INSTRUCTION MANUAL

GONSET
"COMMUNICATOR II-B"

Transmitter-Receiver

DIRECTORY OF COMMUNICATOR MODELS COVERED BY THIS BOOK:

3025-B	2 Meter Amateur 6/115 Volt
3043-B	Ground-to-Air 6/115 Volt
3049-B	6 Meter Amateur 6/115 Volt
3057-B	2 Meter Amateur 12/115 Volt
3058-B	6 Meter Amateur 12/115 Volt
3064-B	C.A.A. 6/115 Volt (Push-to-Talk)
3070-B	C.A.A. 12/115 Volt (Push-to-Talk)
3073-B	Ground-to-Air 12/115 Volt
3074-B	Ground-to-Air 115 Volts A.C.
3077-B	F.C.D.A. Certified 2 Meter 12/115 Volt
3079-B	F.C.D.A. Certified 6 Meter 12/115 Volt
3087-B	F.C.D.A. Certified 2 Meter 6/115 Volt
3088-B	F.C.D.A. Certified 6 Meter 6/115 Volt

The following suffixes, when appended to the above designations, indicate deviations from the standard model as follows:

P indicates push-to-talk has been added.

S indicates special frequency (on special order).

X indicates substitution of a crystal-controlled receiver for the tunable receiver normally supplied.

801 S. MAIN ST. GONSET BURBANK, CALIF.

1124 MBP

This item guaranteed for 90 days from date of purchase against defective material and workmanship.

Name of Article COMMUNICATOR II

Model No. 3025 Serial No. 14146

Date of Purchase 6/5/58

Purchased from HEATH CO.

Address

No. 59860

R4 220K
R59 500K
R58 470K

WARRANTY

The Gonset Company warrants this product to be free from defective material and workmanship when new, and will remedy any defect or replace any defective part other than the vibrator unit free of charge for a period of 3 months from date of original purchase (one year in the case of F.C.D.A. models), provided warranty registration card is filled in and mailed to us within 10 days. This warranty does not apply to units which have in any way been abused or misused, either deliberately or accidentally, or have been altered.

Except for vacuum tubes, the defective unit or part must be returned to us transportation charges prepaid, after first getting authorization to return. In the case of tubes, the adjustment normally can be made by the jobber from whom the unit was purchased, as most jobbers are so authorized by the tube manufacturers supplying them.

OPERATOR LICENSE REQUIRED FOR TRANSMISSION

Operation of the transmitter in this equipment requires a Federal Communications Commission license. Operation without a license is illegal and is subject to penalty.

DANGER, HIGH VOLTAGE

The voltages employed in this unit are sufficient to cause fatal shock under some conditions. Do not attempt to work on the unit out of the cabinet unless you are qualified to the extent of knowing what precautions to observe with regard to avoiding electrical shock. Take especial note that plate voltage appears on the plate cap of the 2E26 at all times the power supply is on, regardless of the position of the transmit-receive switch and the switch which disables the transmitter heaters.

Made in U.S.A.

GONSET CO., INC. **801 S. MAIN STREET** **BURBANK, CALIF.**

GONSET COMMUNICATOR II-B

PERTINENT DATA

POWER INPUT:	Low voltage d-c or 115 volts a-c 60 to 400 cycles using appropriate power cord. On d-c the black wire is ground, regardless of polarity.
POWER DRAIN:	95 watts on transmit, 65 watts on standby receive, and 45 watts on receive alone.
CRYSTALS:	Fundamental type in FT-243 type holder. Refer to individual schematic for crystal multiplication factor and fundamental frequency range.
MICROPHONE:	Single button carbon (telephone type F2 or T-1 recommended), high output crystal, or high impedance dynamic or controlled reluctance (approx. — 50 db). Hot mike lead connects to ring of PL-68 plug. "Crystal-Carbon" mike switch must be thrown to corresponding position. Gain control originally is run full on except for p-a use. Except on push-to-talk models, push-to-talk switch should be shorted out if it breaks mike circuit.
TUNE-UP:	Starting with eye switch on "Osc" position, tune for maximum eye closure by means of indicated control, in counter-clockwise sequence, T/R switch on "Transmit," both power switches in "on" position. On 6 meter model go back and check tripler tuning after resonating final grid.
CRYSTAL SPOTTER:	With T/R switch on "Receive," turn eye switch to "Osc" position. This turns on transmitter oscillator to permit spotting on receiver dial. Always return eye switch to "Tune-Load" position before trying to transmit.
USE AS P-A SYSTEMS:	Connect 4 to 8 ohm voice coil of good trumpet type speaker to a phono connector on rear recess. Turn "Filaments" switch to "Receiver-PA" and the T/R switch to "Transmit." Adjust a-f gain control as required.
MATING CONNECTORS:	Type 83-1SP coax connector. Type PL-68 mike plug. Type 13A or M-93 Cinch "phono plug" p-a voice coil connector.
TUBE COMPLEMENT:	Refer to individual schematic for specific equipment.
OTHER:	Dial lamps, Mazda No. 47; Vibrator, Mallory 294 or 625/825 for 6 volts; G625/G825 or G1501/G4501 for 12 volts.

GENERAL

The Gonset COMMUNICATOR is an AM transceiver designed for use on either low voltage d-c or 115 volts a-c. The receiver has a noise figure of approximately 5 to 6 db, and the transmitter a power output of approximately 6 watts at nominal supply voltage. These figures will vary slightly with frequency and different 6BQA and 2E26 tubes.

POWER SOURCE

The power supply circuit is automatically changed from a-c to d-c and vice versa by jumpers in the two plugs. When operating mobile, it is recommended that except for very short periods the vehicle engine be run at charging speed during transmissions. Of the two wires the *black wire is the ground wire* and the

white wire the "hot" wire, regardless of which pole of the battery is grounded.

Because of the heavy current drawn on transmit (15 amps) when using 6 volt supply, it is desirable that heavy wire be used to supply voltage to the COMMUNICATOR in a 6 volt vehicular installation. No. 8 B&S gauge is recommended from the battery or starter terminal up to the point where the flexible cable furnished with the COMMUNICATOR is attached. For casual operation in "stray" 6 volt automobiles simply clip on the ammeter terminal or main "hot" terminal under the dash. Voltage will be adequate when the generator is charging but it may on the shy side when the motor is not running.

The 12 volt model not only draws half as much current, but a given voltage drop in the wiring amounts to less when figured on a percentage basis (as compared to a 6 volt system). For this reason, use of very heavy wire is not required with the 12 volt model.

Units covered by this manual have tuners and transmitters which can be converted from 6 to 12 volt operation and vice versa by changing tie point jumpers as indicated on the schematic. Thus, it is only necessary to purchase a 12 volt power supply should the owner desire to convert a 6 volt model to a 12 volt model at a later date.

"12 volt" models covered by this manual actually are designed for 13.5 volt input (design center). Many "12 volt" automobiles actually deliver approximately 15 volts under light or moderate loads after the generator has been charging for a time.

