

TECHNICAL MANUAL

**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT,
AND GENERAL SUPPORT MAINTENANCE MANUAL**

**INTERCOMMUNICATION STATIONS
LS-518A/SIC (NSN 5830-01-018-1202)**

AND

LS-519A/SIC (NSN 5830-01-020-6280)

AND

**TEST SET, INTERCOMMUNICATION
TS-3990/SIC (NSN 6625-01-126-4886)**

CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 11 October 1984

**OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT,
AND GENERAL SUPPORT MAINTENANCE MANUAL
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TM 11-5830-258-14, 28 June 1983, is changed as follows:

1. Title of the manual is changed as shown above.
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WARNING

Operation of this equipment involves the use of voltages which are dangerous to life. Proceed with caution when troubleshooting in areas where live circuits are exposed. Do not service or make adjustments without the immediate presence or assistance of another person capable of rendering aid.

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Change 1 A



5

SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1

DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2

IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3

IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

4

SEND FOR HELP AS SOON AS POSSIBLE

5

AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

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TM 11-5830-258-14

Technical Manual

No. 11-5830-258-14

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703.

In either case, a reply will be furnished direct to you.

This manual is an authentication of the manufacturer's commercial literature which, through usage, has been found to cover the data required to operate and maintain the equipment. Since the manual was not prepared in accordance with MIL-SPECS and AR 310-3, the format has not been structured to consider levels of maintenance, nor is it structured to the normal style of military publications.

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CHAPTER 0

INTRODUCTION

This manual contains information and instructions for on-site operation and maintenance of Intercommunication Stations LS-518A/SIC and LS-519A/SIC. The information identifies useful forms and publications, describes the sets, and lists significant performance and configuration data. The manual also contains appendixes of reference information.

0-2. Consolidated Index of Army Publications and Blank Forms.

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

0-3. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System (Army).

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73/AFR 400-54/ MCO 4430.3E.

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 4610.33B/AFR 75-18/ MCO P4610.19C/DLAR 4500.15.

0-4. Reporting Equipment Improvement Recommendations (EIR)

If your LS-518A/SIC or LS-519A/SIC needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. We'll send you a reply.

0-5. Administrative Storage

For procedures, forms and records, and inspections required during administrative storage of this equipment, refer to preventive maintenance schedule in TM2 740-90-1, Administrative Storage of Equipment.

0-6. Destruction of Army Materiel to Prevent Enemy Use

Destruction of Army materiel to prevent enemy use shall be as prescribed in TM 750-244-2.

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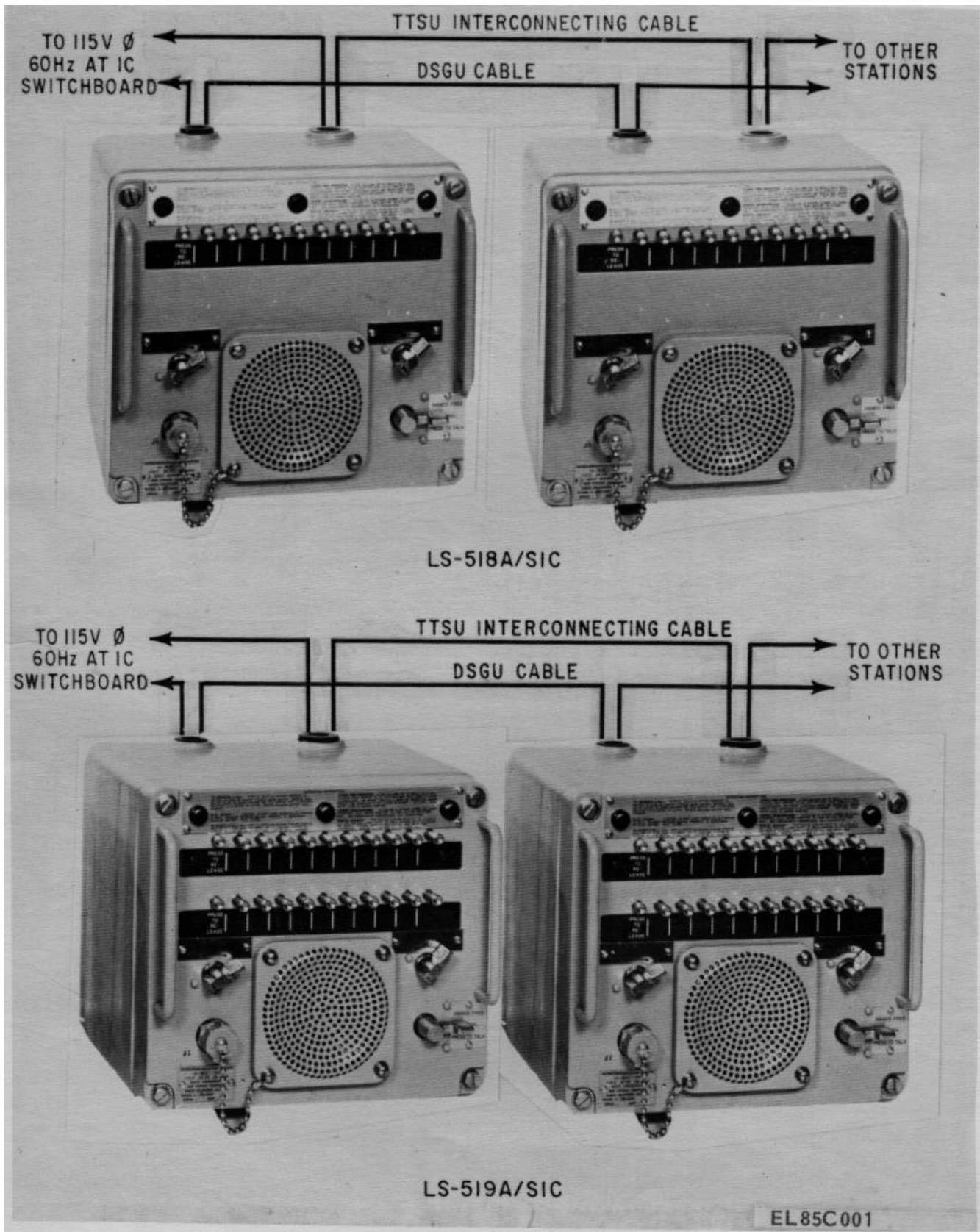


Figure 1-1. Intercommunication Stations Type LS-518AISIC and Type LS-519AISIC, Interrelationship of Units.

CHAPTER 1

GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This Technical Manual, consisting of a single volume, provides general information, operating instructions, functional descriptions, maintenance routines, troubleshooting guides, and installation requirements for both the Type LS-518A/SIC and the Type LS-519A/SIC Intercommunication Stations manufactured by DYNALEC Corporation in Sodus, New York. The LS-518A/SIC is identical to the LS-519A/SIC in every respect except for the quantity of station selector switches. The LS-518A/SIC has one 10 pushbutton selector switch assembly and is capable of operating in conjunction with up to 10 other communication stations in any combination regardless of type. The LS-519A/SIC has two 10 pushbutton switch assemblies and is capable of operating in conjunction with up to 20 other intercommunication stations in any combination regardless of type. (See figure 1-1.)

1-3. The types of different intercommunication stations with which the LS-518A/SIC and LS-519A/SIC are compatible include the 2 station LS-458/ SIC, the 10 station LS-386/SIC, and the 20 station LS-385/SIC. In addition, remote loudspeaker stations, modified types LS-305/SIC (IC/SAA) and LS-306/SIC (IC/SAG) may be incorporated in a particular system with either the LS-518A/SIC and the LS-519A/ SIC.

1-4. EQUIPMENT DESCRIPTION.

1-5. The LS-518A/SIC or the LS-519A/SIC, hereafter referred to as the 'master station, provides two-way voice communications by way of input/output audio devices which may be either microphones, handsets, or loudspeakers. The loudspeaker contained in the master station, which may be used for talk/listen, is the Type

LS-445/U. A receptacle is provided on the front panel which will accept either the type M-132/SIC microphone or the type H-351A/SIC headset. In addition to the station selector switches, MIC OR HEADSET connector, and the loudspeaker, the master station front panel contains a release (REL) lamp, CALL lamp, BUSY lamp, a HANDSFREE-NORMALPRESS TO TALK switch, a DIMMER control switch, and a VOLUME control switch for incoming loudspeaker audio.

1-6. The master station amplifier and power supply are designed with all solid state components. The amplifier has a rated output of 3 watts and is capable of driving two selected station loudspeakers simultaneously to full rated acoustic output of 99dB sound pressure level at 2 feet. More than two stations can be called simultaneously at reduced sound output at the called stations.

1-7. The master station enclosure is designed for mounting on a bulkhead, in a panel, or on a desk and is suitable for shipboard installation in protected areas. The enclosure is aluminum and drip proof in accordance with MIL-I-983.

1-8. Each master station requires about 25 watts of primary power delivered at 115V, 60Hz nominal. See Table 1-1 for complete specifications.

1-9. REFERENCE DATA.

1-10. The manufacturer of the Type LS-518A/SIC and the Type LS-519A/SIC Intercommunication Stations is identified in paragraph 1-2. Table 1-1 contains nominal specifications, both electrical and environmental.

1-11. EQUIPMENT SUPPLIED.

