TTD-3

1-4 Digit DTMF Decoder

Manual Revision: 2009-02-03

Covers Hardware Revision:
TTD-3: C & Higher

SPECIFICATIONS

Operating Voltage	6-24 VDC
Operating Current	5 mA
Operating Temperature	-30 - +60 C
Input Level	25-500 mV RMS
Input Impedance	600 KΩ
Ringing Outputs	1600 Hz
Momentary Output	250 mA
Latched Call Light	100 mA
Dimensions	1.34” L x 1.0” W x 0.26” H

GENERAL INFORMATION

The TTD-3 is a 1-4 digit DTMF decoder capable of decoding the 16 DTMF digits (0-9,*, #, A-D). The unit offers both momentary and latched outputs.

HARDWARE INSTALLATION

Be certain to follow standard anti-static procedures when handling any of Midian’s products.

Connector P1

P1-2 – Red – VIN +6-24 VDC – Connect to switched battery point in the radio.

P1-4 – Black – Ground – Connect to the nearest ground plane in the radio.

P1-5 – Blue – Alert Tone Output (Low-Z) – Connect to the radio’s audio circuit to provide an alert tone upon decode to the receiver’s speaker.

P1-6 – Orange – Tone Input – Connect to an audio point in the receiver, usually the high side of the volume control or discriminator output. When using CTCSS, pick up the audio after the high pass filter.

P1-7 – Yellow – Neg. Squelch Output – Connect to a point in the radio that mutes the audio with a low input. Grounding the monitor input or power interruption resets this output. If using this lead, ground P1-8 which is the Green/White lead for Positive Squelch Output.

P1-8 – Green/White – Pos. Squelch Output – Connect to a point in the radio that mutes the audio with a high input. Grounding the monitor input or power interruption resets this output. If more current is needed, decrease the value of R-10.

P1-9 – White – Call Output – This output is latched low upon decoding and may be used as a decode indicator. Grounding the monitor input or power interruption resets this output.

P1-10 – Gray/White – Momentary Horn Output – Connect to horn relay via ON/OFF switch.

P1-12 – Orange/White – Monitor Input – Un-squelches the radio via the yellow lead when the monitor input goes low from a high or floating state.

P1-13 – Violet – Alert Tone Output (High-Z) – Connect to a non-squelched high impedance point in the receiver audio speaker driver circuit for ringing or to the modulator circuit for transpond.

PRODUCT PROGRAMMING

The TTD-3 is programmable using a series of jumpers.

Setting the Decode Length: On the non-connector side of the PCB there is a series of pads for setting the length of the decoded sequence. Solder a jumper from the ground pad (length on the pictorial) to the pad corresponding to the number of digits (shown on the pictorial). The unit is set for 4-digits by default. If a different value is being used it will be necessary to un-jumper the 4 pad.

Programming the Decode Sequence: On the connector side of the PCB there are a series of pads for setting the DTMF digit(s) to decode. There are 4 groupings of 8 pads. On the pictorial each grouping is shown as having A, B, C, and D pads in one row and 1, 2, 4, and 8 pads in another row. To install a jumper, solder a jumper from the alpha pad to the numeric pad directly across from it. For example to program a "3" jumper A to 1, B to 2, and leave C and D unjumpered. The jumpers come from the factory in the out position which is the "D" digit. Set the jumpers in the positions that correspond to the desired digit as described in the table below.

DECODE NUMBER PROGRAMMING				
DTMF Digit	**A Position**	**B Position**	**C Position**	**D Position**
1	In	Out	Out	Out
2	Out	In	Out	Out
3	In	In	Out	Out
4	Out	Out	In	Out
5	In	Out	In	Out
6	Out	In	In	Out
7	In	In	In	Out
8	Out	Out	Out	In
9	In	Out	Out	In
0	Out	In	Out	In
*****	In	In	Out	In
#	Out	Out	In	In
A	In	Out	In	In
B	Out	In	In	In
C	In	In	In	In
D	Out	Out	Out	Out

OPERATION

Momentary Output: Upon decoding the proper DTMF sequence the momentary output (horn) will go low for approximately 3 seconds.

Latched Output: Upon decode the Squelch Output will un-mute the radio and the Call Output will latch low.

