BROADCAST tools inc.

INSTALLATION AND OPERATION

MANUAL

for the

Broadcast Tools® ENC-16

DTMF Encoder, Auto-Coupler and Dialer

ALL SPECIFICATIONS AND FEATURES FOR THIS PRODUCT ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Firmware version 1.07 and above   Manual update 02/10/04

Due to the dynamic nature of product design, the information contained in this document is subject to change without notice. Broadcast Tools, Inc., assumes no responsibility for errors and/or omissions contained in this document. Revisions of this information or new editions may be issued to incorporate such changes.

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INTRODUCTION

Thank you for your purchase of a **Broadcast Tools® ENC-16 DTMF Encoder, Auto-Coupler and Dialer, (**referred to as the **ENC-16** throughout this manual)**.** We're confident that 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 Broadcast Tools® ENC-16.

✎ **NOTE**:   *This manual should be read thoroughly before installation and operation.*

SAFETY INFORMATION

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

💣 **CAUTION!**   *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.*

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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FCC NOTICE

1. UPON REQUEST ONLY, you must provide the following data to your telephone utility company (telco):

    (a) Notice of intention to install or permanently remove an FCC Part 68 registered device or system, and the *FCC registration Number.
    (b) *The Ringer Equivalence (R.E.N.) number (see device label). Note that if several devices are connected to the same line, the R.E.N.'s must not add up to more than 5.0 {A or B}. This R.E.N. figure is important to your telco.
    (c) *The (USOC) jack type to be provided by the telco. Typically these will be RJ11C/W for single lines.

2. *The *-flagged items above are noted on the equipment's FCC Compliance label.

3. This device may not be used on telco-operated coin phone lines. Party lines & privately owned coin-phones are subject to local State regulatory policies, and possible additional State special requirements.

4. The telco has the right to make changes to their network which may affect the operation of your equipment, provided you are given adequate advance written notice to permit correct operation.

5. In case of operational problems, disconnect your unit by removing the modular plug from the telco's jack. If your regular phone (or other device or system) still works properly, your DEC-16 has a problem and must remain disconnected and (officially) serviced or returned for repairs. If upon the above disconnection your regular service still has problems, notify your telco that they may have a problem. Request prompt service at no cost to you the user. If a problem is found in premises wiring not telco-installed, you are subject to a service charge. If a fault is in telco-installed wiring, you may be subject to a service call charge.

6. Unless otherwise noted in the User's Manual, user may not under any circumstances (in or out of warranty) attempt any service, adjustments or repairs on this unit. It must be returned to the factory or authorized U.S. service agency for all such work. Locations and phone numbers of factory or authorized U.S. service points are listed in this user's manual.

7. Special FCC rules apply to equipment connected behind a PBX or KTS.

8. This device complies with the limits for a class B digital device, pursuant to part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Complies With Part 15 & 68, FCC Rules
FCC Registration Number BRDUSA-36042-OT-T
Ringer Equivalence .4B
Jack Type (USOC) RJ11C

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GENERAL DESCRIPTION

The ENC-16 may be used as a DTMF encoder, dial-up, dial-out or direct connect interface for the purpose of controlling relays or generating DTMF strings for other control purposes. It is capable of automatically calling and connecting to a DEC-16 either on a dial-up telephone line or a direct wire connection. There are 16 input lines. Each input can be used to generate DTMF tone strings from 1 to 16 digits long. The ENC-16 can operate as a master or slave device. Set as a master it will it will automatically establish a connection to its slave encoder. If the connection is lost, it will re-establish contact automatically. The ENC-16 may be controlled by contact closures or its RS-232 serial port. The ENC-16 may be used as a DTMF encoder, dial-up, dial-out or direct connect interface for the purpose of controlling relays or generating DTMF strings for other control purposes. It is capable of automatically calling and connecting to a DEC-16 either on a dial-up telephone line or a direct wire connection. There are 16 input lines. Each input can be used to generate DTMF tone strings from 1 to 16 digits long. The ENC-16 can operate as a master or slave device. Set as a master it will it will automatically establish a connection to its slave encoder. If the connection is lost, it will re-establish contact automatically. The ENC-16 may be controlled by contact closures or its RS-232 serial port.