1-12. The equipment supplied includes both the LS-518A/SIC and the LS-519A/ SIC Intercommunication Stations. Except for preproduction testing; microphones, handsets, remote loudspeakers, and test equipment are not supplied. Table 1-2 provides a cross reference to crated (C) and uncrated (UC) dimensions, weight, and volume of the intercommunication stations. Dimensions are expressed in inches, weight in pounds, and volume in cubic feet.

1-14. The equipment required to operate and maintain the intercommunication stations described in this chapter is listed in Table 1-3.

1-15. FIELD AND FACTORY CHANGES.

1-16. Table 1-4 lists each field and factory changes considered and included in the preparation of this manual.

1-13. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

**Table 1-1. Intercommunication Stations
LS-518A/SIC and LS-519A/SIC, Nominal Specifications.**

FEATURE	CHARACTERISTICS
Power Requirements	Single phase, 24.8 watts @ 0.9p.f. 115 ±6 volts ac @ 60 ± 3Hz., 0.24 amperes nominal.
Heat Dissipation	75 BTU/HR @ full rated output.
Ambient Operating Temperature	0°C to 65°C.
Relative Humidity	95% maximum.
Output	3 watts @ 5% maximum THD (70 volts rms into 1667 ohms).
Input Sensitivity	8.7mv into 150 ohm for mic or handset. 4mv into 16 ohm for speaker input.
Amplifier Gain	78dB voltage gain @ 1,000z. (mic input).
Amplifier Frequency Response	400 to 5,000Hz ±2dB.
Rated Loudspeaker Output; (1,000 Hz)	99dB SPL (Ref. 0.0002 dynes/cm ²) @ 2 ft. from front panel.
Rated Loudspeaker Input, when used as a microphone; (1,000 Hz)	86dB SPL (Ref. 0.0002 dynes/cm ²) @ plane of front panel.

Table 1-2. Equipment Supplied.

NAME AND PART NUMBER	HEIGHT		WIDTH		DEPTH		WEIGHT / VOLUME	
	C	UC	C	UC	C	UC	C	UC
	NOTE This table provides a cross reference to crated (C) and uncrated (UC) dimensions, weight, and volume of the Intercommunication Stations. Dimensions are expressed in inches, weight in pounds, and volume in cubic feet.							
LS-518A/SIC P/N: 61690-000-1	12	9.5	12	10.12	11	9.56	25/0.91	24/0.53
LS-519A/SIC P/N: 61690-000-2	12	9.5	12	10.12	11	9.56	26/0.91	25/0.53

Table 1-3. Equipment Required But Not Supplied.

CATEGORY	RECOMMENDED EQUIPMENT	ALTERNATE	TEST PARAMETERS AND APPLICATION
Stuffing Tube, Nylon	Size 2 NPT	-----	One required for installation
Stuffing Tube, Nylon	Size 5 NPT	-----	One required for installation
Cable	TTSU	-----	Signal and audio cable for installation
Mounting Hardware	Screw, Cap, Socket Head: sst, 1/2-13 UNC Washer, Flat: sst, 1/2: MIL type MS-15795-318 Washer, Lock: sst, 1/2; MIL type MS-35338-86	-----	3 sets for mounting with direct case mount
Hand Microphone	M-132/SIC	-----	For optional use in lieu of internal reproducer
Headset	H-351A/SIC	-----	For optional use in lieu of handset

Table 1-3. Equipment Required But Not Supplied (CONTD.)

CATEGORY	RECOMMENDED EQUIPMENT	ALTERNATE	TEST PARAMETERS AND APPLICATION
Multimeter and Transistor Tester	AN/USM-311 and AN/USM-206A	AN/PSM-4()	Ac and Dc voltage to 150 V and resistance for troubleshooting
Audio Signal Generator	AN/URM-127	TS-382 F/U	1,000 Hz output For troubleshooting
Electronic Voltmeter	AN/USM-143	CAO1-400E	Measure audio voltage from 1mV to 70Vrms for troubleshooting
Test Fixture Assembly	Dynalec P/N: 61690-090	-----	Test all signal and audio circuits LS-518A/SIC and LS-519A/SIC
Cable	DSGU	-----	Power cable for installation

Table 1-4. Field Changes.

CHANGE NUMBER	NOMENCLATURE	DESCRIPTION

Table 1-5. Factory Changes.

CHANGE NUMBER	NOMENCLATURE	DESCRIPTION

CHAPTER 2

OPERATION

2-1. INTRODUCTION.

2-2. This chapter describes the operator's relationship to the master station and identifies all controls and indicators which he is expected to use in the performance of his duties. In addition, illustrative material identifying the location of the controls and indicators as well as information describing normal operation and variations of operation are provided.

2-3. CONTROLS AND INDICATORS.

2-4. All front panel controls and indicators are illustrated on figures 2-1 and 2-2 and described below.

a. REL Indicator Lamp. This indicator lights at a calling station when a station selector pushbutton is depressed. This reminds the operator to depress the PRESS-TO-RELEASE pushbutton when the conversation is finished.

b. CALL Indicator Lamp. This indicator lights at the called station when it is selected by any other station in the system. Visually alerts operator to the incoming call.

c. BUSY Indicator Lamp. This indicator lights at the calling station when the station being selected is already busy.

d. PRESS-TO-RELEASE Switch. This pushbutton switch releases the selector pushbuttons and must be depressed following a conversation. Restores selector pushbuttons to normal position.

e. STATION SELECTOR Switch. This pushbutton switch must be depressed in order to originate a call. The LS-518A/SIC has 10 of these switches; the LS-519A/SIC has 20.

f. VOLUME Control Switch. This control is a six position rotary attenuator switch having five 6dB steps and providing a maximum attenuation of 30dB. Use to control the output volume of the speaker.

g. DIMMER Control Switch. This control is a four position rotary switch which controls the panel illumination. The maximum ccw position (OFF) extinguishes the lamp.

h. HANDSFREE-NORMAL-PRESS TO TALK Switch. This control is a three position rotary switch having two locking positions (HANDSFREE and NORMAL) and one position with spring return (PRESS TO TALK). The NORMAL position is used for listening.

i. MIC OR HANDSET Connector. Used to connect either a microphone or a handset to the station.

j. SPEAKER. This is a 4-inch direct type radiator which functions as either a microphone or a receiver.

NOTE

There is no power on/off switch on the master station or on any intercommunication station mentioned in this manual. Power is usually supplied and controlled from the Ships IC switchboard.

2-5. OPERATING PROCEDURES.

2-6. The master station has many operational features which may or may not be employed in a given intercommunication system. Those features which are necessary in any system are initiated by controls on the front panel. Features which are not always necessary are implemented by optional

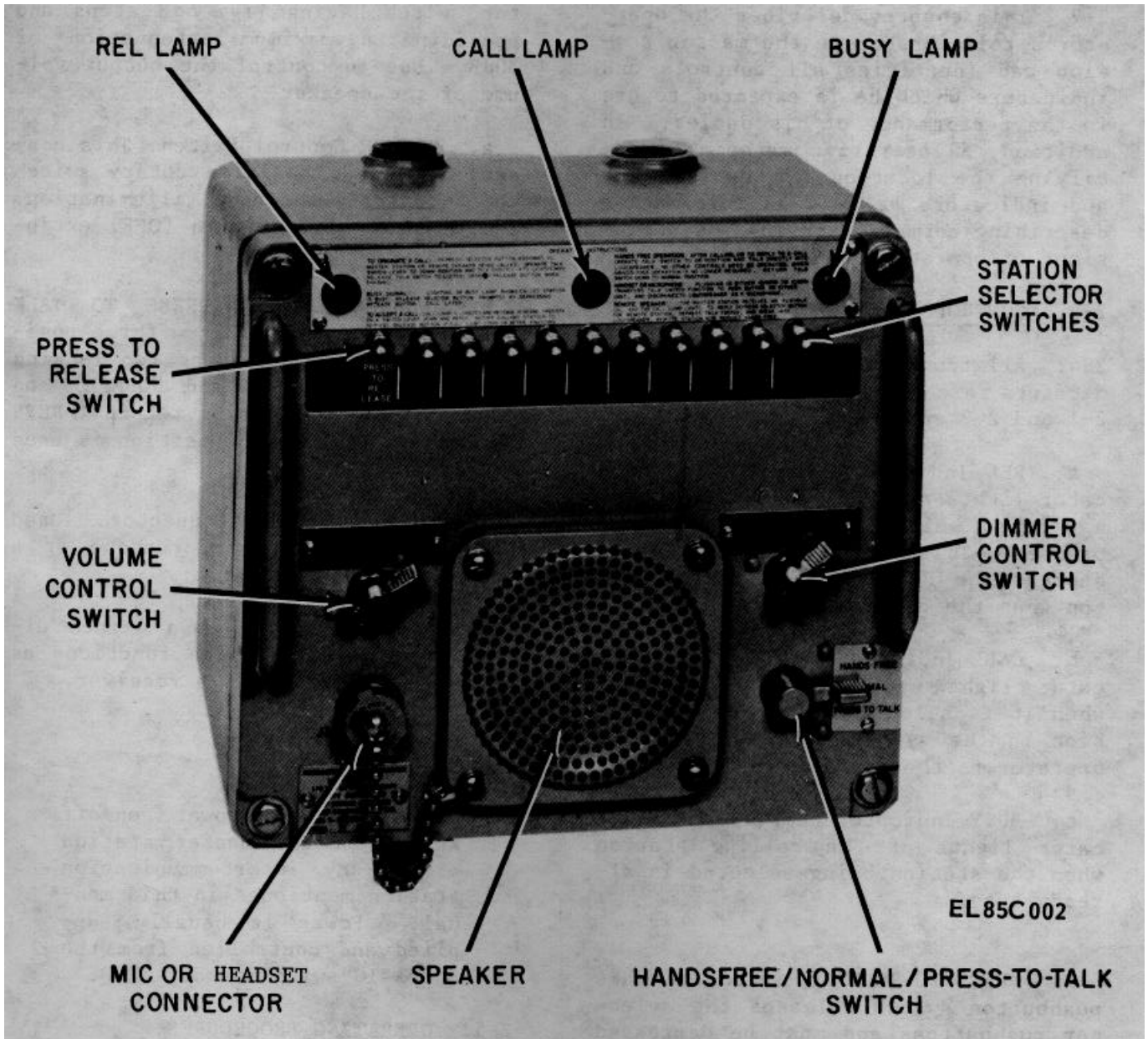


Figure 2-1. Intercommunication Station Type LS-518A/SIC, Operator Controls and Indicators.

