

INSTALLATION AND OPERATING INSTRUCTIONS

GONSET "Super 6"

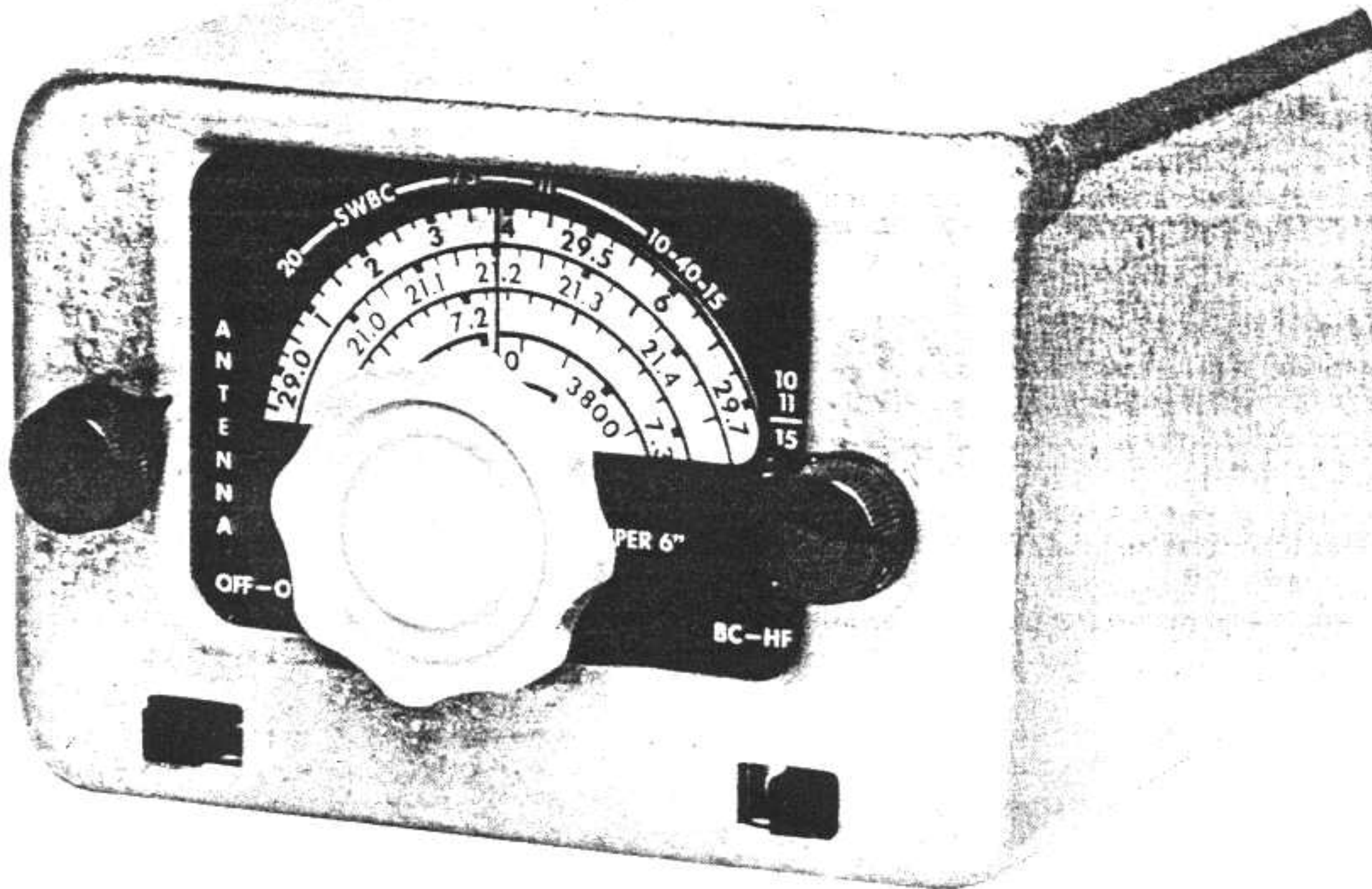
AMATEUR MOBILE CONVERTER

Model "E"



NOTE: To facilitate use of the Super-Six with 12 volt "Hybrid" auto radios having no high voltage "B" supply, the model "E" has been so modified as to work from a 45 volt "B" battery when no "B" voltage is obtainable from the associated receiver. This modification in no way affects performance at higher voltages when such "B" voltage is obtainable from the receiver.

