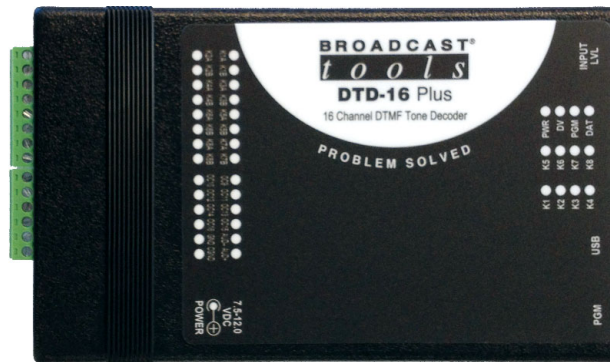


BROADCAST[®] *t o o l s* INC

PROBLEM SOLVED

Installation and Operation Manual



DTD-16 Plus

16 channel DTMF Tone/Sequence Decoder Installation Manual

Manual update: 06/24/2013

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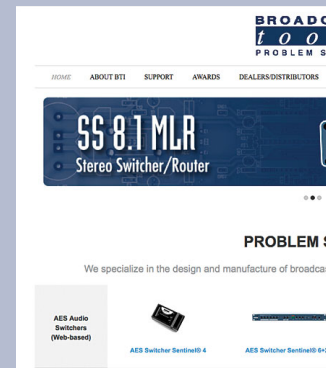
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Table of Contents

Section Title	Page #
Introduction	3
Safety Information	3
Who to Contact for Help	3
Product Overview	4
Features	4
Inspection	4
Installation	4
Surge Protection / RF suppression	4
Input connection	4
Input level control	4
Relay connections	5
Open Collector connections	5
Dip Switch Settings	5
DTMF Tone Detection Jumper JP1	5
USB Data output	5
Power and Status LED's	5
Programming	6
Specifications	8
Warranty	9
Fractional Schematic	Appendix
Functional Diagram	Appendix
Connector and Indicator Layout	Appendix
Product Label	Appendix

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CONTENTS

INTRODUCTION

Thank you for your purchase of the 16 channel DTMF Tone/Sequence Decoder, which we will refer to throughout the manual as the DTD-16 Plus. 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 technical personnel should install Broadcast Tools products. Any attempt to install this device by a person who is not technically qualified could result in a hazardous condition to the installer or other personnel or damage Broadcast Tools product or other equipment. Please ensure that proper safety precautions have been taken before installing this device. If you are unfamiliar with this type of equipment, please contact a properly qualified engineer to handle the installation and setup of the Broadcast Tools product.

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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.

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

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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.

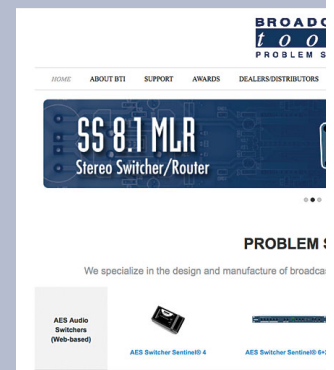


NOTE:

This manual should be read thoroughly before installation and operation.

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INTRODUCTION

Product Overview

The DTD-16 Plus is a full-featured DTMF tone/sequence decoder that is user programmable to decode single tones or sequences up to six tones in length and maybe assigned to any one of eight SPST normally open relays, eight open collectors and/or the USB 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 9.99 seconds) length of time after detection, or latch/unlatch. Programming is performed using a non-dedicated PC's USB port equipped with Windows HyperTerminal and/or Putty.

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 removable screw terminals except for the USB Type B female port connector. The DTD-16 Plus may be set on a desktop, mounted on a wall or up to four units mounted on the RA-1, 1-RU mounting shelf.

Inspection

Please examine your DTD-16 Plus 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 Plus, 7.5 to 12 volt DC wall power transformer, four plastic and/or velcro feet, USB-A/B cable and this manual on the web site or CD.

Installation

Installation of the DTD-16 Plus in high RF environments should be performed with care. Shielded cable is suggested for all audio connections. All shields should be tied to the "GND" Ground terminal. The station ground should be connected to the CGND terminal.

Surge Protection/RF Filtering

It is recommended that all cables connected to the DTD-16 Plus 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 Connection

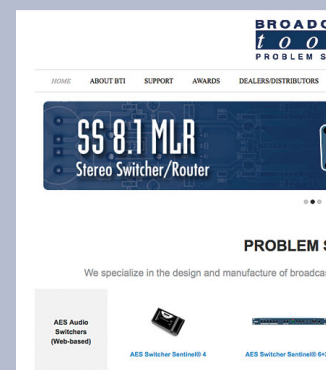
Hi Z, active balanced. Connect your equipment to the AUD- and AUD+ removable screw terminals. If the user is feeding the unit with an unbalanced output, attach the positive output to the + input and a jumper between the "-" input and GND

Input level

The front panel "INPUT LVL" 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.