It should also be pointed out that the newer, very high compression cars with 12 volt ignition also produce much more electrical noise than a typical 6 volt car, particularly with regard to ignition noise but also regulator noise, generator noise et cetera. This is mentioned only so that the reader will know that it is a normal condition.

RECEIVER

Receiver operation is self-explanatory except for squelch. On reception the tuning eye acts as a carrier strength indicator, actuated by the a.v.c.

SQUELCH OPERATION

The COMMUNICATOR II-B employs a highly effective carrier-actuated squelch circuit which may be used or not as desired. In the absence of a signal the exceptionally flat a-v-c characteristic of the COMMUNICATOR receiver normally will cause a high background noise which becomes objectionable if prolonged, as when maintaining a standby watch on C.D., C.A.P., or other net frequencies. The squelch facility permits muting of this background noise.

The squelch circuit employs a biased series-gate diode which is indirectly actuated by the a-v-c voltage. The combination is very effective, gating cleanly on an a-v-c voltage change as small as 0.1 volt when the threshold control is set carefully. The circuit is designed so that compensating factors tend to hold the threshold setting substantially constant over a moderate change in supply voltage to the COMMUNICATOR.

To disable the squelch, just turn the squelch control slightly past the point where the gate "opens" on background noise with no station tuned in. It is not necessary to turn it full clockwise.

To use the squelch, back off the threshold control counter-clockwise just to the point where the background noise disappears, and stop there. This makes the squelch the most sensitive (so that it will open on weak signals). Unfortunately, this also makes the squelch sensitive to electrical noise that is sufficiently strong to cause the a-v-c voltage to change. This means that, if such noise (such as very strong ignition noise or interferences from a nearby commutator motor) is intermittent in nature, the threshold control must be backed off enough to prevent the intermittent noise from triggering the squelch. It will then take a stronger carrier to open the squelch. In extremely noisy locations it may be necessary to turn the threshold control full counter-clockwise to prevent triggering of the squelch by noise. Such operation will be possible only if the desired signals are quite strong.

Certain limitations to the operation of the squelch should be kept in mind. For instance, the normal change in quiescent a-v-c voltage that occurs as the receiver is tuned over the band will cause the threshold setting to change slightly as one tunes over the band. For this reason it is recommended that the squelch be used only after a station is tuned in, and that it be disabled when "looking around the band." For best operation of the squelch, the noise clipper should be left on at all times.

TRANSMITTER

The COMMUNICATOR transmitter is designed for intermittent service with a "transmit" time not to exceed 10 minutes during any 20 minute period. If the transmitter "on" time exceeds this duty cycle, or if the COMMUNICATOR is operated for a long period in an unusually high ambient temperature, it is recommended that the back screen be removed (when this can be done safely).

The output circuit is designed to work either into a quarter wave whip screwed into the coaxial connector on the top at frequencies above 100 Mc., or into 50 or 70 ohm coaxial line having a moderately low standing wave ratio.

The flexible end-fed "zepp" type antenna furnished with 6 meter models provides an easily carried antenna for fixed-portable operation. It may be oriented for either vertical or horizontal polarization. It should be supported by means of a safety pin or string at either end. Performance is much better than with a quarter wave whip stuck directly into the coax fitting, due largely to lack of sufficient grounding surface (cabinet area) at 50 Mc. Inside a steel-reinforced building best results usually will be obtained by locating the indoor antenna near a window.

The multiplier stages are tuned by removing the snap buttons and starting with the "Osc" position, closing the eye as far as possible on each indicated position of the tuning eye switch in sequence with the transmit-receive switch in the "transmit" position. IMPORTANT: When tuning up the 6 meter models, the "tripler" tuning should be touched up after the "final grid" is resonated, as it is difficult to get a pronounced resonance indication on the "tripler" condenser unless the "final grid" is near resonance.

The final amplifier is automatically disabled on all positions of the tuning eye switch *except* the last (tune-load) position. Therefore,

ALWAYS BE SURE TO RETURN THE SWITCH TO THE "TUNE-LOAD" POSITION BEFORE TRYING TO TRANSMIT.

When tuning up, either insert a microphone in the mike jack or else throw the microphone selector switch to "carbon"; otherwise feedback may occur. On the "tune-load" position the eye indicates relative r-f voltage across the coax output, and therefore the maximum amount of closure will vary somewhat with the impedance of the load to which the unit is connected.

A very useful feature is the "crystal spotter," which permits one to spot his own transmitter frequency on the receiver dial and thus check receiver calibration for net operation or determine if a received signal is close enough to cause QRM. With the T/R switch in the receive position, the tuning eye switch is thrown to the osc-tripler position. This turns on the exciter at reduced plate voltage. To avoid feedback and get a closer dial reading, the signal should be zeroed in by eye, with the receiver gain turned down. In some cases a second indication may be observed on another portion of the dial, but this will be weaker. Also, it will be far enough removed from the known crystal frequency that there will be no ambiguity. BE SURE TO RETURN THE TUNING EYE SWITCH TO "TUNE-LOAD" BEFORE ATTEMPTING TO TRANSMIT.

With the T/R switch on "Receive" and the "Filaments" switch on "Receiver P-A", the receiver will work normally but the drain will be lower because the transmitter tube heaters will not be lighted. This is a useful feature when operating on battery for long periods and it is not required that the transmitter be in standby condition. The transmitter heaters take approximately 20 to 30 seconds to reach operating temperature.

The microphone input circuit takes either a carbon microphone or a high-impedance high-output type crystal, controlled reluctance, or dynamic (approximately minus 50 db level). In both cases the microphone is connected between shell (ground) and the *ring* of a PL-68 plug. This is the standard connection for a carbon microphone. Except on push-to-talk models, the push-to-talk switch on a carbon microphone may as well be jumpered if it opens the microphone circuit as well as the separate push-to-talk circuit.

The "Xtal-Carbon" switch on the rear panel recess should be thrown to the correct position for a particular microphone. The adjacent slotted shaft is the audio gain control for the transmitter and for p-a work. The transmitter speech system is designed for close talking, rather than "studio" type pick up, and ordinarily the gain control will be run full on. The main function of the gain control is to permit reduction of the audio gain if desired when using the COMMUNICATOR as a public address system.

PUBLIC ADDRESS OPERATION

The small "snap in" coaxial connector(phono type connector) is for connection to the 4 to 8 ohm voice coil of an external speaker for p-a work. A good, trumpet type PM speaker with husky magnet is recommended for best coverage with good efficiency. To use the unit for p-a work, connect the external speaker, turn the "Filaments" switch to "Receiver P-A", and the T/R switch to "Transmit". Adjust the gain control on the rear recess to the desired level.

OPERATING SUGGESTIONS

For maximum life of the T/R switch the lever should be "flipped" quickly with the tips of the fingers; do NOT grab hold of the lever like a knob and turn it slowly. When used as recommended the switch will give long, trouble-free service.

