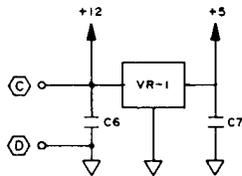
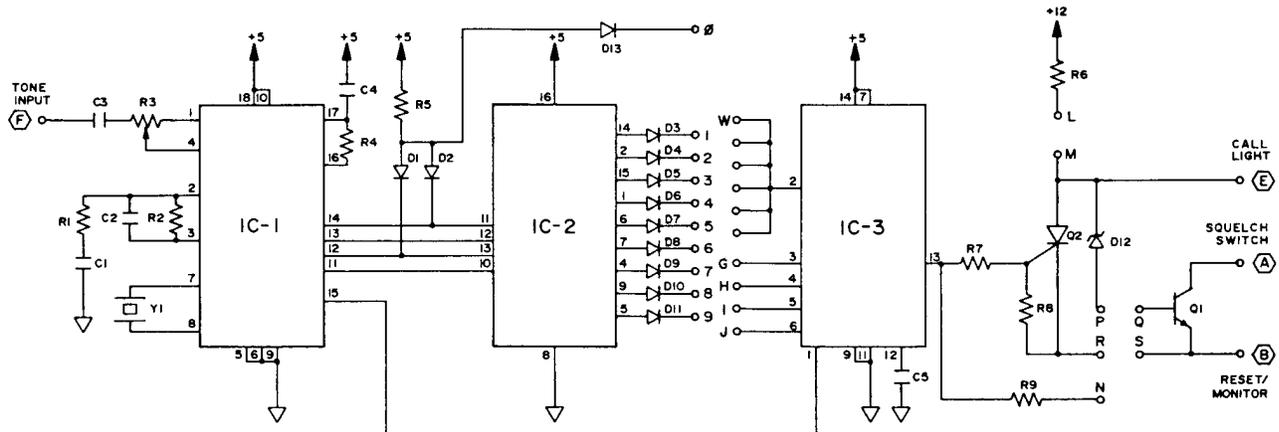


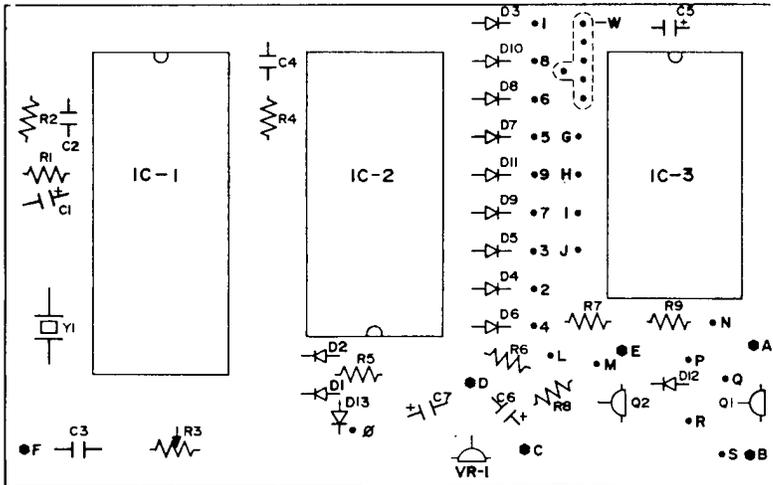
# DTD-1 INSTRUCTION SHEET

Communications Specialists, Inc.  
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## MODEL DTD-1 D.T.M.F. DECODER