For best economy the 45 volt battery should be of medium or heavy duty type, the latter giving over 1000 hours operation because of the low current drain. The negative 45 volts should be connected to the "hot" 12 volt wire from which heater voltage is taken from the auto radio thus giving an additional 12 volts of "B" voltage on cars having negative ground. If generator ripple or regulator "bumps" cause trouble, then the negative 45 volts should be connected to ground instead.



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GENERAL

The Gonset "Super Six" amateur converter is designed expressly for mobile use on the 10, 11, 15, 20, 40 and 75 meter bands. It also covers the 19 meter (daytime) and 49 meter (nighttime) short wave broadcast bands, a useful feature in remote areas where reception on the regular broadcast band is not all that could be desired.

Basically the "Super Six" consists of a low-noise r-f stage, a low noise triode mixer, a modified Clapp high stability oscillator, and an i-f stage for gain and isolation. It is designed to work into the Gonset Superceiver or into practically any standard automobile radio, the exception being the small, inexpensive type which delivers only about 100 volts maximum to the a-f output tube. A Gonset "Signal Slicer" may be added to the auto radio to provide greatly increased selectivity.

ELECTRICAL CONNECTIONS

When the Super-Six is to be used with a Gonset SUPERCEIVER, it is necessary only to plug the power connector into the control head and the coax output lead into the coax receptacle on the main SUPERCEIVER chassis.

When the Super-Six is to be used with an auto radio, it is recommended that the multi-wire receptacle provided be mounted on a clear spot on the auto set to constitute a "break-away" connection, thus facilitating future maintenance work or repair work on the auto set.

The most practical method of obtaining B voltage from an auto radio usually is from the screen grid terminal of the audio output tube. The voltage should not exceed 180 volts, and 130 to 150 volts is optimum. A series resistor should be added if required in order to reduce the voltage to a suitable value. If the a-f output stage is push-pull, check to make sure the screen voltage is taken from the second power supply filter condenser. On a few push-pull sets the a-f screen voltage is taken from the first filter condenser, and does not have sufficient filtering for the converter. In this case, connect to the second filter condenser rather than the screen of one of the a-f output tubes.

Two B plus wires are provided on the Super Six. One is for the oscillator and one for the balance of the converter. This permits external voltage stabilization of the oscillator when the converter is used with a SUPER-CEIVER. The sharp i-f system of the SUPER-CEIVER makes such regulation desirable. When using an ordinary auto radio the i-f bandwidth is wide enough that regulation of the oscillator plate voltage is not required, even on 10 meters, and the two B plus wires may be tied together at the receptacle or connected to the same point in the auto receiver.

The AVC wire on the Super-Six is connected to the AVC bus on the receiver (at the point where the AVC is bypassed to ground with a large tubular paper condenser, usually from 0.1 to 0.5 ufd). If the receiver has two AVC busses ("high-low" AVC), then the converter AVC wire should be connected to the bus feeding the grid of the first tube in the receiver.

The 6 volt heater wire may be connected to the "hot" heater pin of any tube socket except that of the rectifier. Keep both heater and B plus wires away from the power supply compartment of the auto set.

A check should be made before "buttoning up" the installation to make sure the heater voltage at

the converter, with both converter and auto receiver on and generator not charging, is at least 5.5 volts. Some auto receivers employ a combination "A choke" and dropping resistance to limit the heater voltage when the generator is charging and input voltage climbs to over 7 volts. The extra drain imposed by the heaters in the converter may result in excessive voltage drop and cause the h-f oscillator in the converter to stall when the generator is not charging, particularly on the 75 meter band where the oscillator tank impedance is lowest.

