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UNCLASSIFIED

TECHNICAL MANUAL

for

CODAN OPERATED RECEIVER

MODEL COR-3



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y.

OTTAWA, ONTARIO



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NOTICE

THE CONTENTS AND INFORMATION CONTAINED IN THIS INSTRUCTION MANUAL IS PROPRIETARY TO THE TECHNICAL MATERIEL CORPORATION TO BE USED AS A GUIDE TO THE OPERATION AND MAINTENANCE OF THE EQUIPMENT FOR WHICH THE MANUAL IS ISSUED AND MAY NOT BE DUPLICATED EITHER IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER WITHOUT THE WRITTEN CONSENT OF THE TECHNICAL MATERIEL CORPORATION.



THE TECHNICAL MATERIEL CORPORATION

C O M M U N I C A T I O N S E N G I N E E R S

700 FENIMORE ROAD

MAMARONECK, N. Y.

W a r r a n t y

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,*fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes*furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

CHANGE NO. 1 COR-3



INSTRUCTION BOOK CHANGE NOTICE

Date 9-22-66

Manual affected: CODAN Operated Receiver, Model IN -383
COR-3 (issue date Sept. 15, 1966)

Page 4-1. 6th Paragraph.

Change the last sentence of the 6th paragraph on page 4-1 to read as follows:

When the Schmitt trigger is "off" the CODAN relay is de-energized, and the audio output signal to the telephone lines is squelched.

SHOULD ADDITIONAL COPIES OF THIS CHANGE NOTICE BE REQUIRED, PLEASE CONTACT:

THE TECHNICAL MATERIEL CORP., 700 Fenimore Road, Mamaroneck, New York

Attn.: Director of Eng. Services.

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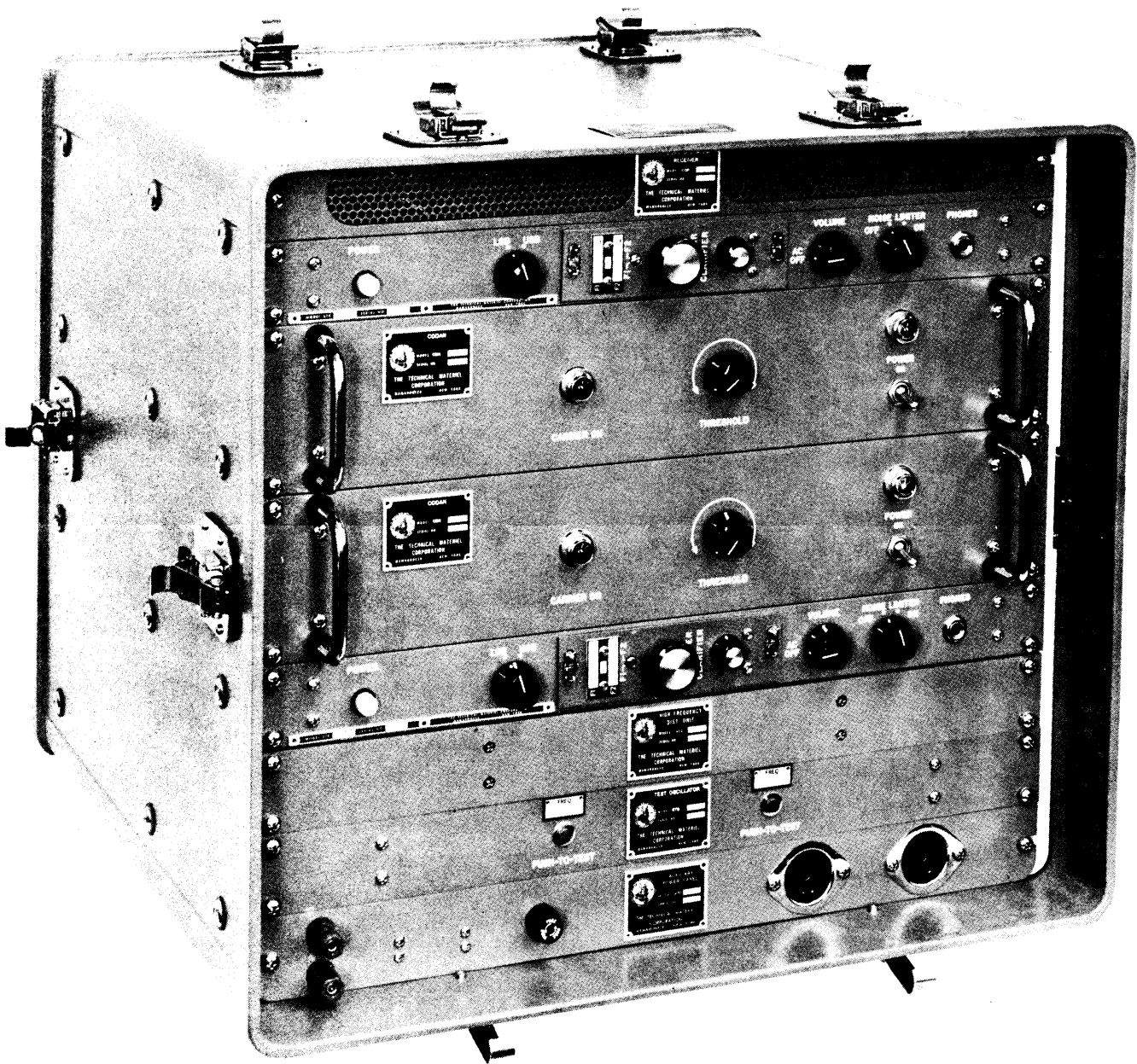
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Figure 1-1. CODAN Operated Receiver Model COR-3

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SECTION 1

GENERAL INFORMATION

1-1. GENERAL DESCRIPTION.

The CODAN Operated Receiver, Model COR-3 (figure 1-1), is a transistorized, two-channel, fixed tuned, 2- to 16-mc (MHz)* receiving system designed for use in radio-telephone communications systems where received-signal quality is of prime importance. Each channel is independently operated and comprises a receiver (STR), and anti-noise device (CDN), a test oscillator (part of RTO), and part of an antenna distribution unit (HFD); refer to figure 1-2. Test circuitry incorporated in the COR allows the operator to check equipment performance from a remote location (operator's site) or at the COR if desired. Front-panel lamps display power failure and channel activity; dry-contact keying circuitry (compatible with existing radio-telephone equipment) may be wired for remote indication. The COR operates on 115/230 vac power; in the event of a-c failure, automatic and instantaneous conversion to battery power is achieved without interruption of service. During a-c operation, the battery supply is trickle charged.

The COR is housed in a weather-proof fiberglass case approximately 24 inches deep, 21 inches wide, and 18.5 inches high which is designed for outdoor service. A thermostatically controlled fan ventilates the fiberglass case to prevent overheating due to absorption of heat from the sun. A companion case for housing four Western Electric batteries (KS 5361 or equivalent) is provided as an accessory item.

