

FAX 716-675-6742

High performance and affordability are featured throughout the GLB product line. All products carry a 90-day warranty.

GLB products include high quality components and prewound coils. Circuit boards are made from G-10 epoxy and are silk-screened and solder-masked for easy construction.

Our design capabilities offer cost-effective solutions for special applications from HF to microwave, with production support for large quantities.

Contact us with your requirements - amateur, commercial, and military.

GLB PRESELECTOR - PREAMP

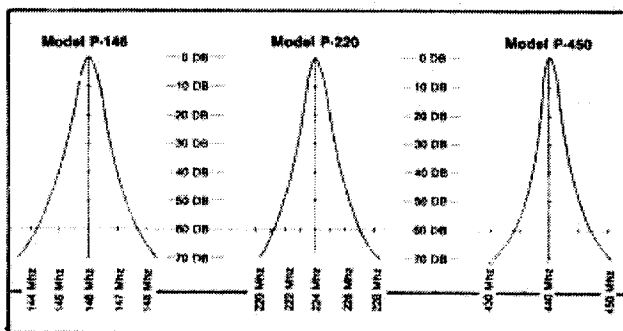
THE SOLUTION TO MOST INTERFERENCE, INTERMOD & DESENSE PROBLEMS.



FANTASTIC REJECTION!

Typical rejection:

- ±600 KHz @ 144 Mhz: -28db
- ± 1.6 Mhz @ 220 Mhz: -40db
- ± 5 Mhz @ 450 Mhz: -50db
- ± 20 Mhz @ 800 Mhz: -65db
- ± 20 Mhz @ 950 Mhz: -70db



Typical Selectivity Curves

Frequency (MHZ)

144-149; 220-225

430-450

150-170

450-470

800-1000 w/GaAs Fet
& N connectors

Other Frequencies available

Connector options: N SO239 BNC

GaAs Fet option (200- 800Mhz)

Special tuning:

Max Selectivity w/ 2-3 db gain
or Max Gain 10-11 db gain

- LOW COST
- 40 - 1000 Mhz - tuned to your RX frequency
- 5 Large Helical Resonators
- LOW noise - HIGH overload resistance
- 8 db Gain - Ultimate Rejection > 80 db
- 10 to 15 Volts DC Operation
- 10-25 ma Current Drain
- Cast Aluminum Enclosure
- Small size - 1.6 x 2.6 x 4.75" exc. connectors

DESIGN OBJECTIVES

The function of a preselector is to provide additional filtering against undesired signals. The design objective in this product line is to achieve the highest possible selectivity with carefully controlled gain. Very sharp selectivity is produced through five helical resonators which can benefit receivers in many instances where intermod and cross-band interferences occur. The "nose" of the selectivity curve is extremely sharp, so the unit must be tuned to the exact frequency used.

Easy installation of our "add on" preselector can be the low-cost cure for problems which until now could only be accomplished by improving the dynamic range of the receiver itself.

Custom units are available on special order. Write or call for quotations.

GALLIUM ARSENIDE VERSION

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.

MODEL P-40-1000

Frequency (Mhz)	-	Price
40-144	-	199.00
144-150	-	159.00
150-175	-	169.00
220-225	-	169.00
420-450	-	169.00
450-470	-	179.00
470-800	-	199.00
800-1000	-	275.00 (incl. GaAs FET & N Conns)
Frequencies not listed	-	199.00

OPTIONS

GaAs FET - available 200 - 800 Mhz	-	\$ 20.00
N Connectors	-	20.00
SO239 Connectors	-	10.00
BNC Connectors	-	6.00
F Connectors with 75 ohm impedance	-	10.00
Maximum Selectivity Special Tuning	-	20.00
Maximum Gain Special Tuning	-	20.00

Please specify exact RECEIVE FREQUENCY AND CONNECTOR TYPE when ordering.

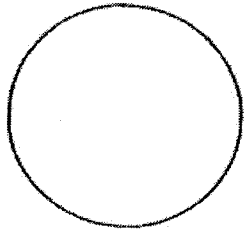
Returns and restock policy:

Contact GLB for Return Authorization Information. A 20% restock charge will be imposed on any standard product returned within 30 days in original condition. Customized products are not returnable.

Prices are subject to change without notice.

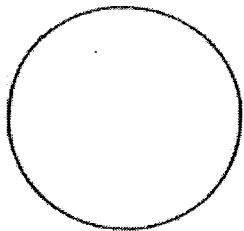
GLB PRESELECTOR-PREAMP

OUTPUT



+12 VDC

INPUT



GLB ELECTRONICS MODELS P50 - P500, PRESELECTORS

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

GLB ELECTRONICS MODELS P50 - P500, PRESELECTORS

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.

