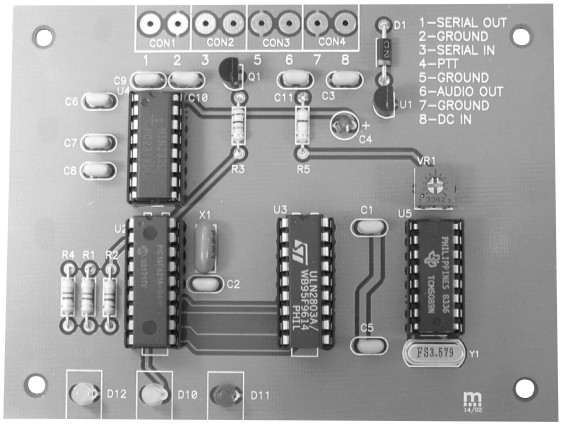
DTMF-ENC232

RS-232 To DTMF Encoder



Description

DTMF-ENC232 is a DTMF (dual tone multiple frequency) encoder board that is controlled via 9600 baud RS-232 serial commands. By using a terminal program such as HyperTerminal or custom developed software, an attached radio transmitter can be keyed with continuous or momentary DTMF digits being sent at any interval. Example applications include the remote controlling of complicated repeater controllers and the driving of DTMF relay camera pan / tilt systems.

Specifications

Dimensions:	3.93" x 3" x .4"
Weight:	1.4 oz.
Input voltage:	8.0 to 14.0 volts DC (37 ma max)
Operating temperature:	0 C to +70 C
RS-232 serial input:	9600 baud, 8 data bits, 1 stop bit, inverted data
Output level:	100 mv p-p to 1.9 v p-p (400mv default)
DTMF digits:	0123456789ABCD*#
Single DTMF digit duration:	100 ms on / 50 ms off

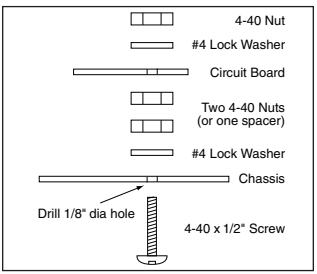
Installation

The following is the list of DTMF-ENC232 circuit board pads (places to solder wires to). Please follow common electronic safety precautions when soldering.

Pad	Description
1	Serial out (female DB-9 pin 2) to PC
2	Serial ground (female DB-9 pin 5) to PC
3	Serial in (female DB-9 pin 3) from PC
4	Push-to-talk (pull to ground) to radio
5	Audio ground to radio
6	Audio out to radio
7	DC ground from power supply
8	DC in from power supply

Board Mounting Details

Mount the DTMF-ENC232 board into a shielded enclosure protect it from RF. For each of the four mounting holes be sure to use two 4-40 nuts or one 1/4” spacer between the DTMF-ENC232 board and chassis to prevent the bottom of the DTMF-ENC232 board from shorting to the chassis.



Adjustments

Pot	Description
VR1	Adjusts audio output level (clockwise to increase)

RS-232 Commands

Command (ASCII)	Description	Parameter(s) (ASCII)
v	Verify communication link with DTMF-ENC232	None
t	Turn radio transmitter off/on	0=off, 1=on
d	Send DTMF digit for 100 ms	0123456789#*abcd
c	Send continuous DTMF digit	0123456789#*abcd
p	Send continuous single pure tone	c1,c2,c3,c4,r1,r2,r3,r4 (see table below)
s	Stop sending continuous DTMF digit or single pure tone	None

An example set of commands are: "**t1**" turns radio transmitter on, "**d#**" sends the pound DTMF digit, and "**t0**" turns the radio transmitter off.

Return Values (after command sent):

Return Value (ASCII)	Description
ok <cr><lf>	Success on command sent
? <cr><lf>	Failure on command sent

Every command will return a success or failure response.

Single Pure Tones:

Parameter (ASCII)	Tone
c1	1209 Hz
c2	1336 Hz
c3	1477 Hz
c4	1633 Hz
r1	697 Hz
r2	770 Hz
r3	852 Hz
r4	941 Hz

Single pure tones can be used for diagnostic purposes.

LED Descriptions

LED	Color	Description
D12	Green	Power applied to board
D10	Yellow	DTMF tone is being sent
D11	Red	Push-to-talk enabled (radio transmitter on)

Trouble Shooting Tips

Problem	Solution
Green LED off (won't power up)	• Verify input voltage (8 - 14 VDC) • Verify input voltage polarity correct
Output tones distorted	• Verify input voltage (8 - 14 VDC)
Failure to communicate with DTMF-ENC232	• Verify PC RS-232 protocol set to 9600, n, 8, 1
Difficult controlling remote device	• Adjust audio output level via the VR1 pot

Warranty & Service

If the product fails to perform as described in our product description or specification, within 90 days from the date of shipment to the buyer, we will repair or replace the product and/or accessories originally supplied. Failure due to improper installation, misuse, abuse or accident is not covered by this warranty. Incidental and consequential damages are not covered by this warranty.

The buyer must obtain a Return Material Authorization by calling (248) 524-1918, and shipping the defective product to Intuitive Circuits LLC, 2275 Brinston, Troy, MI 48083, freight prepaid. After the warranty expires, we will promptly supply an estimate for the repair cost.

Intuitive Circuits, LLC

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