Model

TRE-2

TONE REMOTE ENCODER

INSTRUCTION MANUAL

MANUAL REVISION: 03.05.23

COVERS FIRMWARE VERSION(S):
1.0.0.0

MIDIAN ELECTRONICS, INC. **2302 East 22nd Street** **Tucson, Arizona 85713**
To Order: 1-800-MIDIAN'S **Telephone: (520) 884-7981** **Fax: (520) 884-0422**

SPECIFICATIONS

Voltage/Current:

STANDARD TRE-2 MODULE	
Operating Voltage	5.5-15 VDC
DMV & BEZEL	
Operating Voltage	10-16 VDC

OPERATING CURRENT

TRE-2	2.6 mA
TRE-2 BEZEL	3 mA
TRE-2 DMV	24 mA
All Models	
LED Current	2 mA

Outputs

Audio Output Level..... 1V RMS
Audio Output Impedance ..... 10 KΩ/22 KΩ

Mechanical

Operating Temp ..... -30° to +60° C

Timing

High Level Guard Tone Timing ..... 120 msec

Function Tone Timing **40 msec**

Frequency

Guard Tone ..... .2175 Hz
Monitor ..... .2050 Hz
Frequency 1 ..... 1950 Hz
Frequency 2 ..... .1850 Hz

Frequencies With Optional Keypad

Frequency 3 ..... 1750 Hz
Frequency 4 ..... 1650 Hz
Frequency 5 ..... 1550 Hz
Frequency 6 ..... 1450 Hz
Frequency 7 ..... 1350 Hz
Frequency 8 ..... 1250 Hz
Frequency 9 ..... 1150 Hz
Frequency 10 ..... 1050 Hz
Frequency 11 ..... 950 Hz
Frequency 12 ..... 750 Hz

Levels (Relative)

High Level Guard Tone ..... .+10 dB
Function Tones ..... 0 dB
Low Level Guard Tone ..... -20 dB

Mechanical:

Operating Temperature	-30° to +60° C

Dimensions (in inches):

The following 3 products' dimensions include keypad:

TRE-2 w/flying leads	1.1 x .83 x .17
TRE-2 w/connector	1.27 x .83 x .17
TRE-2 BEZEL	2.37 x 1.87 x .37
TRE-2 DMV	3.0 x 4.1 x 1.25

INSTALLATION INSTRUCTIONS

Installation Note

Midian products utilize CMOS integrated circuits, which are susceptible to damage from high static charges. Be sure to follow standard antistatic procedures when handling, including using grounded workstations and soldering irons and wearing grounding bracelets. Please be careful when selecting wire colors. It is sometimes difficult to distinguish between the gray, black, and brown wire colors under fluorescent lighting. We suggest using Color-Bright/Color-Corrected or incandescent lighting. If in doubt, compare wire positions on board layout for correct color code.

TRE-2 Wire	TRE-2 DMV & BEZEL	Function	Instructions
Black	**Black**	Ground	Connect to ground.
Red	**Red**	5.5 - 15 VDC (standard) or 10-16 VDC (DMV/BEZEL)	Connect to switched B+.
Brown	**Gray**	Test Mode	Connecting this wire to B+ and pressing PTT puts the TRE-2 into a test mode. This extends all of the tones to about 8 seconds each to facilitate setting the output level using pot R42 (DMV & BEZEL) or pot R30 (standard).
Green	**Yellow**	TX Tone Output	Connect to modulator circuit. Use high impedance point in radio. Low-Z will cause low frequency rolloff across C39 (DMV & BEZEL) or C10 (standard) output coupling cap and R43 (DMV & BEZEL) or R31 (standard). In Low-Z mic circuits, it may be necessary to short R43 (DMV & BEZEL) or R31 (standard) and increase C39 (DMV & BEZEL) or C10 (standard).
Blue	**Violet**	Side Tone Speaker Audio	This may be connected to a high side of a speaker with the other side of the speaker at ground. This will allow you to monitor the tones if necessary or desirable. **CAUTION: When attaching this lead to 4 or 8 ohm speakers, add a 100 ohm resistor in series with this lead to limit current.** When using 20 to 40 ohm speakers, the onboard resistor in series with Q5 (DMV & BEZEL) or Q3 (standard) should be sufficient.
Gray	**White**	PTT Input	Requires a logic low from the PTT switch. Sends either the Tone 1 (default = F1 1950 Hz) or Tone 2 (default = F2 1850 Hz) keying tone based on logic level at F1/F2 input.
Org/White	**Mon. Switch**	Monitor	Grounding this lead transmits the monitor function tone.
Violet	**Blue**	F1/F2	High or open selects Tone 1. Grounding this wire selects Tone 2.