1-2. DESCRIPTION OF MODULAR UNITS.

a. GENERAL. - Paragraphs b through f below give a brief description of the modular units employed in the COR-3. For more detailed information pertaining to any of these units, refer to the individual modular-unit manual.

b. STRIP RECEIVER, MODEL STR-2C. - Strip Receiver STR is a transistorized, double-conversion, superheterodyne communications receiver that uses a fixed-tuned, plug-in module (Model TTRR) for its r-f section. A crystal filter employed in the antenna input to the r-f module provides a 6-Kc bandpass at the customer-selected frequency. A change in operating frequency must be accompanied by a corresponding change

in filter. A RECEIVER CLARIFIER control (located on front panel of TTRR) provides fine-tuning of the crystal controlled local oscillator. The STR produces one 250-kc (MHz) i-f output and two separate audio outputs: 500 milliwatts into 4 ohms for speaker or earphone jack, and 1 milliwatt into a 600-ohm balanced load. A VOLUME control is provided to vary the speaker level, and a LINE LEVEL control to vary the 600-ohm line output. An earphone jack permits monitoring the 600-ohm output.

c. CARRIER OPERATED ANTI-NOISE DEVICE, MODEL CDN-3. - The CDN is a compact, solid-state, receiver-controlled unit that electronically determines the signal-to-noise ratio at which the receiver output is squelched. Visual indication of satisfactory or non-satisfactory conditions for signal reception is provided by a front-panel CARRIER ON lamp; associated relay circuitry is designed so that an external alarm system may be readily connected. The CDN requires only a sample of the STR i-f frequency for operation; this feature allows signal flow to continue through the receiver undisturbed and with no loss of quality.

d. RECEIVER TEST OSCILLATOR, MODEL RTO-1A. Receiver Test Oscillator RTO is a two-channel, crystal-controlled signal generator that provides a modulated signal in the 2- to 4-mc (MHz) frequency range. This frequency coverage is compatible with coastal radio-telephone communications systems; extended coverage is available upon special order. A front-panel PUSH-TO-TEST button applies operating voltage to the RTO circuits; operating voltage may also be applied from a remote location. Within the COR receiver system, the output of the RTO (when used) is applied to the antenna of Strip Receiver STR.

e. ANTENNA DISTRIBUTION UNIT, MODEL HFD-1S. Antenna Distribution Unit HFD is a passive antenna distribution device that provides four outputs from a single antenna input.

f. AUXILIARY POWER PANEL, MODEL APP-14. Auxiliary Power Panel APP comprises two fused power receptacles, two telephone jacks, and one fuse. The power receptacles facilitate connection of external test or repair equipment to the a-c source. The telephone jacks facilitate connection of a telephone headset to an external telephone line.

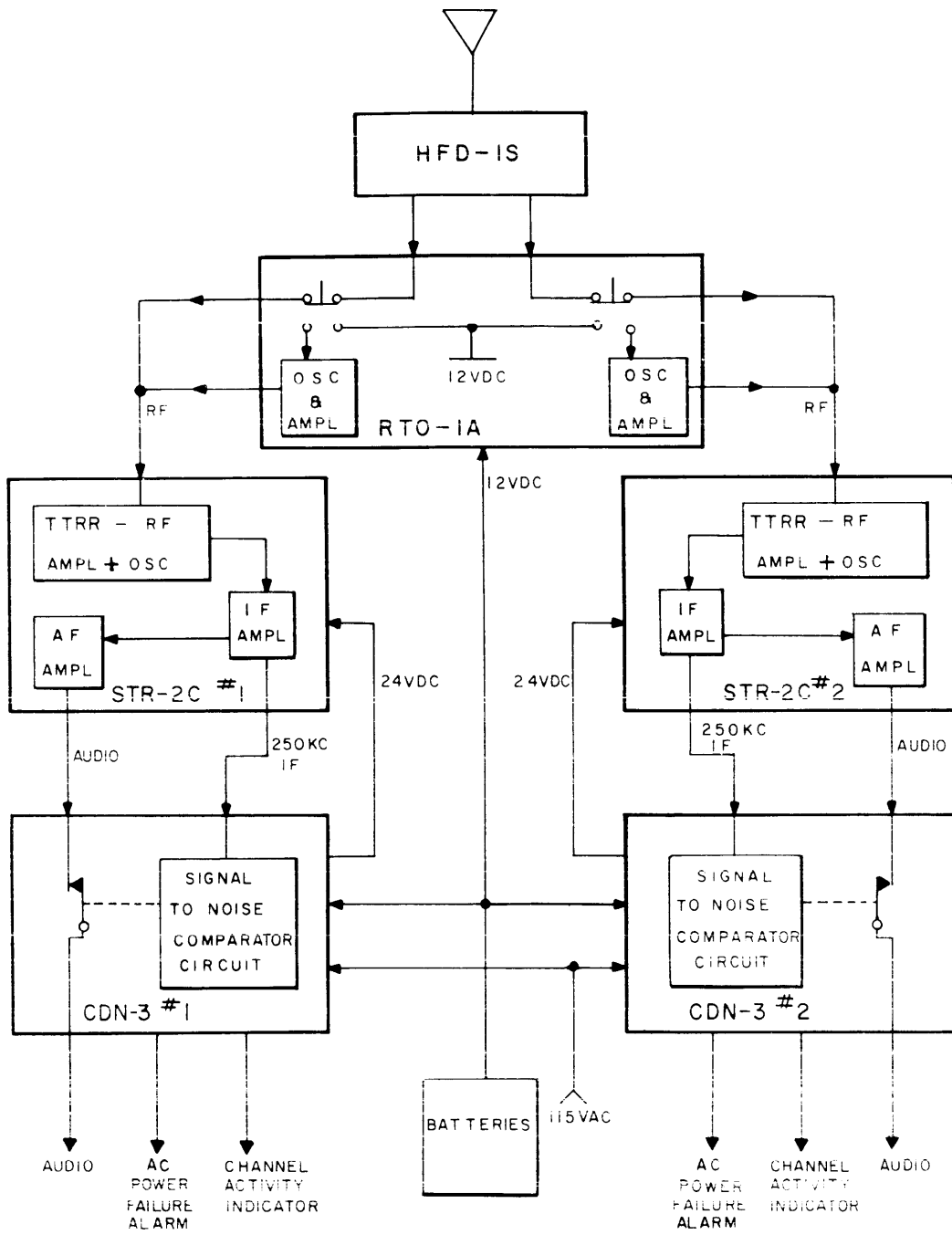
*extended range to 32.0 mc available on special order.

1-3. TECHNICAL SPECIFICATIONS.

Technical specifications for the COR are as follows:

Frequency Range	A customer selected frequency in the 2- to 16-mc (MHz) range.* Frequency coverage is dependent upon r-f module (TTRR) employed in Strip Receiver STR.
Frequency Control	Crystal controlled oscillators are used throughout.
Types of Reception	AM and MCW
I-F Selectivity	6 kc
Image Rejection	a. 120 db or greater with Antenna Filter in STR. b. A minimum of 50 db from 2 to 28 mc, a minimum of 40 db from 28 to 32 mc without filter.
AGC	No more than 5 db increase in output for input variations from 3uv to 100,000uv.
Antenna Input Impedance	50 ohms unbalanced.
Audio Outputs	1. 500 milliwatts for 4-ohm speaker or earphones. 2. 1 milliwatt for 600-ohm load (telephone) line, etc.).
Power Requirements	24V dc or 115 volts $\pm 10\%$, 50-60 cps, single phase power. Also, 12V dc required for remote control of test oscillators.
Emergency Batteries	Case provided for customer supplied 24V battery supply. COR provides 100 ma charging current during a-c operation; draws 480 ma during battery operation.
Environmental Conditions	Operable from 0°C (32°F) to 50°C (122°F) with relative humidity up to 95%.
Dimensions	18-3/4 inches high x 22-3/4 inches wide x 23 inches deep.
Intake Air	100 CFM

*extended range to 32.0 mc available on special order.



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Figure 1-2. Simplified Block Diagram, COR

SECTION 2 INSTALLATION

2-1. UNPACKING AND HANDLING.

Each COR has been calibrated and tested at the factory before shipment. When the equipment is received at the operating site, inspect the packing cases and their contents immediately for possible damage; unpack the equipment carefully. Inspect all packing material for parts that may have been shipped as "loose items". With respect to damage to the equipment for which the carrier is liable, The Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

2-2. POWER REQUIREMENTS.

The COR is designed for either 24 volt d-c power or for 115 volt $\pm 10\%$, 50 to 60 cps, single phase a-c power. An additional 12 volt d-c supply is required for remote control of Receiver Test Oscillator RTO.

2-3. INSTALLATION.