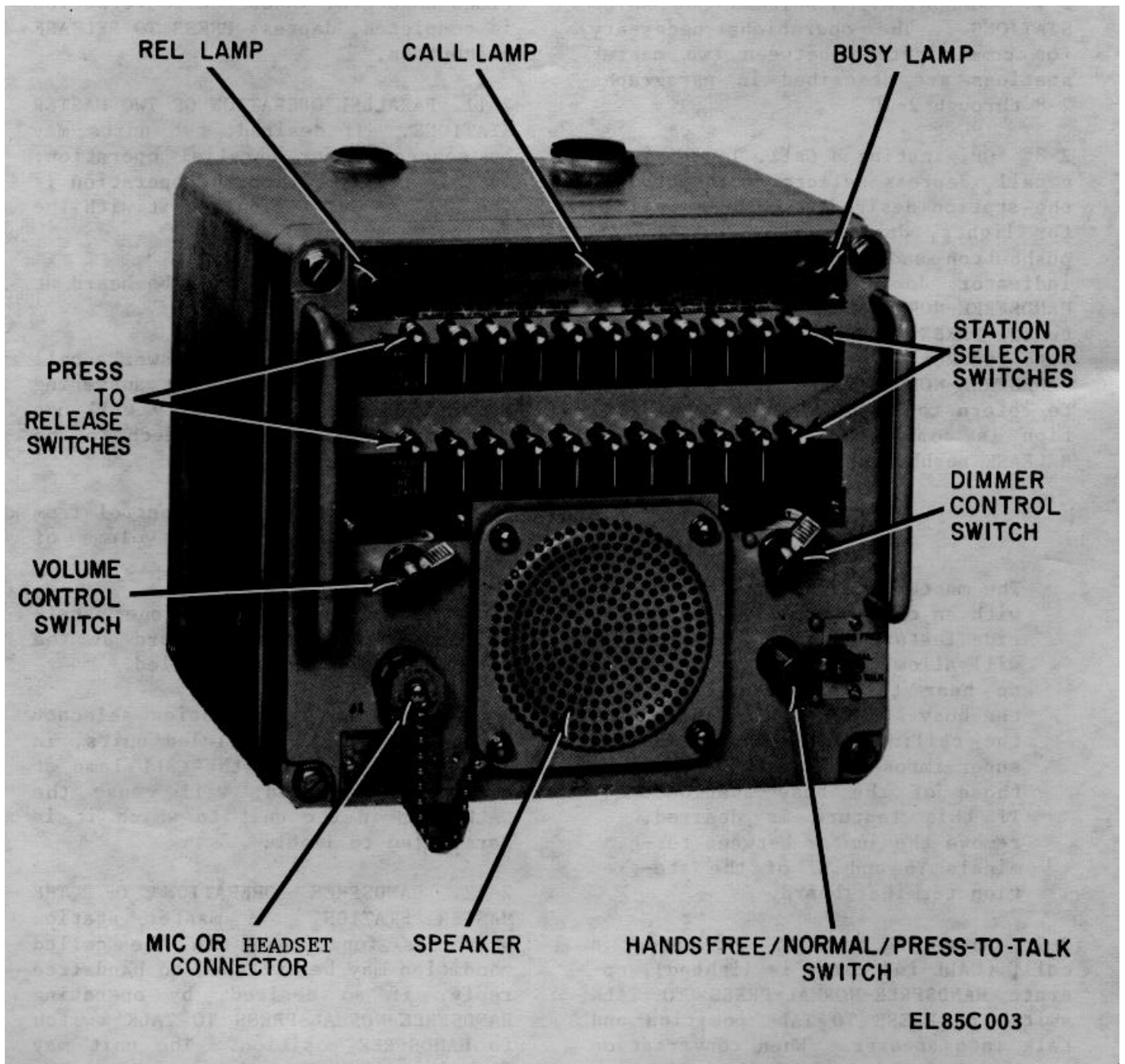


Figure 2-2. Intercommunication Station Type LS-519A/SIC, Operator Controls and Indicators.

wiring interconnections. The procedures described in paragraphs 2-7 through 2-16 delineate all possibilities.

2-7. COMMUNICATION BETWEEN TWO MASTER STATIONS. The operations necessary for communication between two master stations are described in paragraphs 2-8 through 2-10.

2-8. Originating a Call. To originate a call, depress selector pushbutton of the station desired. If BUSY indicator lights, depress PRESS TO RELEASE pushbutton and call later. If BUSY indicator does not light, operate HPNDSFREE-NORMAL-PRESS TO TALK switch to the PRESS TO TALK position and talk into speaker. To receive reply, allow HANDSFREE-NORMAL-PRESS TO TALK switch to return to NORMAL. When communication is completed, depress PRESS TO RELEASE pushbutton.

NOTE

The master station is provided with an operational Busy Override feature which if employed will allow the calling station to hear the conversation of the busy stations. If desired the calling station may also super-impose speech signals on those of the busy stations. If this feature is desired, remove the jumper between terminals Y6 and Y7 of the station terminal board.

2-9. Answering a Call. To answer a call, (CALL indicator is lighted), operate HANDSFREE-NORMAL-PRESS TO TALK switch to PRESS TO TALK position and talk into speaker. When conversation is finished, observe CALL indicator. It should be extinguished. If lighted, instruct the calling station to depress PRESS TO RELEASE pushbutton.

2-10. Busy Override. If BUSY indication is received as described in paragraph 2-8, operate HANDSFREE-NORMALPRESS TO TALK switch momentarily to PRESS TO TALK. This will unlatch the busy circuit, extinguish the BUSY indicator, and permit two-way communications to begin. When the conversation is completed, depress PRESS TO RELEASE pushbutton.

2-11. PARALLEL OPERATION OF TWO MASTER STATIONS. If desired, two units may be connected for parallel operation. In this configuration the operation is the same as for a single unit with the following exceptions.

- a. Incoming speech will be heard at both units.
- b. Either station may answer a call but not both. (Inadvertant answering by both units simultaneously will not cut off transmission of speech to the calling units.
- c. Operation of VOLUME control from either unit will control volume of both units.
- d. Outgoing speech from one paralleled unit will not be heard at the unit to which it is paralleled.
- e. Operation of a station selector at either of the paralleled units, in addition to lighting the CALL lamp at the called station, will cause the CALL lamp in the unit to which it is paralleled to light.

2-12. HANDSFREE OPERATION OF THE MASTER STATION. A master station which is functioning in the called condition may be switched to handsfree reply, if so desired, by operating HANDSFREE-NORMAL-PRESS TO TALK switch to HANDSFREE position. The unit may also be switched to the handsfree mode prior to receiving a call. Under this condition the calling station operator achieves control of the talk and listen circuits between the two stations. The operator at the called station need only talk into the loudspeaker when necessary.

2-13. HANDSFREE OPERATION WITH OTHER TYPE INTERCOMMUNICATION STATION. The master station is compatible with and may be used in an intercommunication system containing other types of stations such as the LS-458/SIC, LS-386/ SIC and LS-385/SIC. The operation is similar to that described in paragraph 2-12. See Technical Manuals NAVSHIPS 0365-282-2000 for the LS-458/SIC and NAVSHIPS 0365-275-0000 for the LS-385/ SIC and LS-386/SIC.

2-14. MASTER STATION OPERATION WITH REMOTE LOUDSPEAKER STATIONS. The master station may be operated with Remote Loudspeaker Stations, Modified Types LS-305/SIC (IC/SAA) or LS-306/ SIC (IC-SAG). The operations necessary for communications in this configuration are described in paragraphs 2-15 and 2-16.

NOTE

Remote talk switches and busy indicators are not usually supplied with the aforementioned station types and therefore must be obtained and incorporated in the system per the simplified schematic shown in figure 3-7.

