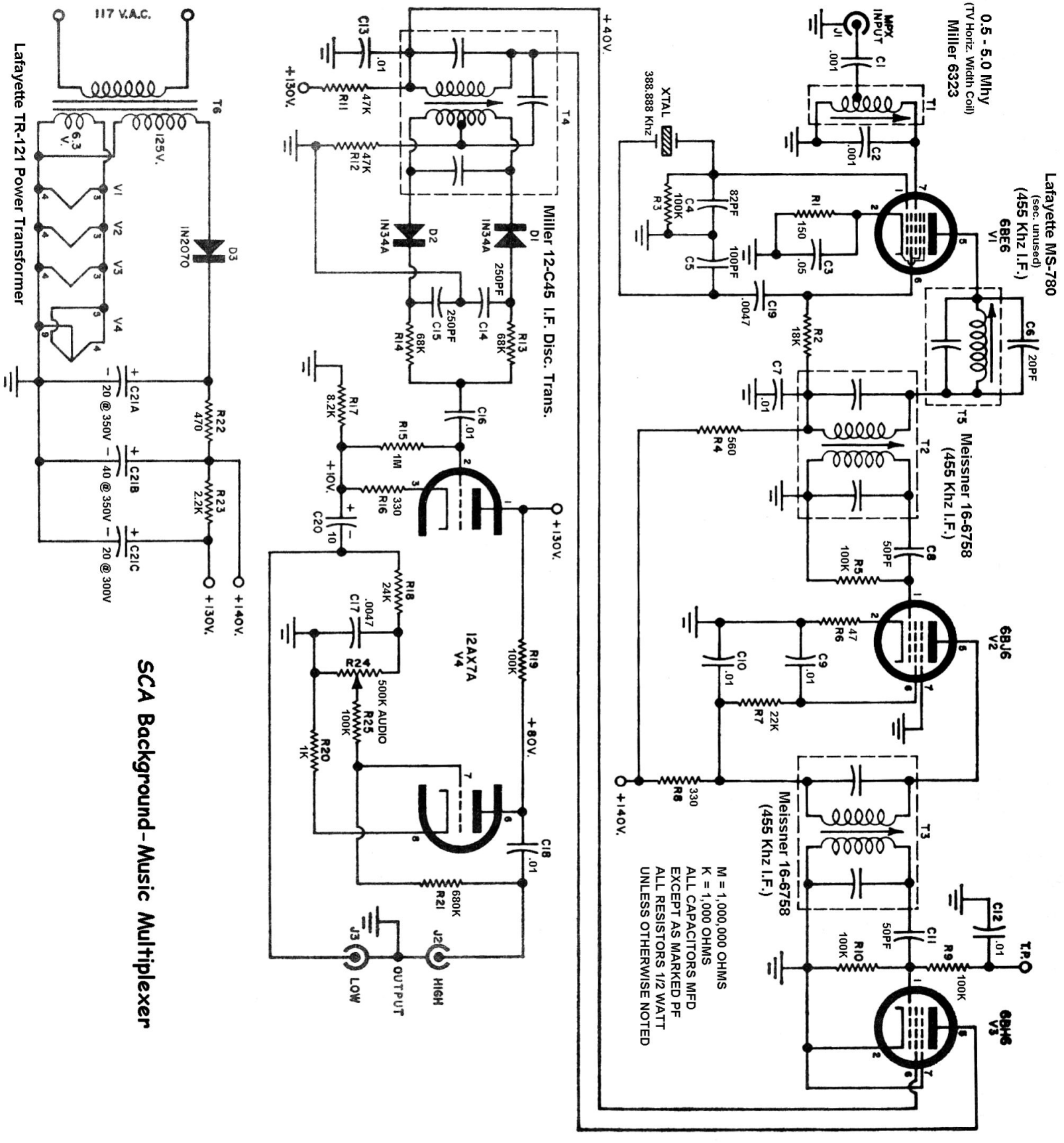


Construction & Alignment

A look at the photographs will show the logical layout of components on the 4" X 6" X 2" aluminum chassis. At the front edge are three jacks for MPX input, low audio output and high audio output, with the oscillator crystal socket just to the rear of the input jack and the audio level control in back of the high output jack. The three 455 Khz I.F. transformers are mounted with the clips supplied and filter can by it's twist tabs. The four shield base tube sockets are fastened with 4 - 36 screws and the shields are used on all tubes. Orient the sockets to insure the best lead arrangement under the chassis. Be sure to mount everything that fastens to the chassis before beginning any wiring. A few suitably placed lug strips will provide terminals for those resistors and ca-

pacitors not soldered directly to the sockets and coil lugs. A three-point strip, center ground, fastened on one of the power transformer screws will mount the 1N2070 rectifier and the limiter test point resistor and capacitor.

A strip with three insulated lugs, fastened in the center of the chassis between the discriminator i.f. transformer and the input i.f. transformer, provides distribution points for the two d.c. voltages used in the i.f. amplifier and for the common terminal of the discriminator 68,000-ohm bridge resistors and output capacitor. Another three-lug strip, center ground, between the discriminator can and the 12AX7A socket, is used to tie the detector diodes to the bridge resistors and bypass capacitors.

Follow the usual practice of putting in the heater and power supply wiring first, then a bare wire bus connecting the grounded points, and finally add the small components, building from the chassis out. The small 24-gauge solid hookup wire is a good size to use. The power transformer primary leads are brought out through a rubber grommet and terminated in an a.c. plug; you may want to use a regular line cord here. The resistors and capacitors are all supported by their terminal leads in a point-to-point wiring arrangement, as is the midget i.f. transformer 388-kc. trap coil.