When the power supply switch is turned off, it should not be turned on again for about 1 minute. If this precaution is not observed, the discharged input filter condenser will act for an instant as virtually a dead short on the rectifiers, which will still be in condition to pass current due to the fact that nearly a minute is required for the cathodes to cool.

ANTENNA AND COMMUNICATION RANGE

The communication range of the COMMUNICATOR via tropospheric propagation depends largely upon terrain factors and the antenna employed. At extreme ranges the weather also is a determining factor.

It is not within the scope of this manual to attempt to cover thoroughly the considerations involved in v-h-f propagation, nor the design on antennas. Summarizing briefly, the higher the elevation of the site, the greater the tropospheric range, particularly when the height of the antenna above ground is low. Also, the higher the antenna above ground, the greater the range, particularly when the site is not elevated. (Height of the antenna above ground becomes less important when the station is located atop a hill.)

The range also is dependent upon the same factors at the other end of the circuit, as well as the character of the intervening terrain. It also is dependent upon the transmitter power, receiver sensitivity, and antenna gain of the other station. Because some stations employ more transmitter power and many have less receiver sensitivity, it is possible to hear more stations than can be worked. The very high sensitivity of the receiver in the COMMUNICATOR tends to make this condition the more noticeable.

To obtain the best possible performance from the COMMUNICATOR at a given site, a good antenna is important. For general coverage fixed-station work with vertical polarization, a Gonset ground-plane antenna is recommended. A good directional array such as one of the Gonset Yagi arrays will greatly increase the range and reduce QRM problems. These arrays may be oriented for either vertical or horizontal polarization.

The receiver in the 6 meter models tunes down to 49 Mc., to permit watching the 49-50 Mc range for ionospheric "openings". The large number of industrial radio assignments in this frequency range makes it almost certain that stations will be heard at distances from 700 to 1500 miles when the 6 meter band is open to sporadic E layer transmission. Likewise an approaching F2 layer opening will first be noted by the reception of 49-50 Mc. industrial signals

at distances between 2000 and 2500 miles when there are stations to hear at that distance.

When using coax, RG-8/U or RG-11/U is recommended in preference to the smaller types in order to minimize line loss. If the antenna is located more than about 120 feet from the COMMUNICATOR, a worthwhile reduction in line loss can be realized by the use of 450 ohm open wire "Gonset Line" stocked by jobbers for TV use. Enough RG-11/U is used to get the line outside the building, then a balun consisting of a half wave phase inverter section of coax (allowing for velocity factor of 0.66) is used to convert to the open line. Four spacers then are removed and the open line is tapered from 1 inch down to 1/2 inch at the point where it attaches to the two ends of the inner conductor in the balun loop. The tapered section must be kept pulled taut. If the antenna is designed for connection to coax, a similar balun may be employed at the antenna end.

For mobile work a quarter wave car top whip will provide good performance as a ground-plane type antenna. If the car does not have a metal top, a coaxial "sleeve" type antenna may be used. The latter must be cut precisely to frequency for good results.

For portable use, emergency work or casual mobile operation above 100 Mc., the quarter wave whip furnished with the COMMUNICATOR may be used by screwing it directly into the coax fitting on the unit.

Surprisingly good results have been obtained using the COMMUNICATOR in this manner with it setting on the front seat of a metal-top sedan, though of course much better results will be obtained with a regular mobile type antenna connected via coaxial line.

In some cases an ordinary side-cowl auto radio antenna will give nearly as good results as a car top whip. Above 120 Mc. the antenna is extended to approximately 3/4 wavelength and undesirable out-of-phase radiation from the lower quarter wave is partially suppressed by proximity to the windshield support post. On 6 meters it is extended only to 1/4 wavelength. Best results with this arrangement require that the lead-in be of the type using polyethylene insulation. (Most of the better quality auto radio antennas employ this type lead in.) An extension cable of RG-59/U or TV-59 using the proper fittings will permit use of the auto radio antenna either for its intended purpose or for occasional "picnic" use of the COMMUNICATOR as a mobile unit.

When working mobile, it will be noticed that a "flutter" is apparent on both the transmitted and received signal, particularly when the signal is weak. The a-v-c in the COMMUNICATOR receiver has been designed with a fast time constant which minimizes the effect when the received signal is moderately strong, but it will still occur to some extent, particularly when traveling at high speed and the "flutter" rate is high. When working mobile-to-mobile the effect is of course accentuated, as the amount of flutter is thereby compounded by the transmitter flutter being superimposed upon the receiver flutter(assuming both vehicles are in motion).

This "flutter" is typical of v-h-f mobile operation and is not caused by any peculiar characteristic of the COMMUNICATOR.

RECEIVER AUDIO SYSTEM

The second detector, noise clipper, and audio system of the COMMUNICATOR receiver have been designed for maximum intelligibility of weak signals. Because the individual characteristics have been engineered to complement each other as an overall system, often it will be found that it is possible to copy weak signals which are not intelligible on a receiver having a comparable measured noise figure (which is the figure of merit commonly employed as a yardstick or receiver sensitivity). This is true even in a quiet location where a noise clipper ordinarily would not be needed for suppression of impulse type noise.

It is recommended that the noise clipper be left on all the time, the in-out switch being provided primarily to assist in aligning the r-f and i-f trimmers on background noise when a signal generator is not available.

TRANSMITTER AUDIO SYSTEM

It will be noted that a Class A single-ended beam tetrode is used in preference to a Class B modulator. The reason for this is that when "square wave" audio is involved, as when heavy speech clipping is employed at high modulation percentages, the former type modulator compares very favorably with the latter, with the advantage of more constant plate current drain and elimination of a driver stage and its transformer. It also facilitates designing the modulator for integral speech clipping, making the incorporation of a separate speech clipper unnecessary(as well as adjustment thereof).

The speech system of the COMMUNICATOR is designed so that to obtain maximum practical speech clipping one need only talk closer to or louder into the microphone, up to the point where the maximum tolerable distortion is obtained.

With voice waveforms and sufficient audio input to produce heavy speech clipping, the percentage modulation is held to approximately 85 per cent, and under no conditions is it possible to exceed this modulation percentage. This means that "splatter" from negative peak clipping is avoided, and no critical adjustments are involved. Assuming that a noise clipper is employed on the receiver at the other end of the circuit when the received signal is weak, upward modulation exceeding approximately 50 or 60 percent is clipped at the receiver and therefore is of questionable utility anyhow.

For those who insist upon heavier modulation, it can be accomplished by the simple process of substituting a 6L6-GB for the 6V6-GT. No circuit changes are required. The carrier power will be slightly less than when a 6V6-GT is used (about 10 per cent) due to the heavier plate current drain upon the power supply. Also, the "transmit" hours life of the vibrator will be reduced, though not seriously if the transmit periods are kept short. When the unit is used mostly or exclusively on battery the substitution is not recommended.

