



## **TDS-3**

### **CTCSS & DCS Encoder**

**Manual Revision: 2008-04-22**

**Covers Software Revisions:**

**TDS-3: 1.3 and higher**

**Covers Hardware Revisions:**

**TDS-3: 349B**

## SPECIFICATIONS

Operating Voltage	5.5 - 15 VDC
Operating Current	2 mA
Operating Temperature	-30 to +60°C
Frequency Range	0-300 Hz
Maximum Tone Distortion	1.0%
PTT Output Current	200 mA
Audio Output Level	0-1V RMS
Audio Output Impedance	22 K $\Omega$
Dimensions	0.68" L x 0.93" W x 0.17" H

## GENERAL INFORMATION

The TDS-3 encodes the 38 standard CTCSS tones, 13 split tones and custom CTCSS tones, as well as any of the 512 (85 recommended) DCS codes (000-777). The TDS-3 can be programmed for up to 4 different CTCSS/DCS tones using 2-line binary. The reverse burst for CTCSS and the invert & shut-off code for DCS are also supported.

## PRODUCT PROGRAMMING

Midian's TDS-3 is programmed using the KL-3. Please reference the KL-3 manual for setup instructions of the KL-3 software and hardware. From the product selection screen on the KL-3 software, select the TDS-3 from the list and click OK.

Set the parameters of the product to fit the application. If any clarifications on a feature are required, move the mouse cursor over the feature name until the question mark appears and right click, a definition of the feature will be shown.

After entering the parameters, save the file by going to File - Save As. Enter the file name in the File Name block and click Save. Saving the file will allow for quick and easy reprogramming of units.

Connect the Orange/White wire to the Green KL-3 lead, the Violet wire to the Yellow KL-3 lead and the Black wire to a common ground with the KL-3's Black lead.

With power to the TDS-3 click "Program Unit" to write to the board and "Read Unit" to read the parameters out of the TDS-3.

## HARDWARE INSTALLATION

Be certain to follow standard anti-static procedures when handling any of Midian's products.

### P1 Connector

**P1-4 – Black** – Ground – Connect to the nearest ground point.

**P1-2 – Red** - +5.5 – 15 VDC – Connect to switched B+ in the radio.

**P1-1 – Green** – TX Tone Out – Connect to the modulator circuit. Use high impedance point in the radio. If generating CTCSS, use the CTCSS point in the modulator.

**P1-8 – Green/White** – Mic Mute – If desired, connect to mic element bias point or to some other point in the audio amp to crowbar mic audio to ground during ANI to prevent voice interference.

**P1-5 – Blue** – Alert Tone/Speaker Audio – Connect to high side of the speaker. This provides Time-Out Timer and go-ahead tones. When using 20-40 Ohm speakers, the onboard resistor in series with Q2 should be sufficient. When attaching this lead to a 4-8 Ohm speaker, add a 100-Ohm resistor in series with the lead to limit current.

**P1-11 – Gray** – PTT In – Requires a logic low from the radio's PTT switch. If TOT is not needed, the PTT In & Out wires can be tied together and connected directly across the radio's PTT switch. For non-common PTT, open the PTT path and connect the gray wire to the switch.

**P1-9 – White** – PTT Out – Connect to the other side of the open PTT path as referred to in the above step. The TDS now has control of the PTT for Time Out Timer (TOT). The PTT transistor, Q3, is rated at 200 mA continuous.

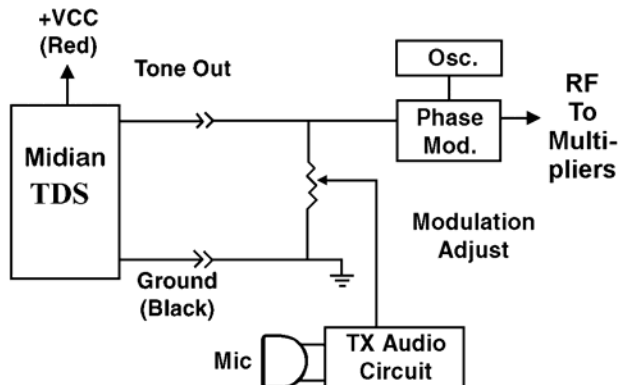
**P1-12 – Orange/White** – Program In/Code Select 1 – For Program In, this lead is connected to the Green lead from the KL-3 programmer. For code positions see the chart in the TDS-3 programming software.

**P1-13 – Violet** – Program Out/Code Select 0 – For Program Out, this lead is connected to the Yellow lead from the KL-3 programmer. For code positions see the chart in the TDS-3 programming software.

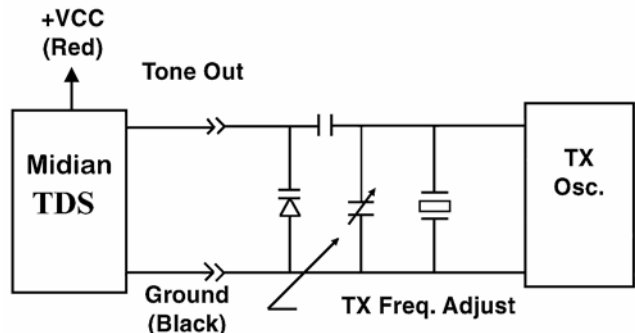
### Installation Diagrams:

The following installation diagrams are provided to give an idea of how the audio wire can be connected. When using DPL, the radio must be a true FM as shown in the Direct FM Modulation diagram below. In fact, a varactor diode could be added to the oscillator circuit in radios employing phase modulation.