LIMITED WARRANTY

GLB PRODUCTS ARE WARRANTED AGAINST DEFECTIVE MATERIALS AND WORKMANSHIP FOR A PERIOD OF 90 DAYS AFTER THE DATE OF PURCHASE. THIS WARRANTY IS VOID IF THE UNIT HAS BEEN PHYSICALLY ABUSED, THE BOARD HAS UNAUTHORIZED SOLDER JOINTS OR REPLACEMENT PARTS, OR IF THE WARRANTY SEALS HAVE BEEN BROKEN.

REPAIR SERVICE POLICY

REPAIR WARRANTY: REPAIRS PERFORMED BY GLB ARE WARRANTED FOR A PERIOD OF 30 DAYS.

RETURN AUTHORIZATION: WRITE OR CALL GLB FOR RETURN AUTHORIZATION INSTRUCTIONS.

UNITS RECEIVED WITHOUT INSTRUCTIONS MAY BE HELD WHILE THE CUSTOMER IS NOTIFIED IN ORDER TO DETERMINE WHAT SERVICE HE EXPECTS TO HAVE PERFORMED. AT OUR OPTION WE MAY PERFORM A ROUTINE SERVICE/ALIGNMENT/CHECK PROCEDURE WHICH WOULD ASSURE PROPER NORMAL OPERATION, BUT MAY NOT DETECT SPECIAL PROBLEMS SUCH AS UNSPECIFIED TEMPERATURE EFFECTS, INTERMITTENT OPERATION OR OTHER PROBLEMS OF AN UNUSUAL NATURE.

KIT UNITS SOMETIMES SUFFER FROM MULTIPLE POOR-SOLDER JOINTS, SOME OF WHICH MAY CAUSE TROUBLE AT A LATER TIME. SIMILARLY, OTHER CUSTOMER-MADE ASSEMBLY MISTAKES (SUCH AS A WRONG VALUE PART) MAY NOT SHOW UP UNTIL THE UNIT IS PLACED BACK IN SERVICE BY THE CUSTOMER. GLB CAN ONLY WARRANTY THAT THE UNIT IS WORKING PROPERLY IMMEDIATELY PRIOR TO SHIPMENT AND NOT SUCH HIDDEN PROBLEMS, EXCEPT AS THEY MAY COME TO LIGHT IN THE PROCESS OF NORMAL SERVICE.

CHARGES: GLB WIRED UNITS WILL BE REPAIRED FREE OF CHARGE WITHIN THE WARRANTY PERIOD, PROVIDED THAT THE TROUBLE HAS NOT BEEN CAUSED BY CUSTOMER TAMPERING. THE WARRANTY FOR KITS IS APPLICABLE TO PARTS ONLY.

NOTE: IF PROPER OPERATION CANNOT BE OBTAINED UPON RECEIPT OF A REPAIRED UNIT, CONTACT GLB IMMEDIATELY. DO NOT ATTEMPT TO SERVICE OR ALIGN THE UNIT WITHOUT PRIOR PERMISSION FROM GLB. YOU MAY VOID ANY SERVICE WARRANTY AND COVER UP THE REAL TROUBLE WITH NEWLY INTRODUCED PROBLEMS.

RETURNS/RESTOCKING POLICY:

WRITE OR CALL GLB FOR RETURN AUTHORIZATION INSTRUCTIONS. A 20% RESTOCKING CHARGE WILL BE IMPOSED ON ANY STANDARD PRODUCT RETURNED WITHIN 30 DAYS, IN ORIGINAL CONDITION: NON-STANDARD PRODUCTS ARE NOT RETURNABLE.

WILL A PRESELECTOR SOLVE DESENSE PROBLEMS?

A preselector is a low-cost solution to desensitization problems in repeaters for cases where receiver overload is the cause. In many cases, however, the cause of desense is transmitter noise, not receiver overload.

All transmitters generate a spectrum of noise. The level of this noise decreases as the frequency of observation moves away from the carrier frequency. It also varies with the transmitter design and the condition of its components. The part of the transmitter noise spectrum that exists at the frequency of the receiver is usually much stronger than the receiver sensitivity, hence can drown out weak signals. The effect on repeater operation is indistinguishable from receiver overload because noise from the transmitter sounds exactly like receiver noise on weak signals.