Alert Tone Output: Upon decode this output will go low for approximately 3 seconds and produce a ~2000 Hz tone.

Resetting the Outputs: The unit may be reset by cycling the power.

Resetting the Decoder: If the sequence of tones is interrupted for more than 3 seconds the decoder will reset. If a wrong digit is presented to the decoder input, the decoder will reset in 3 seconds.

TECHNICAL NOTES

Radio Compatibility: Midian has taken the utmost care to ensure the option board integrates into the radio with minimal impact to the features of the radio. However, some features may not be available in the radio when an option board is used. If a feature is not available, please contact Midian to see if the feature can be added.

MIDIAN CONTACT INFORMATION

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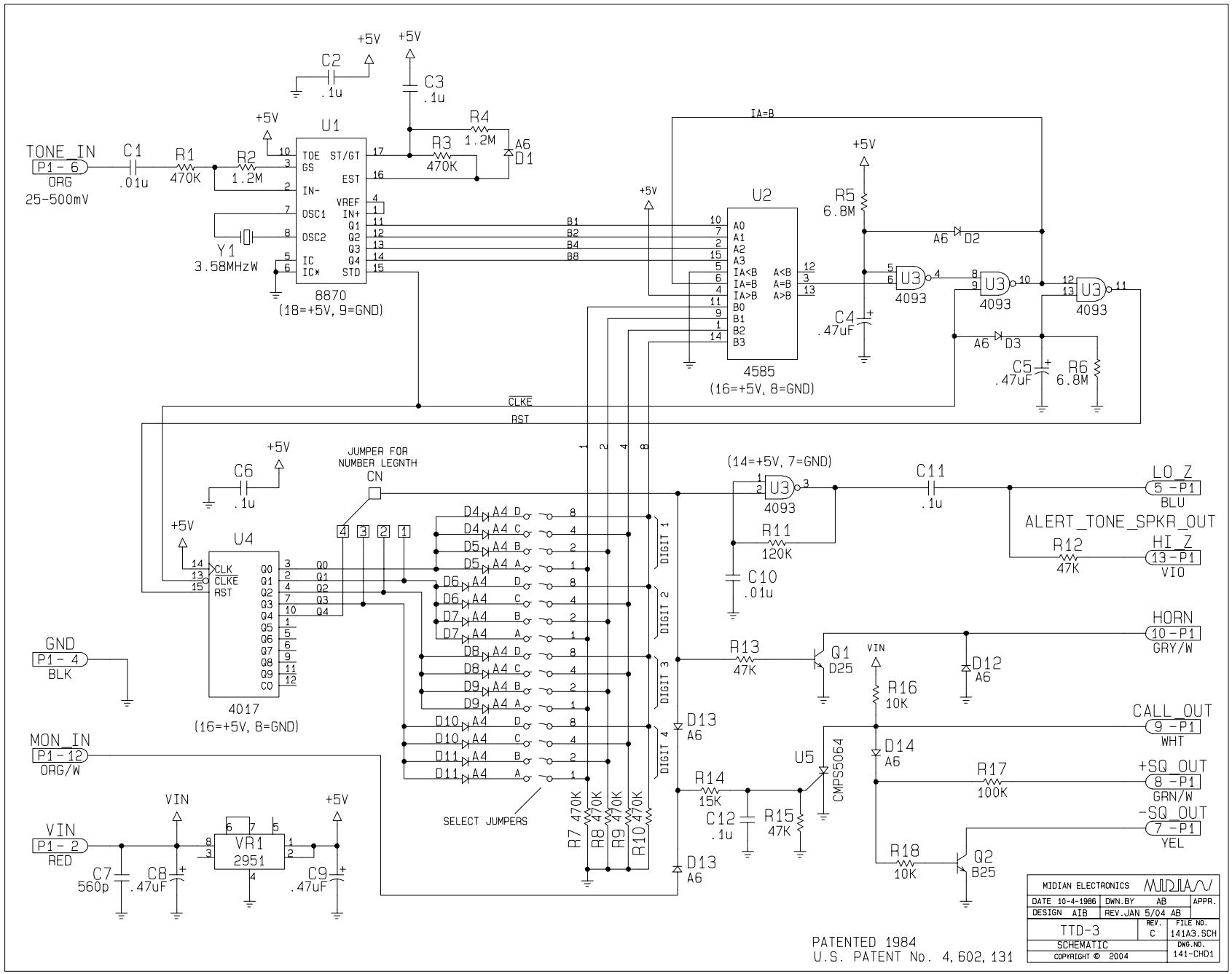
TONE_IN
P1-6
ORG
25-500mV
C1
.01u
R1
470K
R2
1.2M
U1
TDE
GS
IN-
OSC1
OSC2
IC
IC*
ST/GT
EST
VREF
IN+
Q1
Q2
Q3
Q4
STD
8870
(18=+5V, 9=GND)
Y1
3.58MHzW
C2
.1u
C3
.1u
R3
470K
R4
1.2M
A6
D1
+5V
B1
B2
B4
B8
U2
A0
A1
A2
A3
IA<B
IA=B
IA>B
B0
B1
B2
B3