2-15. Master Station Calling Remote Loudspeaker Station. Perform the following operations.

a. Master station operator depresses the station selector switch pushbutton associated with the called station.

b. Master station operator then depresses PRESS TO TALK switch and speaks into loudspeaker.

c. Master station operator releases PRESS TO TALK switch and waits for reply from remote loudspeaker station. Loudspeaker station operator replies without operating any switches by simply talking into the remote loudspeaker.

d. Master station operator releases station selector switch at end of call to return station to standby condition.

2-16. Remote Loudspeaker Station Calling Master Station. Perform the following operations.

a. The loudspeaker station talk switch associated with the master station being called is operated to talk position. If selected master station is busy, the loudspeaker busy lamp will light, indicating master station should not be called.

b. If busy lamp remains extinguished when talk switch is operated to talk position, master station is idle. With talk switch in talk position, speak into loudspeaker. Speech will be heard at master station.

c. After initial transmission to master station, the speaker station operator maintains talk switch in talk position. Master station replies by operating PRESS TO TALK switch.

d. If, when a master station is called by a remote loudspeaker station, master station switch is operated to select station originating call, operation will be as described in paragraph 2-15 until end of conversation.

CHAPTER 3

FUNCTIONAL DESCRIPTION

3-1. INTRODUCTION.

3-2. This chapter includes the detailed analysis of the principles of operation of the master station. The analysis, which begins at the overall level, progresses systematically through the major functional level and finally to the detail descriptions of the individual circuits. Functional block diagrams and simplified schematics are the prime means of communication and the text is used to support the diagrams as necessary for clarity.

3-3. OVERALL FUNCTIONAL ANALYSIS.

3-4. Two master stations, illustrated in block diagram format, are shown on figure 3-1 in a simplified 2 station hookup. Before proceeding into the functional analysis, note the following:

a. The audio signal path between the 2 stations is implemented by a pair of conductors which carries the audio at a nominal 70 volt level in either direction.

b. The block labeled T/R Xfmr (1T1) represents a multiple winding audio transformer which couples the audio signal in either of two directions depending on whether the station is transmitting or receiving a communication.

c. The circles labeled 2, 2C, and 2X are interconnection wiring points on the "calling" stations' terminal board which in this case are associated with station selector switch S2. 3, 3C, and 3X through 21, 21C, and 21X are not shown but are associated with selector switches S3 through S21 respectively.

d. The circles labeled 1, 1C, and 1X are the interconnection points on the "called" stations' terminal board.

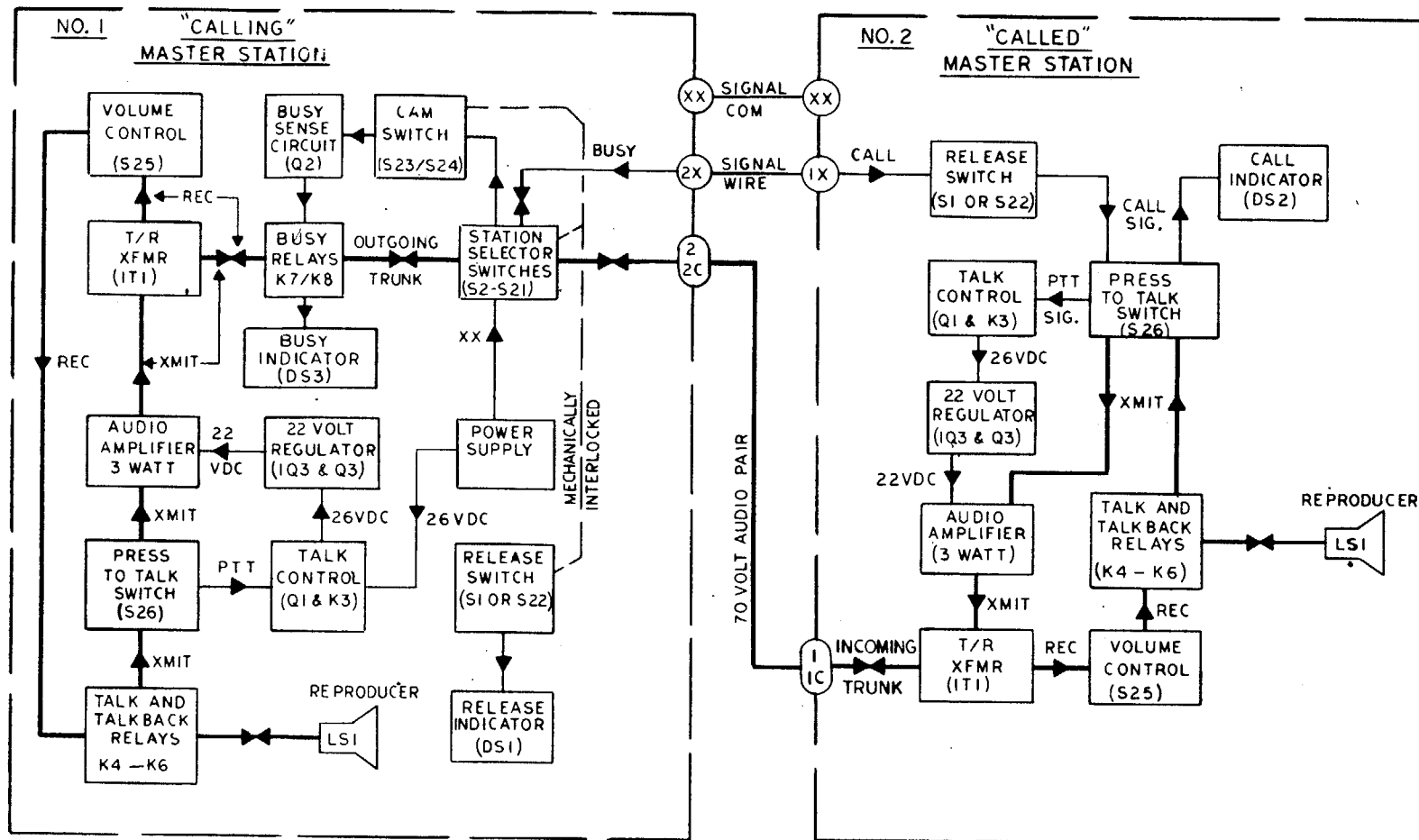
e. Both stations no. 1 and no. 2 are identical master stations, but only the necessary blocks are shown to illustrate the overall functions.

3-5. A communication path, originating from station no. 1 is established to station no. 2 when S2 is depressed providing station no. 2 is not busy.

In addition, the operation of S2 will cause the REL lamp, at the calling station, and the CALL lamp, at the called station, to light. The station no. 1 operator then depresses the PRESS TO TALK switch and speaks into the speaker. This transmission is coupled by way of the "talk relays" and S26A to the audio amplifier input where it is amplified. The amplified transmission is then coupled by the T/R Xfmr, to the outgoing trunk. The incoming trunk at station no. 2 receives the transmission and by way of T/R Xfmr passes the signal through the volume control and talk back relays to the speaker. Operator no. 2 responds to the received message by operating the PRESS TO TALK switch and speaking into the speaker. This transmission is amplified and coupled by way of the incoming trunk to the 70 volt audio pair and subsequently coupled through the designated path to the speaker of station no. 1.

3-6. In the event that station no. 2 is already busy when the station no. 1 operator depresses the selector switch, the busy relays at station no. 1 will energize and disconnect the outgoing trunk from the T/R Xfmr. In this case, the BUSY lamp will light thus notifying the operator that a transmission cannot be made at this time. He should then depress the PRESS TO RELEASE switch and call later.

3-7. MAJOR AND CIRCUIT FUNCTIONAL ANALYSIS.



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Figure 3-1. Overall Block Diagram.

3-8. The following paragraphs provide the analysis for the operation of the blocks shown on figure 3-1. Simplified schematics as well as block diagrams are provided. In some instances reference to the overall schematic (figure 5-3) is suggested. Conventional electronic circuits and theory are described in NAVSHIPS publication 0967-000-0120, For a more thorough understanding of the circuits utilized in the master station audio amplifier and power supply the following topics are recommended.

- a. General information on semiconductor circuits.
- b. Power supply circuits.
- c. Voltage regulator circuits.
- d. Amplifier circuits.

3-9. It is further recommended that the following military publications which detail the specific semiconductor types utilized (all are silicon) be reviewed for information regarding their parameters:

- a. MIL-S-19500/225, Transistor, NPN, 2N1711
- b. MIL-S-19500/407, Transistor, NPN, 2N3055
- c. MIL-S-19500/290, Transistor, PNP, 2N2905A
- d. MIL-S-19500/251, Transistor, NPN, 2N2219A
- e. MIL-S-19500/276, Thyristor, SCR, 2F2323
- f. MIL-S-19500/286, Diode, Power, 1N4245
- g. MIL-S-19500/240, Diode, Signal, 1N645

3-10. POWER SUPPLY AND 22 VOLT REGULATOR. All necessary ac and dc operating voltages for the master

station are provided by the power supply and 22 volt regulator as shown on figure 3-2. The 16 VAC and the 6 VAC outputs are utilized for the signaling and illumination circuits respectively. The +26 VDC output is supplied to the relay control circuits and the 22 volt regulator by way of the talk relay K3. During audio transmission, the +22 VDC regulated output is connected to the audio amplifier collector circuits. In the event that the outgoing trunk is overloaded, transistor Q4 will conduct and significantly reduce the reference voltage at the input of Q3. Q3 output current is therefore reduced and subsequently the output current of 1Q3 is limited. Refer to figure 5-3 for the overall schematic diagram.