The audio characteristics of the transmitter, from microphone input through the modulator, have been engineered to provide maximum utilization of the carrier power from the standpoint of intelligibility under favorable receiving conditions.

TVI AND OTHER INTERFERENCE

When operated in an area in which television signals are of sufficient strength to provide a completely snow-free picture, ordinarily no difficulty with TVI will be encountered if the COMMUNICATOR and antenna are both located a reasonable distance from the TV set and TV antenna respectively. Use of coaxial line with the COMMUNICATOR will tend to minimize TVI. Often moving frequency to another part of the band will cure the trouble.

With the 6 meter COMMUNICATOR some TVI is bound to occur to channel 2 on very nearby television receivers, through no fault of the COMMUNICATOR. The frequency is so close that traps are of little help when the interference is bad. If it is only moderate, a Drake model TV-300-HP filter ahead of the TV receiver often will cure the trouble completely. The TVI situation can be greatly helped simply by locating the antenna as far from the TV antenna as possible. A vertically polarized antenna on the COMMUNICATOR will tend to minimize the interference if the antennas are close and at about the same height above ground. Coax should be used to feed the COMMUNICATOR antenna. Confining operation to the lower end of the band (near 50 Mc.) will also help.

Spurious radiations from the COMMUNICATOR are minimized through the use of a double tuned output circuit. The loaded Q of the antenna coupling circuit is sufficient to provide considerable rejection of frequencies removed from the carrier by as little as 8 Mc. Spurious radiations are further minimized through the use of high Q tunable tank circuits in the multiplier chain, rather than the "broad band" slug tuned tank circuits sometimes employed. In the 6 meter models a low pass filter is incorporated in the common antenna lead, to minimize spurious responses in the receiver and to minimize radiation of transmitter harmonics.

In spite of these precautions a few micro watts of power will be radiated on some frequencies which there are a spurious multiple of the crystal frequency. In some instances this infinitesimal amount of power may be sufficient to interfere with nearby taxicab, police, etc. receiving installations designed for reception of mobile units, particularly if one or both antennas are well elevated. In other cases the interference to other services may be due to receiver image response.

Such interference can be avoided simply by choosing crystal frequencies which do not interfere. Usually such services will be glad to cooperate to the extent of giving a telephone check as to which crystal frequencies interfere and which do not.

IMAGE RESPONSE

In a unit as compact as the COMMUNICATOR and in the interest of avoiding excessive circuit complexity, some compromises of necessity must be made. Occasional to frequent reception of image signals (depending upon proximity and power of station) may be expected in areas where frequencies within the image range are actively employed.

RECEIVER SELECTIVITY

The selectivity of the receiver is about as great as can be utilized with a receiver having a tunable high frequency oscillator and designed for mobile use (with accompanying wide variations in heater supply voltage during operation). Also, it is about as great as can be utilized successfully for "net" operation without resorting to very close tolerance transmitter crystals. Reception of transmitters using plated overtone crystals prone to drift would also be complicated by greater selectivity. The band width of the i-f system of the various COMMUNICATOR models is a compromise between these factors and QRM considerations. Use of four i-f transformers results in a good "shape factor" (low ratio of skirt selectivity to nose selectivity).

TRIMMER ADJUSTMENTS

The r-f and oscillator trimmers on the tunable receivers seldom will require adjustment. To check them, tune the receiver near the middle of the band, turn off the noise clipper, and adjust the compression trimmer accessible through the rear of the two trimmer holes on the under side of the chassis (mixer grid) for maximum background noise. Then peak the slug on the rear of the receiver farthest from the antenna connector for maximum background noise (cascode output). This requires removing the back screen from the cabinet. The other slug is the antenna input trimmer but tunes so broadly that retuning should never be required.

Repeaking or checking the i-f trimmers requires removal of the receiver from the cabinet. It may be done on background noise if the transformers are not too far out of adjustment. If one of the transformers is replaced it probably will require a signal generator for realignment. This should be connected to the mixer grid, and the output level of the generator reduced as alignment proceeds, in order to prevent overload. It is important that final alignment (touching up all i-f trimmers) be done either on background noise or with the signal generator reduced to the point where the tuning eye just flickers slightly.

The front trimmer on the bottom of the cabinet is the oscillator trimmer and should not be touched unless the calibration is off more than about 100 kc., as day to day variations in temperature, humidity, etc. may cause this much error in calibration. The oscillator trimmer should be set *after* the adjacent mixer trimmer has been peaked at the center of the band, as the latter pulls the oscillator trimmer slightly. It is for this reason that the mixer trimmer always should be peaked on background noise rather than a signal.

An r-f gain control on the rear of the receiver is used to set the overall gain (to allow for tube variations, etc.).

This r-f gain control on the back plate of the receiver is adjustable by means of a small screwdriver, and is adjusted to give optimum IF gain after all alignment adjustments have been made. Ordinarily this adjustment need not be made except when changing tubes, realigning the receiver, etc.

REMOVAL OF INDIVIDUAL UNITS

To remove the transmitter section from the cabinet (including the receiver audio output section) remove the tuning eye switch nut, remove the T/R switch nut, disconnect the cable connectors involved, disconnect the voice coil lead from the speaker terminal, remove four screws on antenna connector, and pull the chassis straight back out of the cabinet. Reverse the procedure to replace the transmitter.

To remove the receiver, unscrew the four screws on the bottom of the cabinet, remove the two small receiver knobs, disconnect cables involved, and slide unit back out of the cabinet. To replace, reverse the procedure.

To remove the power supply, unscrew the six screws on the bottom of the cabinet, remove the nuts from the two toggle switches, disconnect cable, and lift unit up and out. To replace, reverse the procedure.

F.C.D.A. MODEL COMMUNICATORS

The "C-D" model 2 meter and 6 meter COMMUNICATORS are certified by the manufacturer to meet applicable F.C.D.A. specifications, and thereby qualify under the F.C.D.A. financial participation program.

While basically similar to the standard amateur counterparts, the C-D models differ in certain details in order to meet F.C.D.A. specifications for utility portable equipment under classifications U-14 and U-16. In addition to differences in accessories furnished (crystal, microphone, carrying case, etc.) there are other differences in certain components and in physical construction. In addition the receiver in the 2 meter model is furnished with a sharp cut-off two-section filter between the cascode r-f stage and mixer in order to provide the required image rejection.

With the image 12 Mc. removed on the low side on the 2 meter model, the filter has been factory adjusted for the maximum attenuation between 132 and 136 Mc. compatible with minimum attenuation within the pass band of 144-148 Mc.

