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DTMF display 32 kit with 2 line x 16 LCD display

Our DTMF display can display up to 32 characters (16 per line). The display can be cleared by a button (not supplied) or can auto clear on a timed basis from receipt of the last character.

The input circuit is the same as our DTMF decoder kits, therefore it can be configured for unbalanced, balanced or microphone input. When an Electret microphone is connected it can pick-up tones from a speaker phone a few inches away.

Connecting a momentary ON button between the button input pin and 0V pin clears the display on pressing, however holding the button during power-up enables the timed reset mode. In timed reset mode the display is automatically cleared 10 seconds after the last character is received. Fitting a jumper to the middle two pins of CN3 will enable timed reset mode every time, without pressing the reset button. The reset button will still clear the display on pressing.

The 'contrast' preset should be adjusted for best display contrast between text and back ground; there will be nothing on the display over a large amount of the adjustment range.

Complete kit of parts including pre-programmed PIC micro, gold plated PCB, LCD display, nuts bolts and spacers.

Runs from 7 to 16V DC at a few mA.

This kit is supplied with a backlit display, a 220 ohm ½ watt resistor (ideal for 12-14V supply) is included on the PCB and a jumper enables the backlight.

Please make sure you fit the pins and socket for the display connection on the back of the LCD & PCB as shown in the pictures.

The overall size of the assembly as pictured is 82mm wide, 36mm high, 30mm deep.

A PDF data sheet for the HT9170B maybe viewed at:-

cstech.co.uk/ht9170.pdf

DTMF Display 32 (2 line 16 character LCD) Parts List

IC1	78L05
IC2	HT9170B
IC3	PIC16F627A (programmed)
D1	1N4148
XT1	3.579MHz crystal
R1*	4K7
R2, 4	not fitted
R3*	270K
R5	wire link
R6*	1K
R7	330K
R8	47K
R9, 11	10K
R10	220R ½ watt
VR1	10K variable
C1, 5, 6	100nF (marked 104)
C2	not fitted
C3, 4	22pf
C7, 8, 9	1uF (observe polarity)
CN1	3 pins
CN2	2 pins
CN3, 4	4 pins
LCD connector	16 way socket (fit to back of decoder PCB)

Also supplied:-

DTMF display PCB Issue B
Crystal insulator pad
2 x 10K for unity gain input configuration
1 x 16 pin header for LCD display (fit to back of LCD)
1 x 2 line 16 character LCD display
2 x nuts, bolts and spacers
2 x Jumpers

*Note:-

Only fit R6 if using an Electret microphone as input.
Only fit R1 and R3 as 4K7 and 270K for use with a microphone otherwise fit R1 and R3 as 10K or calculate a custom input configuration from HT9170 datasheet.

DTMF Display 32 application notes follow.

There are 3 input configurations for our DTMF decoder, Electret microphone, un-balance and balanced, the 3 options are shown below in the circuit extracts. The HT9170 DTMF decoder chip has a wide input signal range from approx. 27mV to 775mV, but as it contains an op-amp at it's input and the op-amp gain can be altered using different resistor values, many combinations can be achieved.

Please see notes below:

The Electret microphone input version provides power to a microphone insert via R6 (1K) and using R1 at 4K7 and R3 at 270K to set the decoder chip's input op-amp gain to x57 the sensitivity allows pick-up from a DTMF tone pad at a couple of inches. A speaker phone, two-way radio speaker or the keypad tones from a mobile can be picked up 6 to 12 inches away.

We do not recommend increasing the input gain any higher.

Connect the microphone between pins 1 and 2 (2 = GND).

Resistors are provided in the kit for this option.