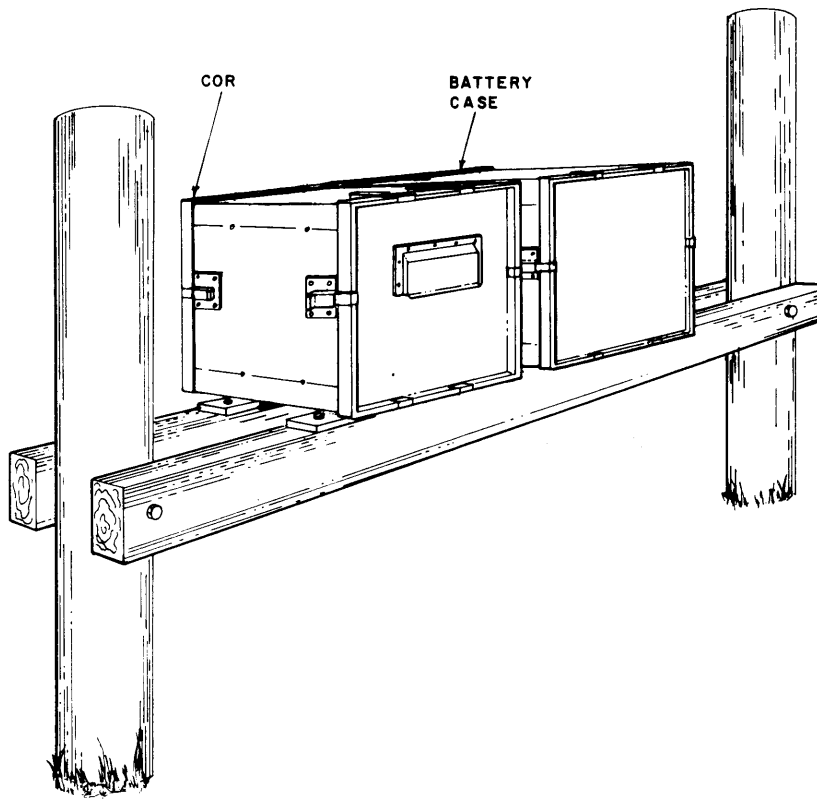
The COR and battery case are designed for outside installation as shown in figure 2-1. When determining ultimate location, two factors are important: (1) the COR must be located so that front-panel controls and rear-panel connections are readily accessible; (2) the area around the air-intake port (in the base of the cabinet) should be kept clear of obstructions.

a. To install the COR, proceed as follows:

NOTE

All item numbers given in this procedure are referenced to figure 2-2.

(1) Release clamping catches and remove front and rear covers.



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Figure 2-1. Typical Installation, COR

(2) Refer to figures 2-2 and 2-4. At bottom of case install feedthrough insulator (item 1). Inside case, connect cable CA480-129-13 to insulator.

(3) Install two plate mounting units (items 2 and 3) and case stiffeners (item 4).

(4) Install four stuffing tubes (items 5, 6 and 7).

(5) Inside case, remove nut on bolt at bottom of rock; connect free end of cable CA 412-73-9.25 (other end of cable is connected to ground, item 8) to bolt. Replace and tighten nut.

(6) Feed power cable CA 953-2-120.00 through its associated stuffing tube until cable extends to its full length. If required, connect plug P106 (item 9) to free end of cable.

(7) Feed cables CA1204 and CA1205 through associated stuffing tubes; connect cables to their associated equipments as shown in figures 2-4 and 2-5.

(8) Connect antenna to feedthrough insulator (item 1); connect shield if used to ground (item 8).

(9) The two Tel Line jacks and convenience outlets located on Auxiliary Power Panel APP are provided for customer convenience and should be wired in accordance with station requirements.

(10) Connect plug P106 (item 9), if used, to a-c power source. If P106 is not used, connect ends of cable CA953-2-120.00 to a-c power source.

(11) Using four lag bolts (item 10) bolt COR to supporting structure.

b. To install the battery case, proceed as follows:

NOTE

All item numbers given in this procedure are referenced to figure 2-3.

(1) Release clamping catches securing cover; remove cover.

(2) Install stuffing tubes (items 1 and 2).

(3) Install button plug vent (item 3) and rubber stopper (item 4).

(4) Install battery mount tray (item 5) and two plate mounting units (item 6).

(5) Install 24 volt battery supply into battery case.

(6) Connect cable CA1204 from COR to 24-volt battery supply (black wire is connected to positive terminal).

(7) Using four lag bolts (item 7) bolt battery case to supporting structure.

2-4. INSTALLATION CHECKOUT PROCEDURE.

Although each modular unit of the COR has been aligned and thoroughly checked against the manufacturer's specifications prior to shipment, it is necessary to insure correct installation (paragraph 2-3) and proper COR operating condition by performing the following checkout procedure. Refer to section 3 for location and function of all operating controls and indicator.

NOTE

Item numbers (numbers enclosed in parenthesis) are callouts referenced to figure 3-1.

a. Set controls at position indicated below:

<u>MODULAR UNIT</u>	<u>CONTROL</u>	<u>POSITION</u>
CDN No. 1 and CDN No. 2	POWER (9)	down (OFF position)
STR No. 1 and STR No. 2	LSB/USB switch (2)	LSB or USB
	F1/F2 switch (3)	At position which selects operating crystal
	RECEIVER CLARIFIER control (4)	Desired setting
	VOLUME control (5)	Fully counterclockwise

b. At CDN No. 1 and CDN No. 2, set POWER switch (9) at ON, POWER lamp (8) of each unit should light.

NOTE

When a 24-volt battery is connected to the COR system, the battery will be charged during a-c operation. However, in the event of a-c power failure, the battery will automatically power the COR system.

c. At STR No. 1 and STR No. 2, proceed

as follows:

(1) Connect Simpson 260 or equivalent across terminals 1 and 3 of TB103. At rear panel of STR No.1, adjust LINE LEVEL control for meter indication of "0" db.

(2) Connect Simpson 260 VOM across terminals 6 and 8 of TB103. At rear panel of STR No. 2, adjust LINE LEVEL control for meter indication of "0" db. Remove meter.

(3) Rotate VOLUME control (5) of each STR clockwise until comfortable signal level is obtained in associated headset. Then adjust RECEIVER CLARIFIER control (4) of each STR for maximum voice clarity.

NOTE

Improved image rejection may be obtained by changing the setting of the LSB/USB switch.

(4) If high transient noise is suspected during operation, set the NOISE LIMITER switch (6) at ON.

d. At CDN No. 1 and CDN No. 2, proceed as follows:

