

# WMR918 APRS Interface

Handling instructions v1.0

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This interface is to be installed between the WMR918 Oregon Scientific weather station, and a common Amateur Radio transmitter. It will read the output data from the station, and convert it to APRS WX format, that will be, then, transmitted by the radio.

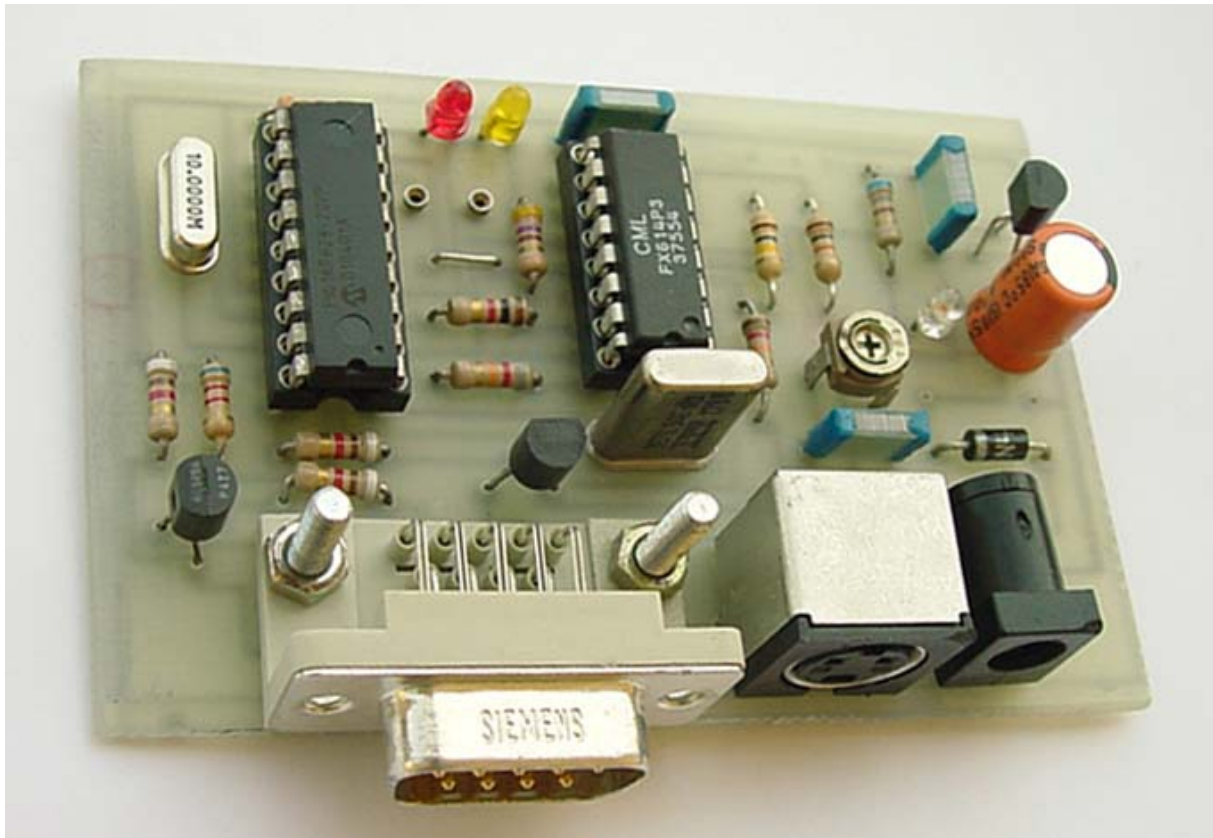


Fig. 1 – WMR918 APRS interface

## Circuit description

This interface is based in a PIC microcontroller, and a chip modem FX614, that outputs the audio to the radio. The power supply is obtained from +12VDC, and uses a normal serial computer cable to connect the interface to the WMR918. The interface only uses RX Data from the WX station. The connection to the radio is made trough a simple mini-DIN plug that carries the Audio to the radio, the Audio from the radio, and switches the PTT.