1. OPERATION

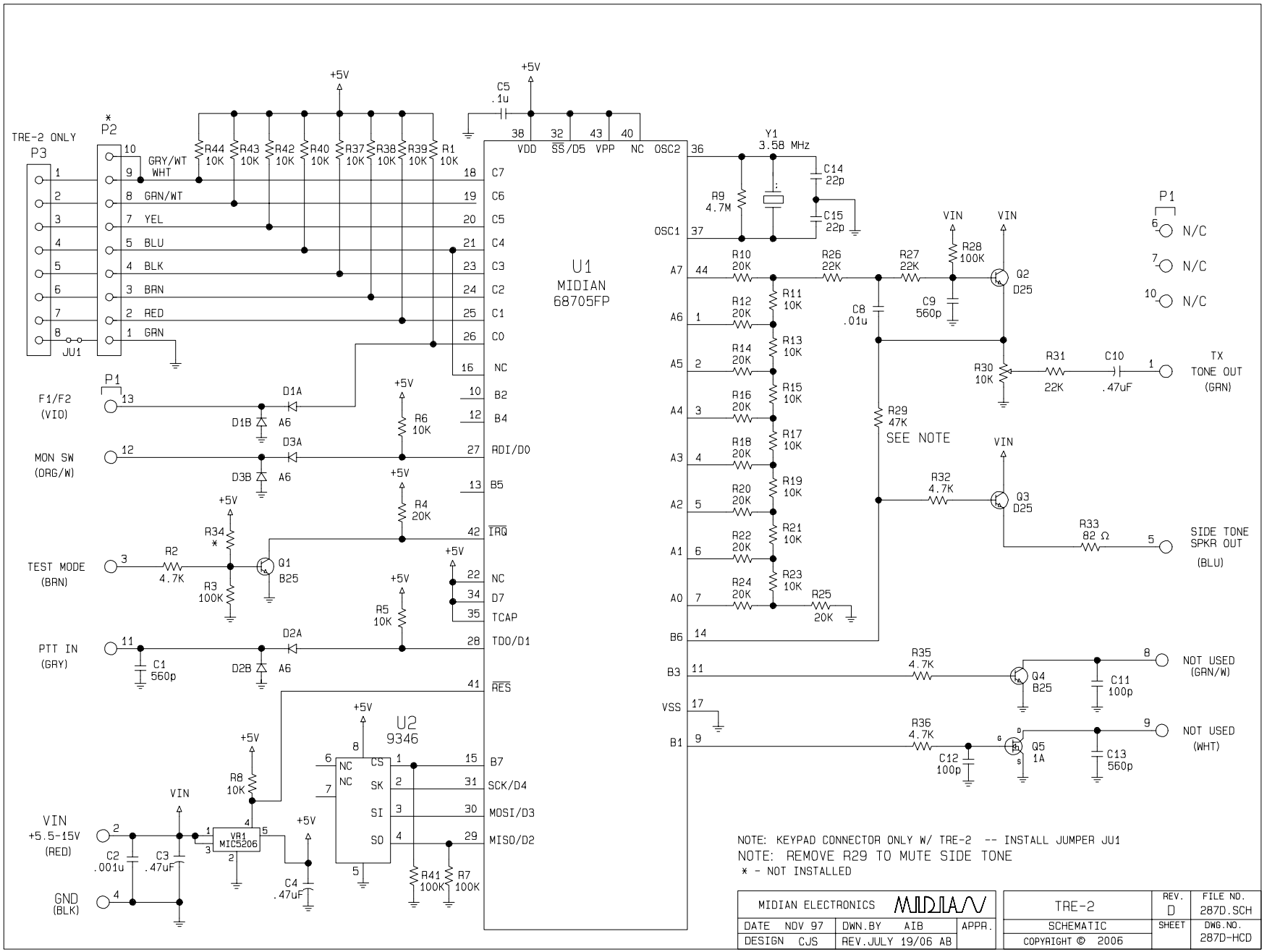
The TRE-2 is a tone remote encoding module that generates a high level 2175 Hz guard tone for 120 msec at a relative level of +10 dB, followed by a 40 msec function tone at a relative level of 0 dB followed by a continuous low level guard tone at –20 dB relative level. This product can be used to convert DC remotes to tone remote. It may be used to key up base stations over microwave, continuous carrier radio link paths, or to modify Telco Butt/In test sets for tone remote.