If this condition of excessive voltage drop is encountered, it will be necessary to take off the heater voltage to the converter ahead of the "A" choke in the auto receiver. This may require use of a Sprague "Hypass" filter condenser at the take off point to prevent ignition or vibrator noise from getting to the converter front end via the heater leads.

The converter output is fed to the auto radio by means of the single, black-sheathed shielded wire which is terminated in an antenna pin jack.

For proper operation of the overall combination, incorporation of a Gonset "Clipper" noise silencer on the auto radio is highly recommended, and should be installed at the same time as the converter itself. The Gonset "Signal Slicer" contains its own noise clipper, and none therefore need be added if a "Signal Slicer" is employed to increase the selectivity of the auto radio.

ANTENNA

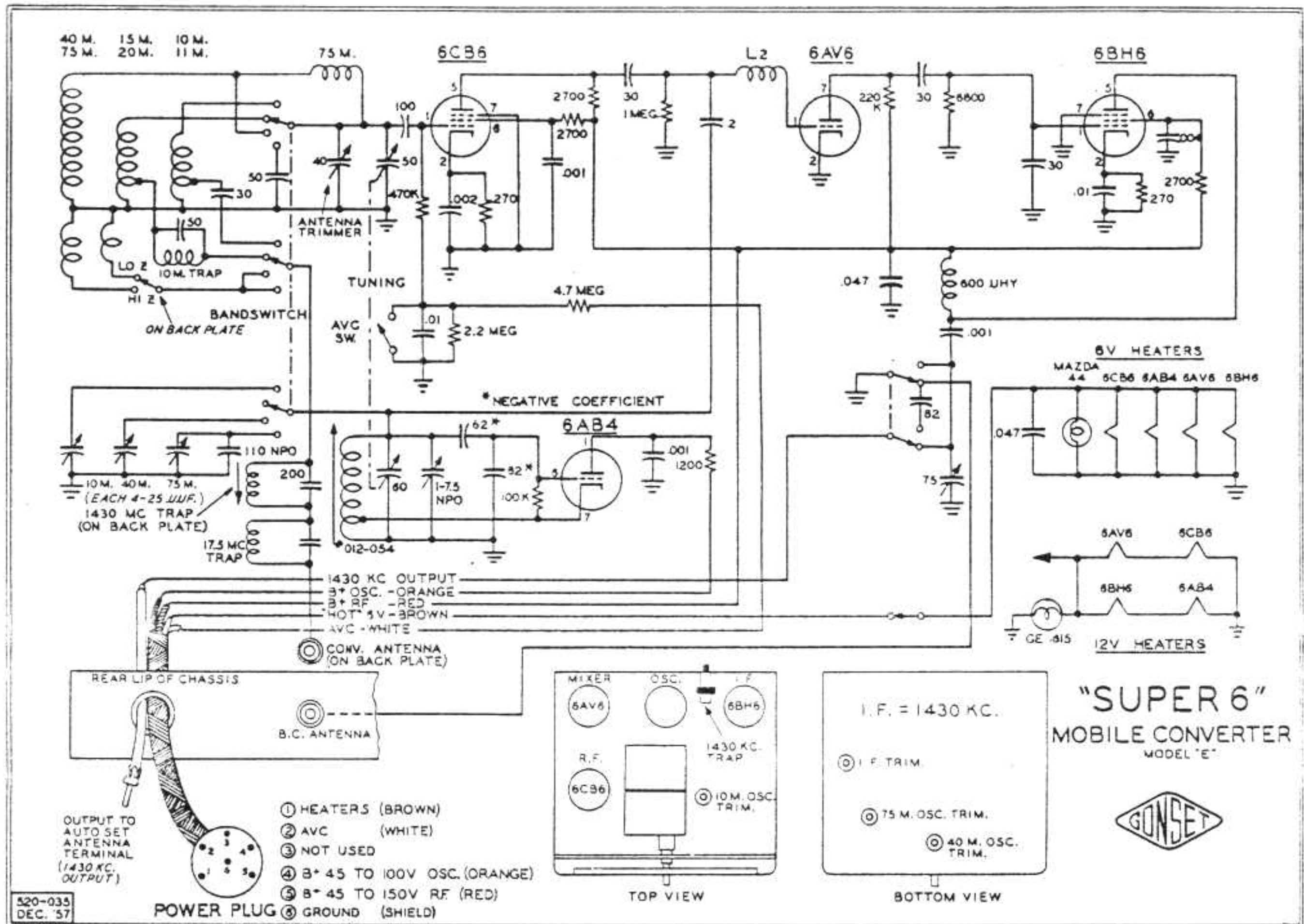
For maximum performance and freedom from images a resonant antenna should be used. This requires a carefully pruned loading coil on 75, 40, and 20 meters, and also on 15 meters if the antenna is less than about 10½ feet long. If a transmitter is used in the car, the loading coil employed for the transmitter will meet this requirement. Unless you intend to change or short out the loading coil when changing bands, use a plain 10 or 15 meter whip on all bands as a compromise when just "listening around" the various bands.