### PARTS LIST DTD-1



R1,7	06-4728	4.7K	Resistor carbon film 1/8 W	.22 ea.
R3	18-1040	100K	Potentiometer Mepco	1.39 ea.
R2	06-1548	150K	Resistor carbon film 1/8 W	.22 ea.
R4	06-3948	390K	Resistor carbon film 1/8 W	.22 ea.
R5	06-1048	100K	Resistor carbon film 1/8 W	.22 ea.
R6	06-4328	4.3K	Resistor carbon film 1/8 W	.22 ea.
R8	06-1038	10K	Resistor carbon film 1/8 W	.22 ea.
R9	06-2228	2.2K	Resistor carbon film 1/8 W	.22 ea.
C1	19-1051	1µF	Cap. Tantalum 10%	.27 ea.
C2	21-4710	470PF	Cap. mono. ceramic 10%	1.00 ea.
C3,4	21-1040	.1µF	Cap. mono. ceramic 10%	2.00 ea.
C5,6,7	19-1051	1µF	Cap. Tantalum 10%	.27 ea.
Q1	48-4401	2N4401	Transistor SI NPN	.20 ea.
Q2	48-5060	2N5060	SCR	.79 ea.
VR1	48-3635	78L05AWC	Reg. voltage 5V 10%	.87 ea.
D1-11,13	48-4148	1N4148	Diode SI	.15 ea.
D12	48-5231	1N5231B	Diode zener 5.1V 10%	.20 ea.
IC-1	51-8870	8870	Decoder DTMF Mitel	32.00 ea.
IC-2	51-4028	4028	Decoder BCD to Dec.	1.44 ea.
IC-3	51-0108	IC108	IC custom	4.65 ea.
Y1	48-0358	3.58 MHz	Crystal color burst	3.75 ea.
1 ea.	09-8514	14 pin	Socket IC	.69 ea.
1 ea.	09-8516	16 pin	Socket IC	.69 ea.
1 ea.	09-8518	18 pin	Socket IC	.69 ea.
6 ea.	05-1007	R50-1	Pin ETP bead	.01 ea.
1 ea.	84-1035	DTD-1	P.C.B.	5.01 ea.
1 ea.	30-7042	1.5" #26	Wire PVC Brown	.05 ea.
1 ea.	30-7043	1.5" #26	Wire PVC Red	.05 ea.
1 ea.	30-7044	1.5" #26	Wire PVC Orange	.05 ea.
1 ea.	30-7045	1.5" #26	Wire PVC Yellow	.05 ea.
1 ea.	30-7046	1.5" #26	Wire PVC Green	.05 ea.
1 ea.	30-7047	1.5" #26	Wire PVC Blue	.05 ea.
1 ea.	30-7048	1.5" #26	Wire PVC Violet	.05 ea.
1 ea.	30-7049	1.5" #26	Wire PVC Gray	.05 ea.
1 ea.	30-7050	1.5" #26	Wire PVC White	.05 ea.
1 ea.	30-7051	1.75" #26	Wire PVC Black	.05 ea.
2 ea.	75-1002	Double sided	Tape square	.05 ea.

## DTD-1 INSTRUCTION SHEET

### DESCRIPTION:

The DTD-1 is a single function DTMF decoder which can be programmed using jumpers, for any of 5040 4 digit codes.

The control output (Pin "A") is an open collector transistor that may be configured (by means of jumpers) to provide the following: a momentary low output; a latched low output; and a latched high output. There is a separate SCR latched low output. The momentary "low" and the SCR "low" can be operated at the same time.

### MOUNTING/INSTALLING:

Use the double-sided foam tape squares (supplied) to mount the board.

**NOTE: The use of epoxy, silicone rubber, or any glue-like substance will void the warranty on this product.**

Use the six plug-on wires provided to install the DTD-1 in a radio.

**NOTE: It is not recommended that the plug-on wires be soldered directly to the DTD-1 circuit board.**

WIRE COLOR	DIGIT NUMBER
BLACK	0, *
BROWN	1
RED	2
RED	2
ORANGE	3
YELLOW	4
GREEN	5
BLUE	6
VIOLET	7
GRAY	8
WHITE	9

### FOR EXAMPLE:

To program the code "4,5,9,8"; jumper digit 4 (YELLOW) to pad G, digit 5 (GREEN) to pad H, digit 9 (WHITE) to pad I, digit 8 (GRAY) to pad J.

Connect the remaining wires (0, 1, 2, 3, 6, 7) to the 6 W pads.

### POWER CONNECTIONS:

Connect a positive 7-16 V.D.C. source to the "C" terminal, and the supply return or ground to the "D" terminal. If the DTD-1 is to be operated from a positive ground power supply, the above connections must be reversed ("C" to ground and "D" to negative supply).

**NOTE: The control output polarity connections must also be reversed when a positive ground is used.**

### AUDIO INPUT:

Connect the audio input to any source in the radio that will provide a level of 3mV to 3V RMS composite tone.

The DTD-1 level pot should be adjusted for approximately .5V RMS at pin 3 of IC-1. The audio source level should not depend on the volume control setting.

### HORN SWITCH:

To sound a horn, the control output is configured for a momentary low (see jumper diagram). The low end of the horn relay is connected to the collector of Q1.

