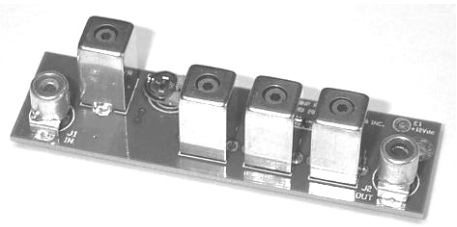
HAMTRONICS® LNP-( ) RECEIVER PRESELECTOR (REV A): INSTALLATION, OPERATION, & MAINTENANCE



DESCRIPTION.

The LNP-( ) preselectors are designed to reduce out of band interference in vhf receivers from broadcast, aircraft, and paging transmitters and other strong signals in nearby bands. It consists of a low-noise preamp driving a sharp, three stage L-C filter. The preamp stage has just enough gain to prevent degradation of noise figure due to the insertion loss of the filter and provides a minimal amount of net gain to avoid overloading the receiver.

The LNP Preselector is connected in series between the antenna and the receiver. They were designed for operation in 50 ohm systems; however, they will operate satisfactorily on 75 ohms as well.

INSTALLATION.

MOUNTING. The preselector can be mounted to any flat surface with standoffs and 4-40 screws through the two mounting holes. The ideal location is in the chassis with the receiver.

Complete shielding of the preselector is not required. However, some care should be given to selection of the mounting location with regard to feedback from adjacent receiver circuits or rf pickup if mounted very close to a transmitter circuit. Because the unit is small, make sure that it is not installed tight against the rf amplifier or first mixer of the receiver to minimize feedback effects. Keep it at least one inch away.

RF CONNECTIONS. Antenna and receiver connections are made with rf type RCA plugs to the input and output jacks on the preselector. The RF INPUT must be connected to the antenna, and the RF OUTPUT must be connected to the receiver input. Be sure to use an RCA plug of the low-loss type made for rf. We sell good RCA plugs with cable clamp. See A5 plug on website.

We do **not** recommend trying to use direct coax soldered to board or another type of connector. The method designed into the board results in lowest loss practical. When soldering the cable, keep the stripped ends as short as possible.

Use good quality low-loss coax to maintain low noise operation. Remember that any loss in coax from antenna cannot be made up later in the preselector; it adds directly to system noise figure.

CAUTION: The preselector cannot be used on a transceiver unless you have a way to connect it only in the receive rf path.

POWER CONNECTIONS. Power for the unit must be filtered +8 to 15 Vdc. Current drain is about 10 mA. Solder positive supply wire to solder pad E1 on the board. Many times, the power supply ground connection can be made through the coax shield. Otherwise, connect a separate power supply ground wire to the ground plane on the pc board.

☹ **CAUTION:** Solid state amplifiers can be damaged by large voltage transients and reverse polarity. Although protection is provided in the preselector, avoid such conditions as a matter of principle. Special care should be taken to install reverse transient absorbing diodes across any inductive devices, such as relays. If the preselector is connected to an antenna used for transmit as well as receive, be sure that the unit is connected only in the receive path and that the coax relay has sufficient isolation to avoid coupling large amounts of rf to the preselector.

OPERATION.

The LNP series preselectors operate in linear mode; so they may be used to receive any mode of transmission, including ssb and atv.

They are factory aligned at the center of the band, and they are easily readjusted if your operating frequency is near one end of the band or the other instead of being near the center. If retuning is necessary, simply retune the variable coils for best reception of weak signals. No test equipment is necessary. If you happen to have access to a signal generator and sinadder, they may be used; otherwise, just do it by ear or S-meter.

Low-noise preamps are effective in improving sensitivity of receivers in weak signal areas. However, it is considered inadvisable to use a preamp, even with a well designed receiver, in very strong signal areas, such as the center of a large city or other locations with high powered transmitters on all sorts of frequencies. Adding gain ahead of a receiver degrades the selectivity of a receiver by an equivalent amount by boosting undesirable signals as well as desirable ones. In severe cases, strong signals which do not cause intermod by themselves will create intermod in the rf stage or mixer of your receiver after being amplified an additional amount by the preselector

If you use a preselector with a repeater receiver, you will need to have additional rejection in your duplexer to attenuate your transmit signal that much more to prevent desense.

Gain control R2 normally is set fully CW. You can reduce the gain if needed for special applications.

TROUBLESHOOTING.

Since the unit is fairly simple, troubleshooting usually is limited to checking the dc voltages on the transistor. These will vary somewhat; but, in general, the source and gate-1 should be 0Vdc, gate-2 should be about 0.8V with the pot fully CW, and the drain should be about 5Vdc. Current drain should be no more than 10 mA.

MODEL	TUNES RANGE	TYPICAL NOISE FIG.	NOM. GAIN	TYP. 3DB BANDWIDTH	TYP. 20DB BANDWIDTH	TYP. 30DB BANDWIDTH	TYP. 40DB BANDWIDTH
LNP-115	108-120 MHz	0.6 dB	13 dB	±0.8 MHz	±3 MHz	±4 MHz	±6 MHz
LNP-121	120-130 MHz	0.6 dB	13 dB	±0.9 MHz	±3.2 MHz	±4.2 MHz	±6.5 MHz
LNP-137	130-140 MHz	0.6 dB	15 dB	±1 MHz	±3.1 MHz	±5.0 MHz	±7 MHz
LNP-146	140-150 MHz	0.6 dB	15 dB	±1 MHz	±3.8 MHz	±4.8 MHz	±7 MHz
LNP-160	150-170 MHz	0.6 dB	15 dB	±1 MHz	±4 MHz	±5 MHz	±7.5 MHz
LNP-220	216-226 MHz	0.6 dB	15 dB	±2 MHz	±8 MHz	±13 MHz	±18 MHz

Note: Unless otherwise requested, units are factory aligned to the nominal frequency as indicated by model number suffix.