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INTRODUCTION

Relay connections

The eight relays are Normally Open/dry contacts. Make your connections to the desired relays K1 A/B thru K8 A/B. Front panel led's indicate when a relay is active.

Open Collectors Connections

The open collectors are labeled OC9 thru OC16. Make your connection between the desired open collector and ground "GND".

NOTE: Each open collector is rated at 12 vdc @ 50 ma.

NOTE: To access the DIP switches and/or jumper, remove all connections and unscrew the two bottom screws, then open the case. Reverse the action to reassemble.

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 turn 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 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.

DTMF Tone Detection Jumper JP1

The DTD-16 Plus is equipped with a 4-position jumper, JP1. This is used to adjust how fast the DTMF tones are detected.

F = Fast, 50ms ON / 50ms OFF. (default)

M = Medium, 100ms ON / 100ms OFF.

S = Slow, 150ms ON / 150ms OFF. To detect multiple tone bursts, the jumper should be left in the default position F = Fast.

USB data Output

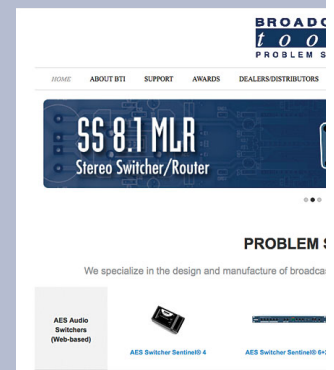
Each DTMF character will be converted to ASCII and outputted to the USB com port at 9600,8,N,1.

Power

Insert the power plug into the power jack on the DTD-16 Plus and the wall transformer into the proper AC outlet. The power supply MUST be attached to the power jack to properly power the unit. Verify that the power LED is lit.

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INSTALLATION

PROGRAMMING

To program the DTD-16 Plus, you must connect it to the USB port of a PC running a serial terminal program such as HyperTerminal, or PuTTY. When you first plug the DTD-16 Plus into your PC it should automatically install the correct FTDI USB Serial port drivers which will allow you to access the DTD on a COM port. Set the terminal program to 9600,8,N,1, flow control to NONE. Character Echo should also be turned ON.

There are two methods of entering program mode. Either press the recessed “PGM” button or send an ASCII “P” to the USB serial port. Once program mode is entered, the “PGM” LED will begin to flash and current data will be displayed.”

```
01-0-0.00-1111/  
02-0-0.00-2222/  
03-0-0.00-3333/  
04-0-0.00-4444/  
05-0-0.00-5555/  
06-0-0.00-6666/  
07-0-0.00-7777/  
08-0-0.00-8888/  
09-0-0.00-9999/  
10-0-0.00-0000/  
11-0-0.00-****/  
12-0-0.00-####/  
13-0-0.00-AAAA/  
14-0-0.00-BBBB/  
15-0-0.00-CCCC/  
16-0-0.00-DDDD/  
EXIT PGM  
DTD-16+ VER 2.00
```

(The factory default has multiple digits corresponding to each output, 1111 for 1, 2222 for 2, etc. Example: If relay one is set to 1234 and relays 2,3,4 were left alone then they would also fire with the 234. 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 Plus, 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 0.00 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 of 0.00 to 9.99 seconds. Do not enter the “.”, it will be entered automatically. 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.

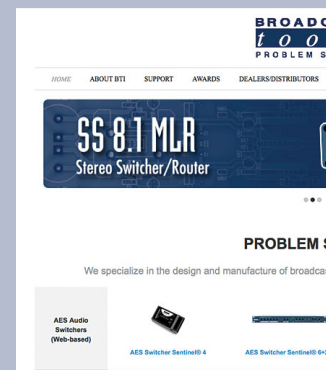


NOTE:

*If DTD-16 Plus's FTDI USB Serial “Virtual COM port” drivers do not automatically install they may be downloaded here:
<http://www.ftdichip.com/Drivers/VCP.htm>*

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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.

Momentary Example:

Momentary Example: To program output 1 for momentary for code 123 and 321 with a time delay of 4.25 seconds before activation:

```
01-  
0  
4.25  
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.

Latch Example:

To program output 2 for 456 latch on, 654 latch off with no time delay:

```
02  
1  
0.00  
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.