To obtain optimum impedance match, use RG-58/U or RG-8/U coax (50 ohms) between the antenna (via the changeover relay if used) and the converter input, of such length that the lead from the antenna terminal to the converter terminal is exactly 21 feet long. This is important.

Because the base impedance of the antenna approaches the impedance of the coaxial line only on 10 and 15 meters, the line becomes part of the input circuit on the lower frequency bands, and the input circuits of the converter therefore have been designed for use with this critical length of lead-in. Therefore, THESE INSTRUCTIONS MUST BE FOLLOWED FOR PROPER OPERATION OF THE CONVERTER.

A separate antenna input circuit and jack have been provided for the broadcast band, permitting use of the regular auto radio antenna and the usual short, low-capacity lead-in for best results at standard broadcast frequencies.

A 10 meter or 15 meter whip will give good results on both the 19 meter and 49 meter short wave broadcast bands, but still better performance will be obtained by using a 20 meter loaded whip for the 19 meter short wave band and a 40 meter loaded whip for the 49 meter short wave broadcast band. However, because of the high power used by short wave broadcast stations, maximum performance of the converter seldom is required for good reception of these stations.



PRELIMINARY ADJUSTMENTS

(when used with auto radio)

With all cables connected, turn the converter on-off (heater) switch to "off" and the "BC-HF" switch to "BC". Turn on the auto set and tune in a very weak station between 1350 and 1400 kc. Then adjust the antenna trimmer on the auto set for maximum gain. Practically all auto sets except those by Automatic Radio Manufacturing Company have such a trimmer, though sometimes it is hidden under a snap button. This adjustment also can be made, if the set has good gain, by tuning to a "dead" frequency between 1350 and 1400 kc., turning the volume control full on, and adjusting the antenna trimmer for maximum background noise. The broadcast set now should exhibit good sensitivity and gain throughout the broadcast band. If not, it is possible that one or more tubes are weak, or the r-f or i-f trimmers are in need of adjustment.

Next, set the auto radio to exactly 1430 kc. Do not trust the auto radio dial the first time this is done, as the reading often will be found to be off as much as 30 or 40 kc. Check the dial reading against the frequency of known broadcast stations near the frequency to determine how much dial error must be allowed for. If the set has push buttons, it is desirable to set one of them up on this frequency. A frequency of 1430 kc. is employed for converter i-f so that the second harmonic of the oscillator in an auto set with 455 kc. i-f will fall below 3775 kc., in case any oscillator r-f should get back into the converter and be picked up as a steady carrier.

The "BC-HF" switch on the converter is now turned to "HF" and the front panel antenna trimmer on the converter is detuned from maximum background noise

(with the heater switch turned on). Next the output trimmer (i-f trimmer) on the under side of the converter (refer to drawing) is peaked for maximum noise.

