

# INSTRUCTIONS

## AMECO PREAMPLIFIER

### MODEL PT-2

The AMECO PT-2 preamplifier may be added to most existing transceivers in the frequency range of 1.8 to 54 MHz. It improves the gain, noise figure, spurious signal and image rejection of the receiver section. This all-new PT-2 preamplifier has been designed specifically for use with a transceiver. Its sophisticated control circuitry permits it to be added to virtually any transceiver without modification. This is accomplished by the use of automatic antenna switching inside the PT-2. When the PT-2 senses transmitter RF power, it automatically switches out of the amplifier mode and connects the antenna directly to the transceiver.

The PT-2 consists of a tuned RF amplifier, covering all the amateur bands from 160 through 6 meters and, in addition, all foreign broadcasts, as well as other services within this frequency range. Model PT-2 employs a low noise dual gate FET transistor, providing a noise figure of 1.5 to 3.5 db, over the frequency range of 1.8 to 54 MHz. The preamplifier will be found especially effective with those transceivers employing the Pi-output network of the transmitter section as the receiver RF stage input. Most transceivers of this type begin to suffer a noticeable decrease in sensitivity on 15 meters, and especially on 10 meters. The PT-2 will be most beneficial on these bands. The inclusion of 6 meters makes it usable with 6-meter transceivers.

The PT-2 is designed specifically for 117-volt, 60 cycle operation.

The input and output impedances are nominally 50 ohms to match most popular types of amateur installations. The input and output impedances of the PT-2 are not critical and therefore, no adjustments or modifications are necessary with other impedances.

### INSTALLATION

**DO NOT PLUG THE PT-2 INTO THE AC OUTLET UNTIL INSTRUCTED TO DO SO IN STEP 3!**

- (1) REMOVE THE POWER PLUG OF THE TRANSCEIVER POWER SUPPLY FROM THE WALL SOCKET AND PLUG IT INTO THE AC OUTLET (MARKED TRANSCEIVER) ON THE REAR OF THE PT-2. FAILURE TO USE THIS OUTLET AS DIRECTED CAN CAUSE DAMAGE TO THE PREAMPLIFIER. An outlet marked SPARE may be used for a rotator; however, under no circumstances should a linear amplifier be plugged into this outlet socket. THE LINEAR AMPLIFIER SHOULD BE PLUGGED DIRECTLY INTO THE WALL OUTLET BECAUSE OF ITS HIGH CURRENT DRAIN.
- (2) Remove the coaxial antenna line from the transceiver and connect it to the jack marked ANTENNA on the rear of the PT-2. The coaxial cable coming out of the rear of the PT-2, terminating in a coaxial connector, should then be connected to the transceiver's antenna jack. See Figure 1. In those installations employing a linear amplifier, the PT-2 is inserted between the linear amplifier and the transceiver (NOT BETWEEN THE ANTENNA AND THE LINEAR AMPLIFIER). See Figure 2 for the installation involving a linear amplifier.
- (3) The PT-2 unit may now be plugged into the AC outlet. The switch on the front panel will control not only the power to the PT, but all items plugged into the rear outlets. This provides for simplification of station operation and insures that the relay control circuitry will be energized whenever the transceiver is in use. **FAILURE TO DO THIS WILL CAUSE EQUIPMENT DAMAGE!**

