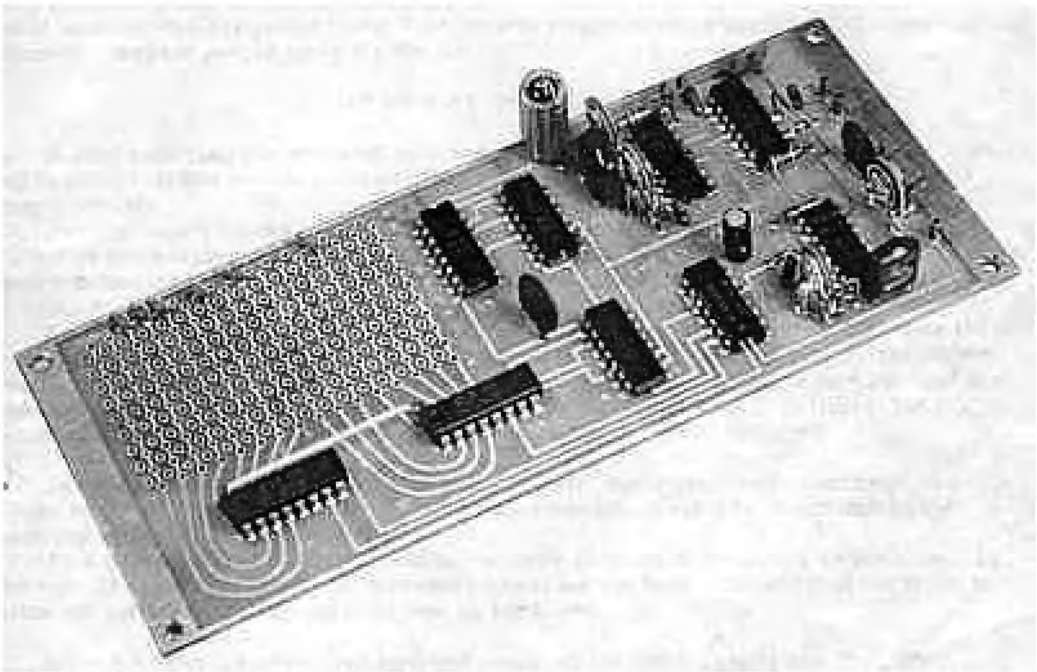
5011002

# CW··ID

MANUAL - $1.00

(Kit 7010260)
(Wired 7010261)





Vhf engineering

DIVISION OF BROWNIAN ELECTRONICS CORP.

320 WATER ST. • PO BOX 1921 • BINGHAMTON, NY 13902 • 607-723-9574

LIMITED WARRANTY

Factory wired units are warranted for one year. The unit must be returned to the factory postpaid with a note describing difficulty and date of purchase, include a check to cover return postage. Our liability under warranty is limited to repair, adjustment or replacement of units proven to be defective. No further warranty is expressed or implied. Units modified or obviously misused will not be covered by the warranty.

The parts in kits built according to our instructions carry the original manufacturers' warranty. Defective parts must be returned for credit. Units built from kits may be returned to the factory for repair and alignment for a nominal charge, plus parts and shipping.

Thank you for purchasing this VHF Engineering kit. We hope you will get as much pleasure and satisfaction out of building and using this unit as we have from designing it for you. Please read all of the enclosed material carefully. Unlike kits which are produced for the general public, this kit was designed for the ham who has some home-brew experience and technical knowledge. If you encounter problems in alignment or testing, don't hesitate to obtain assistance from a competent fellow ham near you or here at VHF Engineering.

Bob Brown Wil Kupfrian Marvin Druskoff

| Bob Brown | Will Kupfrian | Marvin Druskoff |
|---|---|---|
| W2EDN | W2BVA | K2VIV |

The construction techniques and procedures in this manual are very important to the proper and easy building of VHF Engineering kits. If your previous experience has been with unminiaturized equipment the following information should prove invaluable. To build miniaturized equipment using P.C. boards requires extra patience and care, normal dexterity, and the proper tools for the job.

## GENERAL NOTES

A. A good soldering job is essential to the satisfactory performance of this unit. Soldering to etched circuit boards is easier than conventional point to point wiring when it is done correctly.

Use rosin core solder only (1/16" or smaller is easiest to work with). Acid core solder or paste fluxes will cause corrosion and void all warranties. Use a clean, freshly tinned soldering iron of about 30-35 watts. (A controlled temperature type is preferred). A small tip will greatly reduce bridging and similar problems.