Once the foregoing initial adjustments have been made correctly, it is only necessary to tune the auto set to 1430 kc. and turn on the converter whenever it is desired to use the converter. The separate heater "ON-OFF" switch is incorporated for two reasons. It permits immediate change from broadcast to converter, as when checking adjacent broadcast stations to check the 1430 kc. frequency setting, without having to wait for the converter heaters to reach operating temperature when switching from "BC" to "HF". It also allows the hot heater lead (which may possibly carry ignition noise via the heater lead) to be kept well separated from the antenna and converter output leads on the "BC-HF" switch.

OPERATION

The knobs on the front of the converter are self-explanatory. The main tuning knob should be turned until the pointer above the bandspread wheel is closest to the band indicated on the bandswitch. The 19 and 49 meter short wave broadcast bands tune over the range of the dial pointer marked "SWBC".

When changing bands it may be necessary to repeak the front panel antenna trimmer (marked "ANTENNA"). When peaked at the center of an amateur band the adjustment will hold over the entire band. However, care should be taken on the higher frequency bands to see that the trimmer is not peaked to the image frequency. Once the correct position is determined for a given band, it should be noted for future reference.

On the 15 meter band the chance of getting on the wrong peak is especially pronounced when first using the converter because the background noise peaks up slightly louder on the image than on the correct peak. Peaking the trimmer to the image is avoided if it is peaked on a weak amateur signal rather than background noise. On the 40 meter band, however, it is preferable to peak the antenna trimmer on background noise in the center of the band and then not touch it, because on this band it is possible to tune the input circuit to the oscillator frequency and thus "pull" the oscillator (and therefore the main dial tuning) by means of the antenna trimmer. On the other bands the antenna trimmer will not tune to the oscillator frequency, and no oscillator pulling will occur regardless of the setting of the antenna trimmer.

Use of AVC on the converter is made optional by means of a slide switch on the back plate. Blocking on extremely loud signals is reduced by use of AVC, but the signal-to-noise ratio will in some cases be improved very slightly on 10, 15 and 20 meters by disabling the AVC (throwing the AVC switch to "off" position).

A switch is provided on the back plate permitting optional antenna coupling on 40 and 75 meters (also 49 meter broadcast), to allow for different antenna conditions. The best position of the switch (low or high impedance) for a given band and antenna can be determined by experiment. To avoid "leak through" of a powerful, nearby broadcast station on 1430 kc., a 1430 kc. trap is provided. This trap is tuned by means of an adjustable slug on the back plate, and is shipped with the slug full in to prevent damage in transit. If difficulty is experienced with 1430 kc. leak-through on 75 meters as evidenced by a "b-f-o effect" on all signals, proceed as follows: Tune in a loud amateur signal with the antenna switch on the high impedance position. Detune the front panel antenna trimmer to make the "whistle" more noticeable. Then slowly screw out the slug on the 1430 kc. trap until the whistle disappears.

In the immediate vicinity of a station on 1430 kc. a weak whistle might still be apparent due to the fact that the signal may be sufficiently powerful to get into the auto set via the ventilation holes or heater lead. In this case the only recourse is to move the i-f slightly to one side of 1430 kc. while operating in the immediate vicinity of the transmitter.

Never attempt to adjust the oscillator coil slug except to restore 15 and 20 meter calibration after first making sure the i-f is exactly 1430 kc. A fraction of a turn is all that will be required. Calibration on other bands is set by means of the individual ceramic trimmers the location of which is shown on the accompanying drawing.

Any time the coil slug is adjusted (to touch up 15 and 20 meter calibration) it may be necessary to retrim the 10, 40, and 75 meter bands by means of the ceramic "band set" trimmers, as the oscillator slug adjustment affects calibration of all bands. The 40 and 75 meter trimmers can be reached without removing the cabinet, but the 10 meter trimmer cannot. (Refer to layout drawing for location). Because the oscillator frequency will shift considerably when the cabinet is removed, it is necessary to note how many kc. the dial reads high or low on 10 meters

with the unit in the cabinet, then adjust the trimmer to move a signal this number of kc. in the right direction when the unit is out of the cabinet, without regard to the actual reading in kilocycles. When the unit is restored to the cabinet the calibration then will be found to be correct.

