HAMTRONICS® CWID MODULE: ASSEMBLY, INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS

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 code 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 components.

a. The pc board has plated-through holes; so all soldering should be done only on the bottom of the board.

b. Orient IC's and diodes with polarity as shown.

c. Capacitors C1 and C3-C8 now are rectangular, non-polarized capacitors, not round ones as shown on the component location diagram.

d. Mount voltage regulator U11 with the tab oriented toward the front as shown. Apply a small amount of heat-sink compound to front of tab, and screw heatsink to tab as shown, using 4-40 screw, lockwasher, and nut.

e. Cut terminal pins from carrier strip, and press them into holes E1-E5 carefully until they snap in place. Then, solder on bottom of board.

f. Pots may be identified with a coded value, such as "502" for 5K pot or "105" for 1 meg 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 wrapped around 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.

a. Normally, start with "DE". The two blank bits provided at the beginning (where there are no holes) allow for repeater key up before ID begins. For a longer pause, more blank spaces can be left at the beginning. In addition, if you are using the COR-3 module with courtesy beep, start programming with the second row, allowing the time taken to scan the blank first row to delay the ID while the courtesy beep takes place.

b. 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.

c. 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.

d. A total of 70 diodes are provided with the unit, which should be ample for most call signs. If you need more, additional 1N4148 or 1N914, or similar silicon switching diodes can be used.

e. 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 those diodes can share the vertical column pads with the row of diodes above.

f. It may seem like a neat idea to program the name of your city or other information after the call letters. However, consider using as short an ID as you legally can in order to avoid listening to a lot of extraneous cw every ten minutes for the life of the repeater.

g. Since it may be difficult to unsolder diodes from the plated-through holes if you need to remove one or more to make changes, you may simply clip the looped lead at the top of the diode, allowing you to tack solder it back together again if you make further changes. If you make an error in programming, consider doing just that and filling in the blank with diodes where you need to add. It makes correcting the error a lot easier.

h. 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 are 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.

a. Connect unit to +12Vdc, and connect to COR board or merely activate by grounding ID TRIP input when needed. ID starts running when receiver squelch closes the first time after timer U3 runs through its cycle.

b. Listen to ID output through repeater or through an audio amplifier or headphones connected to E5.

c. Momentarily jumper +5Vdc to arm of TIME ADJ pot R6 to simulate timer trip. Momentarily ground ID TRIP input or open and close 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.

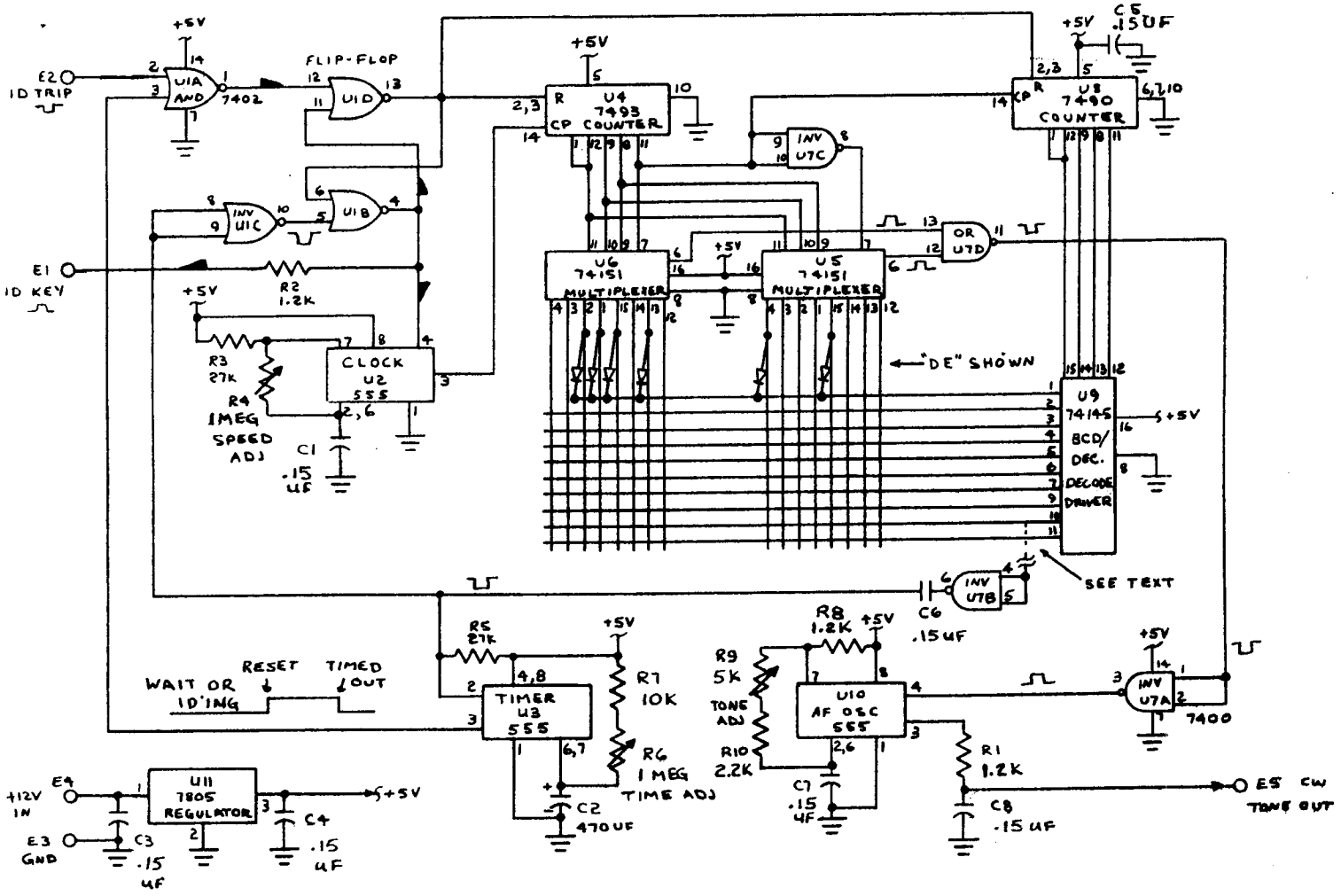
d. Adjust R9 TONE ADJ pot and ID level pot on COR board for desired tone and audio level. Adjust SPEED pot R4 for desired CW speed.

