

**TEN-TEC INSTRUCTION SHEET**  
**MODELS 217, 218, 219 and 220 CRYSTAL FILTERS**

**GENERAL**

Models 217 through 220 are 9 MHz crystal ladder filter options specifically designed for use in the OMNI Series B and C transceivers and the ARGOSY transceiver. Model 220 can also be used in the Model 100 Civil Air Patrol transceiver.

**SPECIFICATIONS**

	Model 217	Model 218	Model 219	Model 220
CENTER FREQUENCY, MHZ	9.000750	9.00150	9.000750	9.00150
6 DB. BANDWIDTH, HZ	500	1800	250	2400
SHAPE FACTOR, 6/60 DB	2:1	1.8:1	2.4:1	1.7:1
INSERTION LOSS, DB	7.5	2.0	10.0	2.2
ULTIMATE REJECTION, DB	90+	90+	85+	90+
Z <sub>IN</sub> - Z <sub>OUT</sub> , OHMS	200	200	200	200
NUMBER OF POLES	8	8	6	8

**INSTALLATION - OMNI TRANSCEIVERS**

- 1.) Turn power off. Loosen four top cover screws and remove top cover.
- 2.) Locate the Crystal Filter Switch Board 90861.
- 3.) On this board are two sockets, each with a YELLOW jumper wire running diagonally across the socket area. The sockets are labeled 1.8 (for Model 218 or 220) and 0.5 (for Model 217 or 219).
- 4.) Remove YELLOW jumper wire associated with the filter being installed by cutting it off flush with the board at each end.
- 5.) Carefully align the four pins on the crystal filter being installed with the corresponding sockets on the board and gently push down until each pin seats in its socket. NOTE: There is no IN or OUT orientation to the filter. It may be inserted into its socket either way.
- 6.) Turn power on and check for proper filter operation. Make sure that the transceiver "receives" in the SELECTIVITY switch positions associated with the filter just installed. If not, make sure the filter is seated in its correct socket.
- 7.) Replace top cover.

**INSTALLATION - ARGOSY TRANSCEIVERS**

- 1.) Turn power off. Loosen the four screws securing the top cover and remove it.
- 2.) Model 220 only (2.4 kHz 8 pole ssb): locate the RF/MIXER Board 80784 which already has a 4 pole filter mounted on it. Remove the standard equipment filter by gently prying at each corner until it can be lifted out of its socket. Install the Model 220 in this socket per step 4 and continue.  
  
NOTE: If only the Model 220 is being installed at this time, the 4 pole ssb filter just removed from the RF-MIXER Board in step 2 may be used as an optional receive filter and installed in the socket on the IF-AF Board per step 3.
- 3.) Models 217 thru 219: Locate the empty filter socket on the IF-AF Board 80785. Any of the optional receive filters or the standard 4 pole ssb filter may be installed in this location. Install per step 4 and continue.
- 4.) Carefully align the four pins on the filter being installed with the corresponding sockets on the board and gently push down until each pin seats in its socket. NOTE: There is no IN or OUT orientation to these filters. They may be installed into their socket either way.

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- 5.) Turn power on and check for proper filter operation. If a filter was installed in the IF-AF Board, make sure the transceiver "receives" with the XTAL switch in either position. If not, make sure all filters are correctly seated in their sockets.
- 6.) Replace top cover.

#### OPERATION - OMNI TRANSCEIVERS

In the Series C OMNI, the crystal and audio filters are controlled by separate three position switches. The front panel switch labeled XTAL selects the crystal filters as follows: 2.4 for the standard built in filter only which is always in line, 1.8 for the optional ssb filter if installed, and 0.5 for either the 500 Hz or the 250 Hz cw filter if installed. As only the 0.5 socket has adequate gain for the cw filters, only one cw filter should be installed at a time.

#### OPERATION - ARGOSY TRANSCEIVERS

The XTAL IN/OUT switch on the front panel inserts the optional filter installed on the IF-AF Board into the receive signal path. The filter on the RF-MIXER Board, either the standard 4 pole or the Model 220, is used on both transmit and receive and is always connected in the circuit. Thus, when an optional filter is selected by the XTAL IN/OUT switch, it is used in series with the transceiver filter and provides additional filtering rather than alternative filtering.

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#### INSTALLATION - CIVIL AIR PATROL TRANSCEIVERS

- 1.) Turn power off. Remove four screws securing top cover and remove it.
- 2.) Locate the SSB GENERATOR assembly 80871 (see Owner's Manual page 4-3).
- 3.) The four pole filter is a plug-in assembly on the SSB GENERATOR that is easily identified by the four small metal cans close together. Remove this filter by gently prying at each corner until it can be lifted out of its socket pins. Needle nose pliers can be used to grasp the four corner pins in turn and to apply upward pressure.
- 4.) Install the Model 220 filter in place of the removed unit by carefully aligning the four corner pins with the four socket terminals on the SSB GENERATOR board. Gently push down until each pin seats fully. There is no IN and OUT orientation required -- it can be installed either way.
- 5.) Replace top cover.

NOTE: Due to the sharper cutoff of frequencies at both ends of the passband response, installation of Model 220 will have the effect of reducing both the received and transmitted lower frequency components in the 400 to 700 Hertz range and also the higher frequencies in the 2500 to 2800 Hertz range. Since most of the voice frequencies fall below 1000 Hertz, the noticeable effect will be that the signal will have a slight loss of low frequencies. If it is desired to regain this loss, a slight readjustment of the carrier oscillator frequency from the normal 9.003300 MHz to 9.003150 MHz will accomplish this. HOWEVER, if this is done, all channels will have to be recalibrated. Only licensed commercial technicians are permitted to make these adjustments. (All transceivers that are shipped from the factory with factory-installed eight pole filters are adjusted to the 9.003150 MHz carrier frequency.)

SERVICE NOTE: With the sharper skirt attenuation, it will be found that when the DRIVE-TX ON knob is pulled out and carrier is inserted, the added attenuation of the filter at the carrier frequency will prevent any appreciable amount of signal from passing through to the antenna, and hence the COUNTER jack. This will also make SWR measurements more difficult. When making channel frequency adjustments first check to see if sufficient signal is present at the COUNTER jack to present a reliable counter readout on all channels. If there is not sufficient signal to drive the counter, it will be necessary to jumper around the filter with a 10 pF capacitor. Temporarily attach the capacitor from the upper left filter terminal pin to the lower right pin as viewed on page 4-3 of the Owner's Manual. After all adjustments are made, remove the capacitor. To make SWR measurements, a steady whistle into the microphone during PTT transmit, with enough DRIVE to light the LED, will be necessary.