

**INSTRUCTION MANUAL**

**GONSET**

**"COMMUNICATOR III"**

**Transmitter-Receiver**

**DIRECTORY OF COMMUNICATOR MODELS COVERED BY THIS BOOK:**

3133	2 Meter Amateur
3133-CD	2 Meter F.C.D.A.
3133-CAP	2 Meter C.A.P.
3136	6 Meter Amateur
3136-CD	6 Meter F.C.D.A.
3139	112-132 MC.
3215	132-152 MC.

801 S. MAIN ST.



BURBANK, CALIF.



### **WARRANTY**

The Gonset Division 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, provided warranty registration card is filled in and mailed to us. This warranty does not apply to units which have in any way been abused or misused, either deliberately or accidentally, or have been altered.

The defective unit or part must be returned to us transportation charges prepaid, after first getting authorization to return.

No dealer or other person is authorized to assume any further liability on our behalf when selling this unit.

### **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. Note especially 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.

Made in U.S.A.

**GONSET DIVISION**  
YOUNG SPRING & WIRE CORP.

**801 S. MAIN STREET**

**BURBANK, CALIF.**

## GONSET COMMUNICATOR III

### 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 fused wire is hot, regardless of polarity.
POWER DRAIN:	95 watts on transmit, 75 watts on receive.
CRYSTAL:	Fundamental type in FT-243 type holder. Refer to individual schematic for crystal multiplication factor and fundamental frequency range.
MICROPHONE:	Push-to-talk single button carbon (telephone type F2 or T-1 recommended), high output-ceramic, crystal, or high impedance dynamic or controlled reluctance (minus 48 to 55 db). Hot mike lead connects to ring of PL-68 plug. Push-to-talk switch connects to tip. Carbon mike must have separate ground leads. "Hot" mike lead of high impedance mike must be shielded. "Crystal-Carbon" mike switch must be thrown to corresponding position. Gain control ordinarily is run full on except for p-a use.
TUNE-UP:	Turn meter switch to EXCITER position and adjust exciter and final grid controls for maximum meter indication. Then turn meter switch to OUTPUT and, with push-to-talk button depressed, adjust PA TUNE and LOAD controls for maximum meter indication. After completion turn meter switch to RECEIVER for use as receiver tuning indicator.
CRYSTAL SPOTTER:	Turn meter switch to SPOT position. This turns transmitter oscillator on to permit spotting on receiver dial. Do not attempt to transmit with meter switch in SPOT position.
USE AS P-A SYSTEM:	Connect 4 to 8-ohm voice coil of good trumpet speaker to connector marked PA on rear recess. Insert shorted PL-55 plug in front-panel headphone jack. Operate TR-PA switch (rear of transmitter) to PA. Adjust 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, VFO, and I.F. out connectors.
TUBE COMPLEMENT:	Refer to individual schematic for specific equipment.
VIBRATOR	Mallory 1501 (6 volts) All Models.

### GENERAL

The Gonset COMMUNICATOR is an AM transmitter designed for use on either low voltage d-c or 115 volts a-c. The receiver has a noise figure of approximately 5db, and the transmitter a power output of approximately 6 watts at nominal supply voltage. These figures will vary slightly with frequency and different 6BZ8 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. Except on special order, all sets are factory wired for 12-volt d-c operation but may be easily converted for use on 6 volts.

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 power-cord wires, the fused lead connects to the "hot" battery terminal.

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.

Adequate power is obtained for 12-volt operation when the power cord supplied is connected to the vehicle ammeter or "accessory" terminal. Be sure to ground the unfused power-cord lead.

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 can be converted from 12 to 6 volt operation by changing tie point connections as indicated on the schematics.

"12 volt" models referred to in 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 high compression cars with 12 volt ignition 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 meter serves as a *relative* carrier strength indicator. Note that the meter is not intended to read actual "S" units.

## SQUELCH OPERATION

The COMMUNICATOR III 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 interference 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 is left on at all times when the squelch is in use.

## 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 exciter portion of the transmitter is tuned by operating the meter switch to EXCITER position and, with the push-to-talk button depressed (or the RECEIVE-TRANSMIT switch in TRANSMIT position) adjusting the EXCITER and FINAL GRID controls for maximum meter indication. Repeat these adjustments since the two controls are slightly interacting.

To complete the transmitter tuning, set the meter switch to OUTPUT position and alternately adjust the PA TUNE and LOAD controls for maximum meter indication. When the tuning meter switch is in OUTPUT position the meter indicates relative r-f voltage across the coax output terminal, and therefore the maximum obtainable indication will vary somewhat depending upon the impedance of the load to which the transmitter is connected.

When tuning up, either insert a microphone in the mike jack or throw the microphone selector switch to CARBON; otherwise feedback may occur.

The SPOT position of the tuning meter switch provides a handy means for checking the receiver dial calibration as might be desirable for net operation or for determining if the received signal is close enough to cause QRM. To use this facility, merely operate the meter switch to SPOT and tune the receiver in the vicinity of the transmitter frequency for maximum meter indication. It is suggested that this be done with the VOLUME control reduced to avoid possible feedback. On some models it is possible that more than one response will be found on the receiver dial. However, any spurious responses will invariably be much weaker and far removed from the correct setting. Remove the meter switch from SPOT position before attempting to transmit.