Units with keypad option: Depending on the logic state of the F1/F2 Input (blue wire for DMV/BEZEL version or violet wire for standard module), pressing one of the digits on the keypad will program the corresponding frequency as the current tone to transmit. If the unit is powered down and then powered back up the default frequencies will be restored. During normal operation, any single digit press on the keypad will program the unit.

1.1. Controls and Indicators

The TRE-2 is controlled by the PTT input, which transmits the desired function tone and high and low level guard tone. The F1/F2 input allows you to select channel 1 or channel 2 when the PTT is pressed. The monitor input sends the monitor function tone along with the guard tone to monitor the remote base station.

TABLE 1				
TONE	**FREQUENCY**	**KEYBOARD DIGIT**	**TONE DURATION**	**RELATIVE LEVEL**
Guard	2175 Hz		120 msec	+10 dB
Function				
MON	2050 Hz		40 msec	0 dB
F1	1950 Hz	1	40 msec	0 dB
F2	1850 Hz	2	40 msec	0 dB
Function Tone with Keyboard Option				
F3	1750 Hz	3	40 msec	0 dB
F4	1650 Hz	4	40 msec	0 dB
F5	1550 Hz	5	40 msec	0 dB
F6	1450 Hz	6	40 msec	0 dB
F7	1350 Hz	7	40 msec	0 dB
F8	1250 Hz	8	40 msec	0 dB
F9	1150 Hz	9	40 msec	0 dB
F10	1050 Hz	0	40 msec	0 dB
F11	950 Hz	*	40 msec	0 dB
F12	750 Hz	#	40 msec	0 dB