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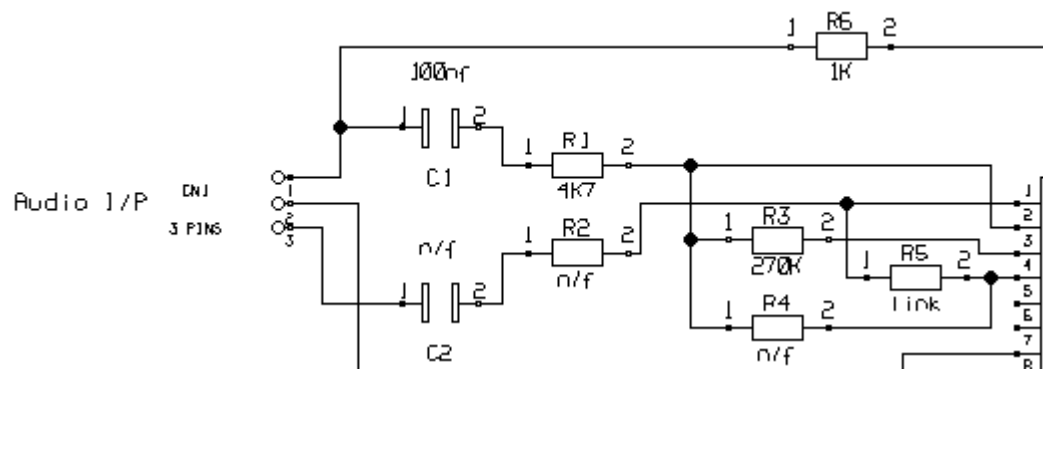
The following example offers an un-balanced audio input, using 10K resistors for R1 and R3 sets the decoder chip's input gain at x1 and gives an input impedance around 10K, R6 is omitted and this configuration can be fed directly from say the Packet modem RX audio output of a Ham radio, or from one of the earphone outputs of say a Nokia 1208 mobile phone.

If it is desired to change the input gain then increase R3 for higher gain and decrease R3 for lower gain.

Connect the signal source between pins 1 and 2 (2 = GND).

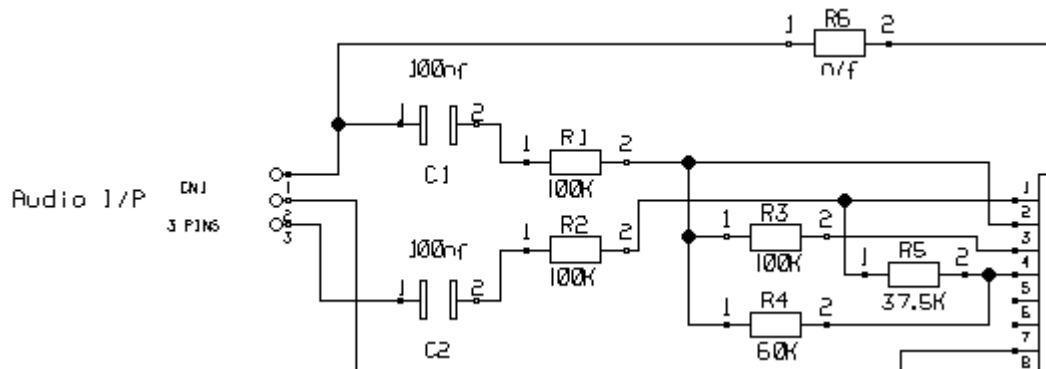Resistors are provided in the kit for this option.

