1. Alignment

The MX920 test and alignment section assumes that the radio is a working module.

Please also see supporting Software Manual for Alignments.

1.1.1 TX Power Adjustment

1.1.2 Peak Deviation and Modulation Balance Alignment

This procedure is used to set the peak deviation and modulation balance for each channel. This can be done on a per channel basis or all channels can be set at once. The alignment is done using the Alignment Screen in the built menu system . To carry out this procedure the demodulated output of the transmitter output needs to be connected to a CRO or some other piece of equipment giving a visual display of the demodulated output. IF Bandwidth of the RF test set should be set at 20kHz or greater (230kHz on the HP 8920) and de-emphasise should be off. The audio filters should be set at <20Hz HPF and 15kHz LPF.

To alter all channels at once use the 'Factory default alignment (All Channels). The peak deviation is aligned on wide band and without CTCSS\DCS Tone enabled. The following table specifies the peak deviation to align to.

Bandwidth	CTCSS Option	Peak Deviation (Hz)
Wide (25kHz spacing)	NO	4800

*Table 1-1 Peak Deviation Settings*

The alignment channel for this routine is the middle frequency band. The test tones used in this routine are generated internally and are a 1 kHz square wave for the transmitter deviation and a 400 Hz square wave for the modulation balance.

Procedure:

1.   Using in built menu system, select --- ALIGNMENT MENU –

2.   Now select either to 'Align current channel (Individual)' OR 'Factory default alignment (All Channels)'

3.   If 'Align current channel (Individual)' select Tx Deviation and Modulation Balance - current channel

4.   The radio will now transmitter.

5.   Follow the built in menu system instructions.

6.   The transmitter will be modulated with test frequencies (1kHz, & 400Hz tone generators under micro controller control)

7.   Adjust the VCO Deviation digital potentiometer using built menu system until a correct deviation is obtained. (See Table 1-1 Peak Deviation Settings).

8.   Adjust the Reference Deviation digital potentiometer until the top of the waveform is flat. If the waveform top droops increase the level (see Figure 1-1) and if it peaks reduce the level (see Figure 1-2).

9. Repeat steps 5 through to 9 until the correct peak deviation and modulation balance is obtained.

Examples of incorrect, observed waveforms are as follows:
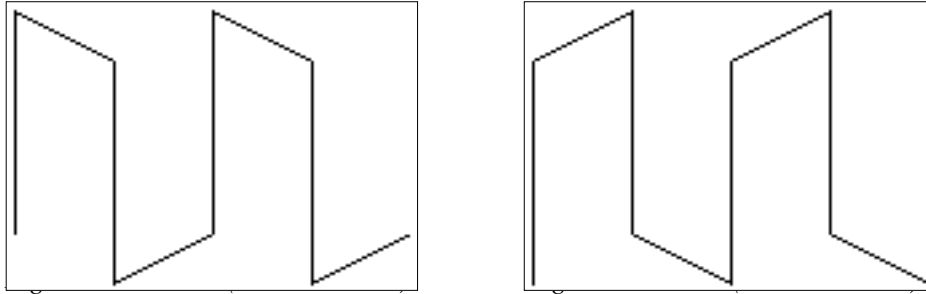
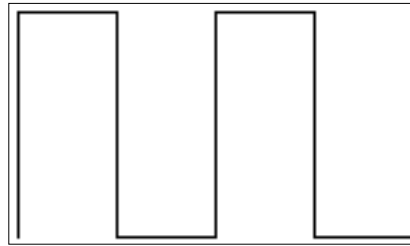The waveform when correctly aligned should look as follows:

Figure 1-3 Correctly Aligned Waveform

Choose 'OK' to accept the changes made. This then saves the changes that you have made to the radio.

After balancing and setting the correct peak deviation is necessary to align the reference oscillator and re-check the deviation alignment, as the reference oscillator alignment affects the deviation. This may require running through the deviation alignment again after the oscillator alignment procedure.

1.1.3 TX Power & Centre Frequency Alignment

The transmitter power setup is used to set the correct power for each channel. This can be done on a per channel basis or all channels can be set at once.

The reference oscillator alignment is used to set the correct centre frequency for each channel. This can be done on a per channel basis or all channels can be set at once. Oscillator alignment is done using a digital potentiometer adjustment through the Built in menu system. To carry out this procedure the transmitter output needs to be connected to a RF test set displaying the frequency error and RF power meter. This procedure should be done after the deviation alignment procedure has been done. Transmitter modulation we be disabled.

Now select either to 'Align current channel (Individual)' OR 'Factory default alignment (All Channels)' Select Tx Reference Oscillator and Output Power and follow the in built menus instructions. Alter the Reference Oscillator Frequency potentiometer until the channel is "on frequency". Choose 'enter' to accept the changes made. This then saves the changes that you have made to the radio.