Ordinarily the calibration of the converter will hold very closely for a long period of time, adjustment of the oscillator slug or trimmers seldom will be required.

Setting the auto set to exactly 1430 kc. presents somewhat more of a problem when the set employs a "signal seeking tuner". If the output trimmer of the converter is peaked at 1430 kc., the r-f gain switch set in the "high" position, the front panel antenna trimmer on the converter peaked for maximum noise, and the "sensitivity" control knob on the auto set is turned full right, then the background noise will be sufficient to stop the tuner without a signal.

The auto radio dial then can be "inched" along in the vicinity of 1430 kc. a few kc. at a time by just tapping the station selector bar. The difficulty arises in making the initial adjustments, because until they are made the noise may not be sufficient to stop the tuner. An external oscillator set on 1430 kc. will be found useful in making the initial adjustments. Otherwise the initial adjustments must be made with the dial as close to 1430 kc. as can be arrived at with the seeking mechanism "free wheeling".

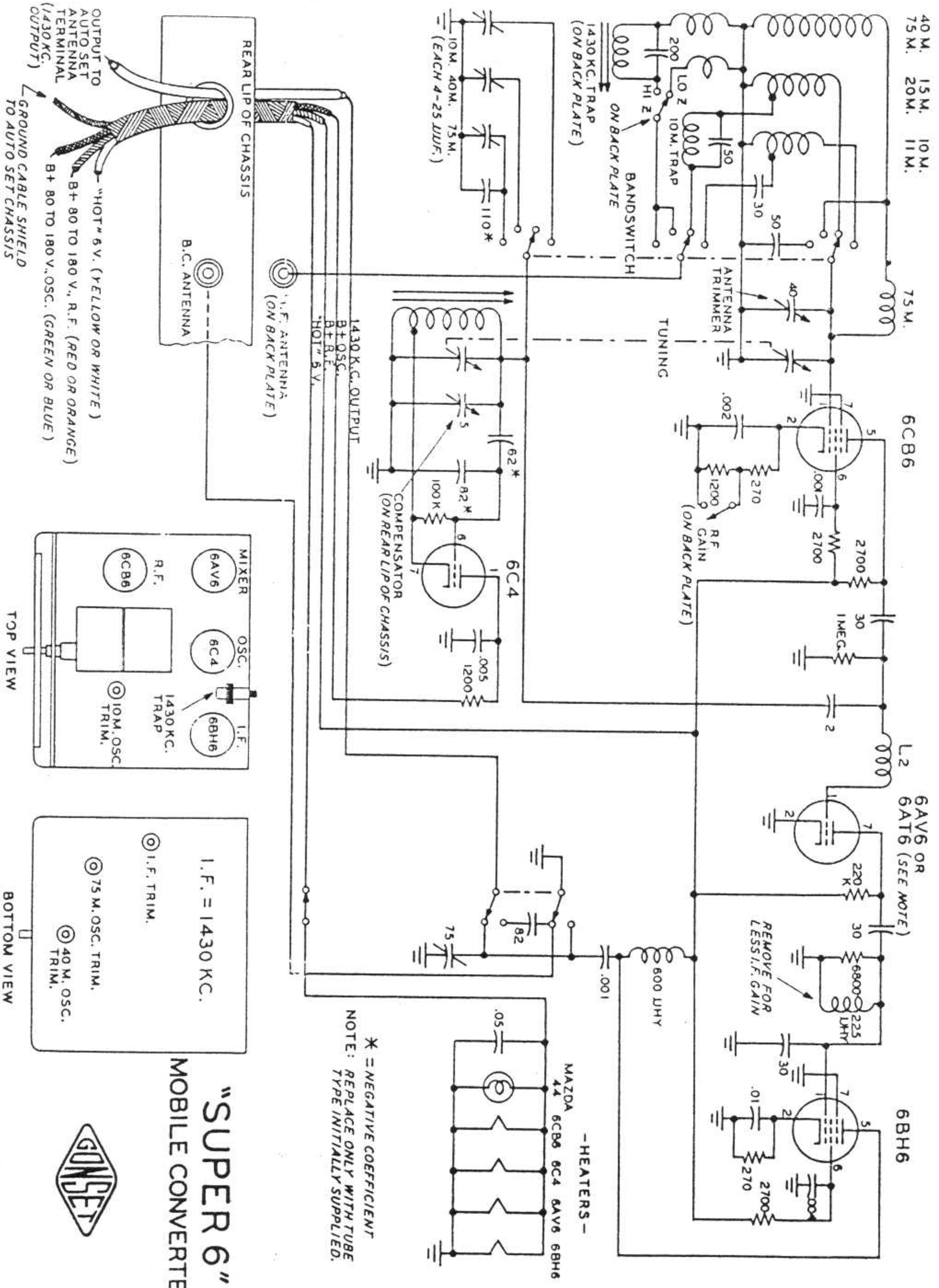
When the converter is used with a typical car receiver it will be observed that the selectivity is not as good as that of a high quality communications receiver. This is explained by the fact that typical auto sets use only one i.f. stage with only two transformers, and frequently rather low-Q transformers at that. This lack of selectivity is a function of the auto set, and has nothing to do with the converter. For greater selectivity substitute a Gonset SUPER-CEIVER, or add a Gonset SIGNAL SLICER to the auto set. This unit provides two degrees of selectivity at the flip of a switch, and also contains its own noise clipper, making the addition of a separate Gonset "Clipper" unnecessary.