When soldering a part to the P.C. board, the solder must completely surround the wire lead where it comes through the board. Do not apply excessive solder, but do not hesitate to apply sufficient heat to assure a smooth flow of solder all around the lead and onto the board. Do not worry about overheating semiconductors. It is likely that P.C. board lands will be lifted long before a semiconductor device is damaged.

B. Leads on resistors, capacitors, transistors etc. are often longer than required. These leads should be trimmed as short as possible unless specific directions to the contrary are given in the instructions.

As a general rule all parts should be mounted as close to the board as possible. In the case of capacitors it may be necessary to scrape the body coating off of the leads to allow the bottom of the capacitor to rest on the board.

C. Inspect your work after each step and check off the steps as they are completed. You will find it helpful to check off capacitors, resistors, etc. on the parts list as they are installed. This will save you time and mistakes.

D. Check and double check the direction in which polarized components should be installed. In particular, take great care when inserting transistors, I.C.'s, electrolytic and tantalum capacitors etc. Remember the old carpenters rule "Measure twice and cut once".

# PARTS IDENTIFICATION

In order to expedite delivery to you, we are occasionally forced to make minor substitutions of parts. For example; 4.7 MFD for 5 MFD; .022 MFD for .02 MFD. Such substitutions are carefully checked before they are approved and the parts supplied will function satisfactorily. These changes are usually self-evident and are mentioned here only to prevent confusion in checking the contents of your kit.

Each manufacturer seems to have his own method of marking for similar parts. In order to eliminate confusion about reading values marked on components, the following examples are presented.

DISC CERAMIC CAPACITORS - value and a tolerance letter printed on body. For example: 2.2C=2.2PF ± 1/4pf; 5D=5pf ± 1/2pf; 12J=12pf ± 5%; 680K=680pf ± 10%; 1000p=.001 Mfd; 104p=10000pf= .1 Mfd. Please note that the letters on capacitors do NOT denote a multiplier, they indicate tolerance only.

SILVER MICA (SM) CAPACITORS - value and tolerance are coded on the body of the device. For example: 220J03=22pf ± 5%; 330J03=33pf ± 5%; 221J03=220pf±5%; 331J03=330pf ±5%. Actual value may also be printed on the body. This should be self-evident.

ELECTROLYTIC AND TANTALUM CAPACITORS - the value is printed on the body of the device. There are several shapes and sizes the only odd one which we use is a tantalum which is shaped like a drop of water. BE SURE THAT YOU OBSERVE POLARITY MARKINGS.

RESISTORS - are color coded. Be very careful, when reading codes, not to confuse red and orange, brown and orange, violet and grey etc. When in doubt, check values with an ohmeter.

R.F. CHOKES - read color code as follows:

1. Start reading from wide silver band.
2. The next group of bands indicate significant figures.
3. When a gold band appears in the significant figure grouping it should be read as a decimal point.
4. Last band indicates tolerance: gold=5% silver=10% None=20%

Examples:
wide silver/ gold/ orange/ orange = .33 uhy20%
wide silver/ brown/ black/ black/ gold = 10 uhy 5%
wide silver/ blue/ grey/ brown/ gold = 680 uhy 5%
wide silver/ yellow/ gold/ purple/ silver = 4.7 uhy 10%

COIL WINDING: Follow our coil data exactly as given in the main part of this manual. When counting turns, be very careful to start with the first complete turn and not the second. For example: when a 3 1/2 turn coil is completed if you look at one side of the coil you will count 3 turns and looking at the other side you will count 4. Be very careful to wind all coils in the same direction.

## THEORY OF OPERATION

IC U1B and U1D are connected as a set-reset control flip-flop. A ground applied to the COR input, after the adjustable timer U-3 has completed a cycle, will cause the control flip flop to set pin 13 to low and reset U4 and U8 to zero. Pin 4 of U16 goes high and starts the clock (U2). The high output on pin 4 of U1B is also applied to the PTT output through a current limiting resistor. This output is used to key the transmitter. A power switching transistor may be used if necessary to interface the PTT output to a keying relay. The setting of R4 controls the code speed.

U4 and U8 are connected as a 160 bit counter driven by the clock. The output of U4 is decoded by U5 and U6 to select 1 of 16 columns. U7C and U7D combine the two 1 of 8 selects to a 1 of 16 select. The output of U8 is decoded by U9 to provide a ground for the selected row. When viewed from the component side, the matrix is scanned from left to right and top to bottom. Installing C7 in option A will reset the I.D. after all 160 bits are scanned. Installing C7 in option B will reset the I.D. after approximately 10 blank bits are scanned. This option is used when less than 70% of the matrix is needed.

A diode connected between the selected column and row will cause a high output from U7B producing a tone corresponding to a dit. Three consecutive diodes will produce a longer tone corresponding to a dah.