3-11. AUDIO AMPLIFIER. The audio amplifier contained in the master station is all solid state design and is illustrated on figure 3-3. In the standby condition, the 22 volt regulator is off, the amplifier is de-energized and diodes CR4 and CR5 isolate 1T1 (winding 1-2-3) from the amplifier output circuitry. In this receiving mode, audio from the incoming trunk appears at the 70 V input terminals (7-8) of 1T1 and is coupled to terminals 4-5-6.

3-12. In the ready, or transmit, mode the regulated +22 volts is applied and the amplifier is energized. This mode is accomplished by operating S26, to the PRESS TO TALK position. In this condition, low level speech signals from either the local microphone or transducer are coupled by input transformer T1 to the preamplifier (Q1) for initial amplification. The signal is further amplified by Q2 and coupled by driver transformer T2 to the pushpull 3-watt output stage consisting basically of 1Q1, 1Q2, and 1T1. The 70 V output, from terminals 7-8 of 1T1, is transferred by the contacts of x8 to the outgoing trunk. Refer to the overall schematic diagram (figure 5-3) and the applicable chapter of NAVSHIPS publication 0967-000-0120.

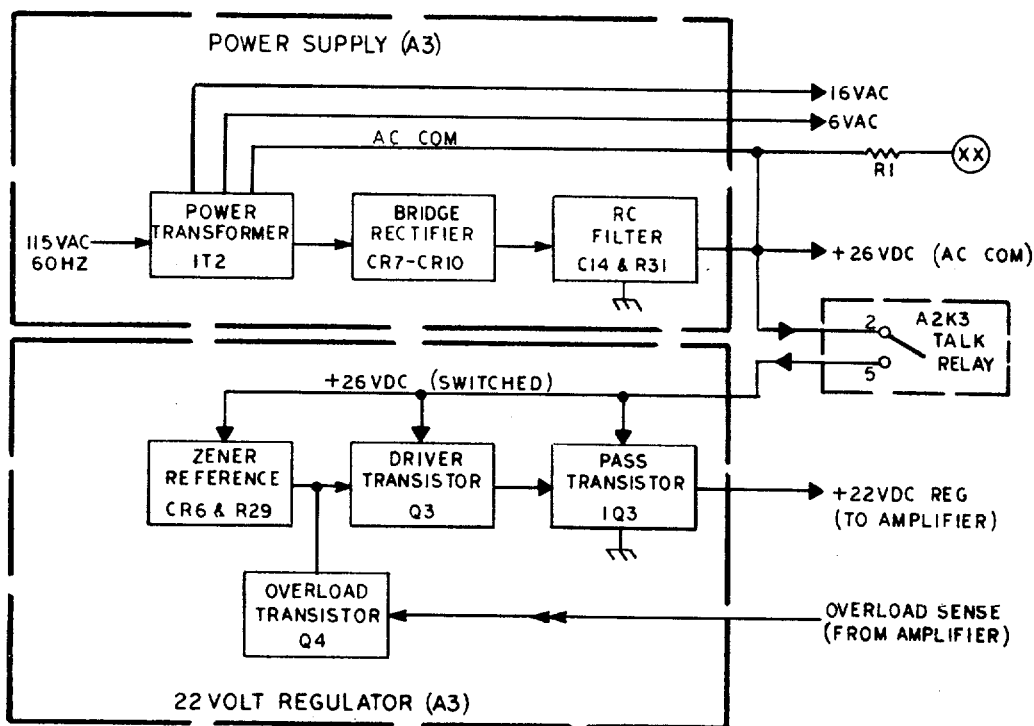


Figure 3-2. Power Supply and 22 Volt Regulator, Block Diagram.

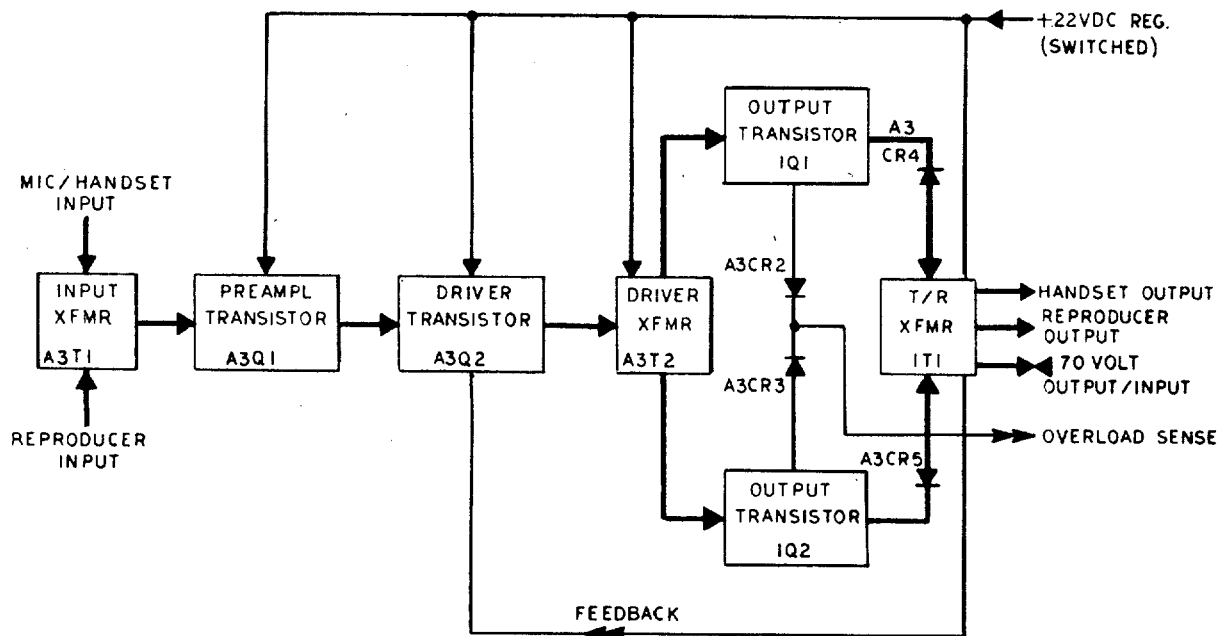


Figure 3-3. Audio Amplifier, Block Diagram.

3-13. SIGNAL CIRCUITS. A signal line designated 2X, 3X, 4X, 5X etc. is assigned to each station. (See figure 3-4.) When a station selector switch is operated, the signal line selected is momentarily connected to the gating network of Q2 due to the action of the delayed cam switch S23. If the selected station is busy, relays K7 and K8 will latch in the operated position and the BUSY lamp (DS3) will light.

The audio circuit is thus disconnected by K8. If the selected station is not busy, K7 and K8 will not operate, the audio circuits between the two stations will be connected and the CALL lamp (DS2) will light at the selected station. In addition, the signal lines of both stations will be connected to the signal common lead resulting in a busy signal at any third station attempting to call either of the two connected stations.

3-14. Station No. 1 Calling Idle Station No. 2. To trace the operation of the signal circuits, refer to figure 3-4. Power transformer T2 has two windings (6VAC and 10VAC) connected in series to provide a total of 16 volts ac. Terminal 5, which is designed as the ac common, is connected by way of a 10-ohm resistor (R1), to XX (the common signal line). The high side, 16 volts ac from T2-4, is distributed to S26, S27, and K7/K8. When a station selector is operated, the gating network of Q2 will be momentarily connected by S23 to the 2X/1X signal lead. Since station no. 2 is idle, the potential reflected back is the same as T2-4 and, therefore, Q2 does not fire and K7/K8 do not energize.

However, when the swinger contact of S23 returns to the normal position (as shown) the potential from T2-5 is connected by way of S26, K4, S23, and S2 to the 2X/1X signal lead and the CALL lamp (DS2) at the idle station will light.