Taking a closer look at the schematic, it can be seen that the interface does not need any adjustments beside the amplitude of output Audio. Once done, the interface can be closed in a box, and it does not need to be open anymore.

The interface has three output led's, indicating the status of the interface, a red led signals the PTT activation, a green led signals Power On, and a yellow led signals a Busy channel.

The interface will read from the WMR918 output the signals from the Wind sensor, Rain sensor, Output temperature/humidity sensor, and inside temperature/humidity/pressure/forecast sensor, and will convert them to APRS data, to be transmitted by the radio.

## Electrical specifications

- *Absolute maximum ratings*

Storage Temperature = -55 - 125 °C

Operating Temperature = -40 - 85 °C

Power Supply  $\leq +25.0$  VDC

Supply Current = 30mA

Audio OUT Level Driving  $\Rightarrow$  40Kohm load = 2.0 dB

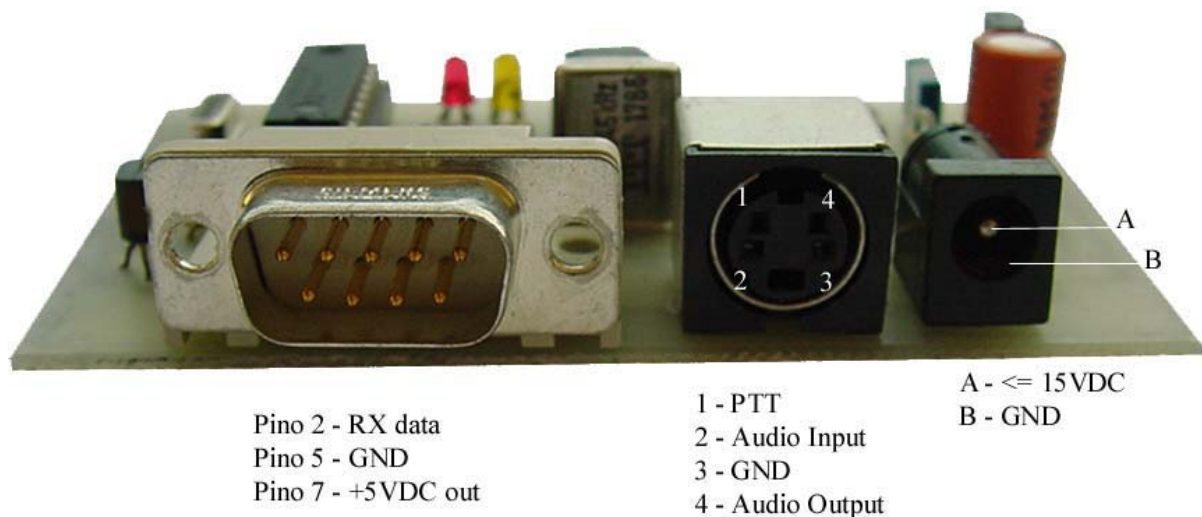
- *Nominal ratings (25 °C)*

Power Supply = 12V – 13.8V DC

Supply Current =  $<15$ mA

## Connections

The connections that have to be made are very simple and straightforward. You will need a normal complete serial cable, a mini-DIN plug and cable with 4 conductors, and a power jack with 2 conductors of 1mm<sup>2</sup> section. More detailed:



## Functional description

After all connections are made, is time to power it up!!

Mind that you need to lay the PCB in a non-conductive plane, if it is not already inside a nice box!

If all connections are well made, and both WMR918 and the Interface have power, after 1 minute the interface will transmit an APRS WX packet with all the information read from the WMR918. This information contains wind speed, wind direction, pluviometer, temperature, humidity, pressure, forecast, and, if any, errors.

The output audio may need to be adjusted. Force beacons and adjust potentiometer with a screwdriver until it sounds clear, strong and with no saturation.