## CONSTRUCTION

1. Install the I.C.'s as shown on the printed parts layout. Pin 1 is indicated by a small dot on the layout. Each IC is marked for positioning by either a notch in the end as shown, or a deep indentation in the top of the IC.

2. Install variable pots R4, R6, R9 and R11.

3. Remove C-7 a .01 disc from the parts packet and set it aside to be installed during MATRIX PROGRAMMING.

4. Install the remainder of the resistors and capacitors as shown. Be sure to observe proper polarity for C4 and C5.

5. Install D1 and D2. The body MUST be placed as shown on the parts layout. The color band (cathode) MUST be down.

## MATRIX PROGRAMMING

Referring to the "C.W. Identifier Program Schedule" note that rows are lettered from A-J and columns are numbered from 1-16. Each square (1 bit) represents a diode position on the P.C. board.

Lay out the program which you require in the blank program schedule provided following the rules as shown. If you wish the I.D. to pause after keying, i.e., begin the I.D. sequence at a later time, you may skip up to 9 spaces in the program before the first diode position is reached.

Install the diodes in the matrix using a small soldering iron (35 watts maximum).

Be extremely careful to avoid solder bridges and cold solder joints. The bodies of the diodes in the matrix MUST be positioned as shown in the printed parts layout. The color band (indicating cathode) MUST be down.

### C7 Installation

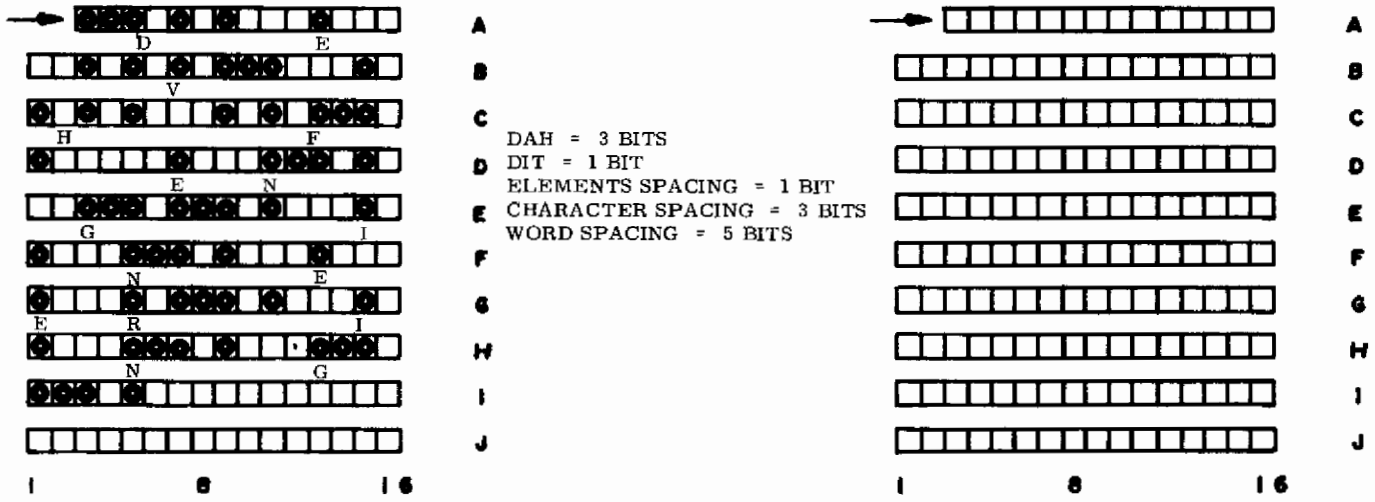
OPTION A: The matrix is scanned from left to right and top to bottom. When C7 is installed in the option A position, a negative pulse is produced after the last bit in the matrix which resets the adjustable timer and control flip-flop.

OPTION B: When less than 70% of the matrix is used, C7 should be installed in position B. This produces a negative (reset) pulse when approximately 10 bits are scanned following the final code character.