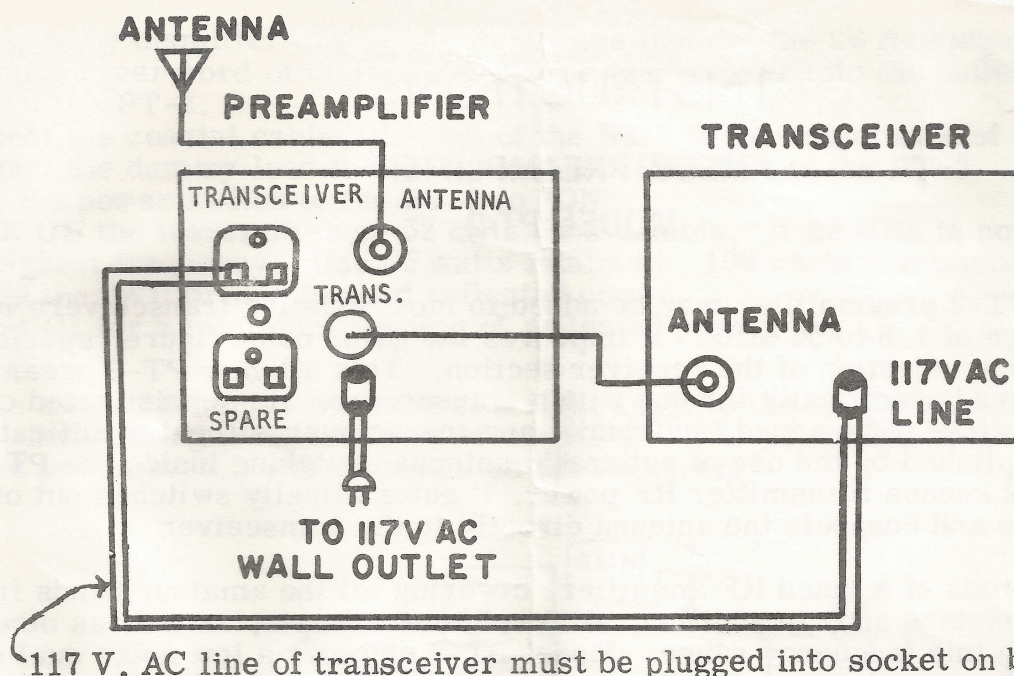


Figure 1. Installation of PT-2 with transceiver only.

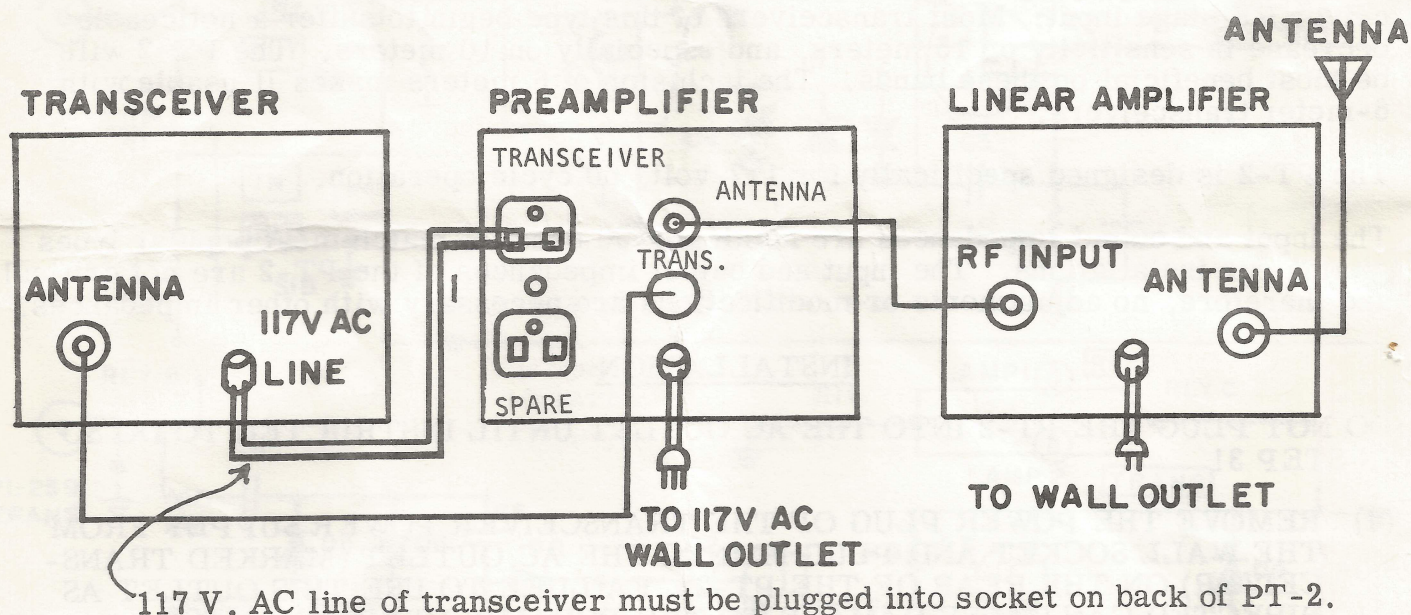


Figure 2. Installation of PT-2 with transceiver and linear amplifier.