Some receivers are provided with a "sensitivity control" which enables the gain of the receiver to be increased or reduced by means of a screwdriver adjustment. It may be desirable in some cases to reset this control to a more suitable setting after a converter is installed.

NOISE REDUCTION

It is desirable that the vehicle in which the converter is installed be effectively "suppressed" in order to minimize electrical noise, so that the full sensitivity of the converter can be utilized with the vehicle in motion. The required work is somewhat more extensive than for an ordinary auto receiver covering only the broadcast band, and varies somewhat with the particular car.

Usually it is difficult to eliminate every bit of electrical noise in a vehicular installation. Also, above approximately 10 Mc. or thereabouts there is the matter of ignition noise from passing vehicles which are not suppressed. The only practical solution to this problem is an effective noise limiter.



"SUPER 6" MOBILE CONVERTER



Modifications for
12 VOLT OPERATION

GONSET TRI-BAND, DELUXE TRI-BAND AND SUPER-SIX CONVERTERS

Modification consists of connecting the 6AV6 and 6CB6 heaters in series, the 6C4 and 6BH6 heaters in series, and replacing the dial light. This is accomplished as follows:

1. Lift pin 3 of the 6AV6 from ground but replacing the original ground connection to pin 2 (cathode) and the center shield.
2. Retain original connection between pin 4 of the 6CB6 and pin 4 of the 6AV6. Remove connection between pin 4 of the 6AV6 and pin 4 of the 6C4.
3. Retain original connection between pin 4 of the 6C4 and pin 4 of the 6BH6. Lift pin 3 of the 6BH6 from ground and connect a new lead from this pin to pin 3 of the 6AV6. The ground connection to the center shield of the 6BH6 socket must be replaced by connecting it to the nearest ground, preferably to same ground lug to which the cathode resistor is connected. However, on the Tri-Band model only, this latter precaution is not necessary since lifting pin 3 from ground does not remove the ground connection to the center shield.
4. On Tri-Band and Deluxe Tri-Band models, the lead from the on-off switch to pin 4 of the 6BH6 is moved over to pin 3.
5. On the Super 6 model, the lead from the on-off switch to pin 4 of the 6CB6 is moved over to pin 3 of the 6AV6.
6. Replace dial light with 12 volt G.E. lamp #1815.



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