e. With reset jumper connected again, adjust TIME pot R6 for desired ID repeat time. Normal adjustment range is about 2 to 9 minutes. Note that timer period may change after the capacitor has been charged and discharged repeatedly during initial break-in period. Also note that you may be able to set R6 to a high enough setting such that the timer never completes its cycle. Being a very high resistance circuit, the varying amounts of leakage resistance from one capacitor to the next makes it necessary to have a wide adjustment range. If you try to set the timer to a length greater than 9 or 10 minutes, the capacitor may never charge up to a great enough voltage to complete the timer cycle.

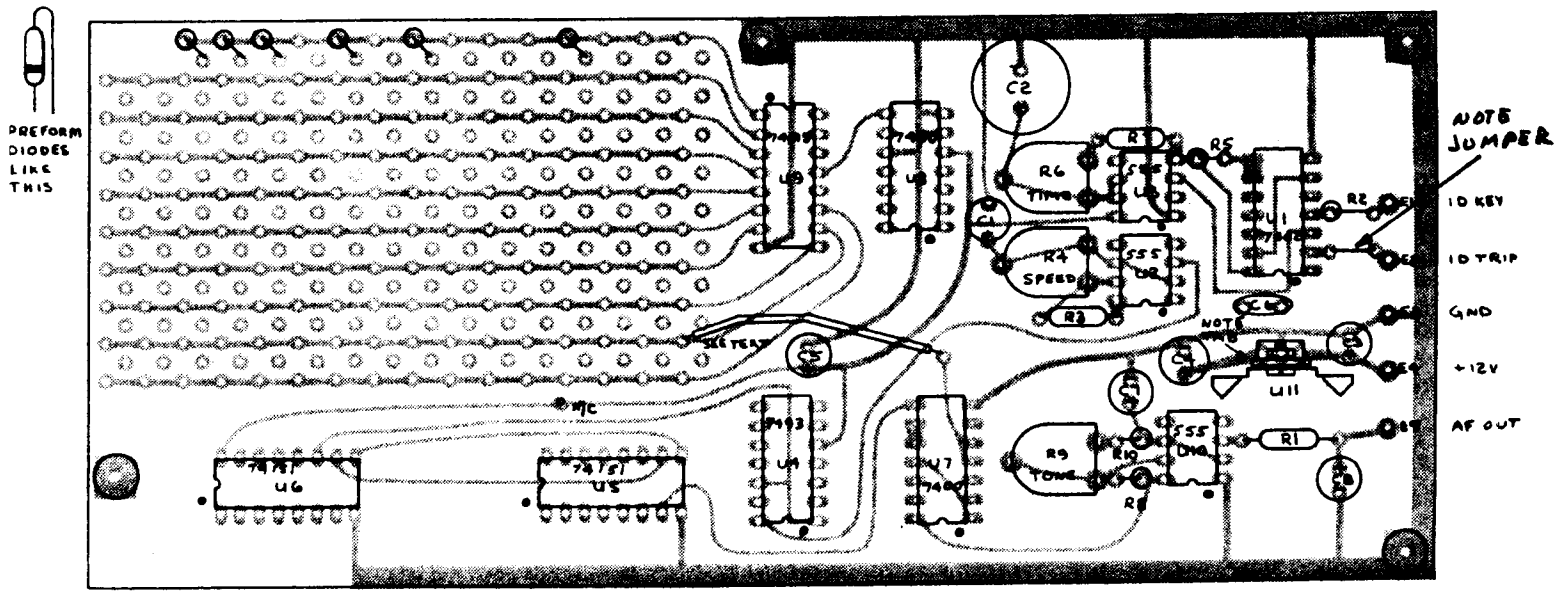
TROUBLESHOOTING.

Troubleshooting is fairly simple due to common use of TTL levels. Most problems probably result from poor solder joints or parts incorrectly installed. Note that the electrolytic capacitor supplied for the timer is stable at room temperature, but you may wish to change to a tantalum capacitor instead if the unit will be used in wide temperature range environment.

If erratic code is generated, for example, tone where a blank should be, especially if the condition repeats at the same place on each row, look for a shorted or backwards diode in that position on one of the rows.



Note: Capacitors C1, C3-C8 now are rectangular and non-polarized.



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PARTS LIST, CWID ID MODULE.

Ref Desig	Value (marking)
C1	.15 uf monolithic ceramic (red)
C2	470 uf electrolytic cap
C3-C8	.15 uf monolithic ceramic (red)
E1-E5	Solder terminals
R1-R2	1.2K
R3	27K
R4	1 meg pot
R5	27K
R6	1 meg pot
R7	10K
R8	1.2K
R9	5K pot
R10	2.2K
U1	7402
U2-U3	555 Timer
U4	7493
U5-U6	74151
U7	7400
U8	7490
U9	74145
U10	555 Timer
U11	7805 Regulator

Note: Be sure to install jumper next to terminal E2.