### OPERATION

THE PT-2 MUST BE INSTALLED PROPERLY BEFORE OPERATING. SEE THE PREVIOUS PARAGRAPHS. With the PT-2 POWER switch in the ON position and the PREAMP switch in the OUT position, the preamplifier will be out of the circuit and the transceiver will work normally. With the PREAMP switch in the IN position, the preamplifier section of the PT-2 will be active and will increase the gain of the receiving system. Tune the preamplifier as follows:

- (1) Turn the BAND switch to a position that includes the desired frequency. For example, the 20 meter Amateur Band is 14 to 14.35 MHz. This is between the 10 and 23. Therefore, the switch must be at the line between 10 and 23.
- (2) When a signal is received, peak it by adjusting the TUNING control for maximum swing on the transceiver's S meter, or maximum volume if no meter is used. In tuning over a band, the tuning knob of the PT-2 should be adjusted fairly frequently. For example, at 4 MHz, it may have to be adjusted every 50 kHz. At 50 MHz, it may have to be adjusted every 200 kHz.

- (3) The PT-2 adds considerable amplification (approximately 20 db.) to the receiver section of the transceiver, which may often have sufficient gain, particularly on the lower frequency bands. This may cause overloading which can result in cross modulation or desensitization, or both. For this reason, a manual GAIN control is included on the front panel. Normally, this control should be turned fully counterclockwise. However, under strong local signal conditions, it may often be found desirable to reduce this control to a point where the local signals tune considerably sharper and therefore, occupy less space on the band. Although this will reduce the sensitivity, it will be very often found, particularly when desired signals are strong, that reduction will provide a more usable signal than when the preamplifier was not in the circuit. This is particularly true in those transceivers having considerable front-end gain without provisions for separate RF gain and IF gain controls.

When switching the PT-2 in and out of the circuit, and with the band switch or the tuning control, or both, at incorrect settings, it will be noticed that, under certain conditions, an appreciable signal will still come through, particularly with the GAIN control at maximum. This is normal.

Some transceivers, having especially good AVC action, will tend to make tuning the PT-2 difficult, particularly on strong signals. This can be overcome by watching the S meter very carefully while peaking the PT-2, or by peaking up on a weak signal, or by peaking up on the background noise in the absence of a signal. The true worth of the PT-2 will be more fully realized under extremely poor band conditions whenever signals are very weak.

A certain amount of delay is built into the preamplifier when the transceiver switches between transmit and receive. This is necessary in SSB because the transmitter's output ceases when we pause between words or sentences. When the transmitter's output ceases, the control circuit will deactivate the relay and the preamplifier will go into the receive condition. As soon as the pause ends and the talking starts, the control circuitry again activates the relay and the preamplifier goes into transmit condition. As this cycle continues, there will be excessive chattering of the relay. To prevent such annoying chattering, a delay has been built into the control circuitry.

### ADDING A SECOND RECEIVER

The PT-2 has been designed so that a jack and some additional parts can be installed in order to add a second receiver.

If you wish to add a second receiver, request addendum sheet entitled "2nd RECEIVER MODIFICATION ON PT-2" from Ameco. For a speedy processing of this request, it is suggested that a stamped, self-addressed envelope be included.

A qualified technician or amateur with adequate training will be required to do this modification.

