



## *Installation and Operation Manual*



### **DTE-16** *DTMF Tone/Sequence Encoder*

Firmware Version 1.05

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## INTRODUCTION

Thank you for your purchase of the tiny TOOLS™ DTMF Tone/Sequence Encoder, which we will refer to throughout the manual as the DTE-16. We're confident this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the product.

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Only qualified personnel should install Broadcast Tools® products. Incorrect or inappropriate use and/or installation could result in a hazardous condition.

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If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

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**NOTE:**

This manual should be read thoroughly before installation and operation.

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## INTRODUCTION

### PRODUCT DESCRIPTION

The tiny TOOLS DTE-16 is a feature rich DTMF tone/sequence encoder that is user programmable to encode up to 15 tone sequences or a single tone via any one of 16 contact closure inputs and/or the RS-232 serial port. Each input may be programmed to generate a tone for the duration of the closure or tone burst immediately on command. A passive mixing network is provided to mix both the program and encoder audio if required. Programming is performed using a non-dedicated PC's COM port equipped with Windows HyperTerminal. Features: Encodes all 16 DTMF tones; adjustable tone generation time; balanced low Z output, passive program mixer input; surge protected power supply; front panel status for power, valid DTMF tone, serial data activity, recessed programming push button with LED indicator and recessed output level control with a range of off to +4dbm. All connections are on screw terminals except for the DB-9 female serial port connector. The DTE-16 may be set on a desktop, wall mounted or up to four units mounted on the RA-1, Rack-Able mounting shelf.

### INSTALLATION

Please examine your DTE-16 carefully for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package contains the DTE-16, 9Vac @ 1 amp wall power transformer, serial cable and this manual.

Installation of the DTE-16 in **high RF environments** should be performed with care. Shielded cable is suggested for all audio connections. All shields should be tied to the "GD" Ground terminals. The station ground should be connected to the chassis ground screw located on the far right side of the DTE-16 as viewed from the rear. It is recommended that all cables connected to the DTE-16 be looped through ferrite cores to suppress RF. Surge protection with RF filtering such as the Tripp-Lite "ISOBAR 4 or 6" is also suggested for the wall transformer.

#### Input:

The input is resistively mixed with the output of the internal DTMF tone encoder. Connect your program audio source equipment to the rear panel screw terminals labeled: **MXA and MXB**.

#### Mixed Output:

Connect the **OPA and OPB** terminals to your input equipment. For unbalanced loads, use the "OPA" and **GD** terminals only. **Do not connect the "-" terminal to ground.** Shields should be tied to the "GD" terminals

#### Output level:

The front panel "Send Lvl" control may be used to adjust the DTMF tone output from off to +4dBu. The factory setting is **0dBu**.

#### Channel Control:

Connect a normally open dry contact closure between the "GD" terminal and any of the 16 channels. These are labeled **IN1 thru IN16**. The DV LED will light when valid tones are active.

## PROGRAMMING

To program the DTE-16, you must connect a PC running a terminal program such as Windows HyperTerminal, Tera-Term, etc. Set the terminal program to 9600,8,N,1 flow control to none. Character Echo must be turned ON. There are two methods of entering program mode. Either press the recessed “PGM” button or send an ASCII “P” over the serial port.

Once the program mode is entered, the **PGM** LED will begin to flash and all of the current data will be displayed:

```
01-1
02-2
03-3
.....
16-D
SELECT 01-16 & ENTER DATA:
```

(The factory default has single digits corresponding to each input, 1 for 1, 2 for 2, etc. Input 10 is DTMF zero, 11 = \*, 12 = #, 13 = A, 14 = B, 15 = C, 16 = D. These default values can be reloaded at any time by removing power from the DTE-16, holding down the PGM button and plugging in the power. Release the **PGM** button after a few seconds. The **PGM** LED will blink once after the defaults are loaded.)

Enter a channel number (01-16) followed by the DTMF sequence to be output when that input is activated. Up to 15 digits can be entered for each channel.

Press the Carriage Return after entering your character string. Data for that input will then be stored and allow you to enter data for a new input. Program mode can be exited at any time by pressing the **ESC** key. Pressing the **ESC** during data entry, before pressing the carriage return, will cause the old data for that input to be retained, the new data will not be saved. If one minute passes without any data entry, it will also exit program mode. The destructive backspace can be used to erase and re-enter DTMF data.

## DIP Switch Selections

There are four DTMF transmit modes available by setting the DIP switch. They are as follows:

1	2	3	Function
Off	Off	Off	Tones sent at 100ms tone, 100ms space
Off	Off	On	Tones sent at 50ms tone, 50ms space
Off	On	Off	Single Tone sent as long as the input is closed. The first tone stored for that input would be sent. Used for pan/tilt camera control etc.
Off	On	On	Tones sent at 500ms tone, 100ms space.

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## PROGRAMMING

## OPERATION

### Power:

Insert the power plug into the power jack on the DTE-16 and the wall transformer into the proper AC outlet. Verify that the power LED is lit. Three additional DTE-16's may be powered by connecting 22-gauge wire between the power screw terminals and following proper polarity.

### Channel Control:

Connect a normally open dry contact closure between the "GD" terminal and any of the 16 channels. These are labeled **IN1 thru IN16**. The DV LED will light when valid tones are active.

### Sending Tones with the Serial Port

Tones can be sent either as a string or as individual tones with the duration controlled by user written software. To send a string of tones with a short duration of 50ms tone and a 50ms space (10 digits per second), send an RS-232 string of @Snnnn<cr>. The "@" is the start character, the "S" tells the DTE-16 to generate "Short" tones, nnn...nn is the string of tones to be sent and the carriage return will begin transmitting the buffered characters. For example, to send 1234, enter @S1234<cr>. Up to 60 digits can be buffered.

To generate a string with 100ms tones and a 100ms space (5 digits per second) send a RS-232 string of @Lnnnn<cr>. The "@" is the start character, the "L" tells the DTE-16 to generate "Long" tones, nnn...nn is the string of tones to be sent and the carriage return will begin transmitting the buffered characters. For example, to send 5678, enter @L5678<cr>.

To generate single tones, at a length defined in your software, send @Tn<cr> (tone length wait) <cr>. For example, to generate a 4 for 5 seconds duration, send @T4<cr> (wait 5 seconds) <cr>.

To generate 500ms tones with 100ms space send: @Xnnnn<cr>.

## SPECIFICATIONS

<b>Mix Input Level</b>	Nominal program
<b>Mix Input Impedance</b>	600 Ω balanced
<b>Output level</b>	0dBu nominal, +4dBu max, @ 600 Ω,, balanced
<b>Output Impedance</b>	600 Ω balanced
<b>RS-232</b>	9600, 8,N,1 / Female DB-9
<b>Connectors</b>	Audio Inputs/Outputs connections – Screw terminals
<b>Power Requirement</b>	9 Vac, 1 Amp, wall transformer, Supplied. Screw terminals for external powering up to three additional units from one wall transformer. (220 Vac 50-60 Hz CE wall transformer OPTIONAL) Surge Protected.
<b>Size</b>	Quarter rack space, 4.20" x 6.00" x 1.55", Painted steel chassis w/ 4 – 6-32 mounting holes.
<b>Weight</b>	2.0 lb.
<b>Options</b>	RA-1, Rack Shelf. 1 RU.

## LIMITED WARRANTY

The term "Buyer" as used in this document refers to and includes both (but only) (a) any person or entity who acquires such an item for the purpose of resale to others (i.e., a dealer or distributor of an item), and (b) the first person or entity who acquires such an item for such person's or entity's own use.

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APPENDIX A

Functional Diagram

