

ARMY TM 11-5805-386-12
NAVY NAVELEX 0967-466-1010

**OPERATOR'S AND ORGANIZATIONAL
MAINTENANCE MANUAL
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS
FOR
CONVERTER, TELEPHONE SIGNAL CV-1919A/G
[FSN 5805-229-5417]**

**DEPARTMENTS OF THE ARMY AND THE NAVY
NOVEMBER 1974**

TECHNICAL MANUAL
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WASHINGTON, DC, 20 November 1974

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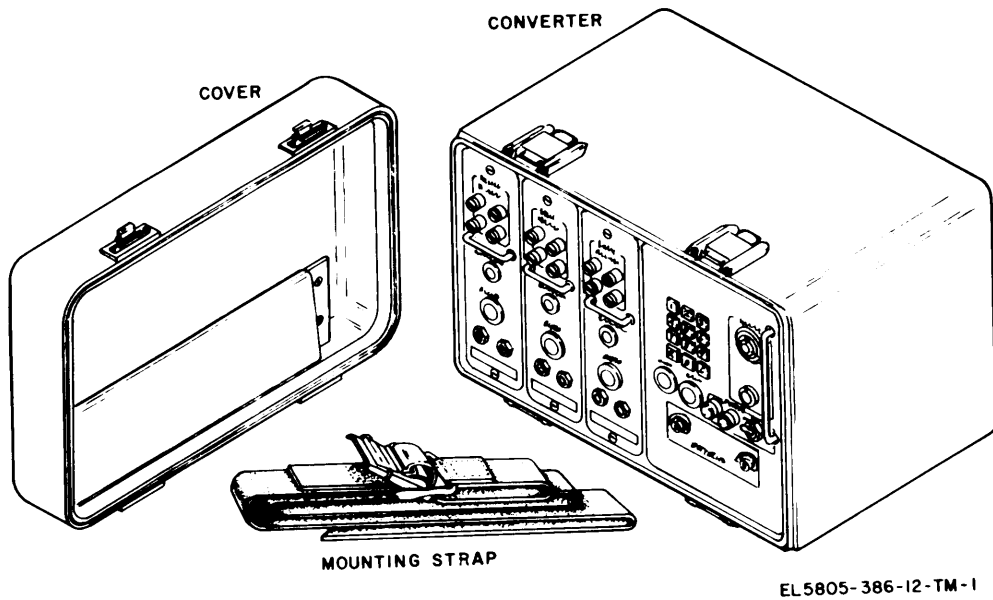
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	Paragraph	Page
CHAPTER 1. INTRODUCTION		
Section I. General		
Scope - - - - -	1-1	1-1
Indexes of publications - - - - -	1-2	1-1
Forms and records - - - - -	1-3	1-1
Destruction of Army materiel to prevent enemy use - - - - -	1-4	1-1
II. Description and data		
Purpose and use - - - - -	1-5	1-1
Description - - - - -	1-6	1-1
System application - - - - -	1-7	1-2
Tabulated data - - - - -	1-8	1-2
Items comprising an operable equipment - - - - -	1-9	1-3
CHAPTER 2. SERVICE UPON RECEIPT AND INSTALLATION		
Section I. Service upon receipt of material		
Unpacking - - - - -	2-1	2-1
Checking unpacked equipment - - - - -	2-2	2-1
II. Installation instructions		
Installation procedure with SB-22A/PT - - - - -	2-3	2-1
Installation procedure with SB-86/P - - - - -	2-4	2-2
CV-1919(A)/G rear panel connections - - - - -	2-5	2-2
Installing batteries - - - - -	2-6	2-2
Installation check with SB-22A/PT - - - - -	2-7	2-2
Installation check with SB-86/P - - - - -	2-8	2-3
CHAPTER 3. OPERATING INSTRUCTIONS		
Section I. Operation under usual conditions		
Controls - - - - -	3-1	3-1
Starting equipment - - - - -	3-2	3-2
Preoperational adjustment and checks - - - - -	3-3	3-2
Night alarm - - - - -	3-4	3-2
Operation with SB-22A/PT - - - - -	3-5	3-2
Operation with SB-86/P - - - - -	3-6	3-2
Turnoff procedure - - - - -	3-7	3-3
II. Operation under unusual conditions		
Operation under emergency conditions - - - - -	3-8	3-3
Operation under extreme environmental conditions - - - - -	3-9	3-3
CHAPTER 4. FUNCTIONING OF EQUIPMENT		
General - - - - -	4-1	4-1
Block diagram analysis - - - - -	4-2	4-1
5. OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS		
Section I. Repainting and refinishing instructions		
Paints and finishes - - - - -	5-1	5-1
Painting procedures - - - - -	5-2	5-1
II. Preventive maintenance checks and services		
Scope of maintenance - - - - -	5-3	5-1
Operator's daily preventive maintenance checks and services - - - - -	5-4	5-2
Organizational monthly preventive maintenance checks and services - - - - -	5-5	5-2
Organizational quarterly preventive maintenance checks and services - - - - -	5-6	5-3

	Page	Illus Figure
APPENDIX A. REFERENCES -----	A-1	
B. BASIC ISSUE ITEMS LIST, ITEMS TROOP INSTALLED OR AUTHORIZED LIST AND ORGANIZATIONAL MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST		
Section I. Introduction -----	B-1	
II. Basic Issue Items List (Not applicable)		
III. Items troop installed or authorized list (Nonapplicable)		
IV. Repair parts list -----	B-5	
Group 01 Converter, telephone signal -----		B-1
02 Channel module assembly, 1A1A1 through 1A3A1 -----		B-2
03 Common module assembly, 1A4 -----		B-3
Section V. Special tools list (Not applicable)		
VI. Federal stock number and reference number index (Nonapplicable)		
APPENDIX C. MAINTENANCE ALLOCATION -----	C-1	
Section I. Introduction -----		
II. Maintenance allocation chart -----	C-3	

LIST OF ILLUSTRATIONS

<i>Number</i>	<i>Title</i>	<i>Page</i>
1-1	Converter, Telephone Signal CV-1919A/G -----	1-0
1-2	System block diagram -----	2-3
2-1	Packing diagram -----	2-4
2-2	Rear panel of CV-1919A/G -----	2-5
2-3	Installing CV-1919A/G on SB-22/PT -----	2-6
2-4	Installing CV-1919A/G on SB-86/P -----	3-1
3-1	Operator controls, Indicators and connectors -----	4-2
4-1	CV-1919A/G, block diagram -----	B-6
B-1	Converter, Telephone Signal CV-1919A/G -----	B-6
B-2	Channel module assembly 1A1A1 through 1A3A1 -----	B-7
B-3	Panel, common module assembly -----	B-7



EL 5805-386-12-TM-1

Figure 1-1. Converter, Telephone Signal CV-1919A/G.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual describes Converter, Telephone Signal CV-1919A/G (fig. 1-1), and covers installation, operation, and maintenance. It includes instructions for all operational modes and instructions for operator and organizational maintenance.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to the latest issue of DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as

prescribed in AR 700-58/NAVSUP PUB 378/AFR 71-4/MCO P4030.29, and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33/AFM 75-18/MCO P4610.19A, and DSAR 4500.15.

d. Reporting of Equipment Manual Improvements. The reporting of errors, omissions, and recommendations for improving this manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-C, Fort Monmouth, NJ 07703.

e. Administrative Storage. For procedures, forms and records, and inspections required during administrative storage of this equipment, refer to TM 740-90-1.

1-4. Destruction of Army Materiel to Prevent Enemy Use

Demolition of the equipment will be accomplished only upon the order of the Commander. For destruction procedures, refer to TM 750-244-2.

Section II. DESCRIPTION AND DATA

1-5. Purpose and Use

(fig. 1-2)

a. The CV-1919A/G translates signals to and from Automatic Telephone Central Office AN/TTC-38(V)(*) (TM 11-5805-628-12) and Manual Telephone Switchboard SB-22A/PT (TM 11-5805-262-12) or Manual Telephone Switchboard SB-86/P (TM 11-2134).

b. The CV-1919A/G detects incoming calls from the automatic switchboard and alerts the manual switchboard operator to a request for

service. It also detects release signals from the automatic switchboard and signals the manual switchboard operator that a release is desired.

c. The CV-1919A/G establishes the interface between the manual switchboard and the automatic switchboard for direct dial into the automatic central office by key send DTMF tones.

1-6. Description

a. The CV-1919A/G is a 3-channel solid state telephone signal converter. It contains the circuitry to signal and connect trunk circuits from

the 4-wire AN/TTC-38(V)(*) to the 2-wire SB-22A/PT or SB-86/P.

b. The CV-1919A/G is a single unit with three plug-in channel modules and one common, plug-in module. Each channel module is completely self-contained and can be removed without affecting the performance of the remaining modules. Each of the three channel modules is identical to the others; therefore, they are interchangeable.

c. The common module includes the tone oscillators, keysender oscillators, and voltage regulator. It also houses the internal dc power supply. The dc power supply consists of four batteries, type BA-30 or equivalent, secured by clips in the BATTERIES drawer. The NIGHT ALARM (audible service request indicator) is mounted on the front panel.

d. Each channel module contains the tone detectors for continuous monitoring of the 4-wire inputs and the circuits for automatically returning the acknowledge tone and ring back tone. It also includes the visual SERVICE REQUEST indicator, ACCESS pushbutton switch, and two access jacks. The lightning arresters are also located on this panel.