Basic Hook up
The ENC-16 is powered with the supplied Class-2, 16 Vac 600 ma power cube. Plug this into the power jack on the right hand corner of the board. The green PWR LED will light. An RS-232 serial port is provided for DTMF to ASCII and ASCII to DTMF conversion. The inputs used to generate DTMF strings are made through the DC-37P connector. The telephone line connects to the RJ-11 on the front panel. The internal vertical RJ-11 is used to program DTMF strings. A balanced audio interface can be made through the small two position terminal block. This is active only when the phone line is on hook.

Programming
To program a DTMF string to be sent when an input is activated plug a standard telephone into the programming jack located next to transformer. Press the PGM button located just behind the DE-9S serial connector. When pressed, the green power/status LED will turn off. Enter the input address, 01- 16 followed by the DTMF string you wish to have sent when that input is activated. For example if you want to program 54321 into input 1, press the program button and then 01 54321 and press the program button again. The tone LED will turn on each time a valid tone is decoded. If you want to erase the multi-digit code and only have the DTMF digit "1" sent when you activate input 1 then press the program button, 01 and the program button again. Now when you activate input 1 only a DTMF 1 will be sent.

GENERAL DESCRIPTION

Programming

If you need to reset all inputs to be single digits rather than multi-digit strings, i.e. input 1 generates a 1, input 2 a 2, etc., this can be done by holding down the program button and at the same time press and release the reset button. Then release the program button. If you have a phone plugged into the programming jack you will hear a beep after all inputs have been changed and stored to the EEPROM.

Operation

There are two modes of operations: Binary and Straight. The mode is selected using the DIP switch setting marked "BIN" and "STR".

DIP Switch Settings Table

1	Not used
2	Not used
3	On = Binary, Off = Straight
4	On = 100ms tones, OFF = the first digits in the string will be sent at 100ms and the last tone will remain on until the input goes away
5	On = Master, Off = Slave
6	Not used
7	Not used
8	On = Program mode (enables telephone program jack). Off = Operate

Binary Mode

In the Binary mode the first four inputs are used to determine which DTMF digit will be generated. Refer to the table below. When input 5, the data valid strobe is brought low the selected DTMF signal will be generated as long as input 5 is low.

Binary DTMF table

0000	D	0100	4	1000	8	1100	#
0001	1	0101	5	1001	9	1101	A
0010	2	0110	6	1010	0	1110	B
0011	3	0111	7	1011	*	1111	C

Straight Mode

Set the DIP switch to "STR".   Inputs 1-16 on the DC-37 will cause the corresponding DTMF string to be generated when brought low or grounded.

If the "MOM" DIP switch setting is selected then tones will be fixed to 100ms on/off. If MOM is off (set to I-L position) the first digits in the string will be sent at 100ms and the last tone will remain on until the input goes away. This is useful for pan/tilt camera control where the last digit is used to cause an action until the tone goes away.

     If there is not a multi-digit code programmed into a particular input then when that input is activated it will produce the tone associated with the input. For example, if the number 5 input is brought low it will produce a number 5 DTMF digit; if input 10 is closed it will produce a DTMF zero, etc. The inputs correspond to DTMF as follows:

Input to DTMF Table

1 - 1	5 - 5	9 - 9	13 - A
2 - 2	6 - 6	10- 0	14 - B
3 - 3	7 - 7	11 - *	15 - C
4 - 4	8 - 8	12 - #	16 - D

Master/Slave Setting

     With the switch set to "MAS" the board is set to be a Master. This means that when power is applied it will attempt to establish contact with its slave. The slave phone number is programmed the same way the inputs are programmed except using address 00. If you are using direct wire connect then set both units as slaves with the DIP switch set to "SLV".