A<B
A=B
A>B
4585
(16=+5V, 8=GND)
IA=B
R5
6.8M
A6
D2
U3
4093
C4
.47uF
A6
D3
C5
.47uF
R6
6.8M
CLKE
RST
JUMPER FOR
NUMBER LEGNTH
CN
C6
.1u
U4
CLK
CLKE
RST
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
CO
4017
(16=+5V, 8=GND)
GND
P1-4
BLK
D4 A4 D
D4 A4 C
D5 A4 B
D5 A4 A
D6 A4 D
D6 A4 C
D7 A4 B
D7 A4 A
D8 A4 D
D8 A4 C
D9 A4 B
D9 A4 A
D10 A4 D
D10 A4 C
D11 A4 B
D11 A4 A
DIGIT 1
DIGIT 2
DIGIT 3
DIGIT 4
SELECT JUMPERS
R7 470K
R8 470K
R9 470K
R10 470K
(14=+5V, 7=GND)
C11
.1u
LO_Z
5-P1
BLU
ALERT_TONE_SPKR_OUT
R12
47K
HI_Z
13-P1
VIO
R11
120K
C10
.01u
HORN
10-P1
GRY/W
R13
47K
Q1
D25
VIN
D12
A6
R16
10K
CALL_OUT
9-P1
WHT
D13
A6
R14
15K
C12
.1u
R15
47K
U5
CMPS5064
D14
A6
R17
100K
+SQ_OUT
8-P1
GRN/W
-SQ_OUT
7-P1
YEL
R18
10K
Q2
B25
D13
A6
MON_IN
P1-12
ORG/W
VIN
P1-2
RED
C7
560p
C8
.47uF
VR1
2951
C9
.47uF
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DWN.BY AB
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TTD-3
REV. C
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DWG.NO. 141-CHD1
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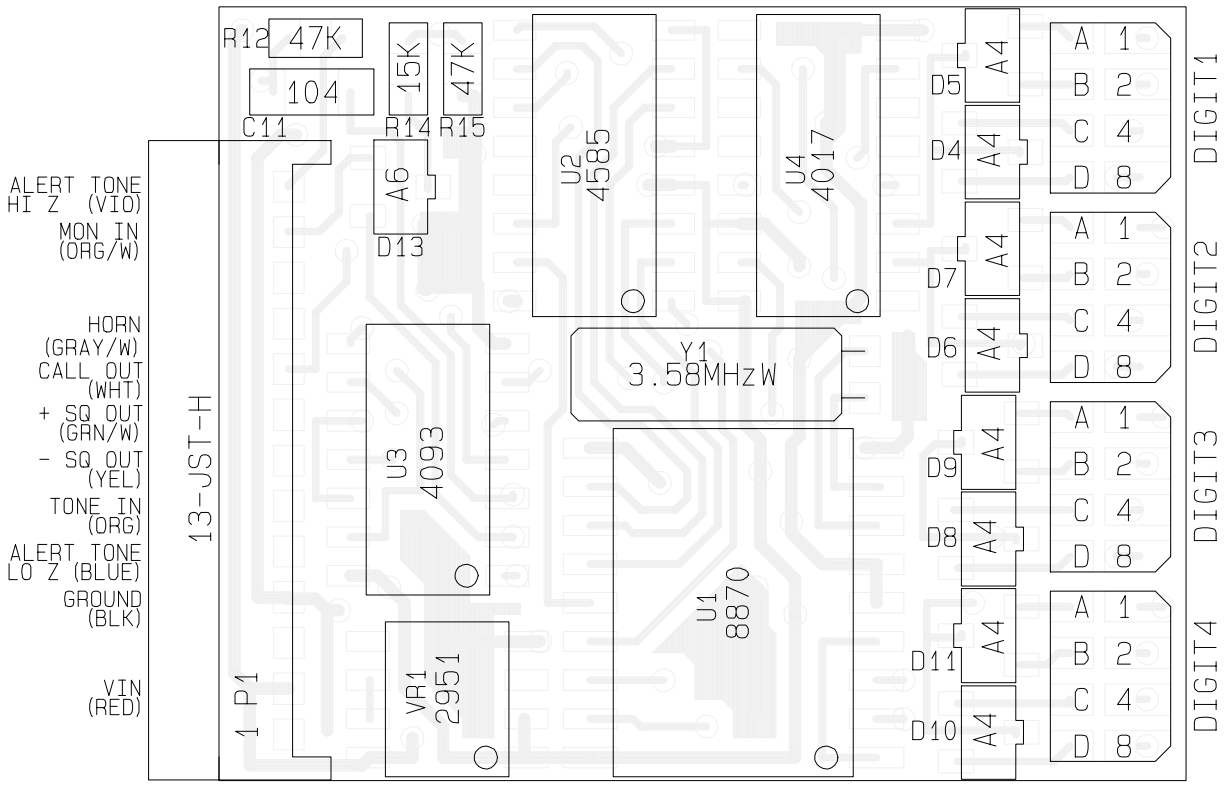