The microphone input circuit takes either a carbon microphone or a high-impedance high-output type crystal, controlled reluctance, or dynamic (approximately minus 46-50 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. A ceramic crystal microphone, such as the Astatic M-101, may be used for close talking if not down more than -55 db.

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, insert a shorted PL-55 plug into the headphone jack, and throw the PA-TR switch to PA. Press the mike button to talk and adjust the GAIN control to the desired level.

### 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 of 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 clipper 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 advantages 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 85-90 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.

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 any trouble encountered.

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 seven tuned circuits in the transmitter. 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 gang-tuned 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 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 at the other end.

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.

## 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 five i-f transformers results in a good "shape factor" (low ratio of skirt selectivity to noise selectivity).

## TRIMMER ADJUSTMENTS

The r-f and oscillator trimmers on the tunable receivers will seldom require adjustment. To check them, tune the receiver near the middle of the band, turn off the noise clipper, and adjust the compression trimmers accessible through the front two of the three trimmer holes on the under side of the chassis for maximum background noise. The antenna input trimmer slug 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 antenna cable, 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 meter just moves slightly.

The rearmost 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.

## REMOVAL OF INDIVIDUAL UNITS

To remove the transmitter section from the cabinet (including the receiver audio output section) pull off all knobs, remove the meter-switch nut, disconnect the cable connectors involved, and remove four cabinet screws on the antenna connector. Slide the chassis rearward about four inches and then tip downward to the angle that allows the final amplifier shield to clear the top of the cabinet. Observe the under-chassis components of the transmitter as the chassis is removed to make certain that no parts are disturbed by

contact with the transmitter shelf. *Do not use force during any part of the removal process since damage to the meter-switch wafer and the 4-gang condenser may easily result.* Reverse the procedure to replace the transmitter.

To remove the receiver, unscrew the four screws on the bottom of the cabinet, remove the four 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 nut from the toggle switch, disconnect cable, and lift unit up and out. To replace, reverse the procedure.

## F.C.D.A. MODEL COMMUNICATORS

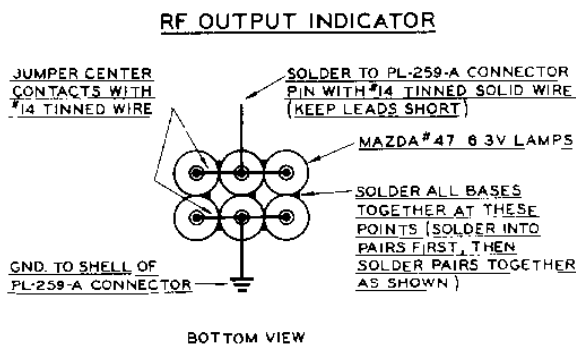
The "C-D" model 2 meter and 6 meter COMMUNICATORS are certified by the manufacturer to meet applicable F.C.D.A. specifications, and thereby qualify under the F.C.D.A. financial participation program.

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, physical construction, and in inspection and test procedure during manufacture.

## 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.

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



## 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 recommended. 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.

### 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. This in effect makes a composite double-conversion superheterodyne having much greater selectivity than the COMMUNICATOR receiver alone.

This is accomplished by connecting the input of the communications receiver through coaxial cable to the I.F. OUT jack on the rear apron of the COMMUNICATOR receiver. Tune the communications receiver accurately to the center of the COMMUNICATOR i-f passband (refer to schematic for i.f.). It will be noted that a definite quieting occurs in the communications receiver output as a signal is approached on the COMMUNICATOR receiver dial. This is the result of normal a-v-c action in the COMMUNICATOR even though the signal is still outside the communications receiver passband.

The I.F. OUT jack is also connected to the a-v-c bus of the COMMUNICATOR receiver through a 10-megohm resistor. Thus by connecting a VTVM to the jack a sensitive alignment indicator is obtained.

### PUSH-TO-TALK RELAYS

The relays employed in the COMMUNICATOR III 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.

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.

Most microphones of the push-to-talk type incorporate a switch section to break the microphone lead when the button is released. When controlling the COMMUNICATOR by means of the front-panel RECEIVE-TRANSMIT switch, it is necessary to short this switch section; otherwise no transmitter modulation is obtained.

The transmit-receive relays in the COMMUNICATOR are arranged to be closed during receive. When the set is first turned on, the relays may close immediately due to the charging surge of the power-supply filter condensers or they may not close until the tube heaters approach operating temperature. In any event the relays should close within 15 seconds after the set is turned on. If they do not click on within this time, make certain that the PA-TR switch is in TR position before suspecting trouble.

The COMMUNICATOR should never be turned on unless all tubes are in their sockets. The tube filaments are connected in a series-parallel arrangement and removing a tube may seriously unbalance the current distribution causing excessive filament voltage to be applied to one side of the string.

RECEIVER DIAL CORD STRINGING DIAGRAM