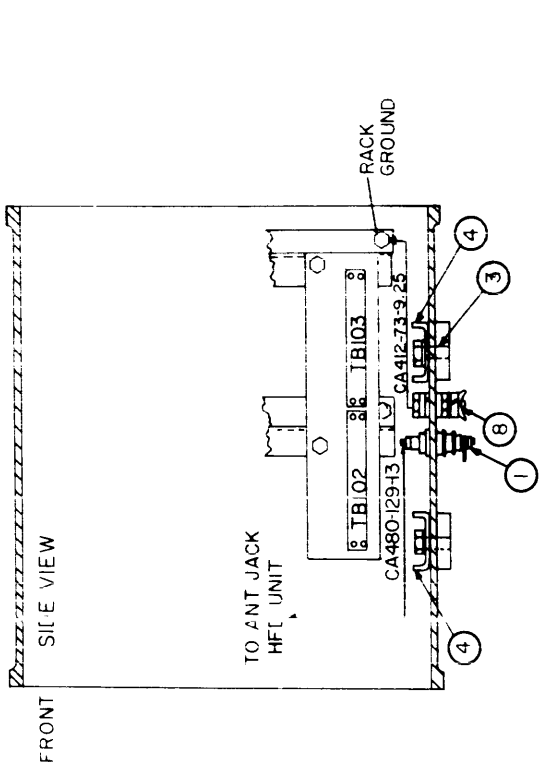
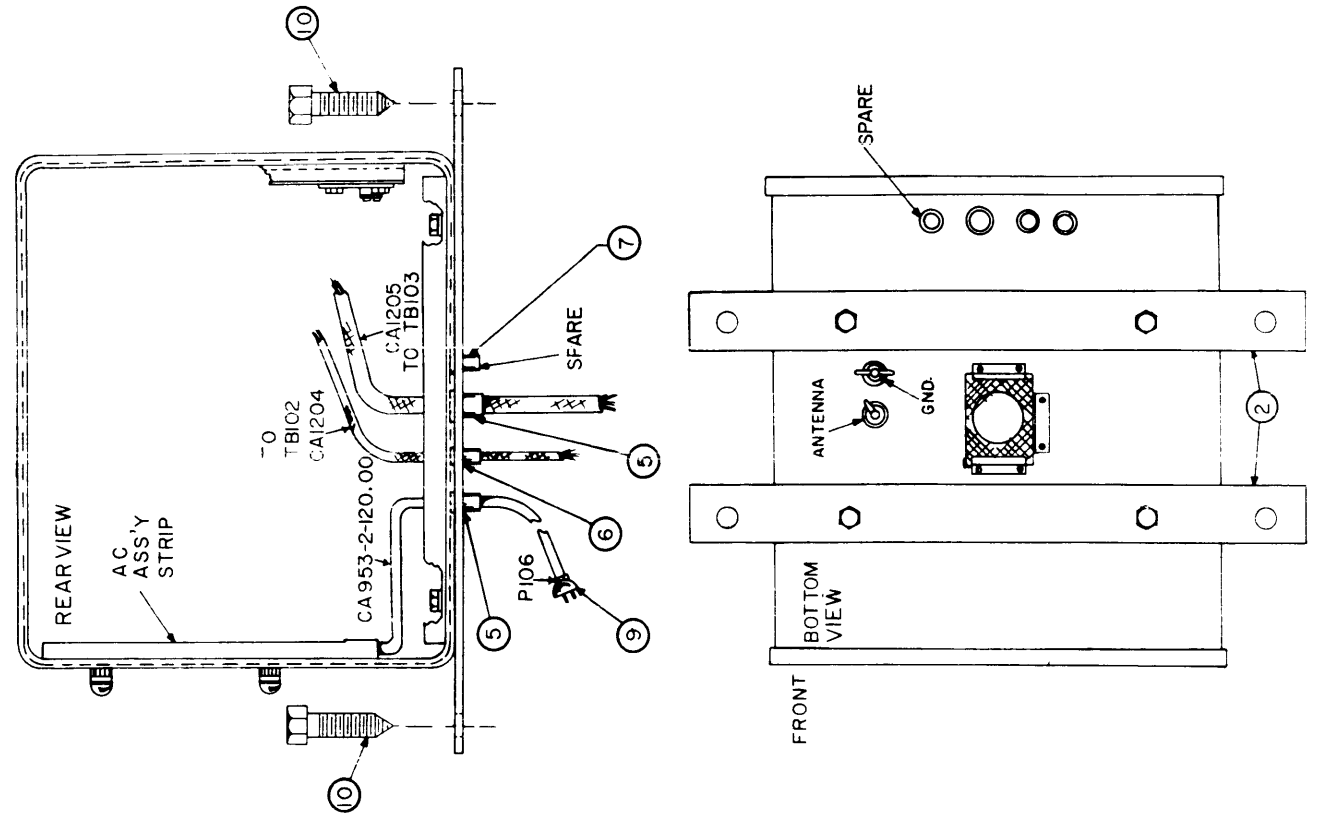
(1) Connect sensitive RF voltmeter (Hewlett Packard, Model 400L or equivalent) to RF MON jack on rear-panel.

(2) Adjust rear-panel ATTEN VAR control for 1 millivolt indication on voltmeter.

(3) Adjust THRESHOLD control for minimum quality of acceptable signal.

NOTE

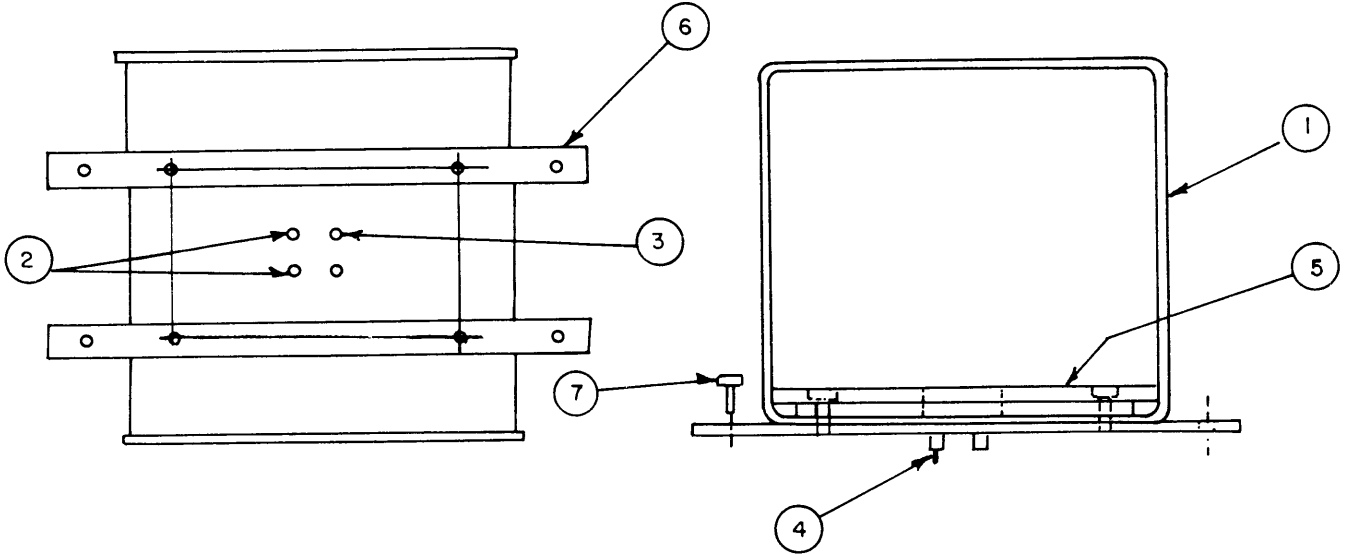
Setting the THRESHOLD control fully counterclockwise will render the system insensitive to all signals but those whose signal-to-noise ratio is in excess of 20 to 25 db. Setting the THRESHOLD control fully clockwise will make the unit sensitive to any incoming signal. Normal operation will be at some intermediate setting.



ITEM NO.	QTY	ITEM	TMC PART NO.
1	1	Insulator, Feed Through	A5480
2	2	Plate Mounting Unit	PM1287
3	4	Bolt, Machine with lockwasher	SCHH318BN12/LW-S31MRN
4	2	Stiffener, Case	PM1301
5	2	Stuffing Tube with 2 flat washers and 2 round gaskets	PO-206-2/FW100-10AE/GA140-BN4
6	1	Stuffing Tube with 2 flat washers and 2 round gaskets	PO-206-3/FW100-9AE/GA140-10N4
7	1	Stuffing Tube with 2 flat washers and 2 round gaskets	PO-2-6-1/FW100-24-AE/GA140-12N4
8		*Ground Hardware	
9	2	AC Connector (PI06)	PL218
10	4	Bolts, Lap	SC111-7
	2	**Plug, Telephone	PJ055B
	1	***Serv Ext. Module	AX436

* Shipped as part of COR case.
 ** Used for connection to PHONES jack on STR.
 *** Used to test modules in STR.