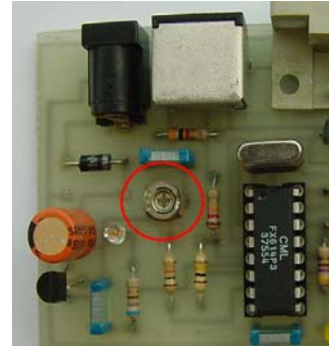


Fig. 3 – Audio adjust

1 minute is the necessary time for the Interface to acquire all the relevant weather data. Why? Because the WMR918 does not send all the data in a row. The WMR918 output data, each time a sensor transmits its values (mind that the WMR918 is a wireless wx station). So, if you connect the WMR918 straight to a computer running a terminal program, showing data in hexadecimal, you will see a new data string appearing once in a while (activate hardware flow control). This is the reason why the Interface needs at least 1 minute to acquire all the relevant weather data.

Each time the Interface transmits, first it will check if the frequency is not busy, signalled by the yellow led on. If not, then the red led will be activated, signalling PTT on and transmission in course.

After this first minute transmission, there will be a transmission every 20 minutes.

A transmission may be forced any time it is necessary, by shorting those two pin connections between the chip modem and the PIC, with a key or a screwdriver, anything that is conductive. **ATTENTION!! DO NOT TOUCH ANYTHING ELSE THAT MAY CAUSE DAMAGE TO THE INTERFACE!!**

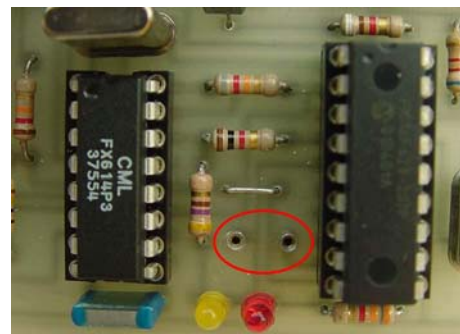


Fig.4 – Where to force beacon

After each transmission, the PIC will reset his WX data values, to avoid accumulation of bad data output by the WMR918 (there are hidden bugs, output by the WMR918). It will also reset the timer of the beacon.

## Additional information

Apart from the WX data, the Interface also transmits the weather forecast, output by the WMR918, and an error condition, if any, informing the user that a particular sensor is with a low battery that needs to be changed.

The forecast messages are: clear sky, partly cloudy, cloudy and rain.

The error messages will appear like” – Error: x” after the forecast or the WX string, with an ASCII character where the “x” is. These characters are taken to a table, converted to a binary number and compared with the equivalent sensor morphology. If the bit is 1 the sensor has error, if bit is 0, the sensor is in good conditions. Bit 0 relates to the wind sensor, bit 1 to the rain sensor, bit 2 to the outdoor temperature/humidity sensor, and bit 3 to the indoor temperature/humidity/pressure/forecast sensor. (Bit 0 is the most left one)

Here is the table with the 15 possible combinations of error messages:

Error char	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
Error binary	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111

By this table, you just have to look up the char and you know which sensors have problems.

## Troubleshooting

The green led is always off – check led; check if there is power available in the supply cable; check if the cable is in a good conditions; check both input diodes;

The green led is on, but the Interface does not transmit – turn the power off, and then on again, if it still does not work, check the PTT transistor, it may be burned (force PTT manually and force a beacon, if you have audio, then the PTT transistor is inoperative); if you have automatic PTT but no audio, or if nothing works contact your supplier, the PIC/Modem may be malfunctioning;

The Interface only transmits after the first minute, and never more – turn the power off, and then on again, if it still does not work, contact your supplier, the PIC may be malfunctioning;

The output WX data is all 0's – check if WMR918 is on; check if serial cable is ok; check if there are +5VDC at pin 7 of the Interface DB9; connect the WMR918 to a PC running a terminal program and check if it outputs data; if the problem persists, contact your supplier;

The output WX data has strange values – wait for more beacons, if the problem persists, contact your supplier and tell him the problem, the problem may not be the Interface, but yes an output bug from the WMR918 (there are hidden bugs).