     When the master calls the slave it will begin sending a '*' every second until it receives a "#" return from the slave. Once this acknowledgment is received, the "CON" LED will light to show that a connection has been established. If it does not get a reply after ten tries it will hang up and dial again. This process will continue ten times if no acknowledgment is received from a slave.   Note: only set the MAS switch on if a phone line is plugged into the board. If a board is set to master, and no phone line is connected, the board will go on and off hook repeatedly due to lack of loop current.

RS-232 Interface

The DE-9S plug on the board is the RS-232 interface. Pin 2 is data out, pin 3 data in and pin 5 is ground. Data rate is 1200,8,N,1. Each time a DTMF digit is received it will output it on the serial port. Any ASCII character received on the serial port that corresponds to a DTMF digit will immediately be output. The tone will stay on until a CR is received. This offers flexibility to send any length of tone.

When the board hangs up it will send an ASCII 'H' on the serial output. When it answers the phone as a result of ringing, it will output a 'T'. If you are in Master mode and a hang-up command is issued by the serial port, the connection will be lost but the unit will try to reconnect automatically

DC-37 Decoder Connections

Pins	Function
1	DTMF 1
2	DTMF 2
3	DTMF 3
4	DTMF 4
5	DTMF 5
6	DTMF 6
7	DTMF 7
8	DTMF 8
9	DTMF 9
10	DTMF 0
11	DTMF *
12	DTMF #
13	DTMF A
14	DTMF B
15	DTMF C
16	DTMF D
17	Manual Dial
18	Op-Amp buffered unbalanced audio input to phone line
19	GROUND
36	Ring output Open Collector
37	N/A

SPECIFICATIONS

Logic / memory: Microprocessor, Non-Volatile memory.

Input & Aux Connector: 37 pin Male D-sub, mating connector/shell supplied.
                                   TTL/CMOS 5 volt compatible

Power connector: 2.1mm, coaxial 16.5 Vac @ 600 ma. /w Green LED.
                                   Wall transformer supplied.

Telephone Line Connector: RJ-11C. Cable supplied

Programming Phone Connector: RJ-11C.

Telephone line audio: Screw terminal

RS-232 Serial Connector: DB-9, Female

FCC registration: Complies with FCC parts 15 & 68.
                                   Reg # BRDUSA-36042-OT-T

Canadian registration: Complies with Industry Canada CS-03 Part 1.
                                   Reg # 3929-11388A

Ringer equivalence: 0.4B

Size: 7.75" x 4.00" x 1.25"; Aluminum Chassis w/ mounting holes

Weight: 2.0 lb.

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LIMITED WARRANTY AND REMEDIES

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.

Broadcast Tools warrants to each Buyer of any item manufactured by Broadcast Tools that the item will be free from defects in materials and workmanship at the time its is shipped by Broadcast Tools if the item is properly installed, used and maintained.

EXCLUSIVE REMEDIES

If Broadcast Tools is notified of in writing of a failure of any item manufactured by Broadcast Tools to conform to the foregoing Limited Warranty within one (1) year following the date of the Buyer's acquisition of the item, and if the item is returned in to Broadcast Tools in accordance with Broadcast Tools' instructions for confirmation by inspection of the defect (which at Broadcast Tools' election may include, without limitation, a requirement that the Buyer first obtain a Return Authorization number from Broadcast Tools, that the Buyer furnish proof of purchase in the form of an invoice and/or receipt, and that the Buyer prepay all freight charges associated with any return of the item to Broadcast Tools using such freight service as Broadcast Tools reasonably may specify), Broadcast Tools will repair or replace the defective item, or will refund the purchase price paid by the Buyer for the item. Broadcast Tools shall have the exclusive right to choose between these alternative remedies.

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