Figure 2-2. Installation Data, COR



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ITEM NO.	QTY	ITEM	TMC PART NO.
1	1	Stuffing Tube with 2 flat washers and 2 round gaskets	PO206-1 /FW100-24- AE/GA140-12N4
2	2	Stuffing Tube with 4 flat washers and 4 round gaskets	PO206-2 /FW100-10- AE/GA140-8N4
3	1	Button, Plug, Vent	HB103
4	1	Rubber Stopper	RY114-77700
5	1	Tray, Battery Mount with 4 flat washers and 4 machine bolts and 4 lock, split, washers	WD143 /FW31HBN /SC- HH3118BN26/LWS31- MRN
6	2	Plate Mounting Unit	PM1287
7	4	Bolt, Lag	SC111-7

Figure 2-3. Installation Data, Battery Case

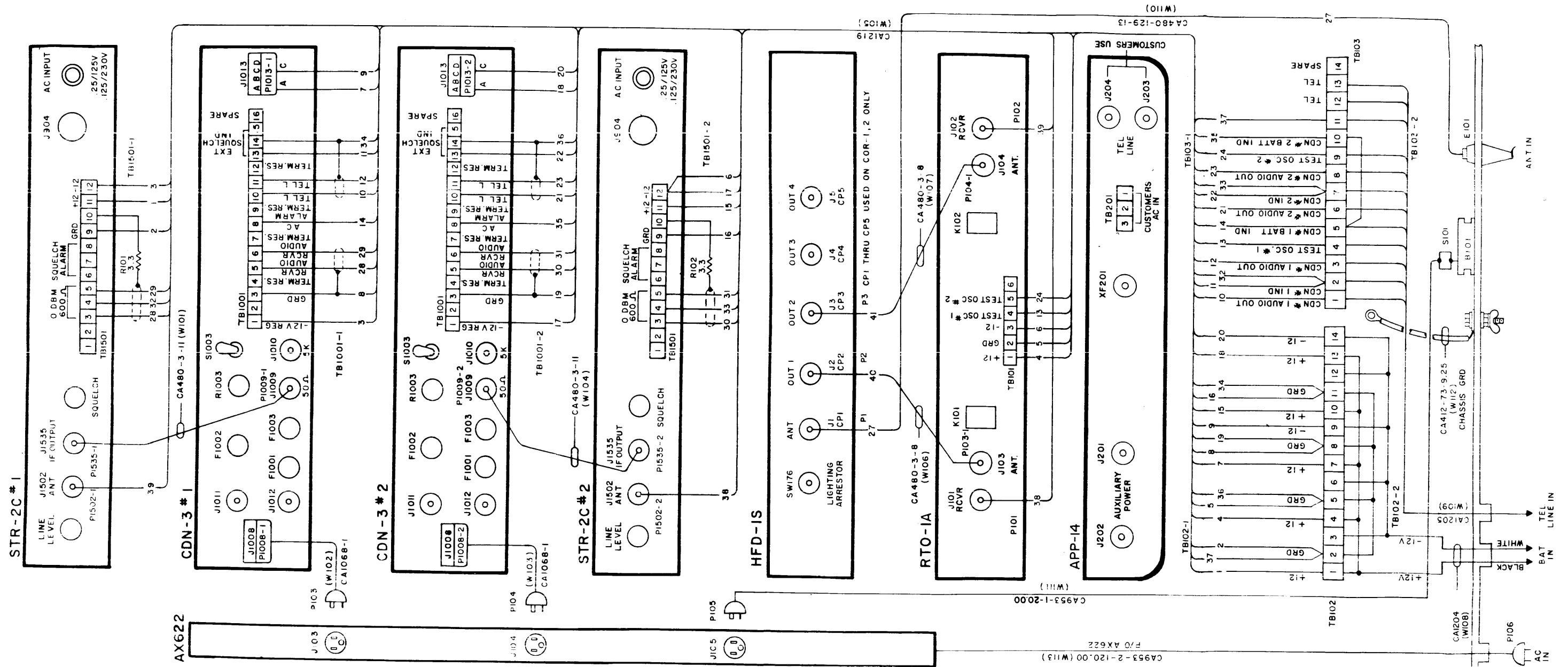
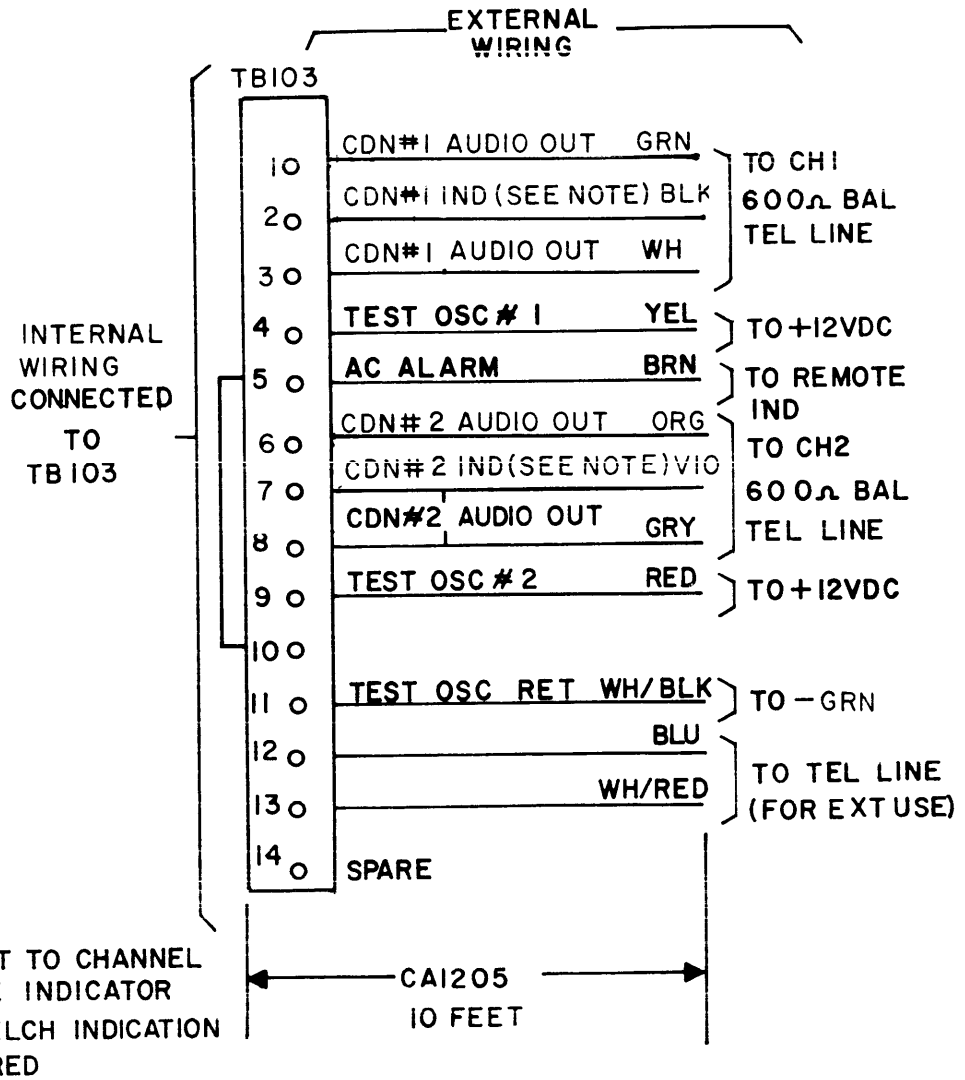


Figure 2-4. Interconnect Cabling Diagram



383-6

Figure 2-5. External Connections, Cable CA1205

SECTION 3 OPERATOR'S SECTION

3-1. OPERATING CONTROLS.