Follow these precautions for the protection of Q1:

- 1) Never switch more than 100 mA.
- 2) When using relays always install a power diode across the coil (cathode to +V).

### CALL LIGHT:

When the DTD-1 decodes a valid four digit code, output pin "E" is latched low (provided that pin "B" is at ground and the proper jumpers are installed). A 12V low current lamp can be connected between +V and pin "E" for use as a call light. To avoid damage to the 2N5060 SCR, the maximum lamp current should be no greater than 200 mA. A relay or power transistor may be used to switch higher currents. Always use a protection diode across the relay coil.

### SQUELCH OUTPUT:

The control output transistor Q1 can be paralleled with the squelch switch in a radio to enable the squelch circuit on decode.

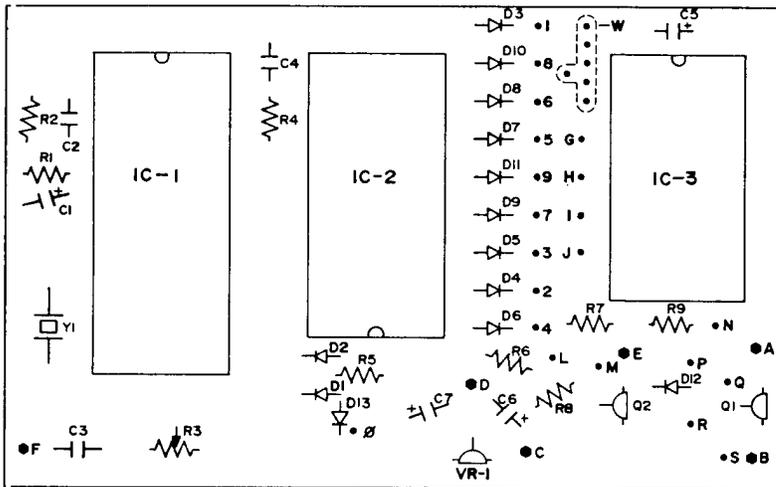
The control output should be jumpered to go high or low as required (see "CONFIGURING THE OUTPUT"). The squelch output is taken from pin "A" while pin "B" is held at ground.

### RESET/MONITOR:

When pin "B" is not at ground, the radio will be in monitor. Q1 will go high and enable the squelch circuit.

If the cathode of the 2N5060 SCR is jumpered to pin "B," the call light circuit will be reset and the call light will turn off.

The monitor/reset pin can be connected to a microphone hanger which returns to ground through the microphone. Each time the microphone is removed from the hanger, the squelch circuit will be enabled and the call light will switch off.



**Figure 1**

The following instructions refer to the board layout Figure 1:

### CONFIGURING THE OUTPUT:

There are 7 jumper pads located in the lower right corner of the DTD-1 board. These pads are lettered L, M, N, P, Q, R, S. The four output options are programmed by installing and or removing jumpers in the above pads. The unit is shipped with the latched high option installed. Use the following table to configure the output.

OPTION	REMOVE JUMPERS	INSTALL JUMPERS
Latched High	N/A	L-M, P-Q, R-S
Latched Low	P-Q, R-S	R-Q
Momentary Low	P-Q or R-Q	N-Q
SCR Latched Low	R-Q, L-M	R-S

### PROGRAMMING THE CODE:

**CAUTION: The digits 0 and \* are equivalent (\* = 0, 0 = \*).**

Codes with the same number in nonadjacent places may not be used. For example, the code "1,2,3,1" is not valid. Codes with the same number in the first two locations are also invalid. The code 1123 or 5589 would not work. Codes with the same number in adjacent places (other than the first two) are useful, however they are not four digit codes. The code "4,1,1,3" is the same as "4,1,3." The code "1,3,3,3" is the same as "1,3."

The DTD-1 is supplied with 10 color coded jumper wires installed. The jumpers are terminated at one end in each of the 10 digit pads. The color of the wire corresponds to the digit number in the same order as the resistor color code. See the table below. Pins 3, 4, 5, and 6 of IC-3 are connected to pads lettered G, H, I, J respectively. The diodes to the right and bottom of IC-2 are numbered 0-9.

To program a four digit code, jumper the first digit number to G, the second to H, the third to I, and fourth to J. All unused digits must be jumpered to any of six "W" pads at IC-3 pin 2.