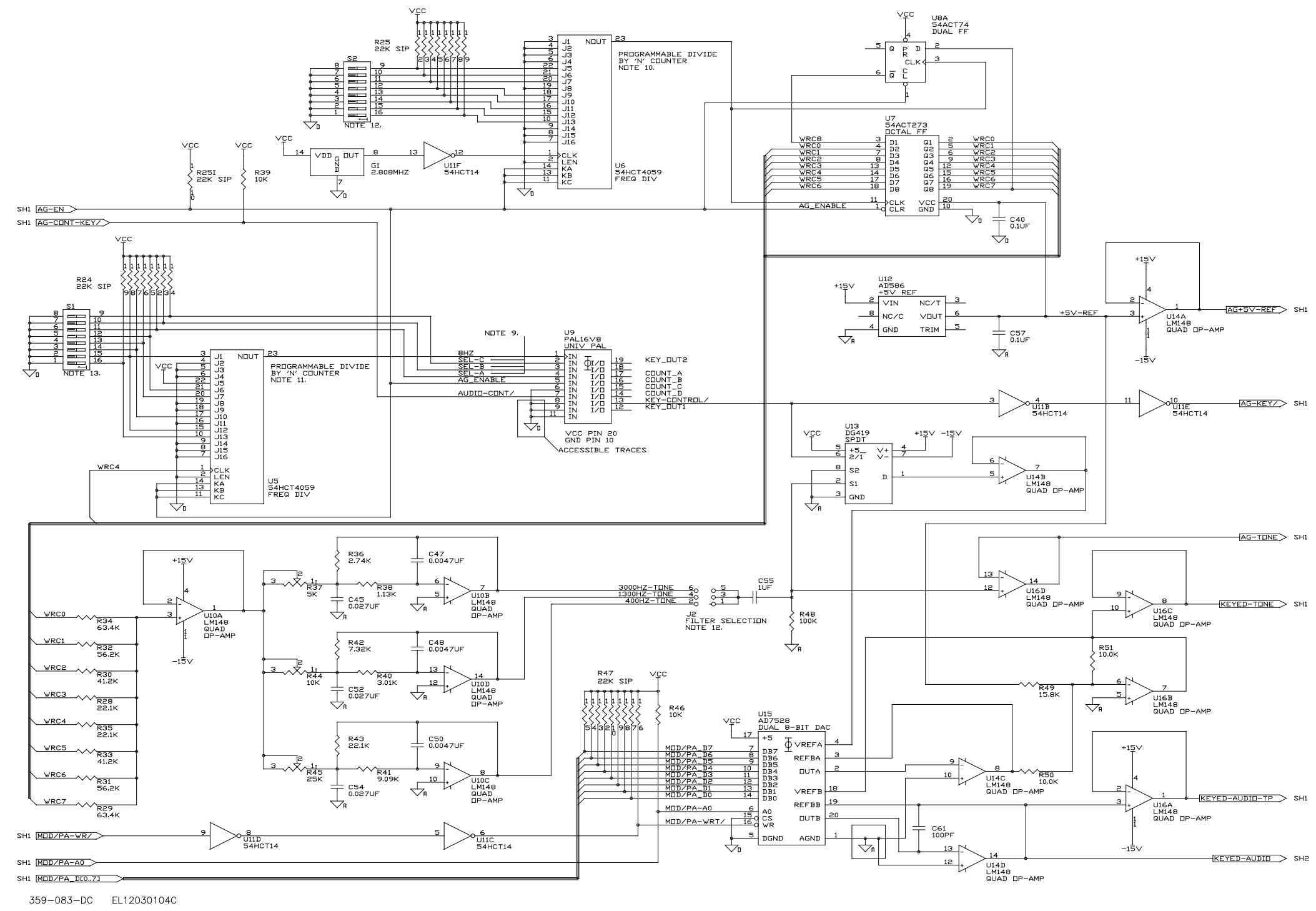


Figure 1. Marker Beacon Modulator/Power Amplifier Assembly 20A2/30A2/40A2, Schematic Diagram (Sheet 3 of 4)



359-083-DC EL12030104C

Figure 1. Marker Beacon Modulator/Power Amplifier Assembly 20A2/30A2/40A2, Schematic Diagram (Sheet 4 of 4)