3-15. Station No. 1 Calling Busy Station No. 2. Assume that a third station has selected station no. 2 and,

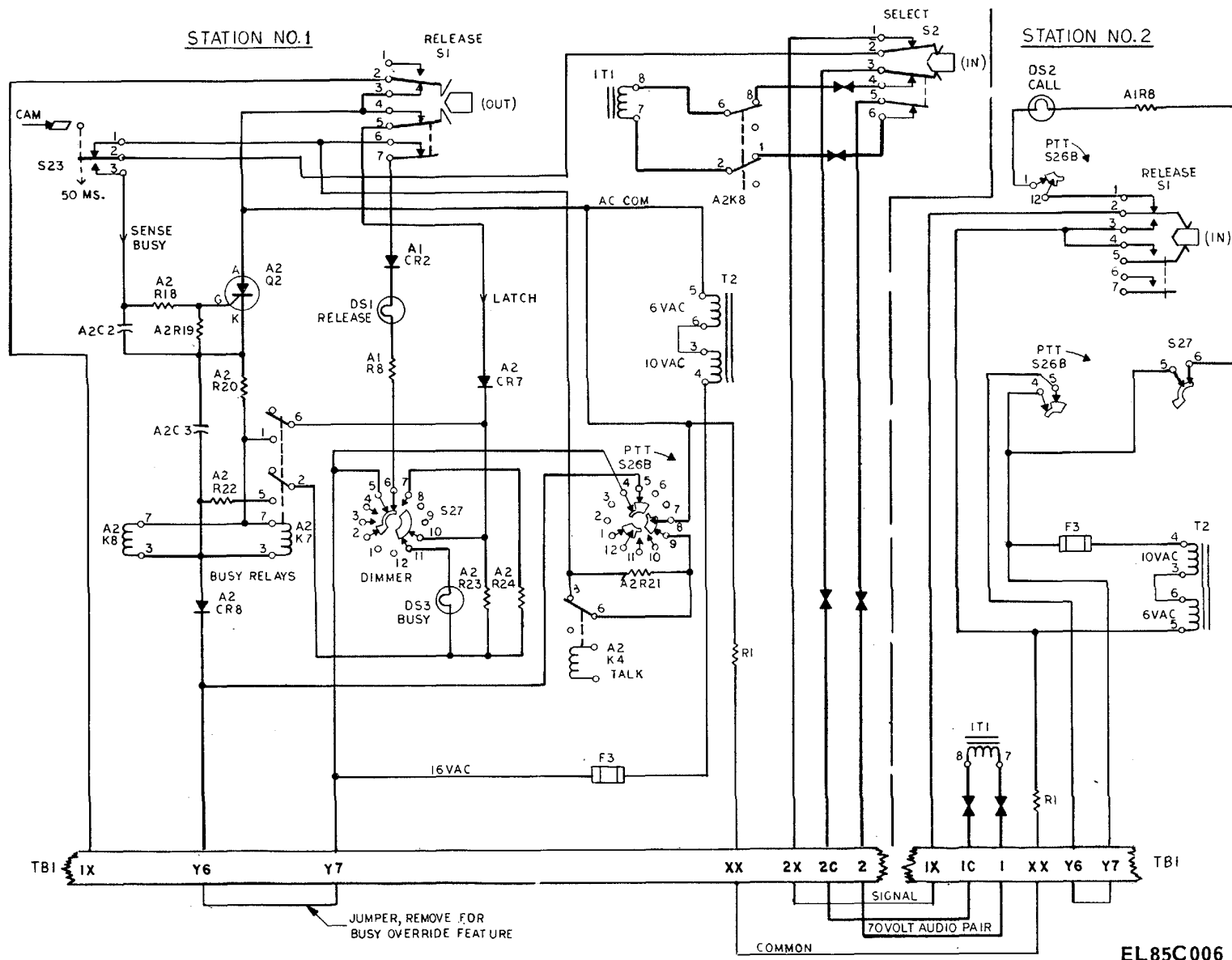
therefore, terminal 1X at station no. 2 is at the T2-5 potential. When station no. 1 attempts to contact station no. 2, the momentary closure of S23 will trigger Q2 and energize K7/K8 which operate and lock through CR5 and S1. Station no. 1 is thus disconnected from the 70 volt audio pair by the contacts of relay K8.

3-16. Delay switch S23 operates when any selected pushbutton is depressed. To assure adequate time for K7 to close and lock on a busy line, the circuit through the delay switch S23 remains closed until the slider bar returns to its normal position. The swinger contact of this switch is actuated by the end projection of the slide bar and is adjusted at the factory to delay the opening for a minimum of 50 milliseconds.

3-17. PARALLEL OPERATION. Two master stations may be connected in parallel as shown, for stations 3 and 3A, on figure 3-5. Incoming speech will be heard at both stations and replies may be made from either station. Either station can call a third station, but both stations cannot call at the same time.

3-18. Incoming speech, from the 70 volt audio pair, appears at terminal 7-8 of transformer 1Ti at both stations 3 and 3A. In this condition, IT1 which functions as a line-to-speaker matching transformer, couples the speech signal to the volume control and contacts of K4. Note that K4 of station no. 3 controls one side of the speech signal for station no. 3A and K4 of station no. 3A controls one side of the speech signal for station no. 3. Therefore, K4 functions as a muting relay to prevent acoustic feedback when either no. 3 or no. 3A is transferred to the transmitting, or PRESS TO TALK, mode by the operation of S26B. (See figure 3-7 for a more detailed presentation of relay circuits K2, K4, and K6.)

3-19. HANDSFREE OPERATION. Figure 3-6 illustrates the circuitry involved



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Figure 3-4. Signal Operation, Simplified Schematic.

in handsfree operation of the master stations. On this illustration, station no. 1 is shown as the calling station and station no. 2 as the called station operating in the handsfree mode. Under these initial conditions, Q1 of the called station is conducting and K3 and K4 are energized. The audio amplifier and audio circuits of station no. 2 are thus energized and speech may be transmitted handsfree from station no. 2 to station no. 1. (See figure 3-7 for a more detailed presentation of the audio circuits.)

3-20. To transmit from station no. 1 to station no. 2, S26B of station no. 1 is operated to the PRESS TO TALK position. In this condition, Q1 of station no. 2 turns off, K3 and K4 are de-energized, and station no. 2 is placed automatically in the normal receive mode.

Simultaneously, the audio amplifier at station no. 1 is energized and speech may be transmitted from station no. 1 to station no. 2.

3-21. The basic handsfree control function revolves around the emitter circuit of Q1 which is normally biased off by R17 when S26 is in the NORMAL position. When S26 is operated to the HANDSFREE position, the anode of CR3 is returned to the +26 Vdc lead potential and forward bias is provided to the base of Q1 by the voltage divider comprised of R16 and R15. Remote control of Q1 is accomplished by the normally closed contacts (6 and 8) of K4 and resistor R21. Removing the short from across R21 results in a sufficiently higher emitter impedance to turn Q1 off.

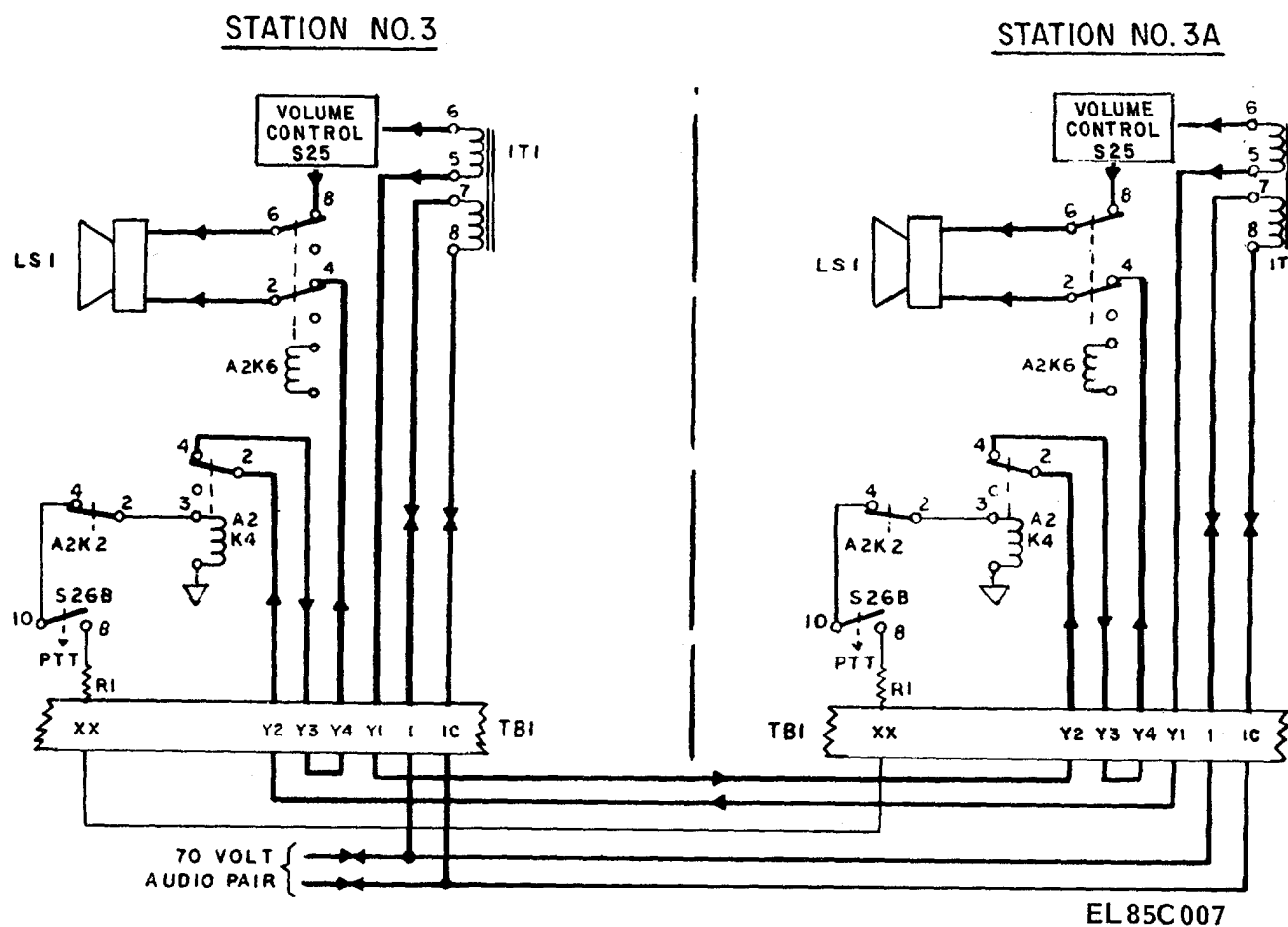


Figure 3-5. Parallel Operation, Simplified Schematic.