Exclusive Latch Example:

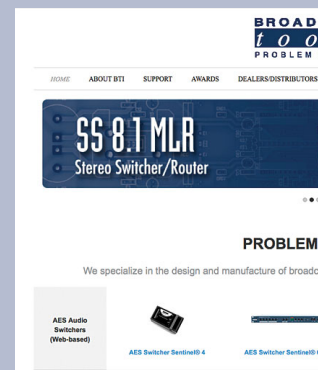
To program output 3 for 789 xlatch on with time delay of .10 second:

```
02  
2  
0.10  
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.

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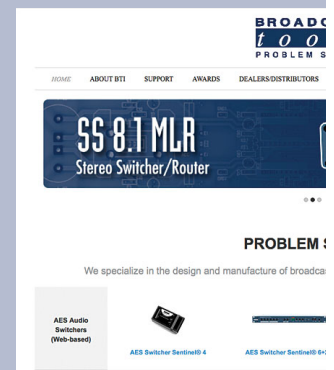


Specifications

Input Level:	-20dBu to +24dBu.
Input Impedance:	200K balanced, 100K unbalanced.
Relays:	Eight SPST, normally open. 30Vdc@1 amp.
Open Collectors:	Eight, 12 Vdc / 50 ma. each
USB Serial:	9600, 8,N,1 / USB type B female.
Connectors:	Audio Inputs, relays and open collector outputs. Removable screw terminals.
Required power supply:	7.5 to 12.0 VDC only @ greater than 400 ma. 2.1mm ID x 5.5mm OD coaxial connector, center positive, inter- nally surge protected. Domestic PS supplied.
Operating Temperature:	-40°F to +185°F (-40°C to +85°C)
Size:	6.18" x 3.70" x 1.42" (L,W,H)
Weight:	1.5 lb.
Options:	CE certified universal power supply. RA-1, 1-RU rack shelf. Note: Velcro may be used to secure the product to the RA-1 shelf.