#### Phase Modulation



#### Direct FM Modulation



## HARDWARE ALIGNMENT

**TX Audio Output:** Adjust R-12 so that per EIA specifications CTCSS is 500 Hz to 1 KHz modulation. In Low-Z mic circuits, it may be necessary to short R11 and/or increase C6.

## RADIO PROGRAMMING

The TDS-3 is a generic module that wire into most radios. Any radio specific programming, if available, would be found on any Application Notes available for those radios. You may visit our website or call us for application notes.

## OPERATION

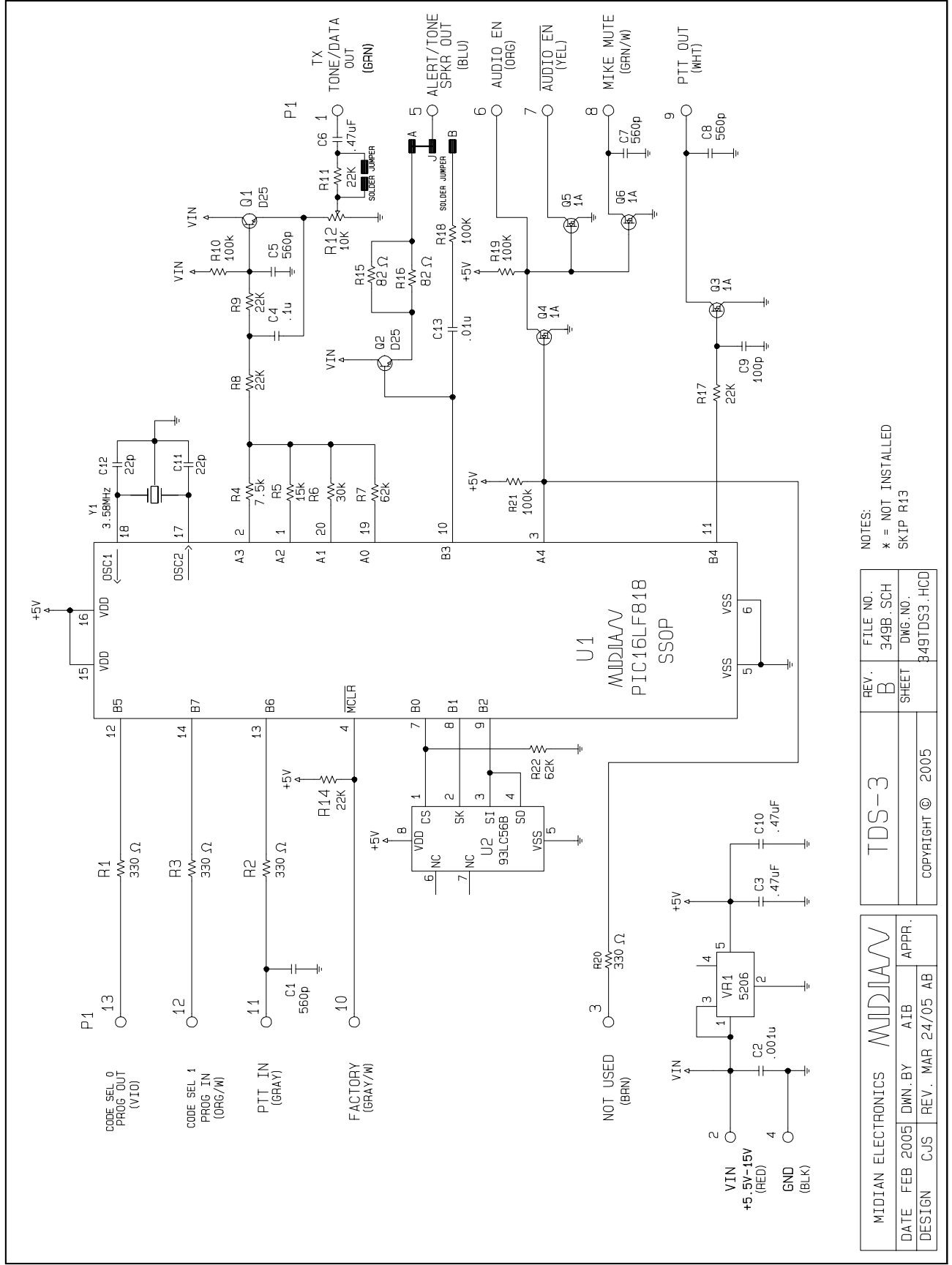
**Encode:** When the PTT Input is taken to ground the TDS-3 will encode the selected CTCSS/DCS code based on the Code Select configuration shown below:

	<b>Code Select 0</b>	<b>Code Select 1</b>
<b>Code 1</b>	Open	Open
<b>Code 2</b>	Ground	Open
<b>Code 3</b>	Open	Ground
<b>Code 4</b>	Ground	Ground

## MIDIAN CONTACT INFORMATION

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NOTES:  
 \* = NOT INSTALLED  
 SKIP R13

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SHEET	DWG. NO. 349TDS3.HCD
TDS-3	
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