3-22. REMOTE LOUDSPEAKER OPERATION. Remote stations consisting simply of loudspeakers, talk switches, and busy indicators may be incorporated in an intercommunication network with either of the master stations described in this manual. However, certain wiring modifications within the master station are required in order to isolate remote master stations. Figure 3-7 illustrates the necessary wiring modifications for interconnecting one remote loudspeaker station to selector switch S21 of the LS-519A/SIC master station. With the wiring as shown on figure 3-7, two way voice transmissions are feasible and may be initiated from either the master station by depressing S21 or from the remote loudspeaker station by operating the PRESS TO TALK switch. If desired, additional remote loudspeaker stations may be employed by simply isolating the proper selector switches. See the overall schematic diagram (figure 5-3) and the wiring diagrams (figures 6-1 and 6-2).

3-23. Relays K5 and K6 (figure 3-7) control the input/output functions of the audio amplifier and are shown in the de-energized (receive) state. Operation of either the local select switch S21 or the remote talk switch will energize K1, K2, K3 and K4 and place the audio amplifier in the ready condition. In this mode, voice transmissions made into the loudspeaker are amplified and reproduced over the master station loudspeaker. To reply, the master station operator depresses switch S26 to the PRESS TO TALK position. In this mode, the talk back relays (K5 and K6) are energized and voice transmissions made into the master station speaker (LS1) will be amplified and reproduced over the remote loudspeaker.

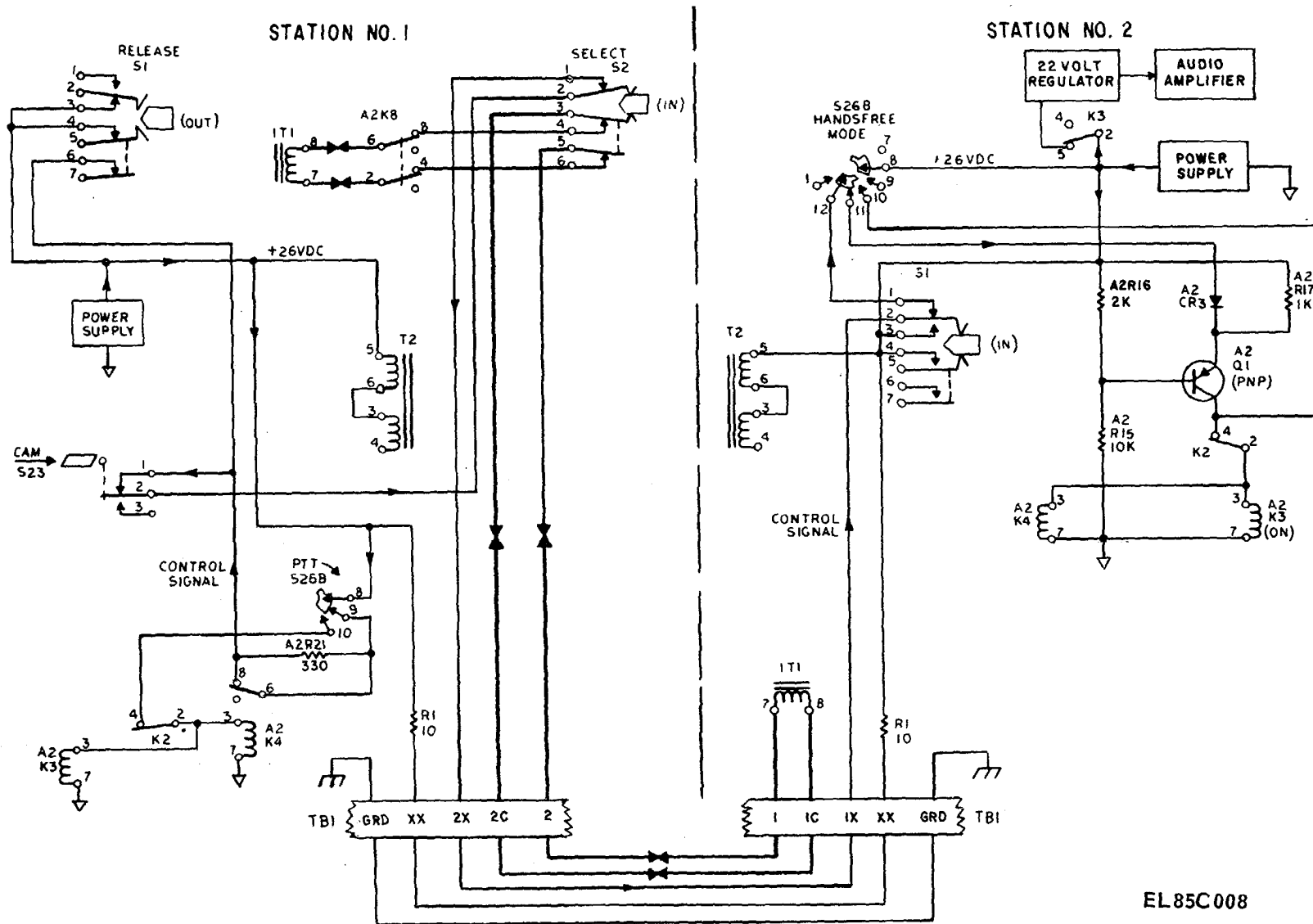
3-24. If a communication is initiated from the master station, the remote operator replies handsfree. If the communication is initiated from the remote loudspeaker station, the remote talk switch must be maintained in the 3-8 talk position to receive the reply from the master

station, unless the master station operator operates the selector switch for the calling stations.

3-25. **PUSHBUTTON SELECTOR SWITCH OPERATION.** The pushbutton selector switch assembly is shown on figure 3-8. Two of these assemblies are utilized in the LS-519A/SIC and one is used in the LS-518A/SIC. In the standby condition, the release pushbar is depressed and all the select pushbars are released (out). The release push-bar is held in the depressed position by the slide-bar. The lift-bar is held in a raised position by a metal cam integral with the release pushbar assembly.

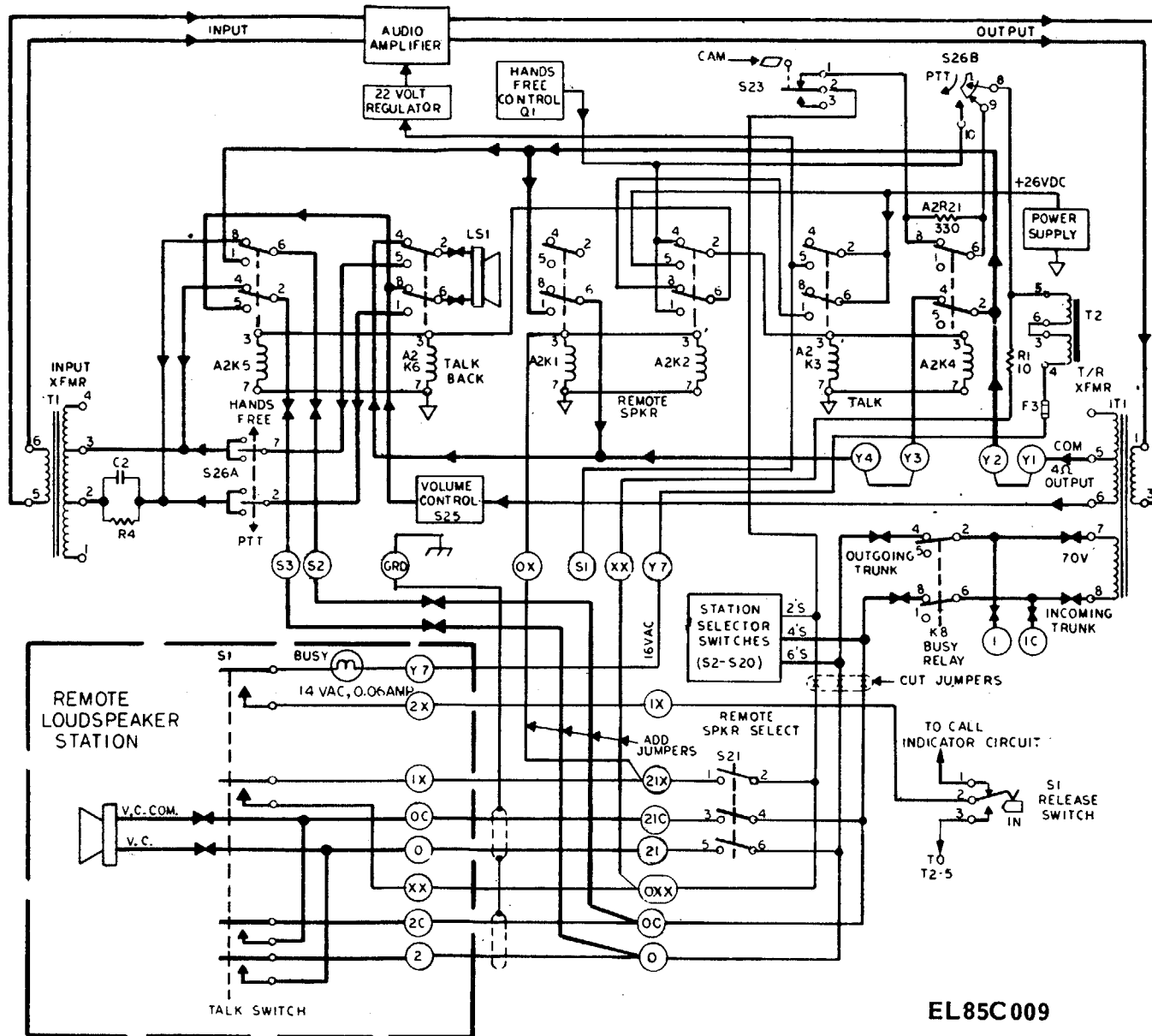
3-26. Depressing any select push-bar will momentarily move the slide-bar to the left (viewed from front). This allows the compression spring to actuate the release push-bar to the nonoperated position (out). The integral cam on the release push-bar also moves from under the lift-bar and the liftbar is then pulled down by its spring. The select pushbar is held in the operated position by means of lock springs which rest on the rear surface of the lift-bar. The second select push-bar may now be depressed without raising the lift-bar from its down position because of the slots in the lift-bar which allow the lock springs to pass through.