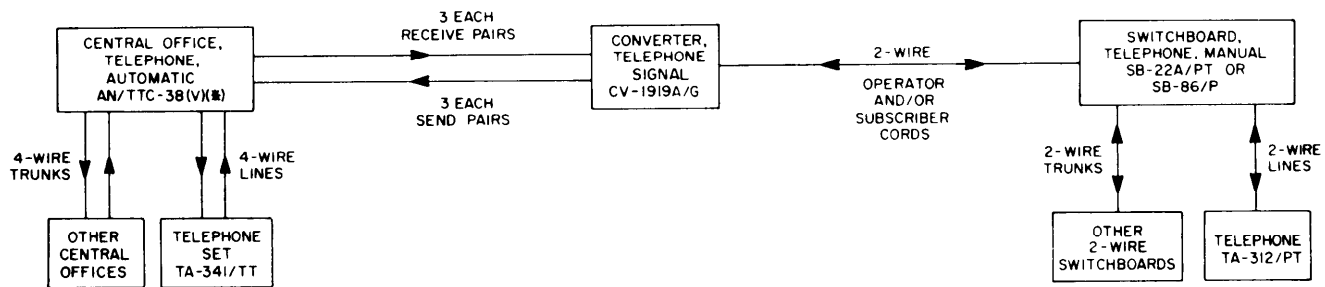
e. The housing design permits stacking the unit on the SB-22/PT or SB-86/P. Its hinged rear cover makes the SEND, RECEIVE, EXTERNAL BATTERY, and GROUND terminals easily accessible.

1-7. System Application

The CV-1919A/G provides interface between the AN/TTC-38(V)(*) and the SB-22A/PT or SB-86/P for three channels. Figure 1-2 is a block diagram that illustrates this interface relationship.

1-8. Tabulated Data

Circuit capacity	3 channels
Transmission range	2 miles
Transmission loss	5 dB max
Transmission line impedance	600 ohms
Voice frequency range	300 to 3500 Hz
Input signal frequency:	
Release	2600 Hz
Seize	2250 Hz
Acknowledge	570 Hz
Input signal levels	-30 dBm minimum
Cross talk attenuation	50 dB minimum
Operating power:	
Internal	4 batteries (BA-30 or equivalent)
External	6.4 Vdc
Operating temperature	-25° to +150° F.
Storage temperature	-70° to +160° F.
Relative humidity:	
Up to +85° F.	100%
85° to 120° F.	85° F. dew point
Above 120° F.	5%
Operating altitude	Up to 10,000 ft above sea level
Storage altitude	Up to 50,000 ft above sea level
Converter output frequencies ±1.3%:	
Release/Duration	2600 Hz/3 to 10 seconds maximum
Seize	2250 Hz
Acknowledge	570 Hz
Ringback	425 Hz interrupted
DTMF keysend signals:	
1	697 + 1209 Hz
2	697 + 1336 Hz
3	697 + 1477 Hz
4	770 + 1209 Hz
5	770 + 1336 Hz
6	770 + 1477 Hz
7	852 + 1209 Hz
8	852 + 1336 Hz
9	852 + 1477 Hz
0	941 + 1336 Hz
C	941 + 1477 Hz
R	941 + 1209 Hz



EL 5805-386-12-TM-2

Figure 1-2. System block diagram.

1-9. Items Comprising an Operable Equipment

FSN	Item	Qty	Dimensions (in.)			Weight (lb)
			Height	Depth	Width	
5805-229-5417	Converter, Telephone Signal					
	CV-1919A/G					
	Consisting of:					
	Converter	1	10.5	10	14.5	24
	Cover	1	10.25	3.25	14	4
	Strap, mounting	1	.125	84	1.0	0.1

CHAPTER 2

SERVICE UPON RECEIPT AND INSTALLATION

Section I. SERVICE UPON RECEIPT OF MATERIAL

2-1. Unpacking

(fig. 2-1)

The CV-1919A/G is packed with fiberboard cushions on all sides and requires no special sequence of unpacking to protect the equipment.

2-2. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (para 1-3b).

b. Check to see that the equipment is complete as listed on the packing slip. If a packing slip is not available, check the equipment against the items comprising an operable equipment list (para 1-9). Report all discrepancies in accordance with TM 38-750. The equipment should be placed in service, even though a

minor assembly or part that does not affect proper functioning is missing.

c. Check to see whether the equipment has been modified. If the equipment has been modified, the MWO number will appear on the front panel, near the nomenclature plate. Check also to see whether all MWO's current at the time the equipment is placed in use have been applied.

NOTE

Current MWO's applicable to the equipment are listed in DA Pam 310-7.

d. Check the latest issue of DA Pam 310-4 (including changes) to see whether you have the latest editions of all applicable maintenance literature.

e. For dimensions, weights, and volume of packed items, see SB 700-20.

Section II. INSTALLATION INSTRUCTIONS

2-3. Installation Procedure With SB-22A/PT

(fig. 2-2 and 2-3)

a. Preparing Mounting Facility.

(1) On rear of CV-1919A/G press red button in relief valve to relieve air pressure.

(2) Remove front cover.

(3) Remove mounting strap from canvas bag which is attached to cover and then store cover.

(4) Remove and store SB-22A/PT cover.

(5) Refer to TM 11-5805-262-12 to set up SB-22A/PT for operation.

(6) Lay CV-1919A/G mounting strap with hollow side of buckle facing upward on suitable surface for installing the SB-22A/PT.

(7) Set SB-22A/PT on mounting strap so that the buckle is approximately 36 inches from either side of SB-22A/PT.

(8) Set up SB-22A/PT for operation, but lock cover latch in position for equipment storage (horizontal).

b. Installing CV-1919A/G on SB-22A/PT.

(1) Set CV-1919A/G on SB-22A/PT with the two front feet resting in long groove and the two rear feet resting in two outer rectangular recesses on top of SB-22A/PT.

NOTE

The rectangular recesses are deeper than slot; therefore the CV-1919A/G will tilt backward slightly.

(2) Raise long portion of mounting strap over CV-1919A/G and draw loose end of strap through large loop of buckle, over and then through small loop of buckle, and back through large loop.

(3) Pull loose end until strap is secure with approximately 2-inch play for takeup when locking buckle.

(4) Set buckle C-clamp to lock position, and close buckle, allowing lock to snap into place under hook.

(5) Check tension to ascertain that CV-1919A/G is securely held in place; if loose, open buckle, pull mounting strap slightly tighter and relock the buckle.

(6) Store loose end of mounting strap under the CV-1919A/G.

2-4. Installation Procedure With SB-86/P

(fig. 2-2 and 2-4)

a. Preparing Mounting Facility.

(1) On rear of CV-1919A/G, press red button in relief valve to relieve air pressure.

(2) Remove front cover.

(3) Remove mounting strap from canvas bag which is attached to cover and then store cover.

(4) Refer to TM 11-2134 to set up SB-86/P for operation, but do not install jack field section or log plate.

(5) Place CV-1919A/G mounting strap on top of SB-86/P so that buckle is approximately 54 inches from either side.

(6) Place jack field section on top of SB-86/P.

b. Installing CV-1919A/G on SB-86/P.

(1) Set CV-1919A/G on SB-86/P jack field section with each foot resting in one of four outside front and rear positions of recess.

(2) Raise long portion of mounting strap over CV-1919A/G and draw loose end of strap through large loop of buckle, over and then through small loop of buckle, and back through large loop.

(3) Pull loose end until strap is secure with approximately 2-inch play for takeup when locking buckle.

(4) Set buckle C-clamp to lock position and close buckle, allowing lock to snap into place under hook.

(5) Check tension to ascertain that CV-1919A/G is securely held in place; if loose, open buckle, pull mounting strap slightly tighter, and relock buckle.

(6) Secure field jack section to SB-86/P and complete SB-86/P setup.

2-5. CV-1919A/G Rear Panel Connections

a. Loosen two ¼-turn fasteners and open hinged rear cover.

b. For SB-22A/PT installation attach facility ground wire to wing nut GROUND terminal. For SB-86/P installation, connect converter GROUND terminal to switchboard EARTH GND terminal.

CAUTION

Long field wires are subject to lighting strikes; do not connect nor disconnect signal lines during lightning conditions.

c. Determine which 4-wire line or trunk on the automatic switchboard connects to each set of CHANNEL terminals.

d. Depress terminal with thumb or screwdriver and insert bare portion of appropriate wire, two for SEND, two for RECEIVE, for each of the three channels.

e. See that power switch on front panel of common module is OFF.

f. If external power is to be used, connect the external power to the EXTERNAL BATTERY terminals observing the marked polarity.

g. Dress the wires along the channel; close and secure the hinged rear cover.

2-6. Installing Batteries

a. If using internal power, loosen the two ¼-turn fasteners and remove the BATTERIES drawer from the common module.

b. Observe polarity markings and install four D-cell batteries (MIL Type BA-30 or equivalent) in the BATTERIES drawer.

c. See that each battery is secure in the spring clips.

d. Reinstall BATTERIES drawer.

2-7. Installation Check With SB-22A/PT

Refer to TM 11-5805-262-12 and place outgoing call for each channel as follows:

a. Place CV-1919A/G common module power switch to INT or EXT position, as applicable.

b. Insert operator's cord into line jack on SB-22A/PT.

c. Insert calling party's line plug into either jack on an idle channel of the CV-1919A/G.

d. Press and hold channel ACCESS pushbutton.

e. Press and hold SEIZE pushbutton until the 570-Hz acknowledge tone is heard.

