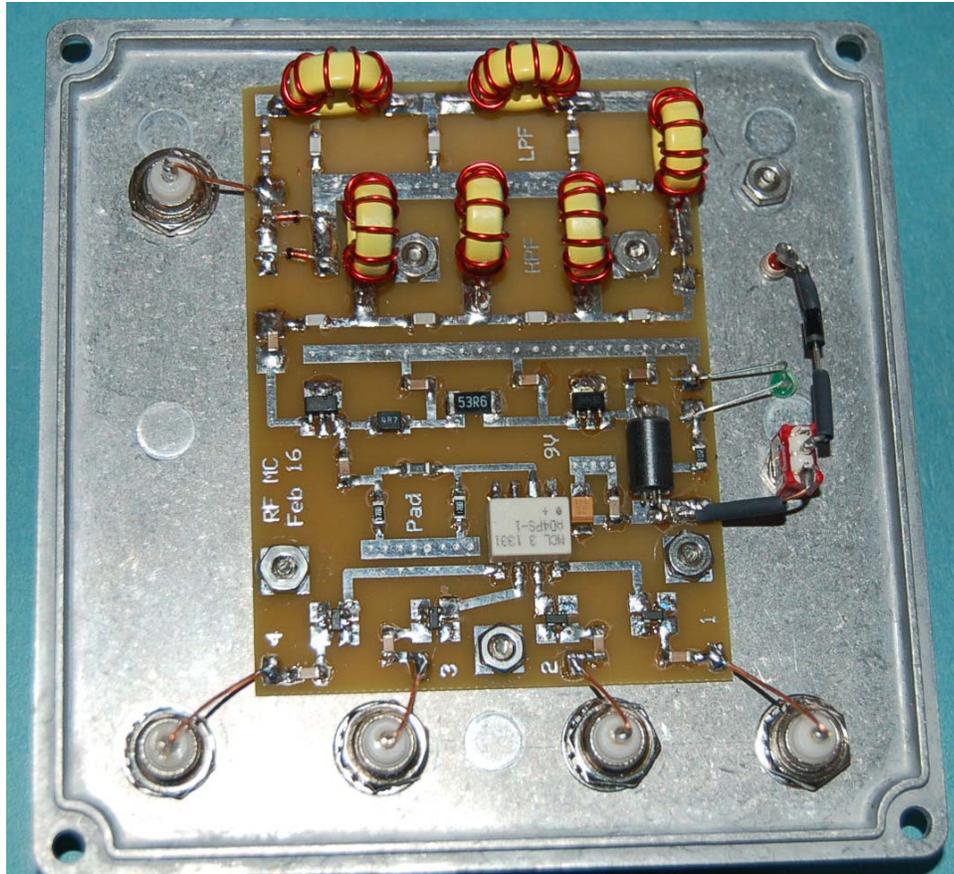


4-Port Multicoupler and Bandpass Filter

Matched Pair for Dual Polarization use



RF Associates LLC
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Multicouplers in your system

You are receiving two matched multicouplers for use with your TFD dual polarization antenna array. Each multicoupler has a single 50 ohm input port and splits the incoming signal into four 50 ohm output ports. One MC should be connected to the RCP coax from your antenna and the other MC to the LCP coax.

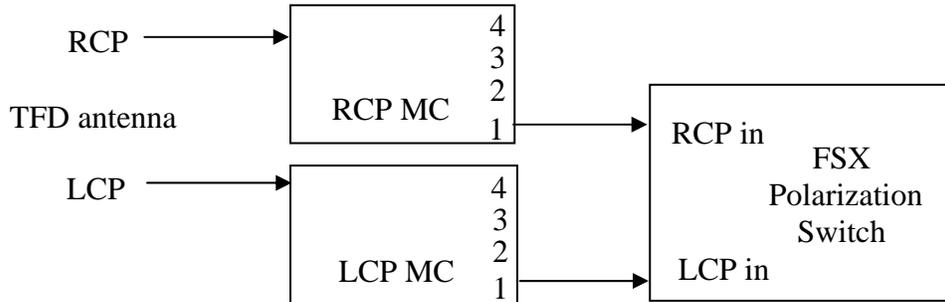


Figure 1 Matched multicouplers connected for use with the TFD antenna. For use with LWA use ports 2, 3, or 4 to connect to spectrograph.

When using a TFD antenna, the output of port 1 should be connected to the FSX polarization switch port of the proper polarization. Output port 1 provides approximately 10 dB of gain and is a good match between the TFD antenna (which has about 4.3 dB of loss in the internal balun and load resistor) and the FSX spectrograph. Output ports 2, 3, and 4 provide typically 3 dB of gain and are available for use with other receivers.