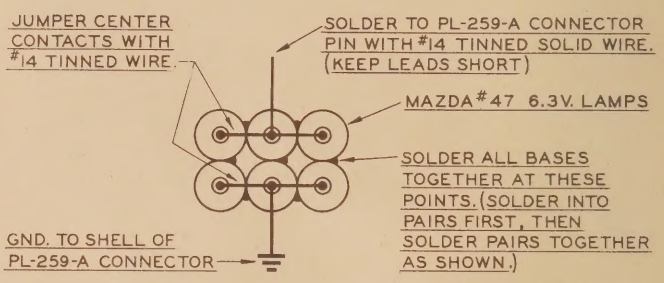
This filter is adjusted by tuning the receiver to 147 Mc., feeding it an image signal from a signal generator set to 135 Mc., and adjusting the two outside plunger-type trimmers for maximum attenuation. If sensitivity at 144 Mc. then appears to be down as compared to a set known to be working normally, these two trimmers are screwed in very slightly to bring the sensitivity up to normal, but no more. This simplified procedure is sufficient to restore proper adjustment should it ever be required. The method of adjusting the complete filter initially at the factory is considerably more complicated, but the foregoing two adjustments are sufficient to compensate for any possible aging of components anywhere within the filter. If for any reason additional information is required on adjustment of the filter it may be obtained from the factory.

TROUBLE SHOOTING

When trouble develops the first thing to look for is a defective tube, as this trouble will represent about 90 per cent of that encountered in service. When replacing the 6T8, it is desirable to try two new tubes, as about 1 out of 10 brand new tubes will not perform satisfactorily when the supply voltage is low, as in mobile service when the generator is not charging. This is explained by the fact that the 6T8 heater voltage is dropped via a ballast resistor to prevent a-c hum or generator or vibrator hash from entering the audio circuit via the cathode of the noise clipper diode, and a 6T8 which is marginal at normal voltage will not perform satisfactorily at the reduced voltage. Failure of one rectifier tube during transmit usually will damage the other; therefore if one is found bad the other should be checked.

If the trouble is not traced to a defective tube, then voltage and resistance measurements should be made, referencing the schematic diagram and voltage chart.

RF OUTPUT INDICATOR



BOTTOM VIEW

DUMMY ANTENNA LOAD

A convenient and easily constructed dummy antenna load is shown in the accompanying illustration. The connecting leads to the PL-259-A connector should be kept very short. This r-f output indicator gives a check on carrier power output and a rough check on audio gain and modulation capability, and a periodic check with such a unit is recomended. When the lamps light to normal brilliancy the output is approximately 6 watts, which is average for a properly operating COMMUNICATOR. (The output varies slightly from unit to unit because of tube variations, etc.) When speaking directly into one of the recommended microphones at "conversational" voice level there should be a noticeable "upward flicker." Whistling into the microphone should cause a pronounced increase in lamp brilliancy.

HEADPHONE OPERATION

For special applications where headphone operation is desired and the speaker must be muted, a closed circuit headphone jack is provided on the front panel. When a pair of low impedance (600 ohm type) headphones are inserted in the jack the voice coil winding of the speaker is automatically disconnected. High impedance phones will work but give less volume.

Because of the excellent sensitivity of the COMMUNICATOR receiver, many amateurs with high power transmitters will want to use it as their fixed station receiver, thus avoiding the expense of a second receiver. The simplest method of muting the receiver on transmit when used with separate transmitter is to short the voice coil by means of a relay connected to

the p-a "phone jack" on the rear recess. The relay contacts should be connected between the phono jack and chassis ground via reasonably short, heavy leads, or otherwise full muting will not be obtained.

MCW OPERATION

"MCW" operation (keyed tone with constant carrier) may be accomplished very easily by simply running a wire from the p-a connector (phono jack) on the rear of the transmitter chassis back via a telegraph key to the hot microphone terminal on a PL-68. A 1200 ohm 1/2 watt resistor should be connected from the hot microphone terminal to ground (shell) of this PL-68. The tone may be varied as desired by adjustment of the a-f gain control on the rear of the transmitter, and by throwing the mike switch between "crystal" and "carbon".

USING COMMUNICATIONS RECEIVER AS I-F STRIP

For home station use it is possible to use any good communications receiver having (or adjustable to) an I-F bandwidth of not less than about 10 kc. following the I-F strip in the COMMUNICATOR, thus in effect making a composite "double conversion" superheterodyne having much greater selectivity than the COMMUNICATOR receiver alone.

This is accomplished by running a piece of coax to the input of the communications receiver from a 1 uufd. (approximately) condenser or "gimmick" connected to the plate of the last I-F tube in the COMMUNICATOR. The communications receiver is tuned precisely to the center of frequency of the COMMUNICATOR I-F pass band. (Refer to individual schematic for IF.) The trimmers on the last I-F transformer in the COMMUNICATOR should be touched up after making this installation, as connection of the "gimmick" condenser will affect the tuning slightly.

PUSH-TO-TALK RELAYS

The relays employed in the push-to-talk models ordinarily will be trouble free for several years of normal use, without need for adjustment. However, when the equipment is exposed to wind blown dust, sand, etc., difficulty may be encountered with foreign matter lodging between contacts or between the pole piece and armature.

Such foreign matter often can be blown out with compressed air. If it has caused contact arcing, the contacts should be burnished with a tool similar to Western Electric (Graybar) relay burnishing tool no. W.E.265-C. Care should be taken during this process not to upset the reed or blade tension on any of the contacts. Do not use liquid contact cleaners.

MISCELLANEOUS NOTES

When removing the receiver from the main cabinet for any reason, it is extremely important that the dressing of the high frequency R-F leads not be disturbed, as some are quite critical.

On the tune-up positions of the tuning eye switch, screen voltage is removed from the 2E26 P-A tube. However, a few milliwatts of power will be radiated under these conditions, which is sufficient to be heard several blocks, if the set is hooked to an antenna. Therefore, tune-up should be accomplished as quickly as possible or else a dummy antenna used if this amount of radiation is likely to bother a net, such as CAP.

Trouble sometimes is encountered in getting positive contact in the microphone jack when a worn PL-68 plug is employed. The jack spring contacts are adjusted for use with a new plug, and if trouble is encountered when using a worn plug it is suggested that a new plug be substituted rather than tamper with the spring adjustment.