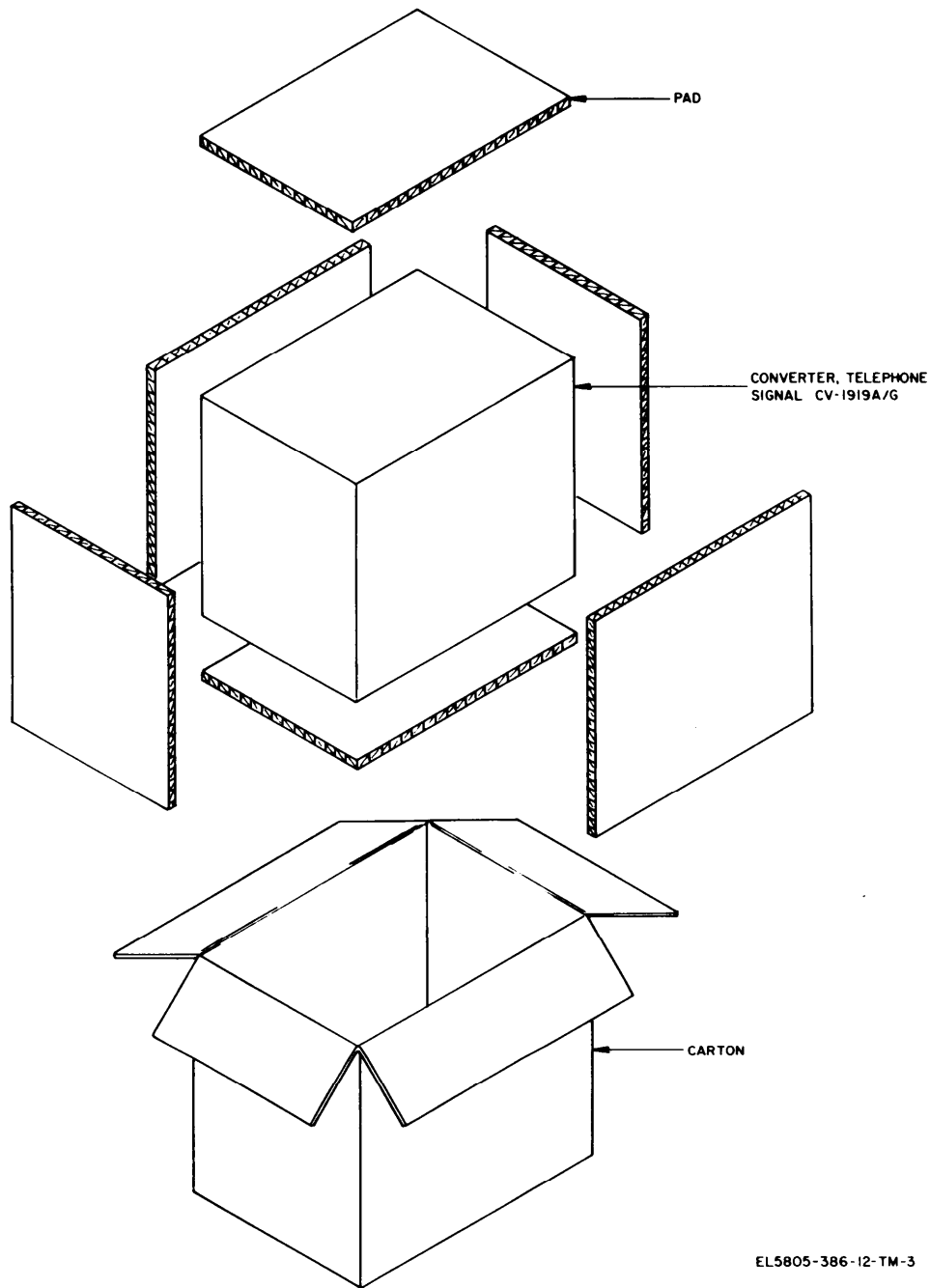
f. Release SEIZE pushbutton and listen for dial tone. Continue to depress ACCESS pushbutton, key digits to place call, then release ACCESS pushbutton.

g. When ringback is heard, disconnect the operator's cord.

h. Momentarily press both ACCESS and RELEASE pushbuttons to disconnect circuit.

i. Return calling party's line to normal.

j. Press SERVICE REQUEST indicator and observe that it glows.



EL5805-386-12-TM-3

Figure 2-1. Packing diagram.

k. Turn lens cap, press SERVICE REQUEST indicator, and observe that the amount of illumination varies from previous check.

2-8. Installation Check With SB-86/P

Refer to TM 11-2134 and place outgoing call for each channel as follows:

a. Place CV-1919A/G common module power switch to INT or EXT position, as applicable.

b. Place cord circuit switch to TALK LIST position.

c. Insert call cord into either channel jack on an idle channel of the CV-1919A/G.

d. Press and hold channel ACCESS pushbutton.

e. Press and hold SEIZE pushbutton until the 570-Hz acknowledge tone is heard.

f. Release SEIZE pushbutton and listen for dial tone. Continue to depress ACCESS pushbutton, key digits to place call, then release ACCESS pushbutton.

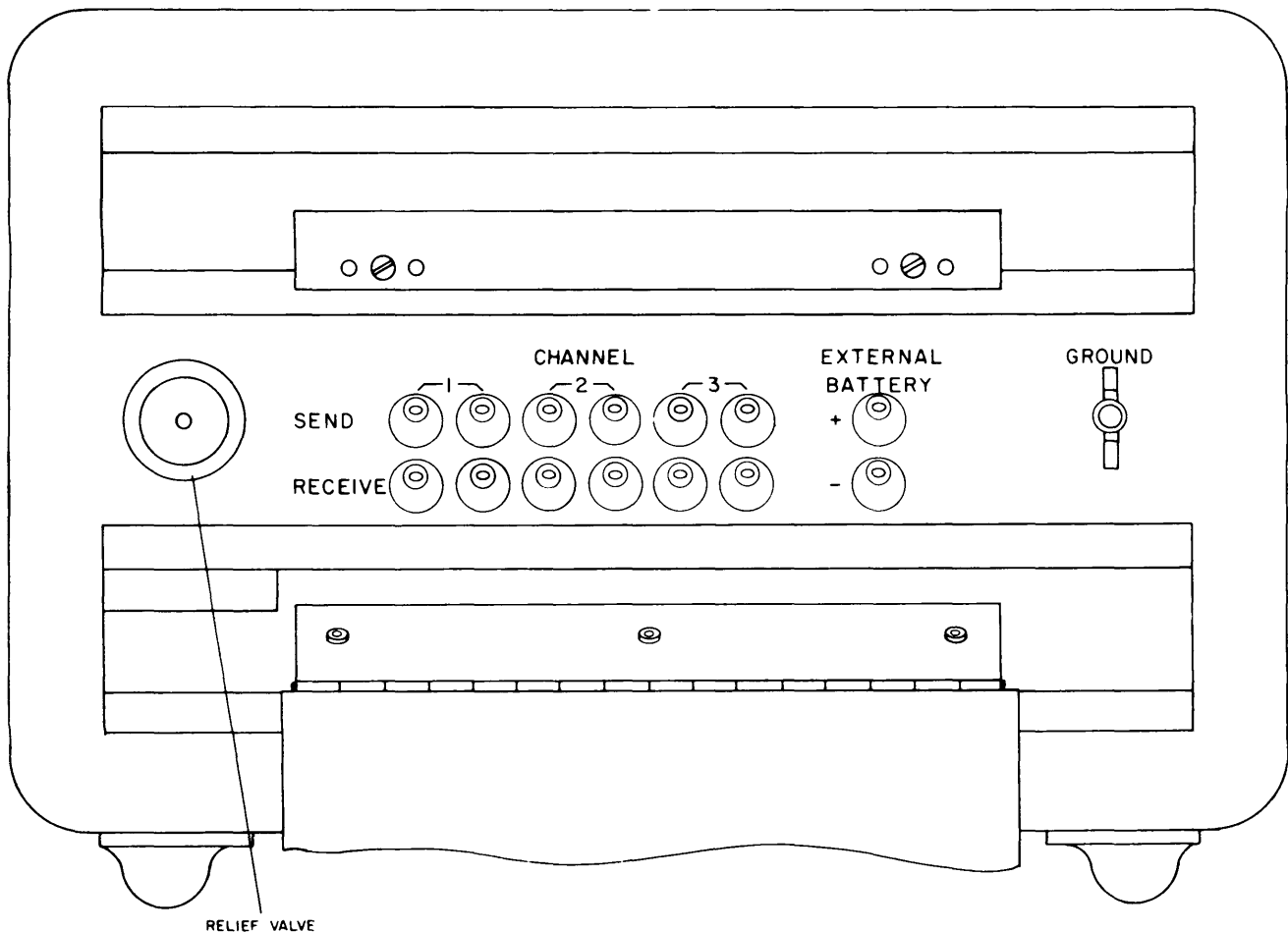
g. When ringback is heard, return cord circuit switch to neutral position.

h. Momentarily press both ACCESS and RELEASE pushbuttons.

i. Return call cord to normal.

j. Press SERVICE REQUEST indicator and observe that it glows.

k. Turn lens cap, press SERVICE REQUEST indicator, and observe that the amount of illumination varies from the previous check.



EL5805-386-12-TM-4

Figure 2-2. Rear panel of CV-1919A/G.