### ALIGNMENT PROCEDURE

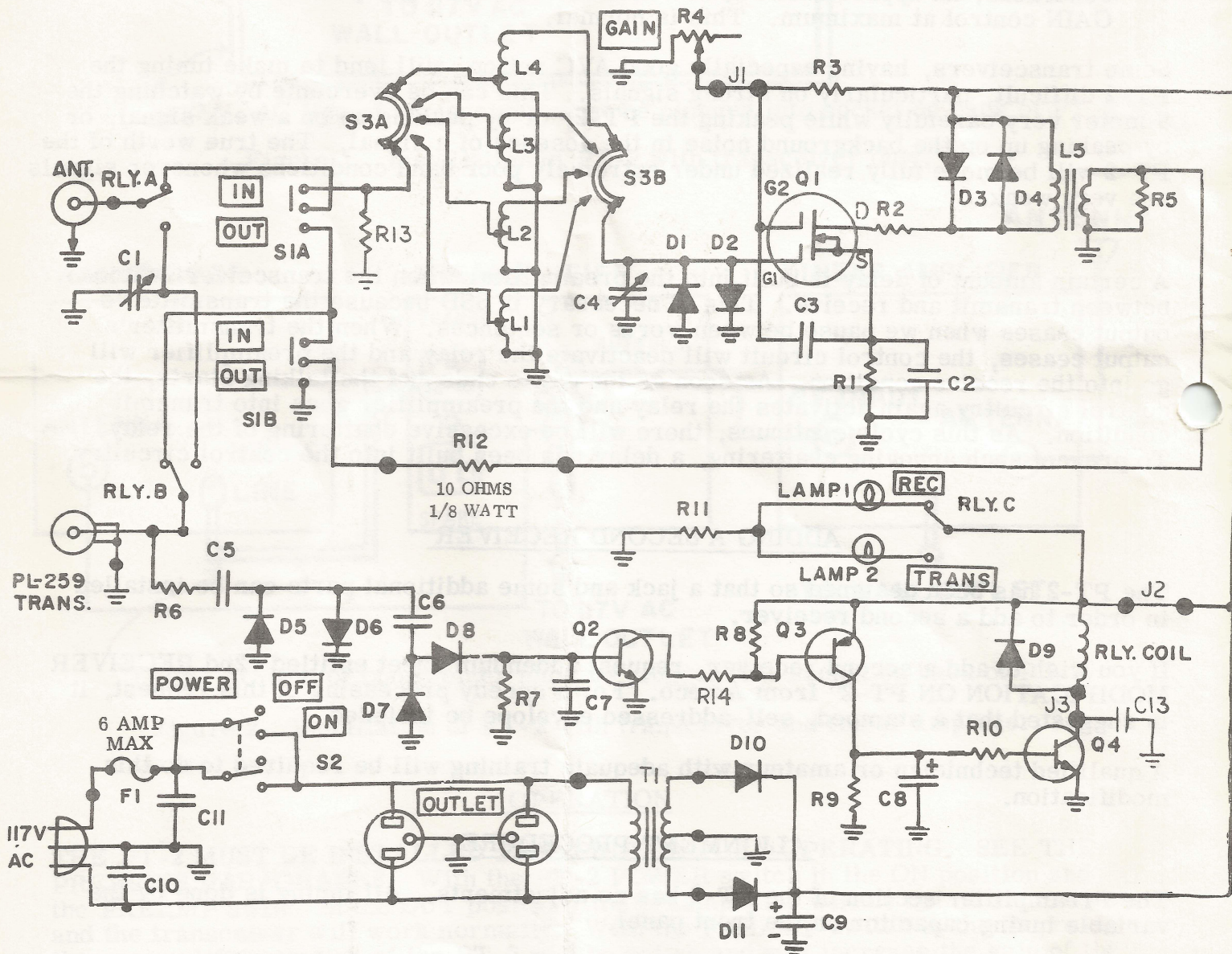
The Preamplifier section of the PT-2 has no adjustments. All tuning is done by the variable tuning capacitor on the front panel.

In order to obtain as good an impedance match as possible between the PT-2, the transceiver and the load, it may be necessary to adjust C1\*. C1 is a reactance cancelling capacitor which is used to reduce the SWR. It has been adjusted at the factory and should not require further adjustment unless it has been inadvertently misadjusted or unless impedances or other factors at the station are not normal.