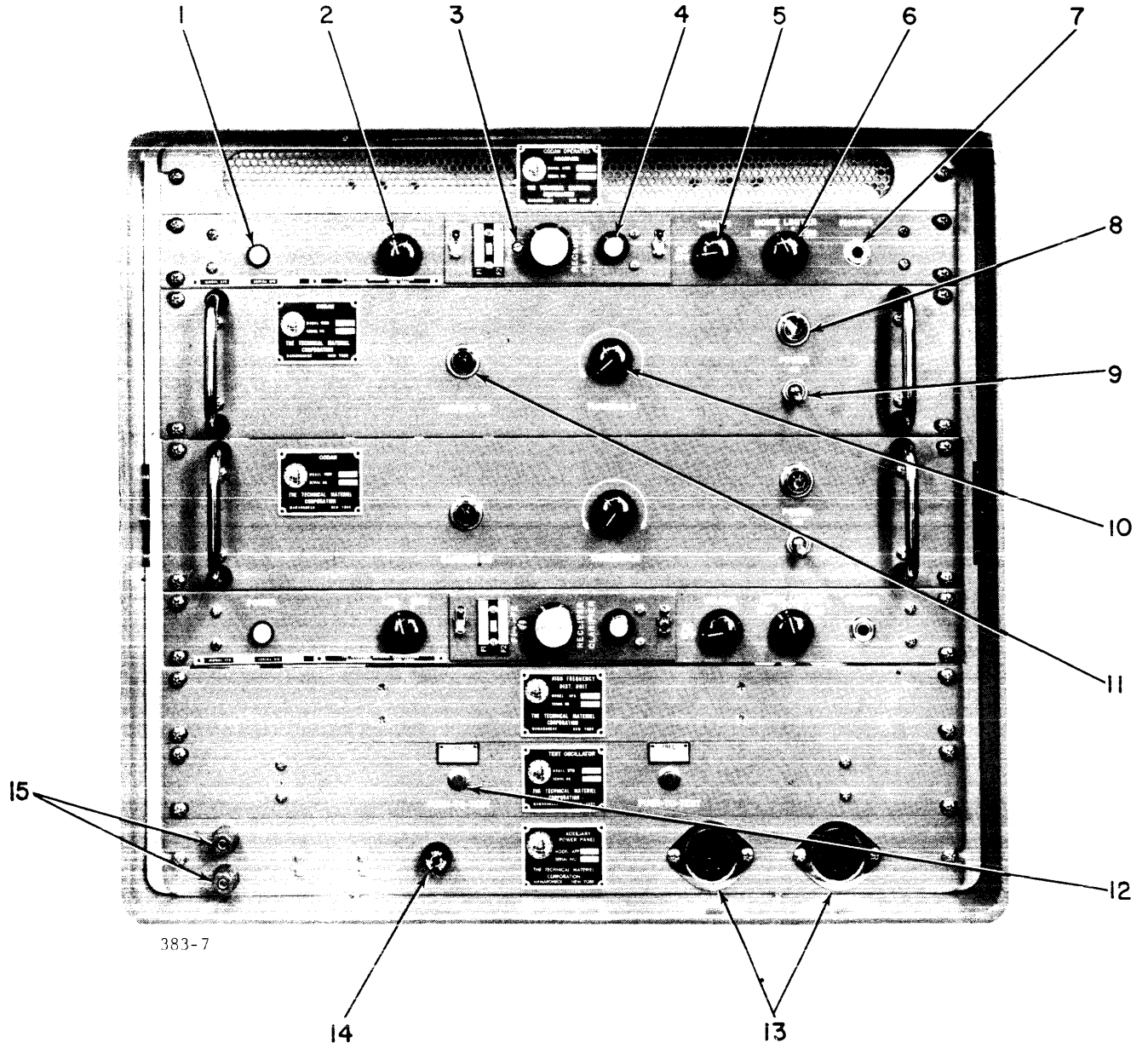
The operating controls for the COR are listed in table 3-1 and are illustrated in figure 3-1.

NOTE

Because channel 1 and 2 controls and indicators are the same, only channel 1 call-outs are described in Table 3-1.

TABLE 3-1. OPERATING CONTROLS

ITEM No. (Figure 3-1)	PANEL DESIGNATION	FUNCTION
STR No. 1 1	POWER indicator lamp, DS1501	Normally lights when the VOLUME control is turned clockwise from AC OFF. (Non-operative when the STR is used in the COR system.
2	LSB/USB switch, S1503	A two-position rotary switch that selects one of two intermediate frequency oscillators.
3	F1/F2 switch: S101 in TTRR-1 S201 in TTRR-2 S301 in TTRR-3 S401 in TTRR-4	A two position screwdriver controlled switch that selects appropriate local oscillator frequency for reception on either F1 or F2 frequency.
4	RECEIVER CLARIFIER control: C121 in TTRR-1 C221 in TTRR-2 C321 in TTRR-3 C421 in TTRR-4	A trimmer capacitor that permits fine tuning of the local oscillator in TTRR module for optimum clarity of audio output.
5	VOLUME control with AC OFF switch (R1546, S1512)	A SPST switch ganged to a potentiometer. The potentiometer controls the audio output level to phones and speaker. AC OFF switch is non-functioning when STR is used in COR system.
6	NOISE LIMITER, OFF/ON, S1520	A 2-position rotary switch. When set at ON introduces noise-limiting action to STR.
7	PHONES jack, J1516	A standard phone jack for earphone connection. Speaker is automatically disconnected when headset is plugged in. The line output is not affected.



* Because Channel 1 and 2 controls and indicators are the same, only Channel 1 call-outs are given in the above figure.

Figure 3-1. Controls and Indicators

TABLE 3-1. OPERATING CONTROLS (CONT)

ITEM No. (Figure 3-1)	PANEL DESIGNATION	FUNCTION
STR No. 1 7 (CONT)	SQUELCH control, R1547 (at rear of receiver) LINE LEVEL control (at rear of receiver)	A potentiometer whose setting determines the point to which r-f input level must drop before 4-ohm audio output is squelched. A rheostat that controls all audio output levels.
CDN No. 1 8	POWER lamp	Lights when the unit is operated from the 115-volt a-c power line.
9	POWER switch	Applies a-c power to CDN No. 1; CDN No. 1 in turn provides power for channel 1 unit COR.
10	THRESHOLD control	Determines carrier + noise to noise ratio threshold of the unit.
11	CARRIER ON lamp	Lights to indicate presence of carrier. Goes off to indicate the absence of a carrier or that noise level is of such magnitude that no intelligence can be received.
12	PUSH-TO-TEST switch, S101	When depressed, simultaneously disconnects antenna signals and connects a modulated test signal at receiver frequency to STR No. 1.
13	AUX PWR receptacle	Permits connection of external test equipment to 115 volt a-c power source.
14	AC LINE fuse	Protective device connected between the AUX PWR receptacles and the a-c power source.
15	TEL LINE jacks	Permits connection to external telephone line.

3-2. OPERATING PROCEDURE.

Once the COR system has been properly installed in accordance with procedures outlined in section 2, it is self operating and becomes activated upon receiving signals of acceptable quality. Therefore, the only operating procedure is a local or remote equipment operation check. For purposes of this discussion, it is assumed that the COR is operated from a remote location. To perform the equipment operation

check, proceed as follows:

(a). In lieu of depressing PUSH-TO-TEST button (12) of RTO, apply 12-vdc (via tel line) to test oscillator circuitry of associated channel (channel 1 or channel 2).

(b). Using headset, monitor 600-ohm balanced tel line originating at TB103 (terminals 1 and 3 for channel 1; terminals 6 and 8 for (channel 2), a 1000-cycle (Hz) tone should be heard.

SECTION 4

PRINCIPLES OF OPERATION

4-1. BLOCK DIAGRAM ANALYSIS.

Refer to figure 4-1. The COR is a two-channel receiver system operating within the frequency range of 2- to 32-mc (MHz). Each channel is independently operated and comprises a receiver (STR), an anti-noise device (CDN), a test oscillator (part of RTO), and part of an antenna distribution unit (HFD). Since the two channels are identical in operation, only Channel 1 will be fully discussed in the following paragraphs.

