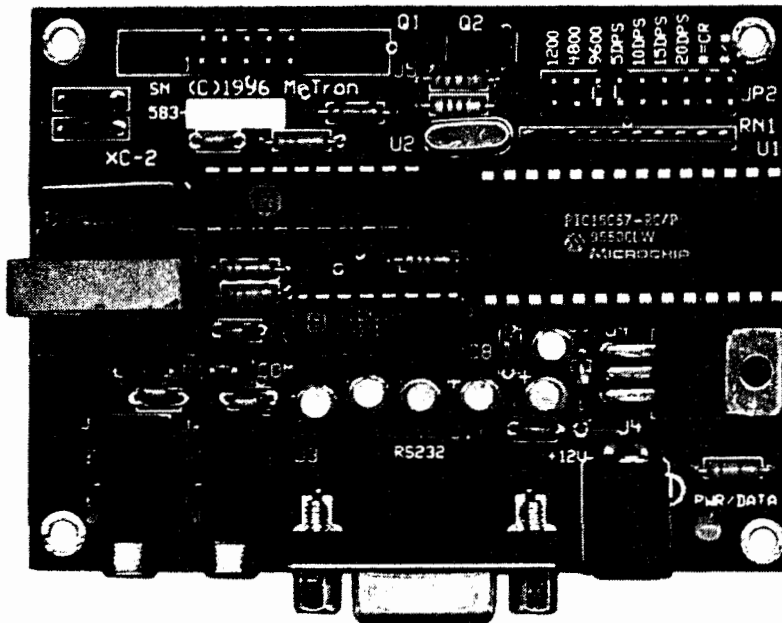


XC-2 DTMF To ASCII Transceiver



The New **MoTron XC-2** is a bi-directional DTMF to ASCII transceiver, replacing the discontinued XC-1. Like its predecessor, the **XC-2** is a small profile printed circuit board which may be used alone or integrated into a larger design. DTMF digits are decoded from the audio line, converted to ASCII, and transmitted out through the serial port. ASCII data is received from the serial port, converted to DTMF digits and transmitted on the audio line. The **XC-2** uses the RS-232C serial communications protocol and includes a PTT output.

Unlike the XC-1, however, the **XC-2** is user-configurable. Using jumper plugs, the user can select either 1200, 4800 or 9600 baud for the serial port and a 5, 10, 15 or 20 characters per second DTMF transmission rate. Additional jumpers can be used to set DTMF "#" to generate an ASCII "CR", and to control an open-collector output with DTMF "*" (on) and "#" (off). Audio connection options allow combined audio signals, AC isolated using a transformer, or separate audio input and output via standard 3.5mm jacks. A standard DE-9S is used for serial communications and the PTT output can be used to control a radio transmitter.

The **XC-2** is a fully assembled and tested printed circuit board, requires +8 to +17 VDC @ 200ma, and is only 2-1/2" x 3-1/2" OEM and Quantity discounts are available.

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Operation Guide

XC-2 DTMF/ASCII Transceiver

General description

The XC-2 will decode DTMF received on the audio line input and convert it to 1200, 4800 or 9600 baud 8 bit, no parity, 1 stop bit ASCII data. ASCII data from the computer will be converted to DTMF and output to the audio line. A 600:600 ohm transformer is provided for AC isolation. A blocking capacitor provides DC isolation.

Input/output

Connections are made via a ten pin IDC connector, or via discreet jacks for audio in/out, DE-9S for data and a coaxial power jack for DC input. JP1 is an audio combining jumper. With the jumper on both the audio in and out are coupled together so that audio can be received and transmitted through the transformer. For some applications, such as a radio interface, it may be advantageous to separate the audio input from the output. Remove the COM jumper, JP-1, and use J1 for audio in and J2 for audio out. An 8 to 15 VDC @100ma (or higher) power supply, center pin positive, can be plugged into the coaxial power jack. A straight pin to pin male to female 9 pin cable can be used for direct connection to a computer.

The pinout of the 10 pin connector is shown on the schematic. L1/pin 2 and L2/pin 3 are the audio line inputs. Ground wires 1 and 4 run on either side of the line input wires of the ribbon cable to add extra protection from outside interference. Pins 5/6 are an open-collector output that can be used for PTT (Push To Talk) to key a radio transmitter. The open-collector output can also be used as a general purpose control output when the */# jumper is in place. Pin 7 is the computer receive connection, this carries data out from the board to the computer and should be connected to pin 3 on a DB-25 serial interface and pin 2 on a DE-9 laptop type interface. Pin 8 is computer transmit line which carries data from the computer into the board. This should be connected to pin 2 of a DB-25 interface or pin 3 of a DE-9 connector. Ground should go to pin 7 of a DB-25 or pin 5 of a DE-9. Pins 9 and 10 are used to input +8 to +15 VDC to the board.

Power LED

The power LED has a dual function. When power is applied to the board, the LED should light. Whenever a DTMF digit is decoded the LED will turn off as long as the digit is being received. This is a convenient way to determine if your audio input is connected properly and the board is decoding all the digits.

Control Output

The open collector output that appears on pins 5 and 6 goes active low when an ASCII "P" is received from the computer and goes open upon receipt of an "N". This can be used to control a radio PTT relay. When the */# jumper is in place on JP2 then a star (*) DTMF digit can be used to turn it on and a pounds (#) will turn it off. To operate a relay with this output, place +12 volts on one side of your relay (assuming it is a 12 volt relay) and connect the other side to pins 5 and 6. When the output is active (on) it will complete the ground path and switch on your relay.