TRE-2 ONLY
P3
P2
JU1
GRY/WT
WHT
GRN/WT
YEL
BLU
BLK
BRN
RED
GRN
R44 10K
R43 10K
R42 10K
R40 10K
R37 10K
R38 10K
R39 10K
R1 10K
+5V
C5 .1u
U1
MIDIAN
68705FP
VDD
SS/D5
VPP
NC
OSC2
OSC1
Y1
3.58 MHz
C14 22p
C15 22p
R9 4.7M
C7
C6
C5
C4
C3
C2
C1
C0
NC
B2
B4
RDI/DO
B5
IRQ
NC
D7
TCAP
TDO/D1
RES
B7
SCK/D4
MOSI/D3
MISO/D2
P1
F1/F2
(VIO)
MON SW
(ORG/W)
TEST MODE
(BRN)
PTT IN
(GRY)
D1A
D1B
D3A
D3B
D2A
D2B
A6
R6 10K
R4 20K
R34 *
R2 4.7K
R3 100K
Q1
B25
R5 10K
C1 560p
U2
9346
CS
SK
SI
SO
R41 100K
R7 100K
R8 10K
VIN
+5.5-15V
(RED)
GND
(BLK)
C2 .001u
C3 .47uF
C4 .47uF
VR1
MIC5206
R10 20K
R11 10K
R12 20K
R13 10K
R14 20K
R15 10K
R16 20K
R17 10K
R18 20K
R19 10K
R20 20K
R21 10K
R22 20K
R23 10K
R24 20K
R25 20K
R26 22K
R27 22K
R28 100K
R29 47K
SEE NOTE
R30 10K
R31 22K
C10 .47uF
C8 .01u
C9 560p
Q2
D25
Q3
D25
R32 4.7K
R33 82 Ω
TX
TONE OUT
(GRN)
SIDE TONE
SPKR OUT
(BLU)
N/C
N/C
N/C
R35 4.7K
Q4
B25
C11 100p
NOT USED
(GRN/W)
R36 4.7K
Q5
1A
C12 100p
C13 560p
NOT USED
(WHT)
NOTE: KEYPAD CONNECTOR ONLY W/ TRE-2 -- INSTALL JUMPER JU1
NOTE: REMOVE R29 TO MUTE SIDE TONE
* - NOT INSTALLED
MIDIAN ELECTRONICS
DATE NOV 97
DESIGN CJS
DWN.BY AIB
REV.JULY 19/06 AB
APPR.
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SCHEMATIC
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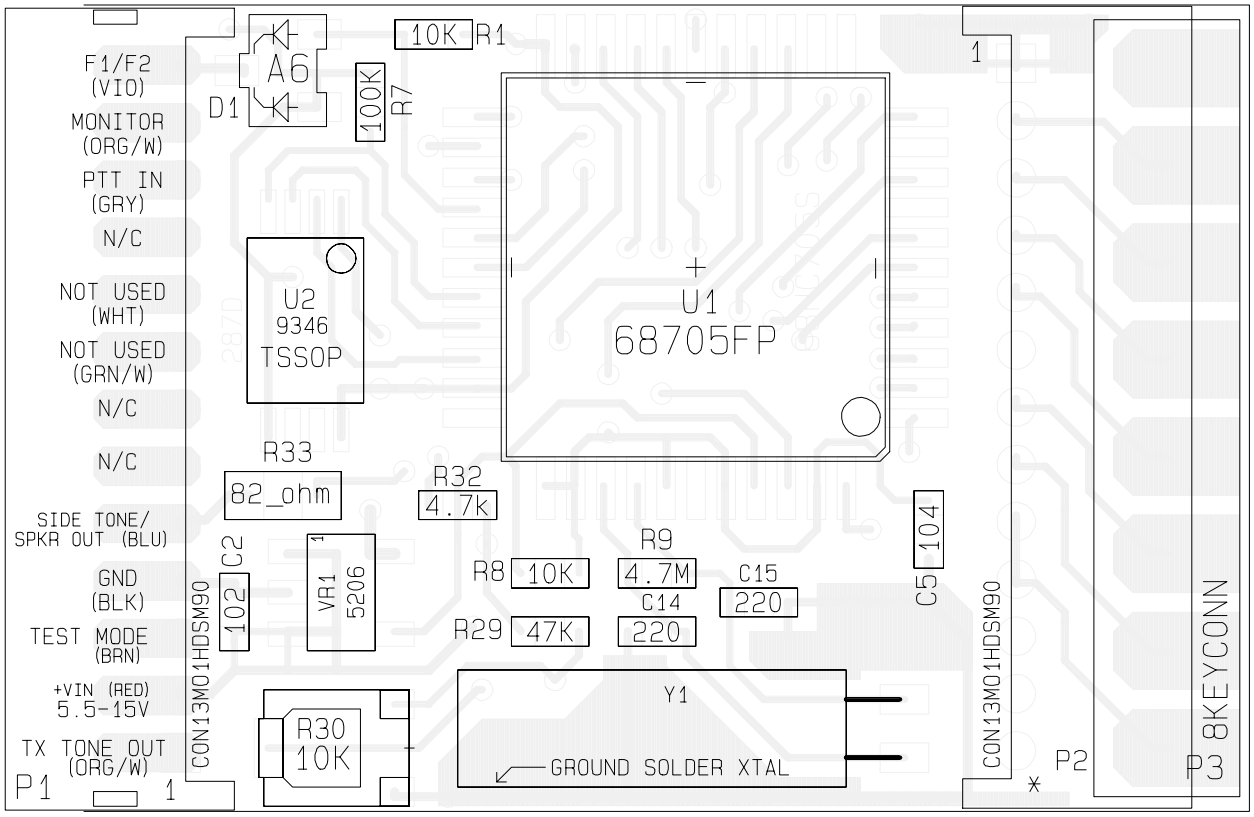