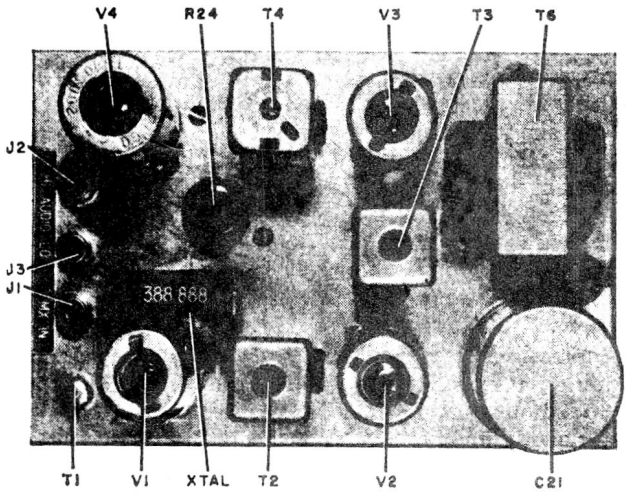
The tune-up requires at least a d.c. voltmeter, preferably a 20,000-ohms-per-volt v.o.m., and a station on the air with an SCA signal.

A visual check of the wiring and parts values after the wiring is completed may save considerable grief later. If no trouble is found, plug the unit into the a.c. line before putting in the tubes, then check the "B+" d.c. voltages. They should be around 200 volts with no load. Plug in all tubes and check the voltages when they settle down, comparing with the diagram values. Then with the v.o.m. on the 10-volt range, connect to the test point and chassis ground to measure the 6BH6 limiter negative grid voltage. If this is about ½ volt, plug in the channel 280 crystal. The leak-through signal from the oscillator on 388.888 kc. will increase the negative grid voltage to 5 to 10 volts. Now carefully adjust the 388-kc. trap coil *T5* slug-tuning to dip this voltage to a minimum of less than 1 volt.

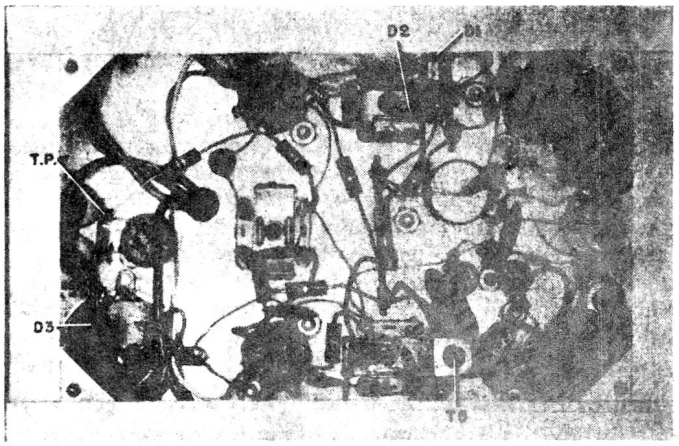
Cable the unit up to the tuner MPX output and adjust the input coil tuning slug until it is out about 1/16" beyond the end of the form. Now tune to a station providing SCA service or tune over the band while watching the limiter grid voltage with the meter on the 50-volt range. Adjust the input coil slug and top and bottom slugs of the two i.f. transformers to peak the meter reading at maximum. Be sure the FM tuner has been exactly centered on the channel with its a.f.c. turned off while doing this. If the tuner is off resonance, a spurious indication may appear on a station without SCA. The voltage should be 20 volts or more when everything is peaked. It is advisable to unplug the tuner and check the trap coil adjustment again for best oscillator rejection. Now clip the v.o.m. between the junction of the two 68,000-ohm discriminator resistors and ground, using the 10-volt range on the meter, and carefully screw in the discriminator slug (top of can) to produce a maximum voltage, positive above ground, of about 3 to 5 volts. After noting the voltage reading, screw the tuning slug *out*, watching the voltage decrease through zero and increase with the opposite polarity. You will swap the meter leads here and continue to screw the slug out until a peak is reached. If this voltage is within 10 percent of that previously noted, the *primary* tuning is satisfactory as is. If not, adjust this tuning (bottom screw) by running it in about one turn.

Now repeat the top tuning procedure, checking the balance of the peaks. If the positive and negative voltage readings are more nearly the same, the primary adjustment just made was in the proper direction. If there is a greater discrepancy between the readings, the adjustment was in the wrong direction and it should be reversed for the next attempt. Continue this juggling until the voltage maximums, positive and negative, produced by the secondary tuning are about equal. This leaves the primary tuning on frequency. Now adjust the secondary tuning to the zero voltage point halfway between the peaks. A small correction may be made later but this will leave the secondary very nearly correct. All this can be done in less time than it takes to describe it. For signal generator users, the discriminator peaks are about 30-kc. apart and the characteristic is quite linear over the ±7-kc. modulation swings.

Now connect the audio output jack to a power amplifier and speaker and check the audio signal for music quality and background hiss. During the silent period in the music, carefully adjust the discriminator secondary to minimize any noise and modulation from the main program. Objectionable hiss here will be due to weak signal level and poor signal-to-noise ratio on the main carrier. As with stereo multiplex,



Top-chassis view showing the compact but uncrowded arrangement.



Wiring is not too critical as frequencies involved are fairly low.

antenna improvements to boost signal levels will be helpful. For average signals, the noise may be barely noticeable during pauses.

Stability of the oscillator and other components is very good and no trouble will be experienced with the unit drifting off the center of the channel. Very accurate frequency measurements of subcarrier signals reveal that not all SCA subcarriers are exactly on 67 kc. A slight variation here, within the range encountered in commercial operations, will not cause tuning troubles since the discriminator will accept signals as much as one kc. off center with no strain.