

UNPACKING AND HANDLING

Because of the sharpness of response, adjustment of these units is critical. Handle it carefully, avoiding shock or excess vibration that could knock it out of alignment. For special applications requiring ruggedized construction we can supply customized units.

----- TYPICAL PERFORMANCE -----

	freq from center mhz	rejection db	
144 mhz:	0.3	6	(Model P150)
	1	40	
	5	80	
220 mhz:	0.5	6	(model P200)
	1.6	40	
	5	80	
450 mhz:	1.5	6	(model P450)
	5	45	
	15	80	

GAIN: typically 8 db.

DESIGN OBJECTIVES

The function of a preselector is to provide additional filtering against undesired signals. Interference can be caused either by insufficient rejection in the receiver itself or by intermodulation effects. Intermod occurs when an interfering signal is strong enough to overdrive one of the receiver stages; therefore any gain in the preselector could tend to aggravate the condition because it amplifies the strength of the interference. Accordingly, the design objective in this product line is to achieve the highest possible selectivity with carefully controlled gain. The "nose" of the selectivity curve is very sharp, so the unit must be tuned to the exact frequency to be used.

For special requirements units with a flat filter passband of custom width can be supplied. Write or call for quotations.

INSTALLATION

Power required is +10 to 15 volts at 5 to 10 ma. Connect the output to the receiver input and the input to the antenna (or duplexer, in repeaters). Avoid locations that would cause excess shock or vibration of the unit, because it could cause detuning.

In repeater installations double-shielded coax is recommended. The ultimate rejection of these units is over 80 db. At this level coax coupling from input to output can limit the performance of the preselector.

ADJUSTMENT

NOTE: The tuning settings are sealed to prevent shock and vibration from jiggling them out of adjustment. If you retune the unit we can't warrant the result. However the warranty against defective materials and workmanship still applies as long as it hasn't been opened or otherwise tampered with. Therefore if you want to try peaking or retuning it to another frequency you may do so, following the procedures recommended, but bearing mind that we'll have to charge for any subsequent realignment that we may need to perform.

These preselectors are shipped pretuned to the specified frequency with good 50 ohm source and load impedances. If the source impedance deviates from this

value noise figure and gain might suffer. A bad load can also cause a distorted passband. For input and output use 50-ohm coax, and make sure the SWR is low.

If nothing can be done about the source impedance try retuning the input resonator for maximum sensitivity (See NOTE above). You can't correct for the mismatch completely with this adjustment but you can tune out reactance.

RETUNING

If you need to retune (See Warranty note) the unit to another frequency it can be done with a signal generator and a receiver with means for measuring signal strength.

Any receiver can be used for rough tuning, but it's a good idea to do the final tuning into the receiver with which it is to be used (also with the interconnecting cable that you're going to use!).

Connect the generator to the preselector input and the output to the receiver cable. Set the signal generator to the receiver frequency and its amplitude within range of good signal strength indication (such as limiter current, etc.)

Adjust each tuning screw for a peak, making sure that the signal strength indication doesn't saturate (by keeping the lowest usable signal generator output at all times). Start at the output end and work back. When finished repeat the procedure, taking ever increasing care to get the exact peak. If any improvement is found, repeat the procedure until you can't improve it further.

If noise figure is important, do the final tuning on signal quieting (if FM) or best noise figure on an AM receiver.

For frequency excursions more than a megahertz at 144 mhz or 5 mhz at 450 mhz you must tune the unit a little at a time, moving a few mhz on each step. If all of the adjustments get far out the rejection is so high that it's impossible to get any signal through it to peak. When that point is reached the only workable method involves disassembly and internally coupling to one resonator at a time (or a lot of fiddling and good luck!).

GALLIUM ARSENIDE VERSIONS

Better performance is obtained with GaAs transistors. The higher gain these transistors provide is traded off for still better selectivity. GaAs transistors also offer greater resistance to overload and improved noise figure; however we tune them for maximum gain. The input tuning adjustment is left unsealed for the user to touch up for best noise figure, if desired.

BACKGROUND INFORMATION

Interference in a receiver can be caused by poor IF selectivity (adjacent channel problems), by spurious responses in the receiver itself (images, etc.) or by intermodulation in the front-end of the receiver where one of potentially interfering signals is strong enough to drive a front-end stage so hard that it becomes nonlinear. When this condition occurs the overdriving signal acts as a local oscillator, and the overdriven stage as a mixer. The result is that undesired signals are internally converted to the receiver frequency.

There are two approaches to eliminating this type of interference. One is to improve the dynamic range of the receiver itself (the range of signal strengths over which it can operate without becoming nonlinear) or to reduce the strength of the interfering signal by rejecting its frequency. The first approach requires improvement in the design of the receiver itself, but the second can be "added on" as a preselector. It is important to note that high preselector gain tends to aggravate the overload problem if the interfering signal is close to the desired one, because gain increases the interference amplitude even more.

The preselector should have only enough gain to prevent loss of receiver sensitivity. Although improvement may occur, it should not be viewed as a sensitivity-improving device.