

THEORY OF OPERATION.

U1-B and U1-D are connected as a flip-flop. If an ID TRIP ground signal is applied after timer U3 completes its cycle, AND gate U1-A sets the flip-flop, which starts the ID cycle. U1-B enables clock U2, which applies clock pulses to counter U4, which in turn provides BCD outputs to drive multiplexers U6 and U5. U6 is enabled until a count of "8", when U7-C enables U5 instead. Each time U6 and U5 are strobed through a complete horizontal scan, counter U8 is advanced one count. BCD decoder/driver U9 then advances to the next row, and the scan continues through U6 and U5 on that row.

Inverter U7-B is connected to the last row used; so it provides a reset pulse after the last useable row is scanned. This pulse resets the flip-flop and timer U3, and U3 starts timing to determine when the next ID will occur.

The multiplexer outputs are routed through OR gate U7-D and inverter U7-A to key audio oscillator U10. Low pass filter R1/C8 filters switching clicks from the CW tone signal. The output tone is applied to the audio mixer on the COR module through a level control on that board. While the ID is running, U1-B applies a positive control voltage through R2 to the ID KEY input on the COR module to key the repeater.

CONSTRUCTION.

There is no special construction sequence. However, following are notes regarding various parts.

- The pc board has plated through holes; so all soldering should be done only on the bottom of the board.
- Be sure to orient IC's, electrolytic capacitors, and diodes as shown.
- Mount voltage regulator U11 with the tab oriented toward the front as shown. Apply a small amount of heatsink compound to front of tab, and screw heatsink to tab as shown, using 4-40 screw, lockwasher, and nut.
- Cut terminal pins from carrier strip, and press them into holes E1-E5 carefully until they snap in place. Then solder on rear.
- Pots may be identified with a coded value, such as "23" and some letter for a 2K pot.

PROGRAMMING.

Note that the matrix consists of 10 rows and 16 columns. The first two bits are not used; so there are a total of 158 available bits. Diodes are soldered in place for each bit as shown on the parts location drawing. "DE" is shown as an example. You may wish to do a matrix layout on paper first to avoid errors. When the first row is used, start the second row as if there was one long row of 158 bits. (There is no pause between rows; only one continuous scan through the matrix.) Following are guidelines.

- Normally, start with "DE." The two blank bits provided at the beginning allow for repeater key up before ID begins. For a longer pause, more blank spaces can be left at the beginning.
- Be sure to install diodes with correct polarity (as shown). Solder on bottom of board only. Be careful to avoid bridges and cold solder joints.
- Use 3 bits for a dah, one bit for a dit, one blank space between dits and dahs, 3 blanks between characters, and 5 blanks between words.
- A total of 70 diodes are provided with the unit, which should be ample for most call signs. If you need more, additional 1N4148, 1N914, or similar silicon switching diodes can be used.
- To save space on the board, vertical pads for the last row of diodes was omitted. In the unlikely event that the last row is used, the anodes of these diodes can share the vertical column pads with the row of diodes above.
- To reset the flip-flop immediately after the ID is completed, solder a jumper wire, as shown in the pictorial, from the pad above U7 to the closest (right hand) pad on the last horizontal row on which diodes were connected. Thus, after the last row used is

scanned, a reset pulse will be generated. If you want a delay before the carrier drops, the reset jumper can be connected to the last row, regardless of the fact that diodes may not be installed in the last few rows. Note that the jumper must be connected to one of the rows; otherwise the ID will repeat continuously.

ALIGNMENT.

- Connect unit to +12 Vdc, and connect to COR or merely activate by grounding ID TRIP input when needed. ID starts running when receiver squelch opens the first time after timer U3 runs out.
- Listen to ID output through repeater or through an audio amplifier or headphones connected to E5.
- Jumper +5V to arm of TIME ADJ pot R6 to simulate timer trip. Then, ground ID TRIP input or open receiver squelch to make ID scan. Note that reset jumper wire can be lifted on one end temporarily to allow ID to repeat continuously for testing.
- Adjust R9 TONE ADJ pot and ID level pot on COR board for desired tone and audio level. Adjust SPEED pot R4 for desired CW speed.
- With reset jumper connected again, adjust TIME pot R6 for desired ID repeat time. Normal adjustment range is about 2 to 9 minutes. The value of R7 can be changed to allow for other lengths of time.

TROUBLESHOOTING.

Troubleshooting is fairly simple due to common use of TTL levels. Most problems probably result from poor solder joints or parts incorrectly installed. Be sure to allow plenty of air circulation around voltage regulator heatsink. Note that time constants for the 555's are controlled by the pots and the electrolytic capacitors on pin 6. Capacitors supplied are stable at room temperature; however, you may wish to use mylar or tantalum capacitors instead if unit will be subjected to very wide temperature range.