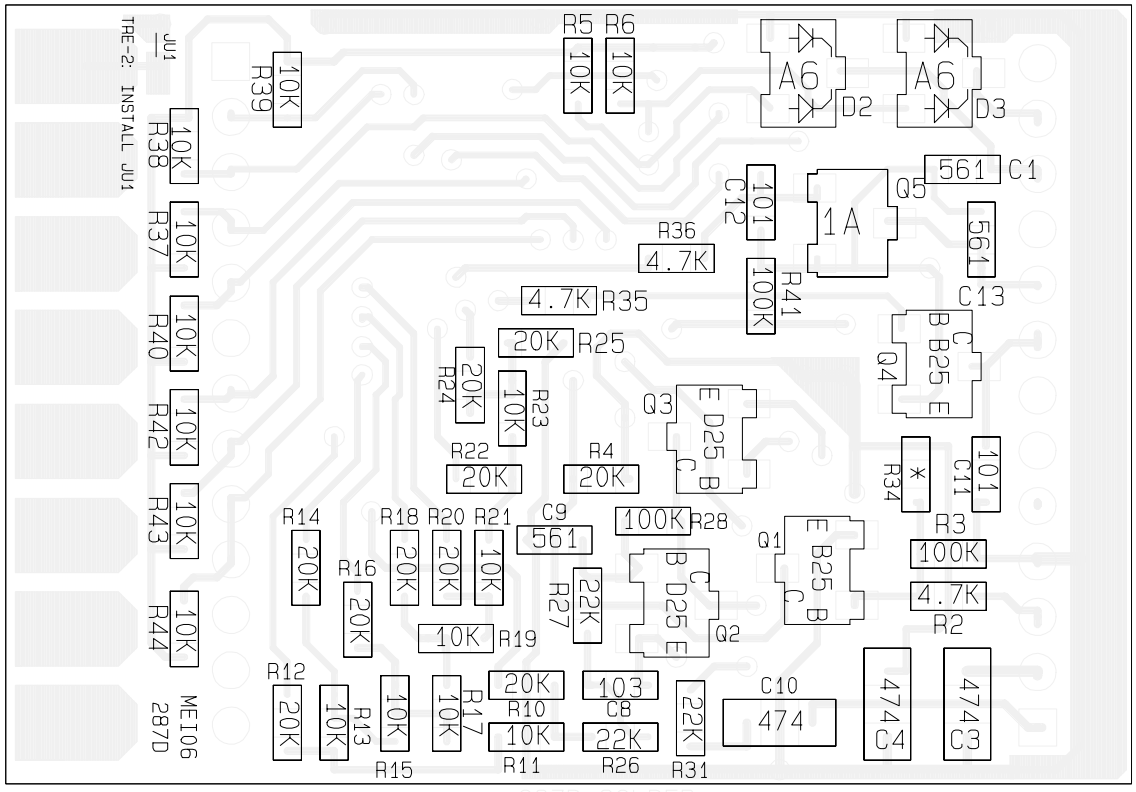

287D SOLDER

* NOT INSTALLED

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