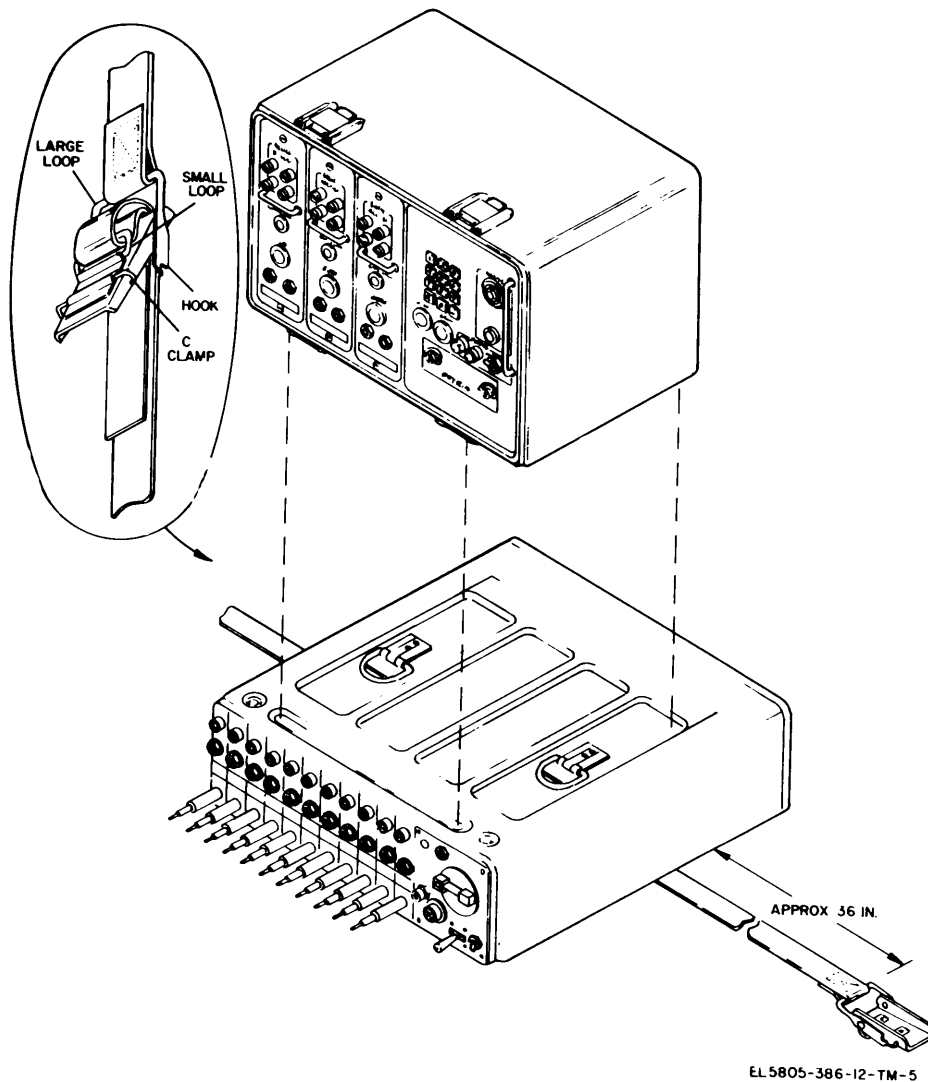


Figure 2-3. Installing CV-1919A/G on SB-22/PT.

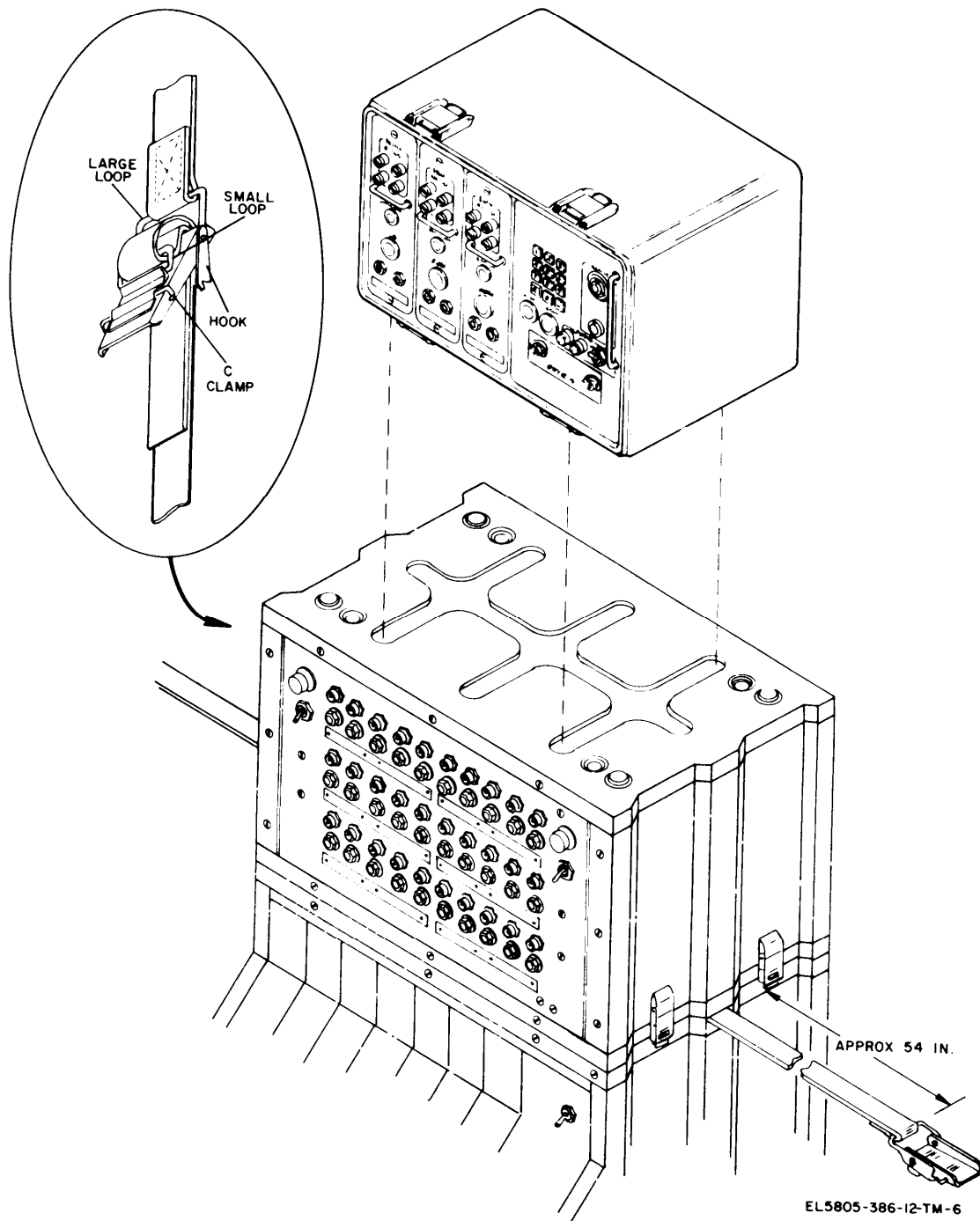


Figure 2-4. Installing CV-1919A/G on SB-86/P.

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. OPERATION UNDER USUAL CONDITIONS

3-1. Controls

NOTE

There are no combination of control settings that may physically damage the CV-1919A/G.

a. General. The chart in *b* below describes the controls, indicators, and connectors on the CV-1919A/G front panel.

b. Front Panel Controls (fig. 3-1).

<i>Control, indicator or connector</i>	<i>Function</i>
SEIZE (pushbutton switch)	Enables 2250-Hz oscillator to initiate seize sequence.
RELEASE (pushbutton switch)	Enables 2600-Hz oscillator to initiate release sequence.
INT-OFF-EXT (3-position toggle switch).	Connects internal batteries in INT position; connects external batteries in EXT position; disconnects all power in OFF position.

<i>Control, indicator or connector</i>	<i>Function</i>
Keysender (12 pushbutton switches).	Permits keying multi-frequency tones (DTMF) into automatic switchboards.
NIGHT ALARM (audible alarm device).	Sounds when the AN/TTC-38 (V)(*) requests service and NIGHT ALARM volume control is not in OFF position.
NIGHT ALARM OFF-LOUD (volume control).	Adjusts volume level of NIGHT ALARM from full OFF to LOUD.
ACCESS (pushbutton switch).	Permits SEIZE or RELEASE to be sent over trunk line.
Jack (J1) _____	Extends incoming call to subscriber's line or permits operator access to call.
Jack (J2) _____	Extends incoming call to subscriber's line or permits operator access to call.
SERVICE REQUEST (visual indicator).	Glows when AN/TTC-38(V)(*) requests service.

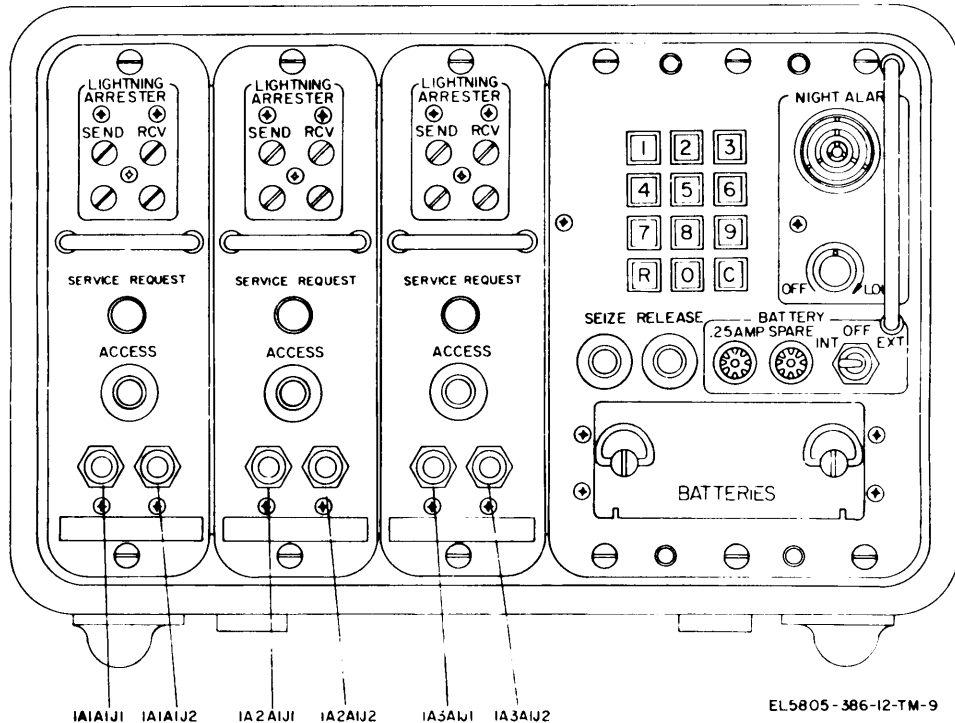


Figure 3-1. Operator controls, indicators and connectors.

3-2. Starting Equipment

a. If internal batteries are to be used, see that batteries are properly positioned in the BATTERIES drawer in accordance with the procedure in paragraph 2-6.

b. If external batteries are to be used, see that external batteries are connected to EXTERNAL BATTERY + and - terminals on the rear panel.

c. Set INT-OFF-EXT switch on common module front panel to INT or EXT as applicable.

d. See that associated switchboard SB-22A/PT (TM 11-5805-262-12) or SB-86/P (TM 11-2134) is ready for operation.