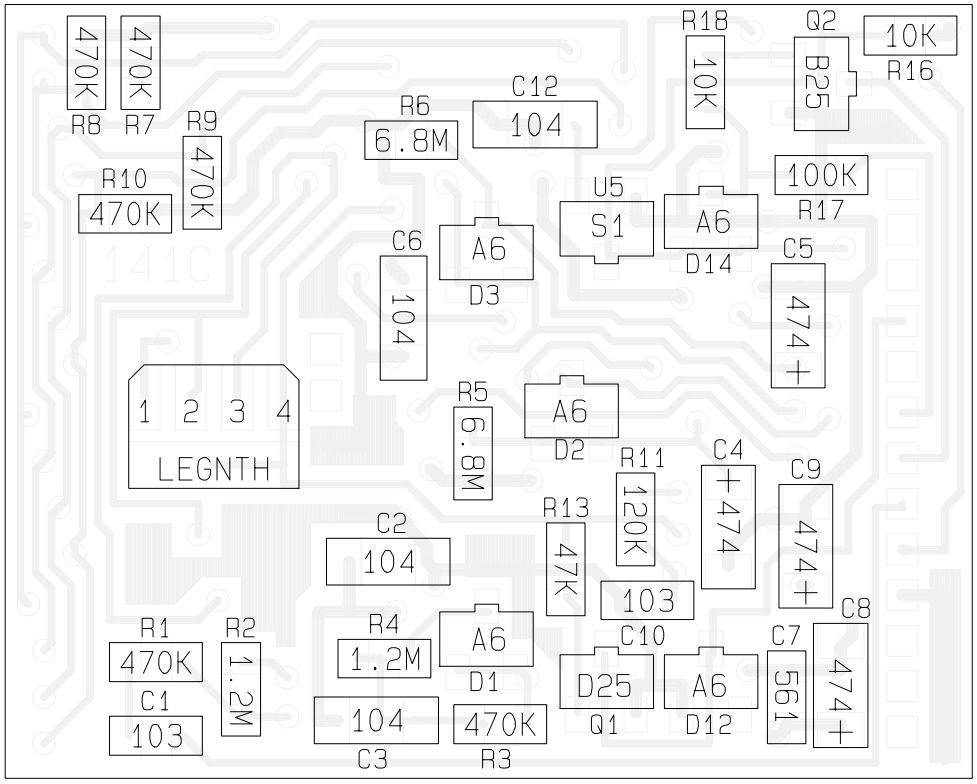

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