NOTES

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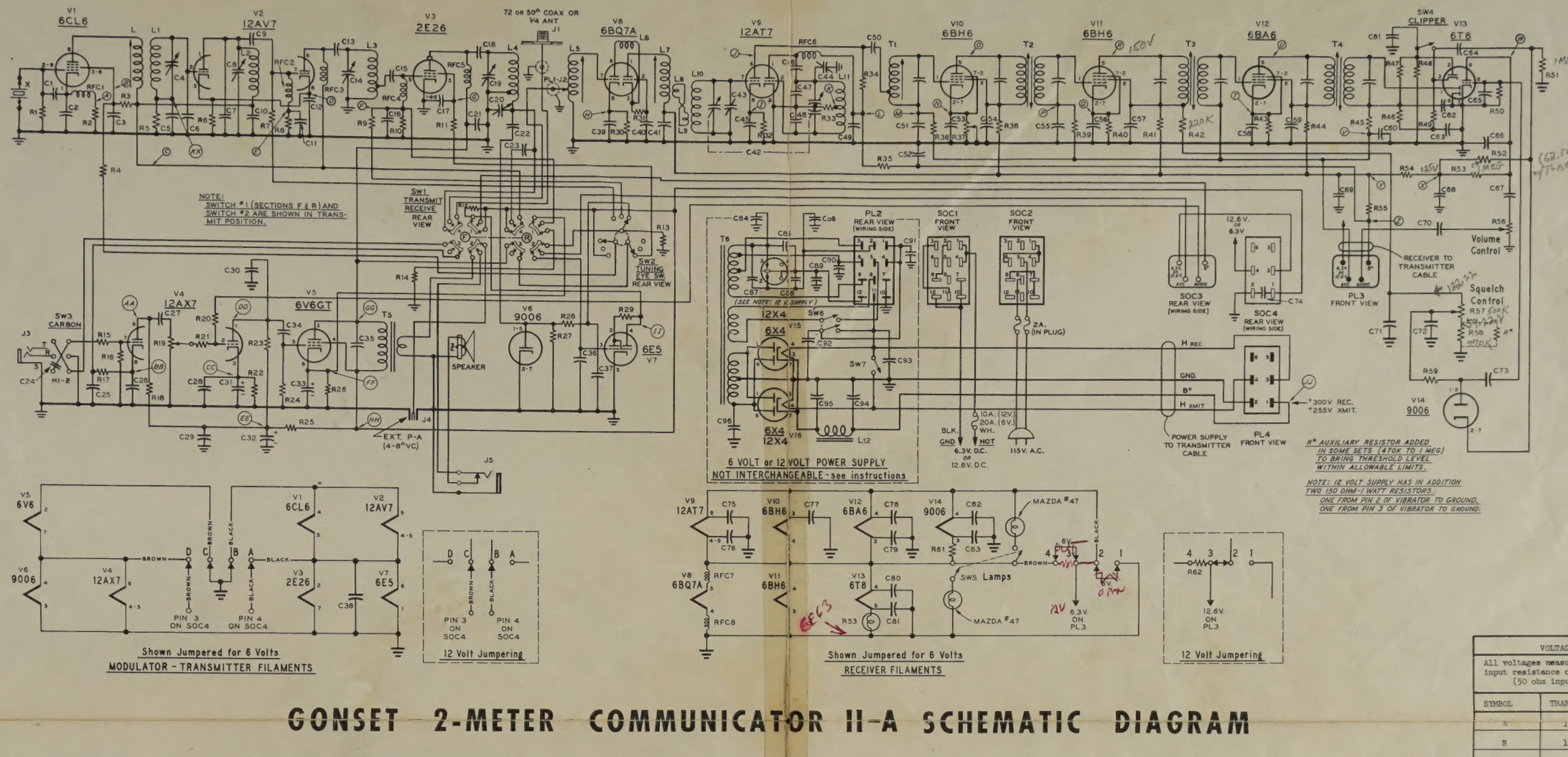
Components such as T1, T2, and others not listed below are special and should be ordered
is 6 MC. Voltages should be measured with a diode type voltmeter having an input resistanc

GONSET
801 S. Main Street Burbank, California

This schematic applies only to Communicator II units ha
serial number over 16386. Power supplies with gray tra
(design center). Those with brown transformer case are
however, are referred to as "12 volt" supplies. 6 volt

C1	10 MMF Ceramic NPO
C2	100 MMF Ceramic
C3	.001 MFD Ceramic 20%
C4	25 MMF APC
C5	.001 MFD Stand-off
C6	20 MMF G.P.
C7	5 MMF Ceramic NPO
C8	5 MMF APC
C9	50 MMF Ceramic NPO
C10	.004 MFD Ceramic 20%
C11	.001 MFD Ceramic 20%
C12	.001 MFD Ceramic 20%
C13	.001 MFD Ceramic 20%
C14	10 MMF APC
C15	100 MMF Ceramic NPO
C16	.001 MFD Ceramic 20%
C17	100 MMF Ceramic NPO
C18	100 MMF 1000 V. Silver mica
C19	15 MMF APC
C20	50 MMF APC
C21	470 MMF 1000 V. Ceramic 20%
C22	3 MMF Ceramic NPO
C23	470 MMF Ceramic GMV
C24	.001 MFD Ceramic 20%
C25	.001 MFD Ceramic 20%
C26	.01 MFD Ceramic GMV
C27	.004 MFD Ceramic 20%
C28	.001 MFD Ceramic 20%
C29	.01 MFD Ceramic GMV
C30	100 MMF Ceramic NPO
C31	25 MFD 50 V.
C32	8 MFD 450 V. } 85 C. Electrolytic
C33	25 MFD 50 V.
C34	.001 MFD Ceramic 20%
C35	.0068 MFD 1600 V. tubular
C36	.001 MFD Ceramic 20%
C37	.001 MFD Ceramic 20%
C38	.001 MFD Ceramic 20%
C39	.001 MFD Ceramic 20%
C40	.001 MFD Ceramic 20%
C41	.001 MFD Ceramic 20%
C42	Special 3 gang
C43	RF trimmer on C42
C44	OSC trimmer on C42
C45	.01 MFD Ceramic GMV
C46	40 MMF Ceramic N30
C47	47 MMF 2% Ceramic N80
C48	47 MMF 2% Ceramic N30
C49	.004 MFD Ceramic 20%
C50	50 MMF Ceramic 20%
C51	.001 MFD Ceramic 20%
C52	.01 MFD Ceramic 20%
C53	.01 MFD Ceramic GMV
C54	.01 MFD Ceramic GMV
C55	.001 MFD Ceramic 20%
C56	.01 MFD Ceramic GMV
C57	.01 MFD Ceramic GMV
C58	.01 MFD Ceramic GMV
C59	.01 MFD Ceramic GMV
C60	.01 MFD Ceramic GMV
C61	100 MMF Ceramic 20%
C62	50 MMF Ceramic 20%
C63	.01 MFD Ceramic GMV
C64	.004 MFD Ceramic 20%
C65	.001 MFD Ceramic GMV
C66	470 MMF Ceramic 20%
C67	.01 MFD Ceramic GMV
C68	0.47 MFD 200 V. paper
C69	.01 MFD Ceramic GMV
C70	.01 MFD Ceramic GMV
C71	0.1 MFD tubular
C72	0.1 MFD tubular
C73	.01 MFD Ceramic GMV
C74	.001 MFD Ceramic 20%
C75	.001 MFD Ceramic GMV
C76	.001 MFD Ceramic GMV
C77	.01 MFD Ceramic GMV
C78	.01 MFD Ceramic GMV
C79	.01 MFD Ceramic GMV
C80	.001 MFD Ceramic GMV
C81	.001 MFD Ceramic GMV
C82	.01 MFD Ceramic GMV
C83	.001 MFD Ceramic GMV
C84	.001 MFD Ceramic 20%
C85	.001 MFD Ceramic 20%
C86	.001 MFD Ceramic 20%
C87	.001 MFD Ceramic 20%
C88	.001 MFD Ceramic 20%
C89	.01 MFD Ceramic GMV
C90	.001 MFD Ceramic 20%
C91	.001 MFD Ceramic 20%
C92	.001 MFD Ceramic 20%
C93	.047 MFD 400 V. tubular
C94	30 MFD 450 V. 85 C. Electrolytic
C95	12 MFD 450 V. 85 C. Electrolytic
C96	.05 MFD 1600 V. tubular

