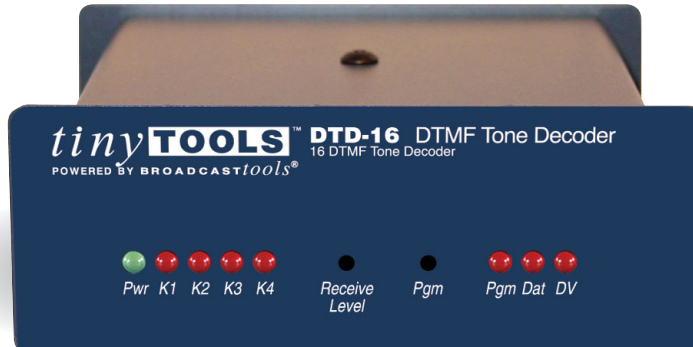# BROADCAST® tools INC

Installation and Operation Manual

DTD–16
DTMF Tone/Sequence Decoder

Manual update 01/22/2009

Firmware Version 1.04

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INTRODUCTION

Thank you for your purchase of the tiny TOOLS™ DTMF Tone/Sequence Decoder, which we will refer to throughout the manual as the DTD-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.

SAFETY INFORMATION

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

WHO TO CONTACT FOR HELP

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

If you would like more information about Broadcast Tools® products, you may reach us at:

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131 State Street
Sedro-Woolley, WA 98284 USA
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Fax: 866.783.1742

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E-mail: support@broadcasttools.com

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BROADCAST TOOLS® BRAND PRODUCTS!

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Broadcast Tools® Products, as with any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.
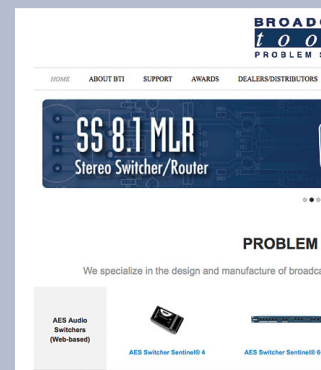
NOTE:

This manual should be read thoroughly before installation and operation.

WEBSITE:

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INTRODUCTION

2

PRODUCT DESCRIPTION

The tiny TOOLS DTD-16 is a full-featured DTMF tone/sequence decoder that is user programmable to decode up to six tone sequences or a single tone and assign it to any one of four relays, twelve open collectors and/or the RS-232 serial port. The relays and open collectors may be programmed to close for the duration of tone, pulse immediately after completion of detection, wait a programmed (up to 15 seconds) length of time after detection, or latch/unlatch. Programming is performed using a non-dedicated PCs com port equipped with Windows HyperTerminal. Features: Decodes all 16 DTMF tones; 16 memory locations; adjustable tone detection time; line level high Z input, which accepts a balanced or unbalanced source, surge protected power supply, front panel status for power, each relay, valid DTMF tone, serial data activity, recessed programming push button with LED indicator and recessed input level control with a range of -20 to +24dbu. All connections are on screw terminals except for the DB-9 female serial port connector. The DTD-16 may be set on a desktop, mounted on a wall or up to four units mounted on the RA-1, Rack-Able mounting shelf.

INSTALLATION

Please examine your DTD-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 DTD-16, 9 VAC @ 1 amp wall power transformer, serial cable and this manual.

Installation of the DTD-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 DTD-16 as viewed from the rear. It is recommended that all cables connected to the DTD-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: Hi Z, active balanced. Connect your equipment to the INA and INB rear panel screw terminals.

Input level: The front panel "Input Level" control may be used to adjust the DTMF tone detection from –20dBu to +24dBu. This control should be adjusted for a solid DV led indication.

Relay connections: The four relays are Normally Open/dry. Make your connections to the desired relay K1 thru K4. Front panel led's indicating when a relay is active.

Open Collectors: The open collectors are labeled OC5 thru OC16. Make your connection between the desired open collector and ground "GD".
NOTE: The open collectors are rated at 12 vdc @ 50 ma.

PROGRAMMING

To program the DTD-16, you must connect a PC running a terminal program such as HyperTerminal, 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" to the serial port. Once program mode is entered, the "PGM" LED will begin to flash and the current data will be displayed.

    01-0-A-1/
    02-0-A-2/
    03-0-A-3/
    …..
    16-0-A-D/
    SELECT 01-16 & ENTER 0=MOM, 1=LATCH, 2=XLATCH,
    DELAY A-O (0-15 SEC), MOM OR ON CODE / OFF CODE:

(The factory default has single digits corresponding to each output, 1 for 1, 2 for 2, etc. Output 10 is DTMF zero, 11 = *, 12 = #, 13 = A, 14 = B, 15 = C, 16 = D. These default values may be reloaded at any time by removing power from the DTD-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.) Default time delay before activation is "A" or 0 seconds

To program, enter the output number 01 through 16. The "-" (dash) will be displayed after the numbers are entered along with a new line. Next, enter a single command digit: "0" for momentary, "1" for Latch or "2" for Exclusive Latch. The "-" (dash) will be displayed after the command digit and a new line will be displayed. Then enter a time delay value A-O where A=0 Seconds, B=1 Second, C=2 Seconds, etc., through the letter O=15 seconds. This is the time that will elapse after a command is received and the output is activated. Now enter the code you want to use to operate the selected output:

Momentary

If you have selected the momentary function for this output channel, you can enter two codes up to 5 digits for the first code and 6 digits for the second code that can be used to activate that output. If your code is shorter than 5 digits enter a "/" at the end of the first data string. This will cause a new line to be displayed. Enter the second code you want to momentarily trigger. If the string is less than 6 digits press the "Enter" key. The codes for that output will now be saved and you can go on to programming another output.