3-3. Preoperational Adjustment and Checks

a. After starting the equipment perform checkout procedures for applicable associated switchboard (para 2-7 or 2-8).

b. Adjust visual SERVICE REQUEST indicator to desired light intensity.

3-4. Night Alarm

The NIGHT ALARM is an audible signal used to supplement the visual incoming SERVICE REQUEST indicator. The NIGHT ALARM can be turned off by rotating the NIGHT ALARM OFF-LOUD volume control fully counterclockwise. When the NIGHT ALARM is activated the loudness can be set by rotating the NIGHT ALARM OFF-LOUD volume control clockwise to the desired audio intensity level. The operating instructions refer to the visual SERVICE REQUEST indicator only. If the NIGHT ALARM OFF-LOUD volume control is on, the NIGHT ALARM will sound simultaneously with the glowing of the visual SERVICE REQUEST indicator.

3-5. Operation With SB-22A/PT

a. *Connecting Call (Originated by Remote Switchboard).*

(1) When a CV-1919A/G SERVICE REQUEST indication is seen, insert operator's plug into jack on the applicable channel module and answer call (SERVICE REQUEST indicator resets).

(2) Insert called party's line plug into other jack on applicable channel module.

(3) Turn the hand ringing generator to ring the called party.

(4) Remove operator's plug from CV-1919A/G and insert it into the called party's line jack. (This action resets the SB-22A/PT line signal.)

(5) After called party answers, return operator's plug to the SB-22A/PT operator jack.

h. *Connecting Call (Originated by Local Switchboard).*

(1) Insert the operator's cord into the jack associated with the SB-22A/PT line signal that has turned white; line signal resets.

(2) Determine the number to be called.

(3) Insert the calling party's line plug into jack on an idle channel of the CV-1919A/G.

(4) Press and hold ACCESS pushbutton of the same channel; then depress and hold the SEIZE pushbutton on the common module until the 570-Hz acknowledge tone is heard.

(5) Release SEIZE pushbutton and listen for dial tone. While continuing to depress ACCESS pushbutton, operate the keysender pushbuttons to key in the required digits of the called party.

(6) Release ACCESS pushbutton.

(7) When ringback is heard, disconnect operator's plug.

c. *Disconnecting Call (Terminated by Remote Switchboard).*

(1) When CV-1919A/G SERVICE REQUEST indication is seen on a channel in use, disconnect the subscriber's plug from the applicable channel jack.

(2) Observe that SERVICE REQUEST indicator resets. (If not, a pre-emption condition exists; refer to e below.)

d. *Disconnecting Call (Terminated by Local Switchboard).*

(1) When SB-22A/PT line signal turns white on a line in use, connect operator's cord to SB-22A/PT connected party line jack. Verify that line is not working. Simultaneously press both CV-1919A/G RELEASE and applicable ACCESS pushbuttons.

(2) Remove subscriber's plug from applicable channel jack.

e. *Pre-Emptying Call.*

(1) When CV-1919A/G SERVICE REQUEST indication is seen after disconnecting a call (pre-emption condition), insert operator's plug into jack on applicable channel module.

(2) Refer to a above to connect call.

3-6. Operation With SB-86/P

a. *Connecting Call (Originated by Remote Switchboard).*

(1) When a CV-1919A/G SERVICE REQUEST indication is seen, insert an answer cord from the SB-86/P into the applicable channel jack. (This action resets SERVICE REQUEST indicator.)

(2) Place cord circuit switch in TALK LIST position and determine the called party desired.

(3) Insert call cord of the same cord circuit into the called party's line jack.

(4) Place ringing circuit switch to RING FWD position to signal called party.

(5) Return cord circuit switch to neutral (handle straight up) when conversation between the called and calling party has begun.

b. Connecting Call (Originated by Local Switchboard).

(1) When an SB-86/P line signal turns white, the operator inserts an answer cord of an idle cord circuit into the line jack of the calling party.

(2) Place the associated cord circuit switch in the TALK LIST position.

(3) Ask the calling party for the number of the line desired. Insert applicable call cord into jack on applicable channel module.

(4) Press and hold channel ACCESS pushbutton; then press and hold SEIZE pushbutton until the 570-Hz acknowledge tone is heard.

(5) Release SEIZE pushbutton and listen for dial tone. While still depressing ACCESS pushbutton, operate the keysender pushbuttons to key in the required digits of the called party.

(6) Release ACCESS pushbutton.

(7) When ringback is heard, return cord circuit switch to the neutral position.

c. Disconnecting Call (Terminated by Remote Switchboard).

(1) When CV-1919A/G SERVICE REQUEST indication is seen on a channel in use, disconnect answer and call cords.

(2) Observe that SERVICE REQUEST indicator goes out. (If not, a pre-emption condition exists; refer to *e* below.)

d. Disconnecting Call (Terminated by Local Switchboard).

(1) When SB-86/P line signal turns white on a line in use, momentarily press both CV-1919A/G RELEASE and applicable ACCESS pushbuttons.

(2) Disconnect answer and call cords.

e. Pre-Emptying Call.

(1) When CV-1919A/G SERVICE REQUEST indication is seen after disconnecting a call (pre-emption condition), insert answer cord into applicable channel jack.

(2) Refer to *a* above to connect call.

3-7. Turnoff Procedure

a. See that all cords are disconnected.

b. Set INT-OFF-EXT switch on common module front panel to OFF.

c. If CV-1919A/G will be out of service for a prolonged period, remove batteries to avoid battery leakage in BATTERIES drawer.

d. If preparing for movement, disconnect all rear panel connections and secure hinged rear cover.

e. Remove mounting strap, store mounting strap in cover, and reinstall cover on converter.

Section II OPERATION UNDER UNUSUAL CONDITIONS

3-8. Operation Under Emergency Conditions

a. General. Some emergency conditions do not require complete shutdown of the CV-1919A/G. Low battery power requires switchover to an alternate power source. A channel loss or DTMF tone loss results in limited operation. Procedures to be followed for these emergency conditions are presented in *b*, *c*, and *d* below.

b. Low Battery Power. The CV-1919A/G is capable of operation on either internal batteries or from an external battery source. If operating on external power and a power source failure occurs, install batteries (para 2-6), then place the INT-OFF-EXT switch in INT position. If operating on internal batteries and battery power becomes low, connect external battery power source (para 2-5), then place INT-OFF-EXT switch in EXT position and continue operation.

c. DTMF Tone Key Inoperative. Failure of a tone key on the keysender of the common module results in the inability to complete calls requiring the specific faulty digit. All other calls can be completed.

d. One Channel Inoperative. Failure of one channel circuit does not affect operation on the other channels. Such a failure only limits the number of calls which can be handled simultaneously.

3-9. Operation Under Extreme Environmental Conditions

The CV-1919A/G is capable of operation in hot, cold, or moderate climates. The shelter facility provides complete protection from the elements for personnel and equipment; however, under extreme conditions, the following precautions are necessary.

a. Cold Climates. Extreme cold causes cables to become hard, brittle, and difficult to handle. Be careful when handling the cables and connecting them to the equipment so that kinks and unnecessary loops will not result in permanent damage. Make sure that all connectors are free of frost, snow, and ice. Never drag or place an open connector in the snow.

b. Hot Climates. In hot, dry climates, connectors and receptacles are subject to damage from dust or dirt. Never place an open connector on the ground.

c. Warm, Damp Climates. In warm, damp climates, the equipment is subject to damage from moisture and fungi. Wipe all moisture and fungi from the equipment with a lint free cloth.

CHAPTER 4

FUNCTIONING OF EQUIPMENT

4-1. General

This chapter provides a block diagram analysis of Telephone Signal Converter CV-1919A/G to the circuit card level. Circuit description includes the interface between the 4-wire Automatic Telephone Central Office AN/TTC-38(V)(*) and the 2-wire Manual Telephone Switchboard SB-22A/PT or SB-86/P.

4-2. Block Diagram Analysis

(fig. 4-1)

a. The CV-1919A/G consists of three plug-in channel modules and a common module. Each channel module is assigned to a specific 4-wire trunk input from the AN/TTC-38(V)(*) and is manually connected to a subscriber of the SB-22A/PT or SB-86/P by an operator through front panel access jacks on the CV-1919A/G.

b. Block diagram figure 4-1 illustrates the interface of the CV-1919A/G with the AN/TTC-38(V)(*) (remote switchboard) and either the SB-22A/PT or SB-86/P (local switchboard). Calls may originate at either end; however, calls originating at the AN/TTC-38(V)(*) are considered incoming calls and calls originating at the SB-22A/PT or SB-86/P are considered outgoing calls.

c. If a call originates at the AN/TTC-38(V)(*), a 2250-Hz seize tone is sent over the receive pair of the 4-wire trunk line to one of the channel modules in the CV-1919A/G. The channel module detects the seize tone, lights the SERVICE REQUEST indicator on the associated channel module, and returns a 570-Hz acknowledge tone. The acknowledge tone from the common module is returned through the channel module and the send pair of the 4-wire trunk to the AN/TTC-38(V)(*) and stops the seize tone. When the seize tone stops, the CV-1919A/G generates a 425-Hz interrupted ringback tone in the common module which is routed through the channel module and sent back over the send pair of the 4-wire trunk to the AN/TTC-38(V)(*). The ringback tone continues until the operator plugs into the jack of the channel requesting service. When the operator plugs into the channel module access jack, the SERVICE REQUEST indicator

goes out and ringback tone is stopped. The operator then manually connects the CV-1919A/G to manual switchboard SB-22A/PT or SB-86/P through the front panel access jack on the channel module. When the call is terminated from the AN/TTC-38(V)(*), the AN/TTC-38(V)(*), sends a 2600-Hz release tone over the receive pair of wires to the channel module. The release tone is detected in the channel module which sets the SERVICE REQUEST indicator and returns a 570-Hz acknowledge tone. This signal from the common module is routed through the channel module and over the send pair in the 4-wire trunk to the AN/TTC-38(V)(*) where it is detected and stops the release tone. When the release tone stops, the channel module stops sending the acknowledge tone.