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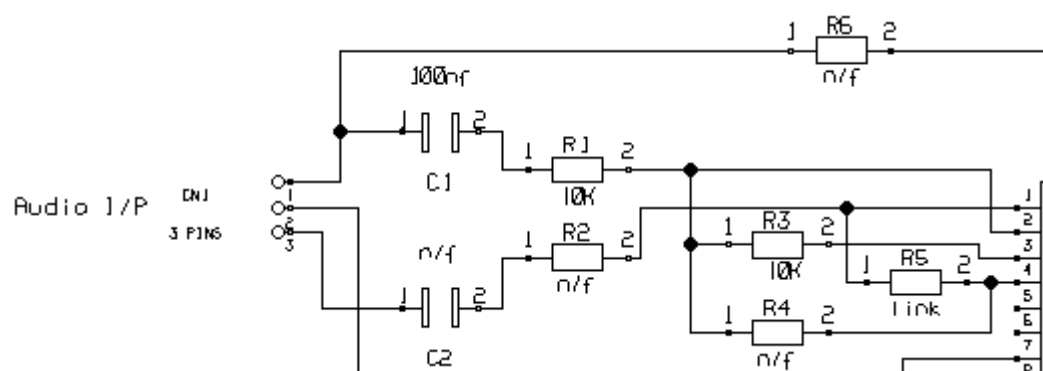
This example of a balanced audio input can be connected to say the earphone audio outputs of a GSM modem, with the values shown the decoder chip's input gain is also x1, however this can be changed as required, see the HT9170 data sheet (cstech.co.uk/ht9170.pdf) for the calculations.
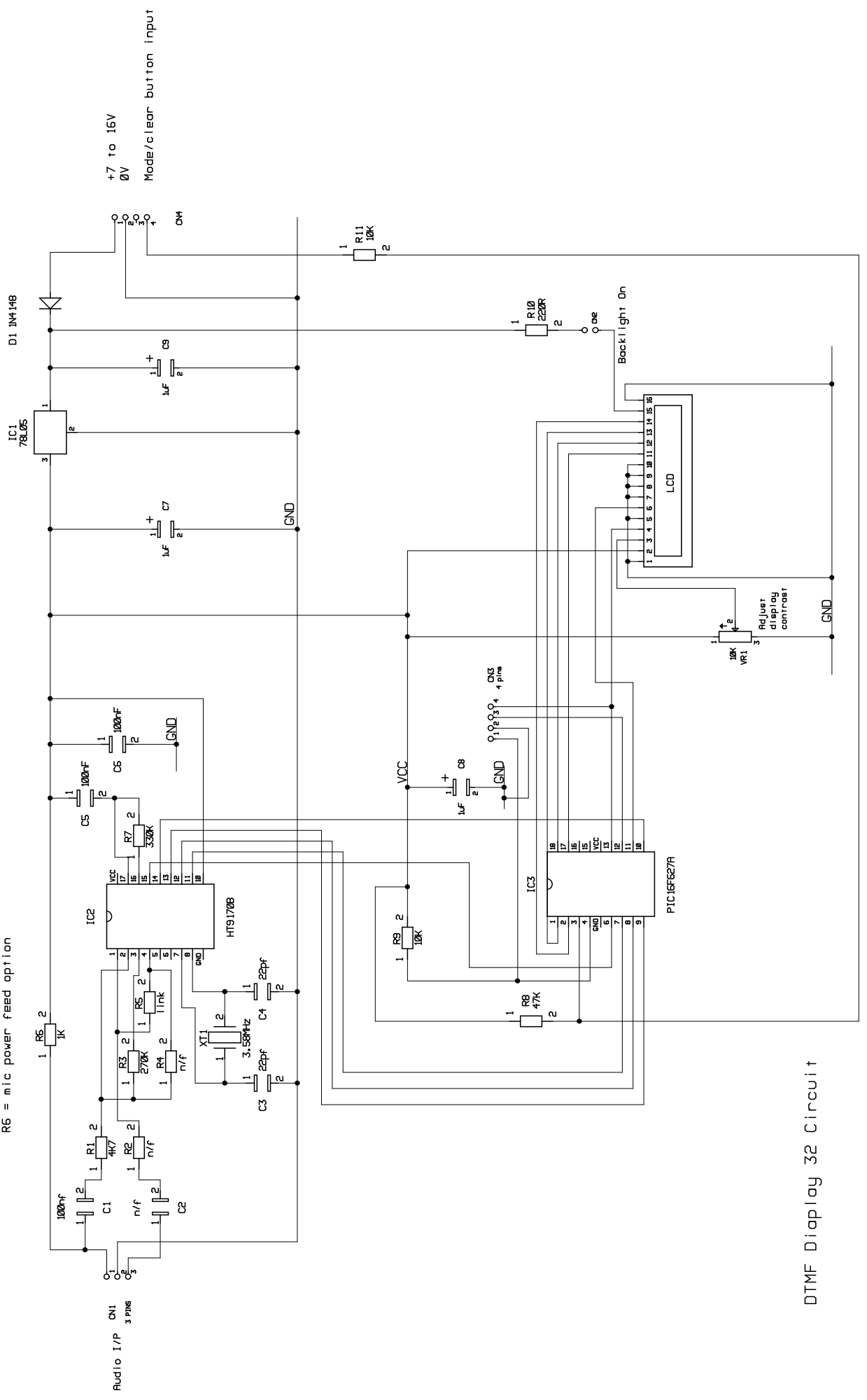
Connect the signal source between pins 1 and 3.

Resistors are NOT supplied in the kit for this option as there are many combinations that could be required.

62K and 36K can be used instead of 60K and 37.5K

DTMF Display 32 Circuit

R1 & R3 set op-amp input gain

C2, R2, R4 & R5 are for balanced input

R6 = mic power feed option

+7 to 16V
ØV
Mode/clear button input

CN4

R11 10K

D1 1N4148

C9 1µF

IC1 78L05

C7 1µF

GND

R10 220R

CN2

Backlight On

LCD 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

GND

Adjust display contrast

10K VR1

CN3 4 pins

C8 1µF

VCC

GND

IC3 PIC16F627A

R9 10K

R8 47K

1000nF C6

GND

100nF C5

R7 330K

IC2 HT9170B

22pf C4

XT1 3.58MHz

22pf C3

R5 link

R3 270K

R4 n/f

R6 1K

R1 4K7

R2 n/f

100nF C1

n/f C2

Audio I/P CN1
3 PINS