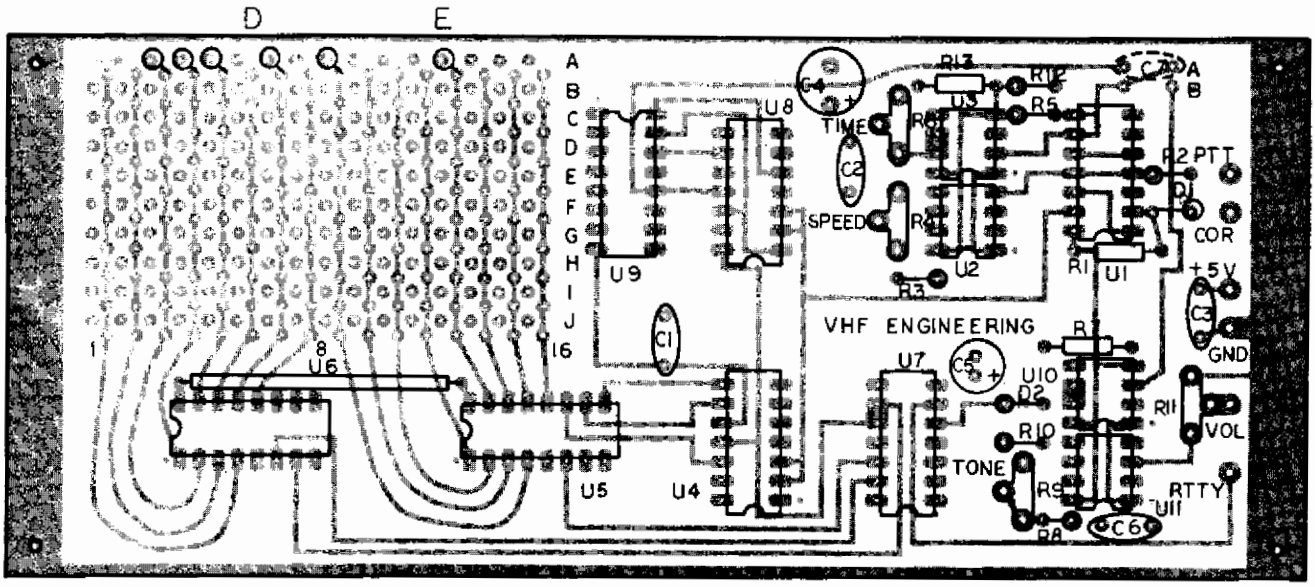
## TESTING

1. Connect +5 volts and ground to a regulated 5V source.
2. Connect output (vol) to an audio amplifier or head phones.
3. Ground COR
4. Jump 5V to arm of R-6 to trip adjustable timer.
5. Adjust R-9 and R11 for best sounding tone.
6. Adjust R-4 for desired speed.
7. Adjust R-6 for required time. For times longer than 5 minutes, C-4 will have to be increased. Be sure to use a tantalum capacitor with a voltage rating of at least 6 volts.

C. W. IDENTIFIER PROGRAM SCHEDULE



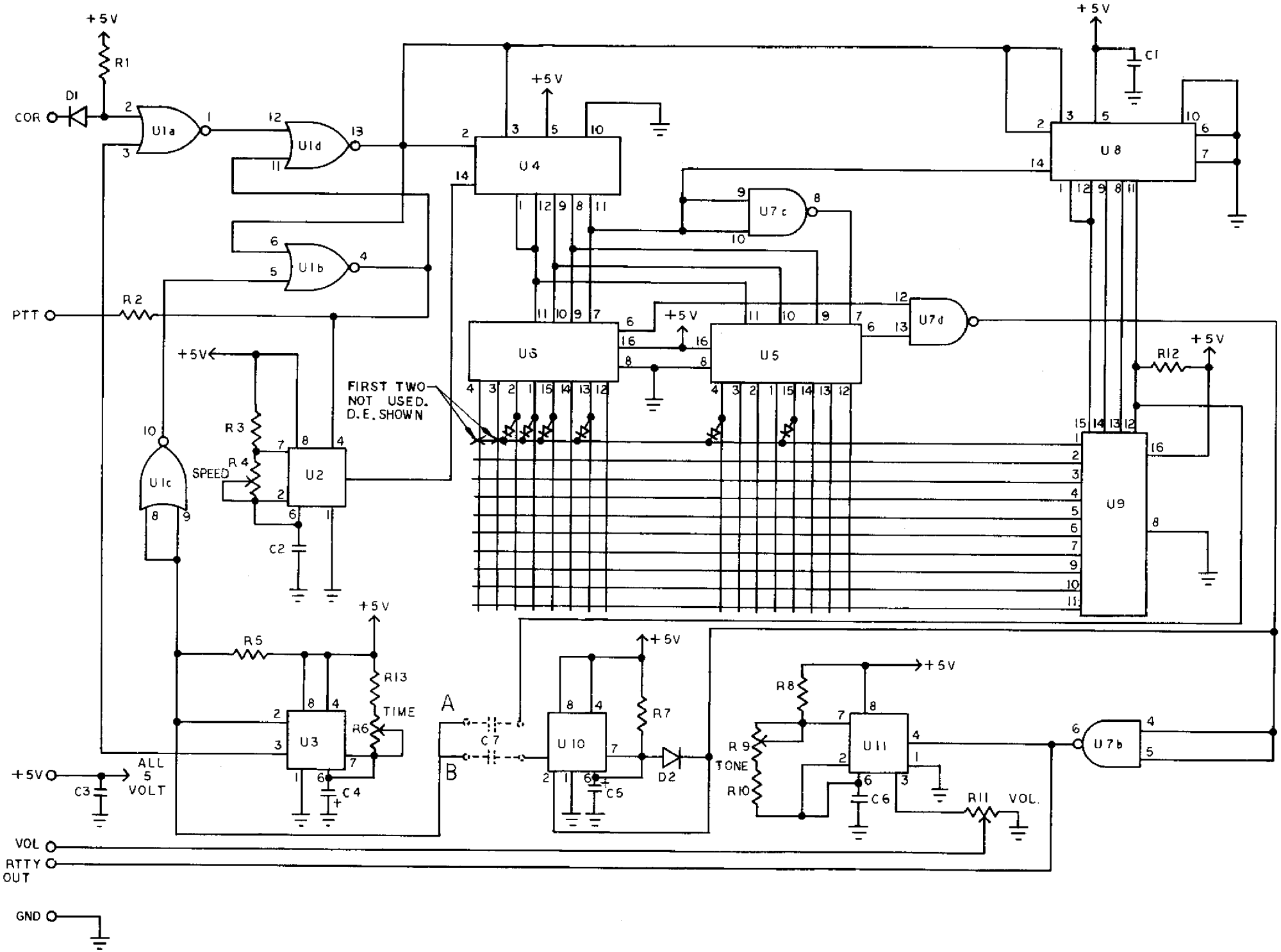
PRE-FORM ALL DIODE LEADS AS SHOWN.