The adjustment procedure is as follows: (DO NOT attempt this adjustment unless you have a good SWR bridge and a good 50 ohm load.)

- (1) Connect a transmitter or transceiver to the input of the SWR bridge.
- (2) Plug the power cord of the transmitter or transceiver into the outlet socket on the rear of the PT-2.
- (3) Connect the coaxial cable (PL-259) of the PT-2 to the output side of the SWR bridge.
- (4) Connect the dummy load to the antenna jack (SO-239) of the PT-2.
- (5) Turn the power switch of the PT-2 to "ON"
- (6) TUNE UP the transmitter on 52 MHz, if available. If 52 MHz is not available, use the highest frequency. Use 35 watts minimum, 100 watts maximum.
- (7) Switch the SWR bridge to read reflected power.
- (8) Adjust C1 for a minimum reading of reflected power.

\*C1 is a mica trimmer mounted at a right angle to the PC board. It is slightly to the right when looking from the front of the PT-2. It is adjustable from the top when the cabinet is removed. Use an insulated screwdriver.



Schematic diagram of Model PT-2 Preamplifier.

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## IMPORTANT ADDENDUM TO PT-2 OPERATING INSTRUCTIONS

### PLEASE READ CAREFULLY BEFORE USING THE PT-2

The AMECO Model PT-2 preamplifier can be used with a transceiver because it has a built-in automatic sensing and switching circuit. As soon as this circuit senses transmitter power from the transceiver, it switches the preamplifier into its "TRANSMIT" mode. In this mode, the red light on the front panel is on and the transmitter power bypasses the preamplifier and goes directly to the antenna. As soon as the transmitter power from the transceiver ceases, the preamplifier sensing circuit switches the preamplifier into its "RECEIVE" mode. In this mode, the green light is on and the preamplifier is in a condition to receive and amplify an incoming signal.

If amplitude modulation (AM) is used, the preamplifier is continuously in its "TRANSMIT" mode when the transceiver is in its "TRANSMIT" mode. This is because, in AM, the carrier power is on all the time, regardless of whether the transmitter is being modulated.

In Single Sideband, the situation is different. When the transceiver is in the transmit mode, output power is fed to the antenna only when modulation is present. When the operator ceases talking into the microphone, the output power drops to almost zero. The preamplifier senses this condition of "low or no transmitter power" and goes into its "RECEIVE" mode. This causes the preamplifier's relay to switch over, causing the red light to go off and the green light to come on. As soon as the operator speaks into the microphone, the preamplifier senses this and immediately goes into its "TRANSMIT" mode and the red light will come on again. **THIS SWITCHING OF THE PREAMPLIFIER RELAY AND PANEL LIGHTS, IN THE SSB TRANSMIT MODE, IS THEREFORE PERFECTLY NORMAL, AND SHOULD NOT ALARM THE OPERATOR!**

In some cases, the red light may stay on or tend to stay on in the SSB transmit mode, even though no one is speaking into the microphone. This is because the transmitter may still be putting out a slight amount of power, or the background noise may be modulating the transmitter enough to cause a slight amount of output power which will activate the sensing circuit in the preamplifier. To minimize the switching of the relay and the lights, during the SSB transmitting mode, a delay has been incorporated into the preamplifier sensing circuit. During normal speaking conditions, the delay will prevent the preamplifier from switching back and forth. However, if the operator stops talking for a period of time, the preamplifier will, of course, try to switch into its receive mode, which is perfectly normal.

The power outlet on the back of the PT-2 is used for the purpose of plugging in the transceiver's power cable. The AC power cable of the transceiver **MUST BE PLUGGED INTO OUTLET ON BACK OF THE PT-2. FAILURE TO DO SO WILL DAMAGE THE PT-2.**

The PT-2 can be used directly with transceivers with a maximum output of 350 W. PEP. Power levels greater than 350 W. PEP **WILL DAMAGE THE PT-2.** For higher power levels, a linear amplifier must be used and placed in the line between the PT-2 and the antenna. At no time must the linear amplifier be fed into the PT-2, otherwise damage will result.