d. When a call originates from the SB-22A/PT or SB-86/P, the operator selects an unused channel of the CV-1919A/G, then simultaneously presses the ACCESS switch on the channel module and the SEIZE switch on the common module. The 2250-Hz seize tone generated in the common module is routed through the channel module and over the send pair in the 4-wire trunk to the AN/TTC-38(V)(*). The AN/TTC-38(V)(*) returns a 570-Hz acknowledge tone over the receive pair to the CV-1919A/G. When the acknowledge tone is heard by the operator, the SEIZE and ACCESS switches are released to stop the seize tone. When the seize tone stops, the AN/TTC-38(V)(*) send a dial tone to the channel module. When the operator hears the dial tone he presses the ACCESS switch on the channel module and keys the required digits on the common module keysender. The tones for the digits are routed through the channel module and over the send pair in the 4-wire trunk to the AN/TTC-38(V)(*). When the connection is completed, the operator can disconnect from the circuit. When the call is to terminate, the operator momentarily presses the ACCESS switch on the channel module and the RELEASE switch on the common module. The 2600-Hz release tone generated in the common module is routed through the channel module to the AN/TTC-38(V)(*) where the release tone is

detected. The AN/TTC-38(V)(*) where the release tone is detected. The AN/TTC-38(V)(*) returns the 570-HZ acknowledge tone to the channel module of the CV-1919A/G. The acknowledge tone is detected in the channel module and stops the release tone.

e. The common module also contains the

NIGHT ALARM. The NIGHT ALARM provides an audible sound concurrent with a SERVICE REQUEST indication on any of the channel modules. The NIGHT ALARM OFF/LOUD volume control on the common module front panel turns the NIGHT ALARM on or OFF and sets sound intensity to desired level.

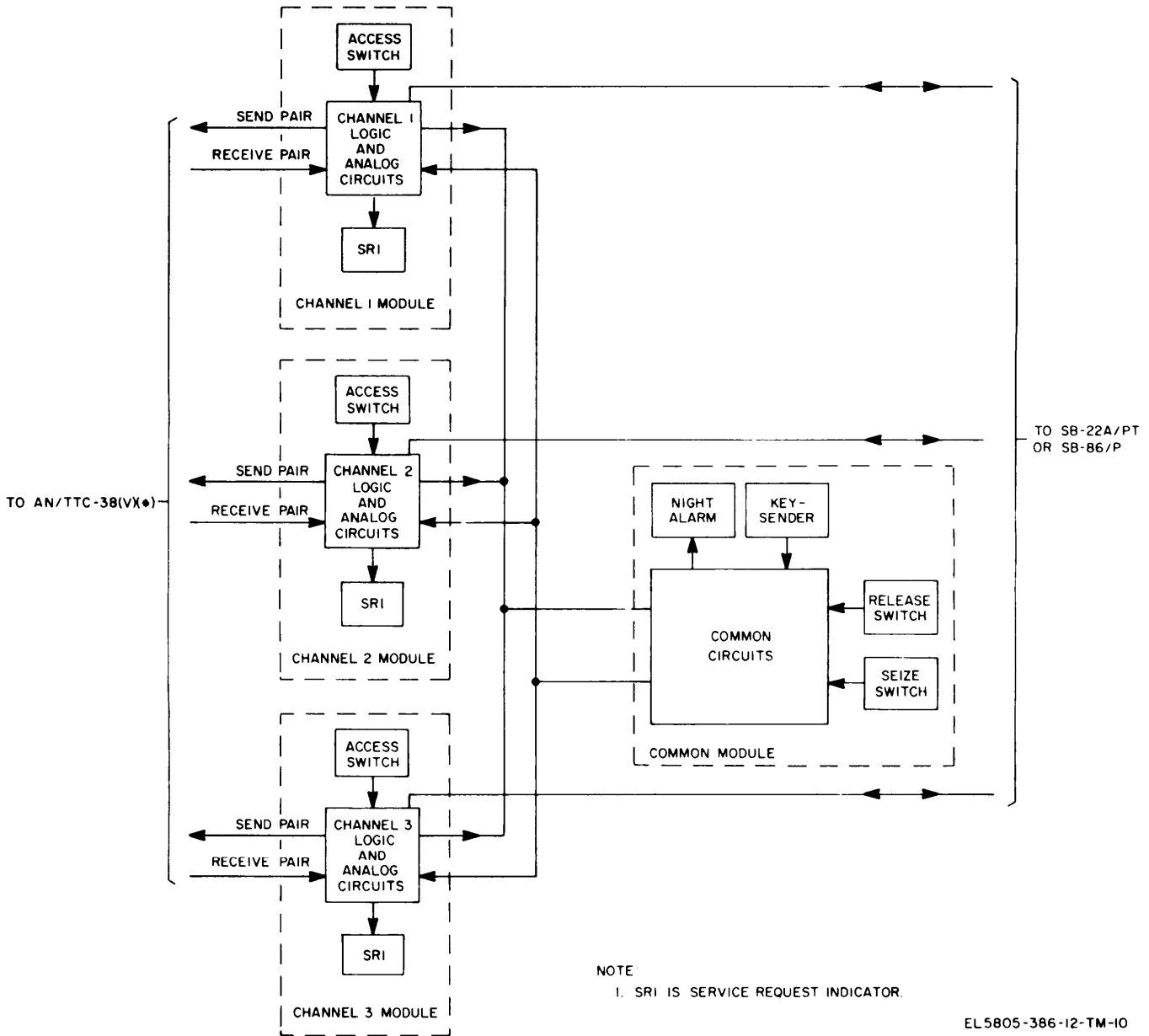


Figure 4-1. CV-1919A/G, block diagram.

CHAPTER 5

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. REPAINTING AND REFINISHING INSTRUCTIONS

5-1. Paints and Finishes

CAUTION

Before painting, carefully mask all unpainted and vented surfaces and nameplates, decals, MWO information and other markings.

The front panel final paint film is smooth, semigloss enamel, light gray color number 26250 conforming to the FED-STD-595 as listed in SB

11-573. The case final paint film is smooth, semigloss enamel, green color number X24087 conforming to FED-STD-595 as listed in SB 11-573. Finish for hardware such as handles, hinges, screws, etc., is in accordance with MIL-F-14072.

5-2. Painting Procedures

Refer to TB 746-10 for instructions on painting and preserving electronics equipment.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

5-3. Scope of Maintenance

a. General. Preventive maintenance is the systematic care, servicing and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to maintain the equipment in serviceable condition.

(1) Operator preventive maintenance is performed daily as specified in procedures provided in paragraph 5-4.

(2) Organizational preventive maintenance is performed monthly and quarterly as specified in procedures provided in paragraphs 5-5 and 5-6.

(3) Defective items that cannot be corrected must be reported to higher category maintenance personnel. Records and reports of repairs and preventive maintenance must be made in accordance with procedures given in TM 38-750.

b. Preventive Maintenance Checks and Services Periods. Preventive maintenance checks and services for an operating CV-1919A/G are required daily (para 5-4), monthly (para 5-5), and quarterly (para 5-6). These checks and services must be performed during the specified periods. In addition, the daily checks and services must be performed under the following special conditions:

(1) When the equipment is initially installed.

(2) When the equipment is reinstalled after removal for any reason.

(3) At least once each week if the equipment is maintained in a standby condition.

c. Cleaning.

WARNING

The fumes of trichloroethane are toxic. Provide thorough ventilation whenever used. Do not use near open flame, as any fumes are converted to highly toxic gases.

(1) Use a dry, clean, lint free cloth or brush to remove dust or dirt. If necessary, moisten the cloth or brush with trichloroethane (FSN 6810-292-9625). After cleaning, wipe dry with a clean cloth.

WARNING

Compressed air is dangerous and can cause serious harm. It can also cause mechanical damage to the equipment. Do not use compressed air to dry parts where trichloroethane has been used.

(2) Dry compressed air, not to exceed 60 pounds per square inch, may be used to remove dirt and dust from inaccessible places.

d. *Touchup Painting.* Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on bare metal to protect it from further corrosion. Refer to paragraphs 5-1 and 5-2 for paint specifications.

e. *Replacing Lamps.*

(1) Turn lens cap counterclockwise and remove it from the panel.

(2) Remove lamp from lens cap.

(3) Insert and seat new lamp.

(4) Reinstall lens cap.

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation; make the complete checks and services when the equipment can be shut down. Check fuse and/or batteries and replace as necessary before reporting defective items to higher category maintenance personnel.

5-4. Operator's Daily Preventive Maintenance Checks and Services

Sequence number	Item to be inspected	Procedure	Reference
1	Exterior surfaces	a. Inspect for chips and scratches in the paint b. Clean	Para 5-3a(2) Para 5-3c
2	Mounting strap	a. See that mounting strap is not frayed or torn b. See that mounting strap is taut; if necessary, open buckle lock, pull mounting strap slightly tighter and relock the buckle (fig. 2-3 or 2-4).	Para 5-3a(2) None
3	Grounding system	See that ground wire is secure at GROUND terminal on rear panel.	Para 2-5b
4	Connections	a. See that wires are secured in CHANNEL SEND and RECEIVE terminals on rear panel. b. If external power is used, see that connections are secure in EXTERNAL BATTERY terminals on rear panel.	None None
5	Batteries	Inspect BATTERIES drawer in common module for electrolyte leakage, and corroded contacts or clips.	Para 5-3c
6	NIGHT ALARM indicator	Request the remote switchboard to place incoming call and check to see that audible alarm sounds. Turn NIGHT ALARM OFF/LOUD volume control to OFF position and then rotate clockwise to check change of volume.	Para 5-3a(2)
7	Audible alarm control	See that NIGHT ALARM control doesn't bind	Para 5-3a(2)
8	Battery switch	See that BATTERY INT OFF EXT switch does not bind	Para 5-3a(2)
9	Pushbuttons	a. See that SEIZE and RELEASE pushbuttons on common module do not bind. b. See that ACCESS pushbuttons on channel modules do not bind.	Para 5-3a(2) Para 5-3a(2)
10	SERVICE REQUEST indicators	See that each SERVICE REQUEST indicator glows when pressed.	Para 5-3e

5-5. Organizational Monthly Preventive Maintenance Checks and Services performed daily (para 5-4) and the following items.