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The two common failure modes, caused by excessive rf or dc voltage transients, **may** cause the gate-2 voltage to be quite low or the same as the drain of the transistor, indicating an internal short. Generally, dc power line problems, such as transients cause a drain to gate-2 short, and high rf fields or lightning coming in the antenna connector usually cause a gate-1 to source short. The latter usually doesn't show up as a change in dc voltage because gate-1 is connected to dc ground in the circuit. A sudden loss of sensitivity with no change in dc voltage usually indicates damage to the input gate (gate-1). Note that the two gates have built-in diode protection, but diodes will only withstand a limited surge; beyond that, the diodes will be damaged along with the FET.

CAUTION: FET's are static sensitive. If replacement is necessary, be sure to ground your wrist before handling them. Internal diode protection will reduce, but not eliminate, risk. If FET is replaced, be sure to orient as shown with the source lead being the wide one. Often times, the best way to remove surface mount devices from a board are to cut the part up, removing the leads individually and then unsoldering them.

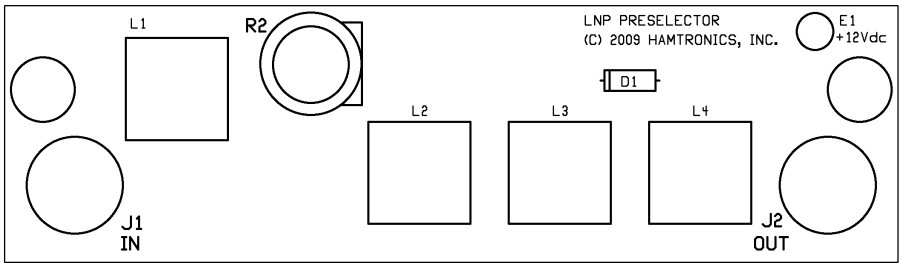
PARTS LIST, COMMON PARTS FOR ALL MODELS.

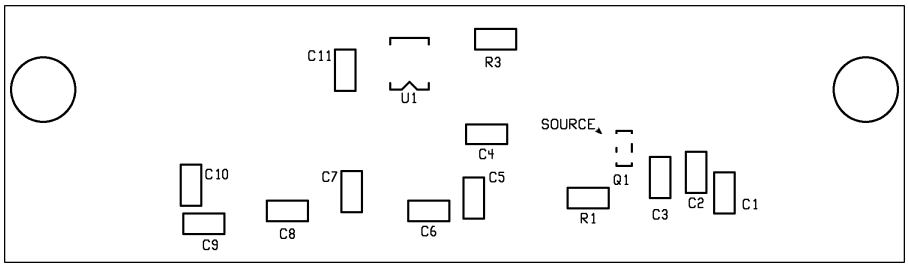
Ref #	Value (marking)
C3, C4	390pf chip capacitor
C11	0.1uf chip capacitor
D1	1N4148 diode
J1, J2	RCA jack (rf type)
L1-L4	2½ turn slug-tuned coil
Q1	Philips BF-998 MES FET
R1	10Ω chip resistor
R2	2K pot.
R3	2.2K chip resistor
U1	78L05ACD voltage regul.

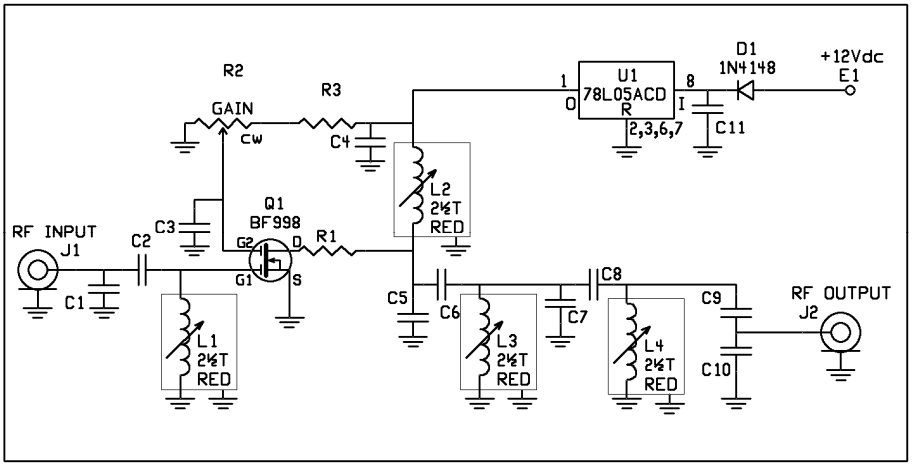
Parts List, Parts which change with Frequency Band.

Model	C1	C2	C5	C6	C7	C8	C9	C10
LNP-110	147 pf*	47 pf	39 pf	0.5 pf	39 pf	0.5 pf	47 pf	147 pf*
LNP-121	100 pf	39 pf	27 pf	0.5 pf	30 pf	0.5 pf	39 pf	100 pf
LNP-137	100 pf	33 pf	22 pf	0.5 pf	25 pf*	0.3 pf	33 pf	100 pf
LNP-146	82 pf	27 pf	18 pf	0.5 pf	20 pf	0.3 pf	27 pf	82 pf
LNP-160	56 pf	18 pf	12 pf	0.5 pf	15 pf	0.3 pf	18 pf	56 pf
LNP-220	27 pf	8 pf	5 pf	0.3	7 pf	0.3 pf	10 pf	27 pf

* Note: Some values are a combination of two chip capacitors.







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