RF Signals from the antenna are applied to Strip Receiver STR No. 1 via the associated OUT 2 jack of Antenna Distribution Unit HFD and the ANT and RCVR jacks of Receiver Test Oscillator RTO.

Within the STR, incoming signals are extended to the TTR module where they are amplified and mixed with the output of a local oscillator which is tuned 1.75 mc above the carrier of the received signal. The 1.75 mc output of the TTR module is amplified and applied to a mixer stage together with the output of the LSB or USB crystal oscillator (1.5 mc or 2.00 mc, respectively) depending upon the setting of the associated LSB/USB switch.

The output of the mixer, a second i-f centered about 250 kc, is applied simultaneously to agc and second i-f amplifier stages. At the second i-f amplifier, a noise limiter circuit presents a low-impedance path to ground for negative-going transients (noise) when the associated NOISE LIMITER switch is set at ON. One output from the second i-f amplifier is routed to "Anti-Noise Device CDN No. 1" where it is used in a carrier-to-noise comparison circuit; another output from the i-f amplifier is extended through a detector and two amplifier stages (line amplifier and power amplifier) where the carrier component of the 250-kc signal is removed and the audio component is amplified for use with a 600-ohm balanced telephone line and a 4-ohm speaker line. A PHONES jack (J1516), inserted in the 4-ohm output circuit, is configured to disconnect the speaker when earphones is used. Power (+12vdc) for Strip Receiver STR No. 1 is provided by CDN No. 1.

The 250-kc signal from the second i-f amplifier stage in STR No.1 is routed through three mixer stages in CDN No. 1 where it is mixed with the output signals of a 750 kc oscillator and a 355-kc oscillator to produce a 355-kc signal that has the frequency stability of the 355-kc oscillator and the amplitude characteristics of the 250-kc input signal. This 355-kc signal is applied to both the carrier and noise channels

of CDN No. 1.

The carrier channel, consisting basically of an amplifier, a filter, and a carrier detector, provides a positive going voltage which is applied to the Schmitt trigger circuit. The noise channel, comprising an envelope detector, a low pass filter, an a-f rectifier, a gated amplifier, a carrier reject filter, and a noise detector provides a negative going voltage which is also applied to the Schmitt trigger circuit. The positive-going signals tend to turn the Schmitt trigger circuit "on"; the negative going signals keep the Schmitt trigger circuit in the "off" state. When the Schmitt trigger is "on", a relay driver circuit energizes CODAN relay K1002, and the audio signal output of Strip Receiver STR No. 1 is routed to external 600-ohm telephone lines. When the Schmitt trigger is "off" the CODAN relay is de-energized, and the audio output signal to the telephone is squelched.

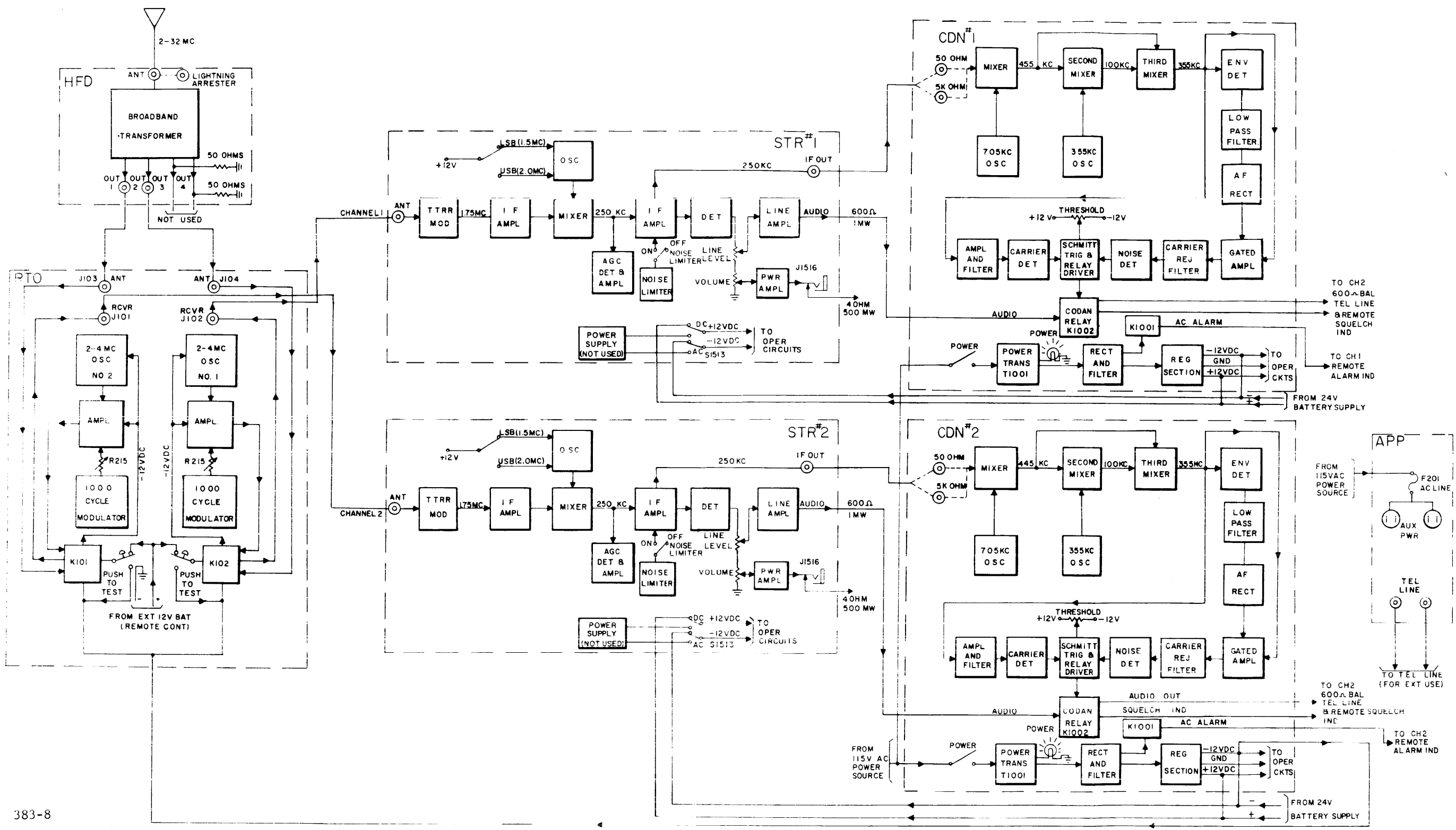
Two crystal-controlled oscillator contained in Receiver Test Oscillator RTO are used for channel testing. Each oscillator generates a modulated r-f signal which is applied to the associated receiver (STR No. 1 or STR No. 2). Normally, the test oscillators are de-energized and the signals received by the antenna are routed directly to the receivers. When the PUSH-TO-TEST button is depressed or when 12 volts dc is applied to relay K101 or K102, the associated test oscillator is energized, the operate contacts of relay K101 or K102 open the signal path from the antenna, and the modulated r-f signal from the RTO is routed via the RCVR jack to the associated receiver. The RTO is powered by the 12 volts dc it receives from the CDN No. 2.

Relays K1001 and K1002 contained in the CDN provide a-c power-failure and channel-activity indications. In the event of a-c power failure, relay K1001 de-energizes and ground is extended to terminal board TB103 for application to an external alarm system. When a signal of acceptable quality is received, relay K1002 is energized thus extending around to terminal board TB103 for external monitoring application.

The COR is designed for either a-c operation (115 volts $\pm 10\%$, 50 to 60 cps, single phase) or for d-c operation (24 volts). An additional 12 volts d-c supply is required for remote control of the test oscillators in Receiver Test Oscillator RTO. During a-c operation, the 115 volts is applied to the CDN. The ± 12 volt d-c output of the CDN is used to power its own operating circuits and also that of the associated STR. The -12 volt dc output of CDN No. 2 is used to power Receiver Test Oscillator RTO.