It is for this reason that duplexers have cavities on both the transmitter and the receiver. The receiver cavities pass received signals and reject the transmitter frequency. Thus, they prevent the receiver from being overdriven by the transmitter signal. The transmitter cavities pass the transmitted signal to the antenna but reject NOISE at the receiver frequency, which would otherwise drown out weak signals.

ANALYZING THE CAUSE

The first thing to do in any repeater is to make sure that the transmitter and receiver are shielded from each other adequately. No filter can do any good if signals are bypassing it. Disconnect transmitter output from the duplexer and connect it to a shielded dummy load. Radiate a signal to the receiver and key the transmitter. If there is any desense you need better shielding.

Next, reconnect the transmitter and connect the receiver input to a shielded signal generator. Repeat the test. There should be no desense. If either of these tests fail, don't waste time on other experiments until the shielding is improved and these tests are passed.

Now a simple test can be made to determine whether the trouble is caused by receiver overload or transmitter noise. Connect a meter to a signal-strength indicator (such as limiter current) test point in the receiver. Disable the repeater transmitter and send a constant-strength signal into the receiver, sufficient to increase the limiter current noticeably. Now key the transmitter and observe any change in the reading.

-If the reading decreases the receiver is being overloaded

-If the reading increases the signal is being swamped by noise

Receiver overload decreases the reading because a signal that is too strong for the receiver reduces the gain of the overdriven stage.

Transmitter noise increases the reading because it appears in the receiver as an additional signal, which increases limiter current in the normal way.

There is one other possibility-no change. If this is the case BOTH conditions probably exist and one offsets the other. At any rate both symptoms need to be treated to effect a cure.

WHERE A PRESELECTOR CAN HELP

If your problem is due to transmitter noise a preselector won't help. In fact if the preselector increases the sensitivity of the receiver the problem may seem worse because it's simply increasing the sensitivity to the noise as well as the signal.

If the problem is overload the preselector can help by providing additional attenuation of the transmitter signal which is causing the overload.

INTERMODULATION CONSIDERATIONS

A second condition which a preselector can cure is intermod. The most obvious cause of intermod is when the receiver is being driven too hard by at least one signal in the spectrum. The resulting overdrive causes a receiver stage to behave as a mixer. If another signal is present at a susceptible frequency it can mix with the primary signal and produce a new spectrum of signals, any one of which is received as interference. The tip-off of intermod is that if both signals are modulated, you can hear both audio signals in the receiver. If one of the signals involved is your own transmitter there will be an audio howl due to feedback, as well as the other station's audio.

When the intermod is being generated IN THE RECEIVER the preselector is likely to help due to its ability to attenuate the undesired signals.

Another cause of intermod which won't be helped by a preselector is outside of the repeater station. If there are rusty joints on the repeater tower, they may exhibit nonlinear effects in the same manner as diodes do. Since they are a part of a substantial metal structure that behaves as an antenna such joints are a surprisingly efficient intermod source. In this case nothing you can do to the repeater (except possibly a drastic reduction in transmitter power) can help, since the interference is being generated externally and radiated to the receiver antenna at the receiver frequency. Since the receiver is SUPPOSED to receive that frequency no amount of filtering can help.

The solution is to clean up the tower, and any other conduction objects in the antenna field by either bonding or insulating all metallic joints. Adding a preselector in a case of external intermod exaggerates the condition because of increased sensitivity.

TESTING WITH A PRESELECTOR

When you evaluate a preselector, make your first tests with the transmitter turned off. Compare receiver sensitivity with and without the preselector connected. After proving that the preselector functions properly, key the transmitter. If signals desensitize now, repeat the limiter current test to determine whether an overdrive condition or a transmitter noise condition exists. It may be that an overdrive condition was masking a transmitter noise condition, and addition of the preselector un.masks it by clearing up the overdrive condition. If so, you must take steps to reduce transmitter noise.

TRANSMITTER NOISE

One could try different transmitters until a quieter one is found. It is unlikely that you could find so much difference among transmitters to clear up a severe case completely because they all generate noise.

What you can do is touch up the transmitter alignment to minimize noise. Often reductions on the order of 20db occur by this simple expedient. The procedure is to observe the internal transmitter test points. However, radiate a test signal into the receiver while you do the tuning. As each transmitter adjustment is peaked you may note that the noise level on the received signal varies. Usually on one side of the peak the noise is stronger than it is on the other side. Retune to the side having the least noise - but stay very near to the peak to avoid detuning the transmitter too much. Normally a succession of such adjustments will yield full transmitter performance with substantial reduction of noise output.

If you find conditions that can be helped with a preselector, we'll be happy to sell you the best available.