The monthly checks and services include those

Sequence number	Item to be inspected	Procedure	Reference
1	Plug-in modules	a. See that plug-in modules are properly seated b. See that mounting screws are secure and not burred	None Para 5-3a(2)
2	Batteries	c. Check handles for damage a. Clean BATTERIES drawer and contacts b. Check ¼-turn fasteners for damage	Para 5-3a(2) Para 5-3c Para 5-3a(2)
3	Rear cover	a. Check for damage b. Check hinge for smooth operation c. Check ¼-turn fasteners for damage	Para 5-3a(2) Para 5-3a(2) Para 5-3a(2)

5-6. Organizational Quarterly Preventive Maintenance Checks and Services
 The quarterly checks and services include those

performed daily (para 5-4), monthly (para 5-5), and the following items.

Sequence number	Item to be inspected	Procedure	Reference
1	Modification work orders _ _ _ _ _	Check to see if any MWO's are required. Check to see if current MWO's have been applied and MWO number is stamped as required.	Applicable MWO (DA Pam 310-7).
2	Hardware _ _ _ _ _	Check, tighten and replace as necessary _ _ _ _ _	None

APPENDIX A

REFERENCES

DA Pam 3104	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Army Equipment Index of Modification Work Orders.
SB 11-573	Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment.
SB 700-20	Army Adopted/Other Items Selected for Authorization/List of Reportable Items.
TB 746-10	Field Instructions for Painting and Preserving Electronics Command Equipment.
TM 11-2134	Manual Telephone Switchboard SB-86/P; Installation and Operation.
TM 11-5805-262-12	Operator's and Organizational Maintenance Manual: Switchboards, Telephone, Manual SB-22/PT and SB-22A/PT.
TM 11-5805-628-12	Operator's and Organizational Maintenance Manual: Automatic Telephone Central Offices AN/TTC-38(V)1 and AN/TTC-38(V)2.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX B

BASIC ISSUE ITEMS LIST, ITEMS TROOP INSTALLED OR AUTHORIZED LIST AND ORGANIZATIONAL MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists repair parts and special tools required for the performance of organizational maintenance of the CV-1919A/G.

B-2. General

This Basic Issue Items, Items Troop Installed or Authorized, Repair Parts and Special Tools is divided into the following sections:

a. Basic Issue Items List - Section II. Not applicable.

b. Items Troop Installed or Authorized List - Section III. Not applicable.

c. Repair Parts List-Section IV. A list of repair parts authorized at the organizational level for the performance of maintenance.

d. Special Tools List-Section V. Not applicable.

e. Federal Stock Number and Reference Number Index — Section VI. Not applicable.

B-3. Explanation of Columns

The following provides an explanation of columns found in the tabular list.

a. Source, Maintenance, and Recoverability Codes (SMR).

(1) *Source code.* Source codes are assigned to support items to indicate the manner of acquiring support items for maintenance, repair, or overhaul of end items. Source codes are entered in the first and second positions of the Uniform SMR Code format as follows:

<i>Code</i>	<i>Explanation</i>
PA	Item procured and stocked for anticipated or known usage.
AF	Item to be assembled at direct support maintenance level.

NOTE

Cannibalization or salvage may be used as a source of supply for any items

source coded XA, XD, and aircraft support items as restricted by AR 70042.

(2) *Maintenance code.* Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code Format as follows—

(a) The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace, and use the support item. The maintenance code entered in the third position will indicate one of the following levels of maintenance.

<i>Code</i>	<i>Application/Explanation</i>
O-	Support item is removed, replaced, used at the organizational level of maintenance.
(b)	The maintenance code entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). This position will contain one of the following maintenance codes:
<i>Code</i>	<i>Application /Explanation</i>
D-	The lowest maintenance level capable of complete repair of the support item is the depot level.
Z-	Nonreparable. No repair is authorized.
(3)	<i>Recoverability code.</i> Recoverability codes are assigned to support items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the Uniform SMR Code format as follows—
<i>Recoverability code</i>	<i>Definition</i>
Z—	Nonrepairable item. When unserviceable, condemn and dispose at the level indi-

cated in the first digit of the maintenance position 3.

D— Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.

b. Federal Stock Number. Indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. Indicates the Federal item name and a minimum description required to identify the item. The last line indicates the reference number followed by the applicable Federal Supply Code for Manufacturer (FSCM) in parentheses. The FSCM is used as an element in item identification to designate manufacturer or distributor or Government agency, etc., and is identified in SB 708-42.

d. Unit of Measure (U/M). Indicates the standard or basic quantity by which the listed item is used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

e. Quantity Incorporated in Unit. Indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. The letters "REF" are

used to indicate a repeated item within an assembly; the first item shows the quantity used in the assembly.

f. 15-Day Organizational Maintenance Allowances.

(1) The repair parts indicated by an asterisk in the allowance columns represent those authorized for use at the organizational category, and will be requisitioned on an "as required" basis, until stockage is based on demand in accordance with AR 710-2.

(2) Major Army commanders are authorized to approve reduction in the range of support items authorized for use in units within their commands. Recommendation for increase in range of items authorized for use will be forwarded to Commander, US Army Electronics Command, ATTN: AMSEL-MA-C, Fort Monmouth, N.J. 07703. Any changes approved will be reflected in a revision to the RPSTL.

g. Illustration. This column is divided as follows:

(1) *Figure Number.* Indicates the figure number of the illustration on which the item is shown.

(2) *Item Number.* Indicates the callout number used to reference the item on the illustration.

B-4. Special Information

Not applicable.

(Next printed page is B-5)

SECTION IV REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 15 DAY ORGANIZATIONAL MAINTENANCE ALW				(7) ILLUSTRATIONS	
					(a) 1 5	(b) 6 20	(c) 21 50	(d) 51 100	(a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
AFODD	5805-229-5417	GROUP 01 CONVERTER, TELEPHONE SIGNAL CONVERTER, TEL SIG CV1919AG SMD743615 (04655) 1							B-1	
PAOZZ		GROUP 02 CHANNEL MODULE ASSEMBLY 1A1A1 THROUGH 1A3A1 LAMP, INCANDESCENT SMC743870 (04655) 1A1-A31DS2	EA	1	*	*	*	*	B-2	23
PAOZZ	5805-322-2122	PROTECTOR, TELEPHONE SMD2015983 (04655) 1A1-A3A1E1	EA	4	*	*	*	*	B-2	21
PAOZZ	5805-322-2122	PROTECTOR, TELEPHONE SMD2015983 (04655) 1A1-A3A1E2	EA	REF	*	*	*	*	B-2	21
PAOZZ	5805-322-2122	PROTECTOR, TELEPHONE SMD2015983 (04655) 1A1-A3A1E3	EA	REF	*	*	*	*	B-2	21
PAOZZ	5805-322-2122	PROTECTOR, TELEPHONE SMD2015983 (04655) 1A1-A3A1E4	EA	REF	*	*	*	*	B-2	21
PAOZZ	5920-321-8455	GROUP 03 COMMON MODULE ASSEMBLY 1A4 FUSE, CARTRIDGE FO3A250V1-4AS (81349) 1A4F1	EA	2	*	*	*	*	B-3	9
PAOZZ	5920-321-8455	FUSE, CARTRIDGE FO3A250V1-4AS (81349) 1A4SPARE	EA	REF	*	*	*	*	B-3	9
PAOZZ	5355-958-9982	KNOB MS91528-2E2B (96906)	EA	1	*	*	*	*	B-3	10

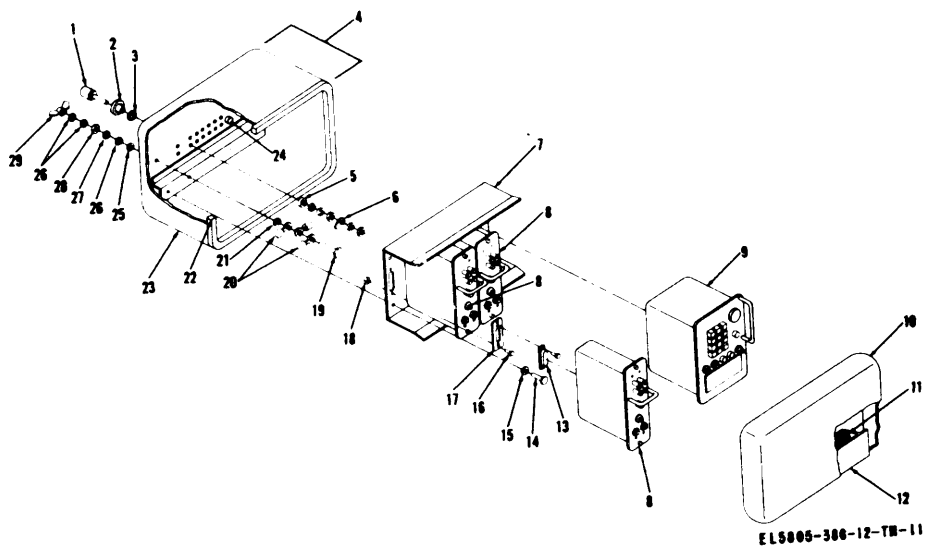


Figure B-1. Converter, Telephone Signal CV-1919A/G.