The COR system can also be operated with both a-c and d-c power applied. During this method of operation, the a-c supply of the CDN provides operating power for the COR and charg-

ing current for the batteries. Upon failure of a-c power, the batteries will provide operating power for the system with no interruption of service.



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Figure 4-1. Functional Block Diagram, COR

SECTION 5 MAINTENANCE

5-1. PREVENTIVE MAINTENANCE.

a. The COR has been designed to provide long-term, trouble-free operation under continuous duty conditions. However, in order to prevent failure of the equipment due to corrosion, dust, or other destructive elements, it is suggested that a schedule of preventive maintenance be set up and adhered to.

b. At periodic intervals, the equipment should be removed from its mounting for cleaning and inspection. All accessible covers should be removed and the wiring and all components inspected for dirt, corrosion, charring, discoloring or grease. Remove dust with a soft brush or vacuum cleaner. Remove dirt or grease from other parts with any suitable cleaning solvent. Use of carbon tetrachloride should be avoided due to its highly toxic effects. Trichlorethylene or methyl chloroform may be used, providing the necessary precautions are observed.

NOTE

When using toxic solvents, make certain that adequate ventilation exists. Avoid prolonged or repeated breathing of the vapor. Avoid prolonged or repeated contact with skin. Flammable solvents shall not be used on energized equipment or near any equipment from which a spark may be received. Smoking, "hot work", etc. is prohibited in the immediate area.

CAUTION

When using trichlorethylene, avoid contact with painted surfaces due to its paint removing effects.

5-2. TROUBLESHOOTING.

a. GENERAL. - Refer to figure 4-1. When used in conjunction with the checkout procedures given in paragraph 5-2 c., figure 4-1 will aid in localizing trouble to a particular modular unit. Once the trouble is localized to a modular unit, refer to the appropriate modular-unit manual for detailed information necessary to verify the probable cause and to locate faulty components. The results of defective front-panel indicator lamps and meters, and the remedial procedures concerned are obvious and, therefore, are not considered in the checkout procedures given in this manual.

b. TEST EQUIPMENT REQUIRED. - Test equipment required to check the COR is listed in Table 5-1.

c. TEST PROCEDURE. - Proceed as outlined below: If the results of any portion of the following test procedure are unsatisfactory, refer to the appropriate modular-unit manual for remedial information.

(1) Ensure that all external equipment has been disconnected from COR.

(2) At rear panel of Strip Receiver STR No. 1, disconnect cable connected to ANT jack J1502. Connect signal generator to ANT jack.

(3) Connect plug P106 to a-c power source; connect cable CA1204 to 24-volt battery source (black wire is connected to positive terminal).

(4) Set POWER switch of each CDN at ON.

(5) Refer to Figure 2-4. Using Simpson 260 VOM, check a-c and d-c voltages being applied to COR components. If voltages are present and the unit is inoperative, refer to fuse replacement information given in paragraph 5-3.

TABLE 5-1. TEST EQUIPMENT REQUIRED

QTY	ITEM	MANUFACTURER AND MODEL
1	Signal Generator	Measurements, Model 82 or equivalent
1	VIVM	Ballantine Model 314 or equivalent
1	Volt Ohmmeter (VOM)	Simpson, Model 260 or equivalent
1	24-volt d-c supply	
1	12-volt power source	

(6) Tune signal generator to STR operating frequency modulated 30% with 1000 cycles. Set output attenuator for a 3 microvolt signal.

(7) Connect a Simpson 260 VOM or equivalent to terminals 1 and 3 of TB103.

(8) At rear of STR, adjust LINE LEVEL control for indication of 0 db on Simpson meter.

(9) At rear of CDN No. 1 connect VTVM from RF MON jack to ground. Adjust signal generator for 10 microvolt output. Adjust ATTEN VAR control and IN OUT 40 DB switch for 1.0 millivolt indication on VTVM.

(10) Remove VTVM. Reduce signal generator output to 1.0 microvolts.

(11) Connect Simpson 260 VOM or equivalent between terminal 2 of TB103 and ground. Set THRESHOLD control of CDN fully CCW; indication on VTVM should be infinity.

(12) Adjust THRESHOLD control on CDN unit until CODAN relay operates. Check that a short circuit condition exists between terminal 2 and ground of TB103.

(13) Connect signal generator to ANT jack of STR No. 2 unit and repeat steps 5 through 11 for the STR No. 2 and its associated CDN unit with the following exceptions:

(a) In step 6, connect Simpson 260 to TB103 6 and 8 of TB103.

(b) In step 8 substitute CDN No. 2 for CDN No. 1.

(c) In step 10, connect Simpson 260 VOM between terminal 7 and ground of TB103.

(14) Remove all test equipment.

(15) Connect Simpson 260 VOM between terminals 1 and 3 of TB103.

(16) Connect 12-volt source between terminal 4 of TB103 and ground; negative terminal of power source should be connected to ground.

(17) At RTO, adjust modulation level control R215 of test oscillator No. 1 (Z202) as required for indication of 0 db on VOM.

(18) Disconnect 12 volt supply from terminal 4 of TB103.

(19) Press PUSH-TO-TEST button for test oscillator No. 1 (item 12, figure 3-1); indication on VOM should be 0 db.

(20) Connect Simpson 260 VOM between

terminals 6 and 8 of TB103 and ground.

(21) Connect 12-volt power source between terminal 9 on TB103 and ground; negative terminal of power source should be connected to ground.

(22) At RTO, adjust modulation level control R215 of test oscillator No. 2 (Z201) as required for indication of 0 db on VOM.

(23) Disconnect the 12-volt supply from terminal 9 on TB103.

(24) Press PUSH-TO-TEST button for test oscillator No. 2; indication on VOM should be 0 db.

(25) Disconnect Simpson 260 VOM from TB103.

(26) Connect VOM between terminal 5 on TB103 and ground; indication should be infinity.

(27) Disconnect all a-c power from COR system.

(28) The ohmmeter should indicate zero and the system should continue to operate.

(29) Reconnect a-c power and repeat Steps 26 through 28 except that in Step 26 VOM must be connected between terminal 10 and ground on TB103.

(30) Connect signal generator to ANT jack of STR No. 1 unit and repeat steps 6 through 26 on battery operation. In step 26 VOM should indicate 0.

(31) Connect the generator to the ANT jack of the STR No. 2 and repeat steps 6 through 26 on battery operation. In step 26 the ohmmeter should read zero.

(32) Disconnect all test equipment and battery power from COR. Reconnect the cables to the ANT jacks of STR No. 1 and STR No. 2.

5-3. COMPONENT REPAIR AND REPLACEMENT.

Information concerning the repair and replacement of components contained in the modular units that constitute the COR is given in the appropriate modular unit manual. Repair and replacement of cabinet (TOC) components is obvious upon inspection; detailed procedures are therefore not given in this manual. Although fuse-replacement information is given in each modular-unit manual, a complete list of COR fuses, their location and their function is given in table 5-2 as a matter of convenience.

TABLE 5-2. FUSE REPLACEMENT INFORMATION

MODULAR UNIT	FUSE	RATING	FUNCTION
STR No. 1 and STR No. 2	F907	.25A/115V .125A/230V	Normally protects STR power supply. However, STR power supply is not used when STR is part of COR system. Instead, the STR is powered by the associated CDN.
CDN No. 1 and CDN No. 2	AC F1001	1/2A, 115V 1/4A, 230V	Protects CDN internal power supply.
	POS 12V F1002	1/2A	In normal operation, protects +12 volt regulated section of CDN power supply. In battery operation, protects external battery.
	NEG 12V F1003	1/2A	In normal operation, protects -12 volt regulated section of CDN power supply. In battery operation, protects external battery.
APP	AC	15A	Protective fuse connected between a-c power source and receptacles mounted on APP.