R1	100K ½ watt
R2	82 ohm ½ watt
R3	47K 1 watt
R4	100K 1 watt
R5	47K ½ watt
R6	100 ohm ½ watt
R7	4.7 megohm ½ watt
R8	22K ½ watt
R9	2.2 megohm ½ watt
R10	22K ½ watt
R11	22K 2 watt
R12	27K ½ watt
R13	270K ½ watt
R14	390 ohm 1 watt
R15	100K ½
R16	1.5 me
R17	680 oh
R18	47K ½
R19	100K
R20	270K
R21	100K
R22	3.9K
R23	470K
R24	470K
R25	12K ½
R26	820 oh
R27	39K ½
R28	39K ½
R29	1.2 me
R30	120 oh
R31	470K ½
R32	1500 o
R33	6800 o
R34	82K ½
R35	22K 2
R36	270K ½
R37	100-10
R38	10K 1
R39	270K ½
R40	120 oh
R41	10K 1
R42	220K ½
R43	120 oh
R44	10K 1
R45	1.2 me
R46	1 mego
R47	270K ½
R48	270K ½
R49	1 mego
R50	2.2 me
R51	1 mego



GONSET 2-METER COMMUNICATOR II-A SCHEMATIC DIAGRAM

Components such as T1, T2, and others not listed below are special and should be ordered by symbol designation. All registor values are 10% tolerance. Intermediate frequency is 6 MC. Voltages should be measured with a diode type voltmeter having an input resistance exceeding 10 megohms and an isolating resistor in the probe (such as RCA voltohmist).

GONSET
801 S. Main Street Burbank, California

This schematic applies only to Communicator II units having a transmitter serial number over 6599 and a tuner serial number over 16386. Power supplies with gray transformer case are designed for 12 volt d-c input (design center). Those with brown transformer case are designed for 13.5 volt input (design center). Both, however, are referred to as "12 volt" supplies. 6 volt supply has a black case on the power transformer.

C1 10 MMF Ceramic NPO
C2 100 MMF Ceramic
C3 .001 MFD Ceramic 20%
C4 25 MMF APC
C5 .001 MFD Stand-off
C6 20 MMF G.P.
C7 5 MMF Ceramic NPO
C8 5 MMF APC
C9 50 MMF Ceramic NPO
C10 .004 MFD Ceramic 20%
C11 .001 MFD Ceramic 20%
C12 .001 MFD Ceramic 20%
C13 .001 MFD Ceramic 20%
C14 10 MMF APC
C15 100 MMF Ceramic NPO
C16 .001 MFD Ceramic 20%
C17 100 MMF Ceramic NPO
C18 100 MMF 1000 V. Silver mica
C19 15 MMF APC
C20 50 MMF APC
C21 470 MMF 1000 V. Ceramic 20%
C22 3 MMF Ceramic NPO
C23 470 MMF Ceramic GMV
C24 .001 MFD Ceramic 20%
C25 .001 MFD Ceramic 20%
C26 .01 MFD Ceramic GMV
C27 .004 MFD Ceramic 20%
C28 .001 MFD Ceramic 20%
C29 .01 MFD Ceramic GMV
C30 100 MMF Ceramic NPO
C31 25 MFD 50 V.
C32 8 MFD 450 V. — 85 C. Electrolytic
C33 25 MFD 50 V.
C34 .001 MFD Ceramic 20%
C35 .0068 MFD 1600 V. tubular
C36 .001 MFD Ceramic 20%
C37 .001 MFD Ceramic 20%
C38 .001 MFD Ceramic 20%
C39 .001 MFD Ceramic 20%
C40 .001 MFD Ceramic 20%
C41 .001 MFD Ceramic 20%
C42 Special 3 gang
C43 RF trimmer on C42
C44 OSC trimmer on C42
C45 .01 MFD Ceramic GMV
C46 40 MMF Ceramic N30
C47 47 MMF 2% Ceramic N80
C48 47 MMF 2% Ceramic N30
C49 .004 MFD Ceramic 20%
C50 50 MMF Ceramic 20%
C51 .001 MFD Ceramic 20%
C52 .01 MFD Ceramic 20%
C53 .01 MFD Ceramic GMV
C54 .01 MFD Ceramic GMV
C55 .001 MFD Ceramic 20%
C56 .01 MFD Ceramic GMV
C57 .01 MFD Ceramic GMV
C58 .01 MFD Ceramic GMV
C59 .01 MFD Ceramic GMV
C60 .01 MFD Ceramic GMV
C61 100 MMF Ceramic 20%
C62 50 MMF Ceramic 20%
C63 .01 MFD Ceramic GMV
C64 .004 MFD Ceramic 20%
C65 .001 MFD Ceramic GMV
C66 470 MMF Ceramic 20%
C67 .01 MFD Ceramic GMV
C68 0.47 MFD 200 V. paper
C69 .01 MFD Ceramic GMV
C70 .01 MFD Ceramic GMV
C71 0.1 MFD tubular
C72 0.1 MFD tubular
C73 .01 MFD Ceramic GMV
C74 .001 MFD Ceramic 20%
C75 .001 MFD Ceramic GMV
C76 .001 MFD Ceramic GMV
C77 .01 MFD Ceramic GMV
C78 .01 MFD Ceramic GMV
C79 .01 MFD Ceramic GMV
C80 .001 MFD Ceramic GMV
C81 .001 MFD Ceramic GMV
C82 .01 MFD Ceramic GMV
C83 .001 MFD Ceramic GMV
C84 .001 MFD Ceramic 20%
C85 .001 MFD Ceramic 20%
C86 .001 MFD Ceramic 20%
C87 .001 MFD Ceramic 20%
C88 .001 MFD Ceramic 20%
C89 .01 MFD Ceramic GMV
C90 .001 MFD Ceramic 20%
C91 .001 MFD Ceramic 20%
C92 .001 MFD Ceramic 20%
C93 .047 MFD 400 V. tubular
C94 30 MFD 450 V. 85 C. Electrolytic
C95 12 MFD 450 V. 85 C. Electrolytic
C96 .05 MFD 1600 V. tubular