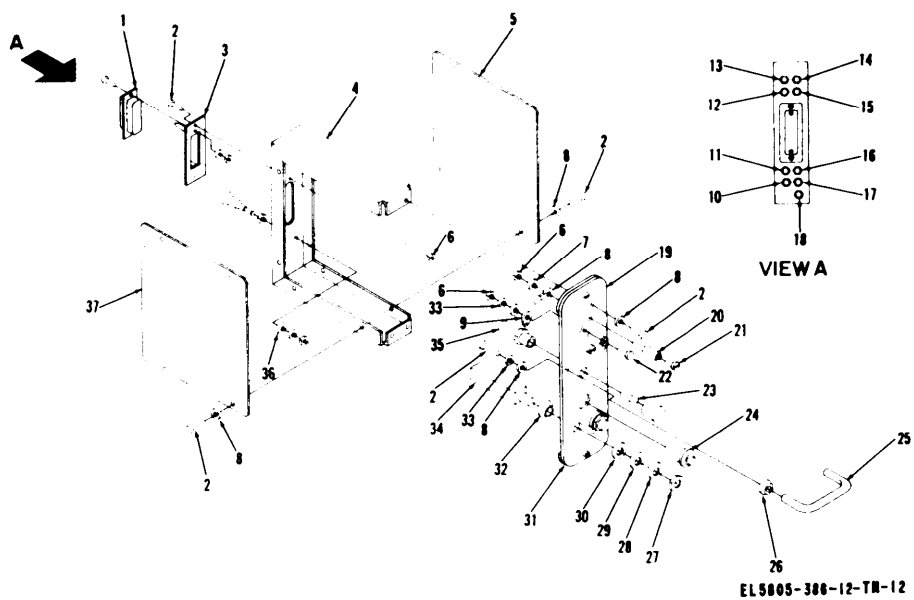


Figure B-2. Channel module assembly 1A1A1 through 1A3A1.

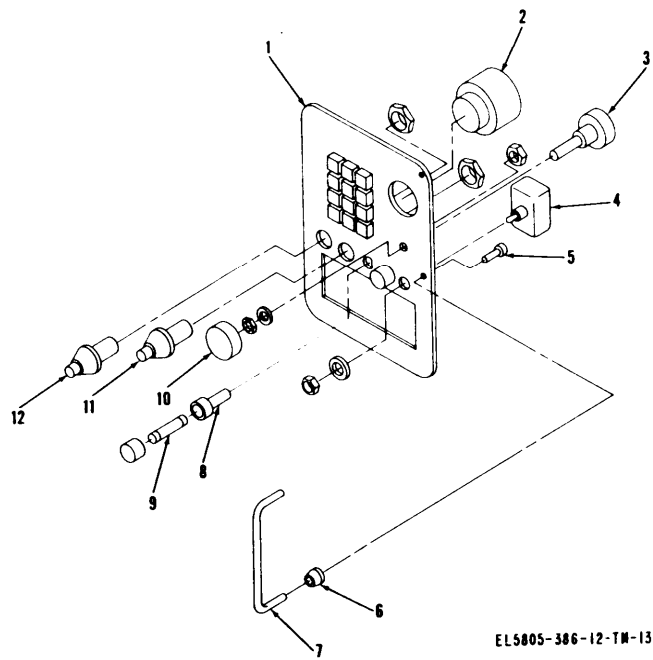


Figure B-3. Panel, common module assembly.

APPENDIX C

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Functions

Maintenance functions shall be limited to and defined as follows:

a. Adjust. Maintain within prescribed limits by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

b. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

c. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

d. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

e. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment/system.

f. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (e.g., DMWR) in pertinent technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul

does not normally return an item to like-new condition.

g. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipment/components.

h. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other material activities (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly module/component/assembly, end item or system.

i. Replace. The act of substituting a serviceable like-type part, subassembly, module (component or assembly) in a manner to allow the proper functioning of an equipment/system.

j. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean, preserve, drain, paint or to replenish fuel/lubricants/hydraulic fluids or compressed air supplies.

k. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

l. Symbols. The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

C-3. Explanation of Format

a. Column 1 — Group Number. Column 1 lists group numbers, the purpose of which is to match components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2 — Functional Group. Column 2 lists the next higher assembly group and the item names of components, assemblies, subassemblies and modules within the group for which maintenance is authorized.

c. Column 3 - Maintenance Function. Column 3 lists the twelve maintenance functions defined in C-2 above. Each maintenance function required for an item shall be specified by the symbol among those listed in *d* below which indicated the level responsible for the required maintenance. Under this symbol there shall be listed an appropriate work measurement time value determined as indicated in *e* below.

d. Use of Symbols. The following symbols shall be used to prescribe work function responsibility:

- C - Operator/Crew
- O — Organization
- F — Direct Support
- H — General Support
- D - Depot

e. Work Measurement Time. The active repair time required to perform the maintenance function shall be included directly below the symbol identifying the category of maintenance. The skill levels used to obtain the measurement times shall approximate those found in typical TOE units. Active repair time is the average aggregate time required to restore an item (subassembly, assembly, component, module, end item or system) to a serviceable condition

under typical field operating conditions. This time includes preparation time, fault isolation/diagnostic time, and QA/QC time in addition to the time required to perform specific maintenance functions identified for the tasks authorized in the maintenance allocation chart. This time will be expressed in man-hours and carried to one decimal place (tenths of hours).

f. Column 4 — Tools and Equipment. This column shall be used to specify, by code, those tools and test equipment required to perform and designated function.

g. Column 5 - Remarks. Self-explanatory.

C-4. Explanation of Format of Table I (Tool and Test Equipment Requirements)

The columns in table I are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the maintenance allocation chart. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number of the specific tool or test equipment.

e. Tool Number. Not used.

(Next printed page is C-3)

SECTION II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	FUNCTIONAL GROUP (2) COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTION (3)											(4) TOOLS AND EQUIPMENT	(5) REMARKS		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD				
0201	CONVERTER, TELEPHONE SIGNAL CV-1919A/G	C 0.2	F 1.0	C 0.2				O 0.2		C 0.1					1 thru 6, 10	Repair by replacing lamps, fuses, lightning arrestors
	01 CONVERTER CHASSIS	C 0.2	F 0.5	C 0.2						F 0.5			D 2.0	1 thru 10	All repairs except printed circuit cards	
	02 CHANNEL MODULE ASSEMBLY	C 0.1	F 0.5	C 0.1						C 0.1				1, 5, 10 1, 5 thru 10	Replace lamps and lightning arrestors	
	CIRCUIT CARD, CHANNEL MODULE, ANALOG								F 0.1		F 0.5			1 thru 6 10 10	All repairs except printed circuit boards	
									F 0.2				D 2.0	1 thru 10 10		
														1, 2, 4, 11 thru 17		

SECTION II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	FUNCTIONAL GROUP (2) COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTION (3)											(4) TOOLS AND EQUIPMENT	(5) REMARKS	
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD			
0202	CIRCUIT CARD, CHANNEL MODULE, LOGIC								F 0.2					10	Replace lamps and fuses and batteries All repairs except printed circuit boards
	03 COMMON MODULE ASSEMBLY	C 0.1		C 0.1										1, 2, 4, 11 thru 17	
			F 0.5											1 thru 6, 10 10	
0301	CIRCUIT CARD, COMMON MODULE								F 0.1	F 0.5				1 thru 10 10	
										F 0.2				1, 2, 4, 11 thru 17	
0302	CIRCUIT CARD, OSCILLATOR								F 0.2					10	
											D 1.5			1, 2, 4, 11 thru 17	

TABLE I. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
1	F, D	MULTIMETER TS-352B/U	6625-553-0142	
2	F, D	OSCILLOSCOPE AN/USM-281A	6625-228-2201	
3	F	TELEPHONE SET TA-341A/TT	5805-910-8844	
4	F, D	ATTENUATOR TS-402 ()/U	6625-230-5149	
5	F	EXTENDER CABLE 211681 FMC15412		
6	F	TELEPHONE SET TA-312/PT	5805-543-0012	
7	F	EXTRACTOR CET-20-11	5120-931-2788	
8	F	CRIMPING TOOL MS 3191-1	5120-064-5631	
9	F	LOCATOR P-20-3191-1	5120-933-4104	
10	F	TOOL KIT TK-105	5180-610-8177	
11	D	OSCILLATOR, AUDIO TS-421 C/U	6625-669-0228	
12	D	COUNTER, ELECTRONIC, DIGITAL READOUT AN/USM-207	6625-911-6368	
13	D	VOLTMETER, ELECTRONIC ME-30E/U	6625-669-0742	
14	D	POWER SUPPLY HEWLETT PACKARD 6200B	4931-463-4638	
15	D	WAVE ANALYZER HEWLETT PACKARD 302A	6625-806-5929	
16	D	VOLTMETER, DIGITAL AN/GSM-64	6625-970-2204	
17	D	METER, DBM/DBA CONSOLIDATED ELECTRODYNAMICS MODEL 11B		

By Order of the Secretaries of the Army, the Navy, and the Air Force:

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

RAYMOND J. SCHNEIDER
Rear Admiral, United States Navy
Commander, Naval Electronic
Systems Command

Distribution:

Active Army:

USASA (2)
CNGB (1)
Cir of Trans (1)
COE (1)
TSG (1)
USAARENBD (1)
AMC (1)
TRADOC (2)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (4)
LOGCOMDS (3)
MICOM (2)
TECOM (2)
USACC (4)
MDW (1)
Armies (2)
corps (2)
HISA (Ft Monmouth) (43)
Svc College (1)
USASESS (100)
USAADS (2)
USAFAS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USAINTCS (3)

WRAMC (1)
ATS (1)
Fort Gordon (10)
Fort Huachuca (10)
WSMR (1)
Fort Carson (5)
Ft. Richardson (ECOM Ofc) (2)
Army Dep (1) except
LBAD (14)
SAAD (30)
TOAD (14)
ATAD (10)
USA Dep (2)
Sig Sec USA Dep (2)
Sig Dep (2)
Sig FLDMS (1)
USAERDAA (1)
USAERDAW (1)
MAAG (1)
USARMIS (1)
Units org under fol TOE
(1 copy each unit):
11-15
11-35
29-16
29-36
29-134
29-26

NG: None.

USAR: None.

For explanation of abbreviations used, see AR 310-50.