## PARTS LIST

(Kit 7010260)
(Wired 7010261)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| R1 | 4.7K | (2020290) | C1 | .1 cer | (2010440) | U1 | 7402 | (1040020) |
| R2 | 1K | (2020231) | C2 | .1 mylar | (2010450) | U2 | NE555 | (1050150) |
| R3 | 4.7K | (2020290) | C3 | .1 cer | (2010440) | U3 | NE555 | (1050150) |
| R4 | 1 Meg Pot | (2020570) | C4 | 150MFD Tant. | (2010560) | U4 | 7493 | (1040090) |
| R5 | 33K | (2020380) | C5 | 4.7MFD Elec. | (2010490) | U5 | 74151 | (1040110) |
| R6 | 1 Meg Pot | (2020570) | C6 | .1 mylar | (2010450) | U6 | 74151 | (1040110) |
| R7 | 220K | (2020430) | C7 | .01 cer | (2010410) | U7 | 7400 | (1040010) |
| R8 | 2.2K | (2020260) | | | | U8 | 7490 | (1040070) |
| R9 | 5K Pot | (2020520) | D1 | 1N4148 | (1010049) | U9 | 74145 | (1040100) |
| R10 | 1K | (2020231) | D2 | 1N4148 | (1010049) | U10 | NE555 | (1050150) |
| R11 | 5K Pot | (2020520) | | | | U11 | NE555 | (1050150) |
| R12 | 4.7K | (2020290) | 1 | Manual | (5011002) | | | |
| R13 | 1 Meg | (2020470) | | | | | | |
| | | | 1 | PC Board | (4040160) | | | |


+5V
R1
D1
COR
U1a
U1d
U1b
U1c
R2
PTT
+5V
R3
R4
SPEED
U2
C2
FIRST TWO
NOT USED.
D.E. SHOWN
U4
U7c
U8
C1
U6
U5
U7d
R12
U9
R5
R13
TIME
R6
U3
C4
C3
ALL
5
VOLT
A
B
C7
U10
R7
D2
C5
R8
R9
TONE
R10
U11
C6
R11
VOL.
U7b
VOL
RTTY
OUT
GND

## SPECIAL APPLICATIONS

When used in the VHF Engineering Repeater, the CWID can be wired to cause the repeater to ID at a constant interval. Make the following changes:

1. Remove the violet wire from the COR pin.

2. Solder a wire from the COR terminal to ground.

3. Remove grey wire from the PTT terminal.

On the COR board:

1. Remove the grey wire from the ID PTT terminal.

2. Wire the ID PTT terminal to ground.

Finally, connect a wire from the PTT terminal on the CWID board to the terminal on COR board connecting to the base of Q5, the relay switching transistor (this terminal should have a brown wire leading to the hot side of the simplex-repeat switch. Leave this wire intact).