Example

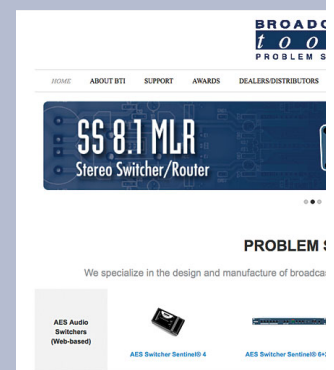To program output 1 for momentary for code 123 and 321 with a time delay of 4 seconds before activation:

    01-
    0
    E
    123/
    321(CR)

Latch

For the Latch Function, the first code will be used to latch the output on, and the second code to turn it off. Enter the "ON" code, from 1 to 6 digits. If it is shorter than 5 digits terminate with the "/" character. A new line will be displayed. Now enter the code you want to use to turn OFF that output. It must be from 1 to 6 digits long. If it is shorter than 6 digits terminate with the "Enter" key. You cannot enter the same code to latch an output on and turn it off.

Example
To program output 2 for 456 latch on, 654 latch off with no time delay:
02
1
A
456/
654

Exclusive Latch

For the Exclusive Latch function, the first code will be used to latch the output on, and the second code to turn it OFF, if desired. You do not need to enter an OFF code. In Exclusive latch mode, when any exclusive latch output is selected, all other exclusive latch outputs will be reset. Enter the "ON" code, from 1 to 5 digits. If it is shorter than 6 digits terminate with the "/" character. A new line will be displayed. Now enter the code you want to use to turn off that output. It must be from 1 to 6 digits long. If it is shorter than 5 digits terminate with the "Enter" key. You cannot enter the same code to latch an output on and turn it OFF.

Example
To program output 3 for 789 xlatch on with time delay of 1 second:
02
2
B
789(CR)

To exit Program mode, press the ESC key. Also, program mode will be exited after 60 seconds of inactivity. When Program mode is exited, it will list the current values and perform a reset.

Dipswitch Setting
DIP-1

If DIP-1 is turned ON; all momentary outputs will become key-follow outputs. This means that the selected output will go on when the last digit of the momentary code is decoded and stay on for as long as that digit is being decoded. This is useful for remote pan-tilt camera control.

DIP-2

When DIP-2 is ON, the "#" character will be translated to a CR/LF (0Dh 0Ah) on the ASCII RS-232 output. This is useful for using DTMF to remotely control equipment that requires a CR/LF termination. This allows you to use the "#" as an "Enter" key.

DIP-3
When DIP-3 is ON, codes programmed into odd channels, 1,3,5,7, etc., will operate relay one. Even channels, 2,4,6,7, etc., will operate relay 2. Relays 1 and 2 can be programmed to with any mode; momentary, latching or Xlatching.

DIP-4
When DIP-4 is ON, Relays will be engaged on the trailing edge of the DTMF signal in both momentary and latching modes.

RS-232 Output
Each DTMF character will be converted to ASCII and outputted on the RS-232 serial port at 9600,8,N,1.
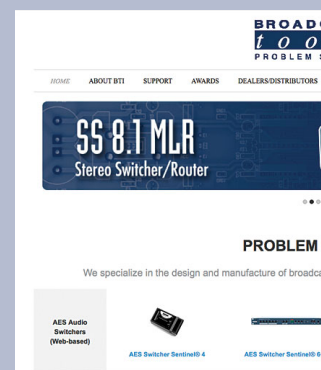
OPERATION

Power
Power   Insert the power plug into the power jack on the DTD-16 and the wall transformer into the proper AC outlet. Verify that the power LED is lit.

WEBSITE:

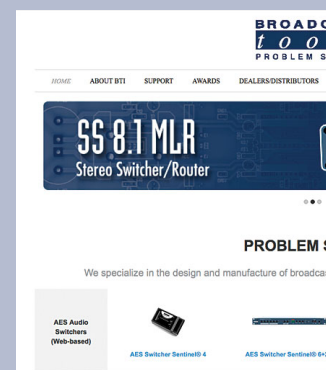*Visit our web site for product updates and additional information*

PROGRAMMINNG

6

SPECIFICATIONS

Input Level	-20dBu to +24dBu
Input Impedance	200K Ω balanced, 100K Ω unbalanced
Relays	4 - SPST, 30Vdc/1 amp.
Open Collectors	12 - 12 Vdc / 50 ma.
RS-232 Serial	9600, 8,N,1 / Female DB-9
Connectors	Audio Inputs/Outputs connections – Screw terminals
Power Requirement	9 Vac, 1 Amp, wall transformer, Supplied. External powering of up to three add'l units from one wall transformer. Surge protected power supply.
Size	1/4 rack space, 4.20" x 6.00" x 1.55", Painted chassis w/ 4 – 6-32 mounting holes.
Weight	2.0 lb.
Options	RA-1, Rack Shelf. 1 RU. / 220 Vac 50-60 Hz CE wall transformer.

WEBSITE:

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SPECIFICATIONS

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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