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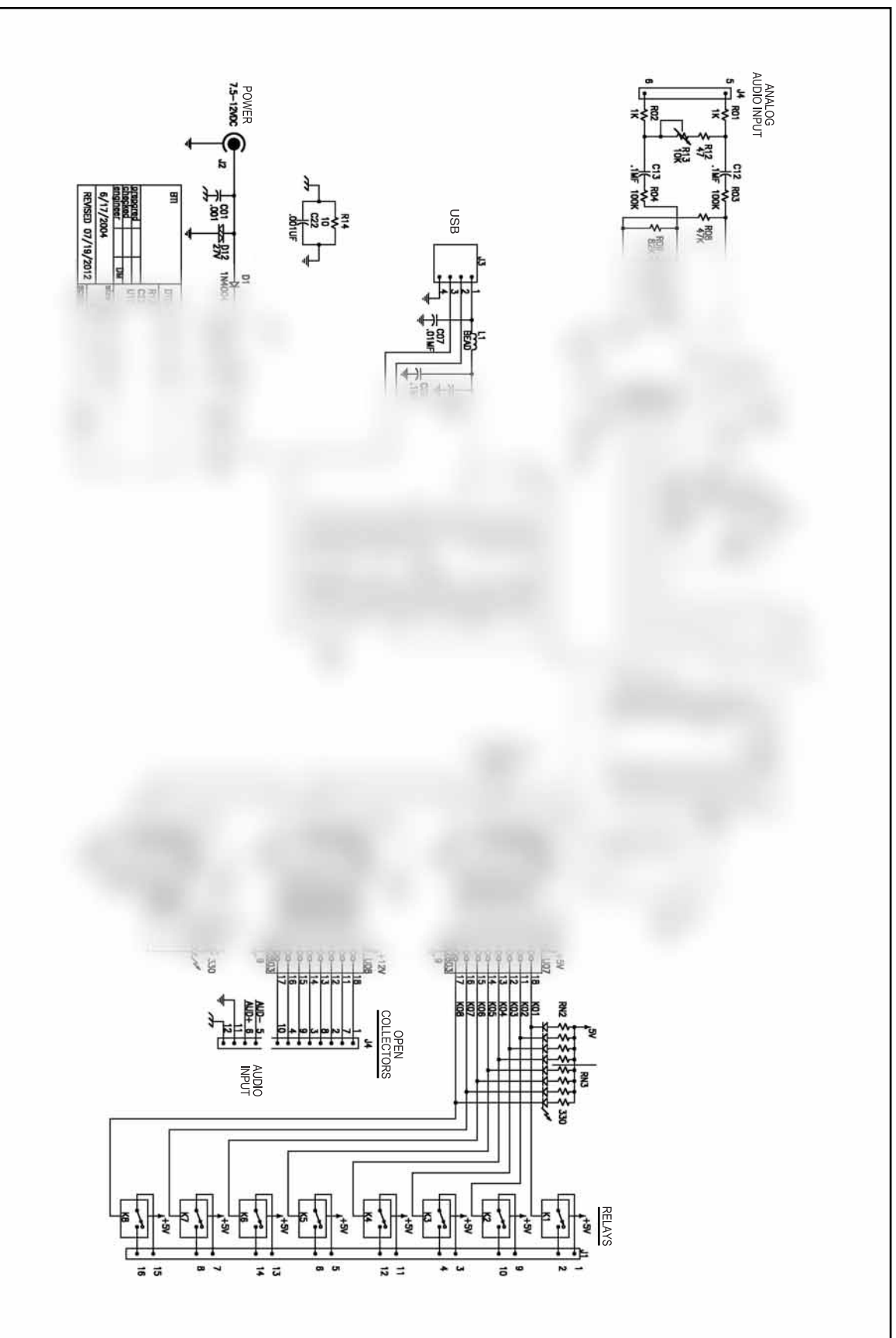
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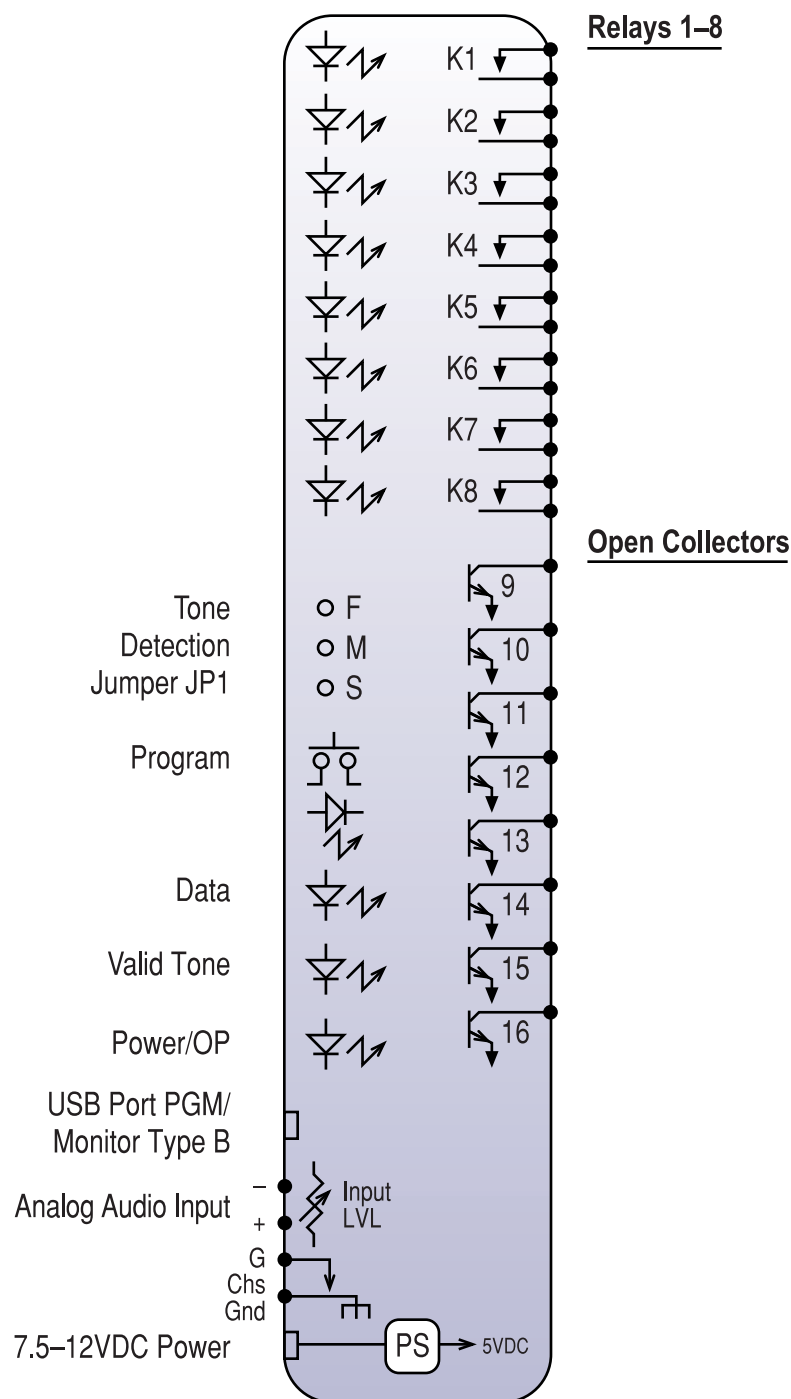
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Fractional Schematic



Functional Diagram

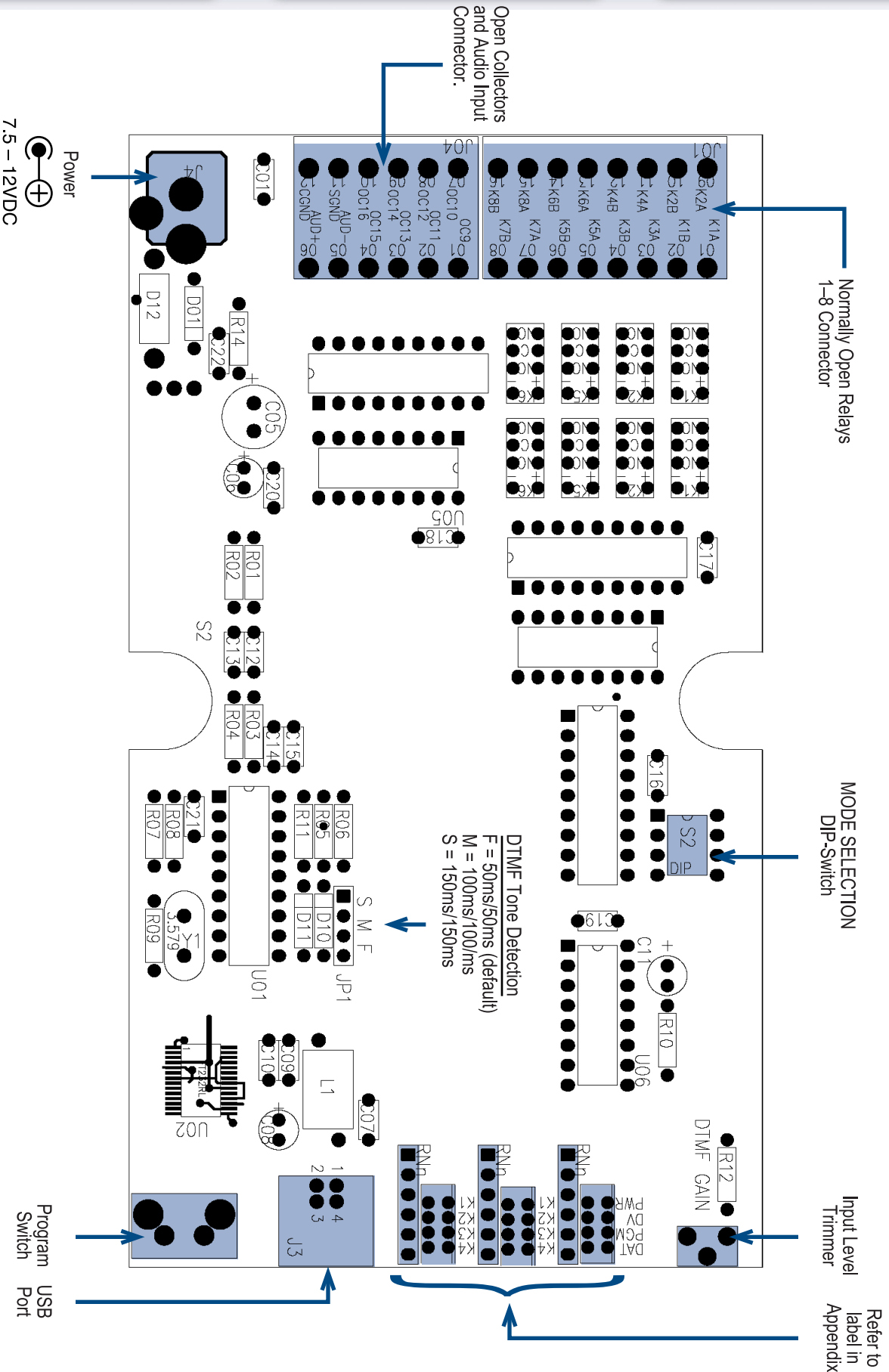


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Connector and Indicator Layout

APPENDIX

12



Product Label