R1 100K ½ watt
R2 82 ohm ½ watt
R3 47K 1 watt
R4 100K 1 watt
R5 47K ½ watt
R6 100 ohm ½ watt
R7 4.7 megohm ½ watt
R8 22K ½ watt
R9 2.2 megohm ½ watt
R10 22K ½ watt
R11 22K 2 watt
R12 27K ½ watt
R13 270K ½ watt
R14 390 ohm 1 watt
R15 100K ½ watt
R16 1.5 megohm ½ watt
R17 680 ohm ½ watt
R18 47K ½ watt
R19 100K Pot. AF taper
R20 270K ½ watt
R21 100K ½ watt
R22 3.9K ½ watt
R23 470K ½ watt
R24 470K ½ watt
R25 12K ½ watt
R26 820 ohm 1 watt
R27 39K ½ watt
R28 39K ½ watt
R29 1.2 megohm ½ watt
R30 120 ohm ½ watt
R31 470K ½ watt
R32 1500 ohm ½ watt
R33 6800 ohm ½ watt
R34 82K ½ watt
R35 22K 2 watt
R36 270K ½ watt
R37 100-1000 ohm variable
R38 10K 1 watt
R39 270K ½ watt
R40 120 ohm ½ watt
R41 10K 1 watt
R42 220K ½ watt
R43 120 ohm ½ watt
R44 10K 1 watt
R45 1.2 megohm ½ watt
R46 1 megohm ½ watt
R47 270K ½ watt
R48 270K ½ watt
R49 1 megohm ½ watt
R50 2.2 megohm ½ watt
R51 1 megohm ½ watt
R52 1 megohm ½ watt
R53 150K ½ watt
R54 100K ½ watt
R55 4.7K ½ watt
R56 250K Pot. - audio taper
R57 500K Pot. - linear taper
R58 470K ½ watt
R59 1 megohm ½ watt
R60 Mazda #63 lamp
R61 15 ohm ½ watt
R62 82 ohm ½ watt

CONNECTOR	MATING CONNECTOR (Not Furnished)
J 1	AMPHENOL #83-1SP
J 3	PL-68
J 4	CINCH #M-93

J1 ANTENNA CONNECTOR - AMPHENOL 83-1R
J2 RECEIVE ANTENNA JACK - CINCH 8611
J3 MICROPHONE JACK - SWITCHCRAFT JK-43
J4 AUXILIARY SPEAKER JACK - CINCH 8171
J5 PHONE JACK - SWITCHCRAFT C-12A
L12 FILTER CHOKE - MERIT C2974
PL1 RECEIVE ANTENNA PLUG - CINCH M-93
PL2 POWER SUPPLY PLUG - JONES P312AB
PL3 RECEIVE POWER PLUG - CINCH 2770
PL4 TRANSMIT POWER PLUG - JONES P306-FHE
RFC 1 600 uH
RFC 2, 3, 4, 6 5.4 uH
RFC 5, 7, 8 1.9 uH
SOC1 MAIN POWER SOCKET - JONES 312CCT
SOC2
SOC3 RECEIVE POWER SOCKET - CINCH 2765
SOC4 TRANSMIT POWER SOCKET - JONES S-306-AB
SW1 TRANSMIT-RECEIVE SWITCH - SPECIAL
SW2 TUNING EYE SWITCH - SPECIAL
SW3 MIKE SELECTOR SWITCH - D.P.D.T. - WIRT #726
SW4 CLIPPER SWITCH - S.P.S.T. - WIRT #723
SW5 PILOT LIGHT SWITCH - S.P.S.T. - WIRT #723
SW6 POWER SWITCH - D.P.S.T. - CARLING #216-6 OR SMITH #522
SW7 TRANSMIT FILAMENT SWITCH - S.P.S.T. - CARLING #110 OR SMITH #510
SPEAKER - STD. 4 INCH, 1.47 OZ. MAGNET
VIBRATOR - 6 VOLT: MALLORY 294, 825 or 825-C.
12 VOLT: MALLORY G-625

VOLTAGE CHART		
All voltages measured with VTVM having input resistance of at least 10 megohms (50 ohm input, no signal.)		
SYMBOL	TRANSMIT	RECEIVE
A	1.6	
B	135	
C	255	
D	4.0	
E	-80	
F	-85	
G	165	
H		1.0
I		1.5
J		52
K		-4.2
L		143
M		1.0
N		Varies with R37
O		165
P		1.0
Q		0.7
R		150
S		62
T		0.8
U		120
V		-1.0
W		65
X		125
Y		190
Z		300
AA	185	300
BB	0.9	25
CC	1.3	1.6
DD	100	145
EE	225	290
FF	12	21
GG	235	295
HH	255	300
II	255	260
JJ	255	300
KK	-100	

1045-A
1-23-55

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watt
ohm ½ watt
½ watt
att
. AF taper
watt
watt
watt
watt
watt
tt
1 watt
tt
tt
ohm ½ watt
½ watt
watt
½ watt
½ watt
tt
tt
watt
ohm variable
tt
att
½ watt
tt
att
½ watt
tt
hm ½ watt
½ watt
att
att
½ watt
hm ½ watt
½ watt

R52 1 megohm ½ watt
R53 150K ½ watt
R54 100K ½ watt
R55 4.7K 4 watt
R56 250K Pot. - audio taper
R57 500K Pot. - linear taper
R58 470K ½ watt
R59 1 megohm ½ watt
R60 Mazda #63 lamp
R61 15 ohm ½ watt
R62 82 ohm ½ watt

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PL4 TRANSMIT POWER PLUG - JONES P306-FHE
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RFC 2, 3, 4, 6 5.4 uH
RFC 5, 7, 8 1.9 uH
SOC1 MAIN POWER SOCKET - JONES 312CCT
SOC2
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SW1 TRANSMIT-RECEIVE SWITCH - SPECIAL
SW2 TUNING EYE SWITCH - SPECIAL
SW3 MIKE SELECTOR SWITCH - D.P.D.T. - WIRT #726
SW4 CLIPPER SWITCH - S.P.S.T. - WIRT #723
SW5 PILOT LIGHT SWITCH - S.P.S.T. - WIRT #723
SW6 POWER SWITCH - D.P.S.T. - CARLING #216-6 OR SMITH #522
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SPEAKER - STD. 4 INCH, 1.47 OZ. MAGNET
VIBRATOR - 6 VOLT: MALLORY 294, 825 or 825-C.
12 VOLT: MALLORY G-625

V1 92222

C	255	
D	4.0	
E	-90	
F	-55	
G	165	
H		1.0 ✓
I		1.5
J		52
K		-4.2
L		143
M		1.0
N		Varies with R37
O		165
P		1.0
Q		0.7
R		150
S		62
T		0.8
U		120
V		-1.0
W		65
X		125
Y		190
Z		300
AA	185	300
BB	0.9	25
CC	1.3	1.6
DD	100	145
EE	225	290
FF	12	21
GG	235	295
HH	255	300
II	255	260
JJ	255	300
KK	-100	