If using the multicouplers with an LWA type antenna it will be preferable to connect the spectrograph polarization switch to any port other than #1. Ports 2, 3, and 4 have 3 dB of gain and are better suited to the LWA (which itself has 19 dB gain in the active baluns).

Isolation

The 4-port multicoupler (MC) provides low noise amplification and high isolation between output ports (in excess of 45 dB). This means that a signal injected into one of the output ports from a receiver will be attenuated by over 45 dB at any other output port. Most receivers generate various frequencies for use as local oscillator signals and these signals are often present at the antenna terminals of the receiver. The JOVE receiver for example generates a strong signal at whatever frequency the receiver is tuned to. The high isolation of the MC prevents that signal from appearing in the FSX spectrograph display.

Bandpass Filter

The input to the amplifier is bandpass filtered (15 to 30 MHz) to minimize overload and out-of-band interference. The bandpass filter is made from a 7th order Chebychev 15 MHz high pass filter and a 30 MHz 7th order Chebychev low pass filter. One potential source of overload is local FM stations – the input lowpass filter provides in excess of 60 dB of attenuation at 100 MHz.

Multicouplers 6 & 9

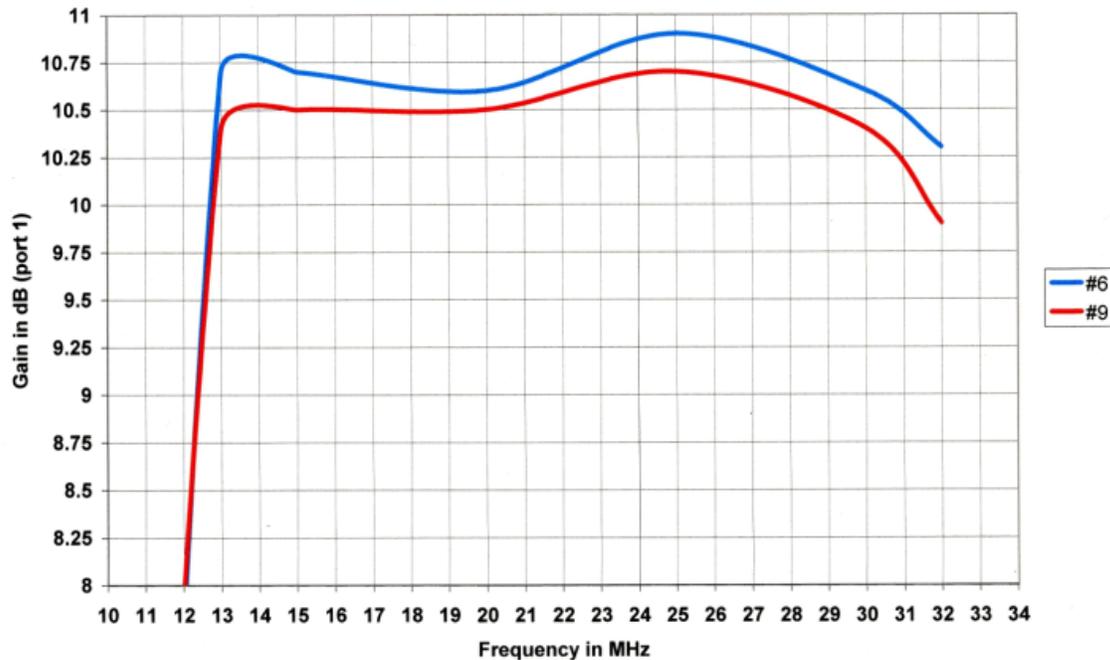


Figure 2. Both multicouplers track each other well in gain vs frequency with approximately +/- 0.25 dB of variation from a completely flat response from 15 to 30 MHz.

Output Port Termination

The internal power divider operates properly with all of its ports terminated in 50 ohms. Each of the multicoupler output ports has a 50 ohm attenuator pad which helps to provide the proper load impedance for the power divider. Ports 2, 3, and 4 have 10 dB pads and port 1 has a 3 dB pad. In general you will find that you can connect and disconnect receivers from the power combiner without affecting levels on other attached receivers. This means that you can usually leave unused output ports unterminated. However, for the purist, it is probably desirable to terminate all unused output ports in 50 ohms. Mouser sells 50 ohm BNC terminations (571-1-1337523-0) for about \$5 each.

Power Supply

Power required is a well filtered DC voltage between 12 and 15 VDC. Each MC draws about 90 milliamps and contains a 9 volt regulator and a polarity protection diode. Absolute minimum power supply voltage is 12.0 volts measured at the input to the MC. It is the responsibility of the user to provide power supply fusing if desired. The power jack accommodates a 2.1 mm power plug.