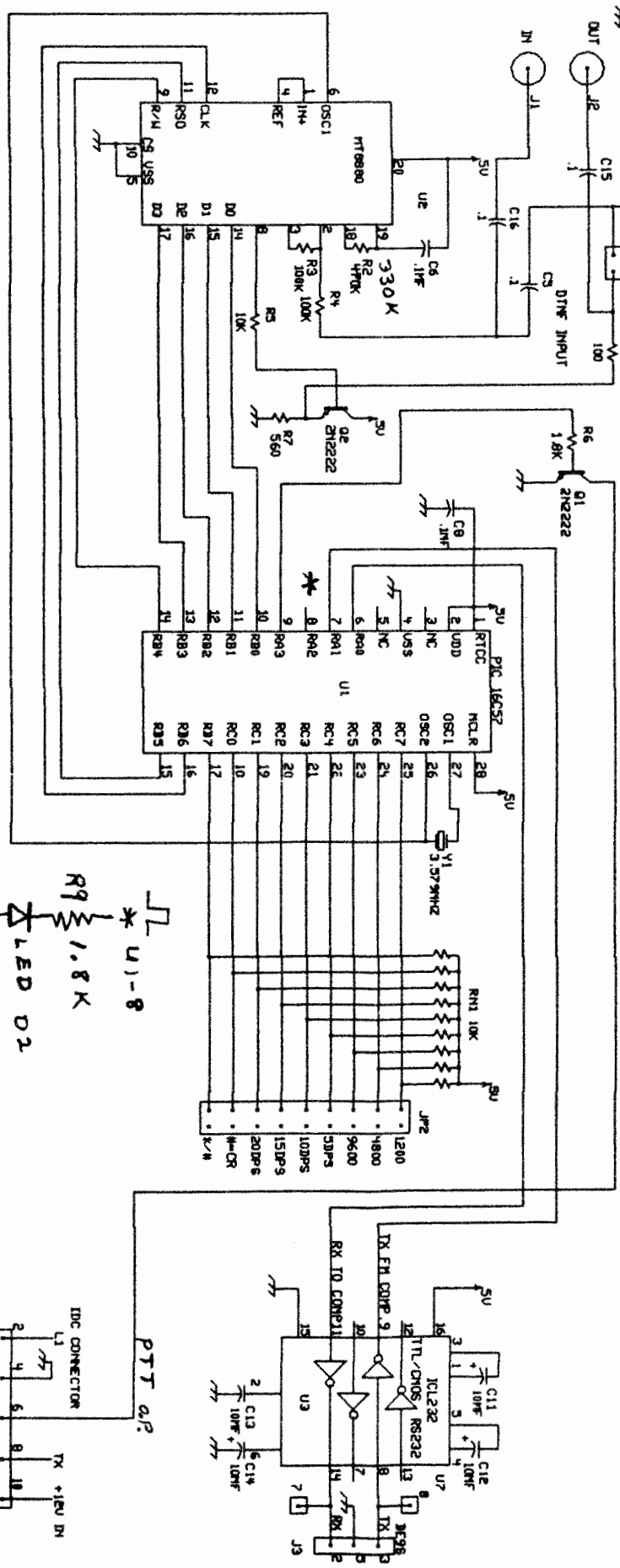
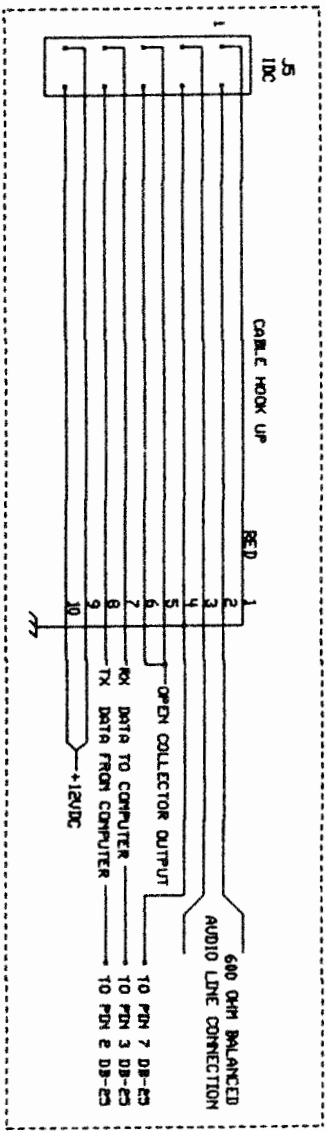
Baud rate - DTMF speed

Baud rate settings are made using JP2. Place a jumper on either 1200/4800 or 9600 baud. The rate at which DTMF digits are sent is determined by the settings on JP2. Select from 5, 10, 15 or 20 DPS (Digits Per Second). Timing uses a 50% duty cycle, or the same length of tone as space between tones. If you change a setting on JP2, you must remove power as the jumper settings are only read on power up.

The ASCII data from the computer is buffered in the PIC micro-controller until a carriage return is received or the 48 digit buffer is filled. A comma (,) is interpreted as a one second wait.

Decoded DTMF will immediately be output to the computer. The MT8880 will decode at about 12.5 digits per second (40ms tone/space) when R2 is 330K. If you want to decode faster, the value of R2 can be lowered. A value of 100K will cause it to decode at about 25 DPS. Raising the value of R2 will create a longer guard time.

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