3-27. As each select push-bar is depressed, the delay switch is momentarily operated by the slide bar. When the release push-bar is depressed, the slide-bar moved to the left and the lift-bar is raised, allowing each spring on a depressed select push-bar to restore its push-bar to the normal (out) position. The shock-bar, which is located on the left end of the pushbutton selector switch assembly, inhibits movement of the slide-bar under mechanical shock conditions. This prevents false operation of the select push-bars.



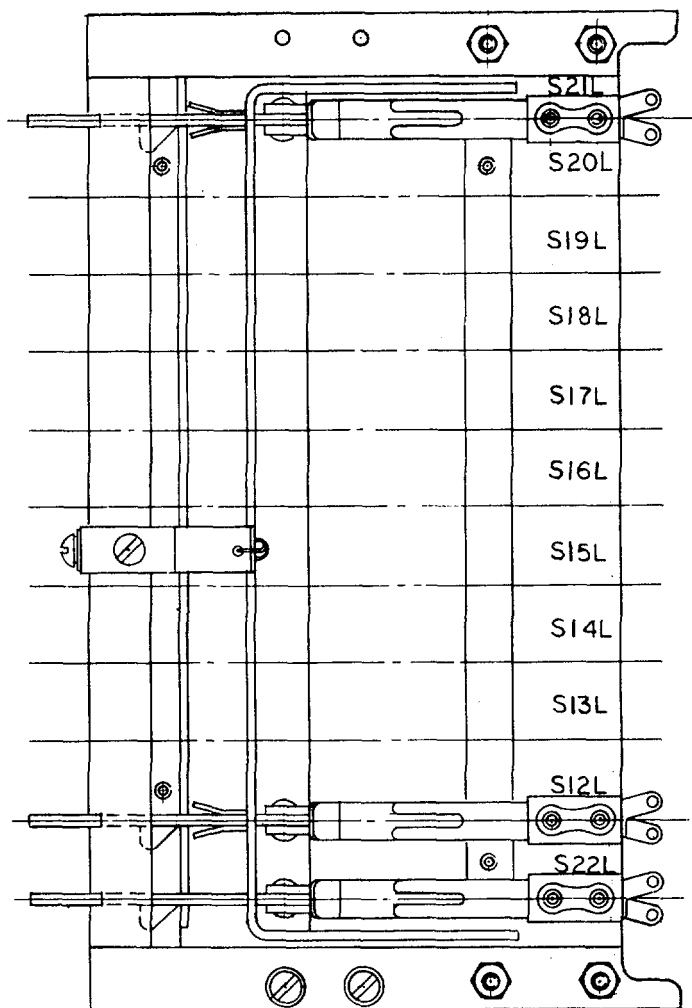
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Figure 3-6. Handsfree Operation, Simplified Schematic.



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Figure 3-7. Remote Loudspeaker Operation, Simplified Schematic.



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Figure 3-8. Pushbutton Selector Switch Assembly.

3-11/(3-12 blank)

CHAPTER 4

SCHEDULED MAINTENANCE

4-1. INTRODUCTION.

4-2. This chapter contains the preventive maintenance procedures and performance test instructions to be accomplished on the master station periodically. The purpose of scheduled maintenance is to prevent failures and prove that the equipment is in specified working order. The scheduled maintenance instructions in this manual are canceled when the Planned Maintenance System (PMS) is implemented for this equipment aboard your ship or station.

4-3. SCHEDULED PREVENTIVE MAINTENANCE PROCEDURES.

4-4. The following procedures should be performed on a monthly basis or as directed by the ship's maintenance supervisor.

a. Clean the exterior of the equipment. Loose dirt may be removed with a vacuum cleaner or cloth. Dirt adhering should be removed with an approved solvent and cloth.

b. Remove the unit from its case and visually inspect all wiring. Watch for loose connections. Do not unnecessarily move wiring or parts. Resolder or tighten as required.

WARNING

The terminal board in the case has 115 volts ac on terminals MC and MCC. Turn off power source during inspection.

c. Inspect and tighten all loose hardware.

d. Check the mechanical operation of each rotary switch and replace any parts showing wear or incorrect operation.

e. Check each pushbutton switch for smooth mechanical operation. Clean dirt off shafts and lightly lubricate with Dow Corning DC4 grease or DC400 fluid or equivalent.

f. Install unit in its case and perform the operations described in paragraph 4-5.

4-5. SCHEDULED PERFORMANCE TEST INSTRUCTIONS.

4-6. The following performance tests should be accomplished on a weekly basis or as directed by the ship's maintenance supervisor. It is recommended that close cooperation be maintained between operating and maintenance personnel. Each should keep the other informed on the condition of the equipment.

a. Check the two-way voice capabilities of each master station by selecting other stations in the system and carrying on two-way conversations. Transmissions and receptions should be clear, undistorted, and easily understood.

b. Check the indicators. The CALL lamps at the called stations should light. The REL lamp at the calling station should light. If a called station is busy, the BUSY light at the calling station should light.

c. Check the VOLUME control switch. Vary its position during a reception to verify that the intensity of the received speech can be controlled.

d. Check the handsfree capability by operating handsfree with another station in the system.

e. Check the DIMMER control switch by varying its position and observing the intensity of the panel illumination.

4-7. MALFUNCTIONS.

4-8. In the event that the preventive maintenance procedures, or the performance test instructions reveal

one or more malfunctions, it is recommended that the unit under investigation be replaced by a serviceable unit. The tests should then be repeated to verify that the problem is definitely associated with the removed unit. Refer to Chapters 5 and 6, Troubleshooting and Corrective Maintenance respectively, to isolate and repair the malfunction.

CHAPTER 5

TROUBLESHOOTING

5-1. INTRODUCTION.

5-2. This chapter contains the information required to enable the technician to localize and isolate malfunctions in the master station. The information, which is presented, appears in various related formats such as tables, procedures, schematics and wiring diagrams. In addition, references to pertinent information contained in other chapters are also provided. Close cooperation is again recommended between operating and maintenance personnel because information which can at least localize a problem may already be available. Also review the results of the procedures and tests outlined in Chapter 4 for data which may be useful in isolating the fault. Generally, observe the following:

a. If sufficient information is available which localizes the problem to a functional area, refer directly to table 5-1, Troubleshooting Index, and review the applicable data.

b. If sufficient information is not available, refer to table 5-4, Maintenance Turn-On and Test Procedure and localize the malfunction. The test fixture required is illustrated on figure 5-1.

WARNING

Operation of this equipment involves the use of voltages which are dangerous to life.

Proceed with caution when troubleshooting in areas where live circuits are exposed. Do not service or make adjustments without the immediate presence or assistance of another person capable of rendering aid.

5-3. TROUBLESHOOTING INDEXES.

5-4. Troubleshooting reference data, presented in convenient tabular format, are provided in tables 5-1, 5-2, and 5-3 for functional areas as well as relays, lamps, and protective devices. Table 5-1 relates functional areas, such as the audio amplifier or signal circuits, to the associated troubleshooting paragraphs and diagrams. Table 5-2 identifies all relays and lamps and gives their rated energizing voltages. Table 5-3 identifies the protective devices such as fuses and semiconductors.

5-5. Always refer to the applicable index whenever a malfunction in the master station is encountered and remember that fuses, lamps, and electromechanical devices are inherently more likely to fail than solid state components. Schematic diagrams are located at the end of this chapter, wiring diagrams are located in Chapters 6 and 8. Parts location diagrams are located in Chapter 7.

5-6. MAINTENANCE TURN-ON AND TEST PROCEDURE.

5-7. If a master station is thought to be defective, but the exact symptoms are not known, refer directly to table 5-4 and utilize the test fixture (figure 5-1) to localize and define the problem. Table 5-4 provides a step by step process with observations and some references to related information in other parts of the manual. However, once the symptoms are recognized refer either to the troubleshooting indexes (tables 5-1 through 5-3) or go directly to the appropriate troubleshooting paragraph and isolate the defective part.

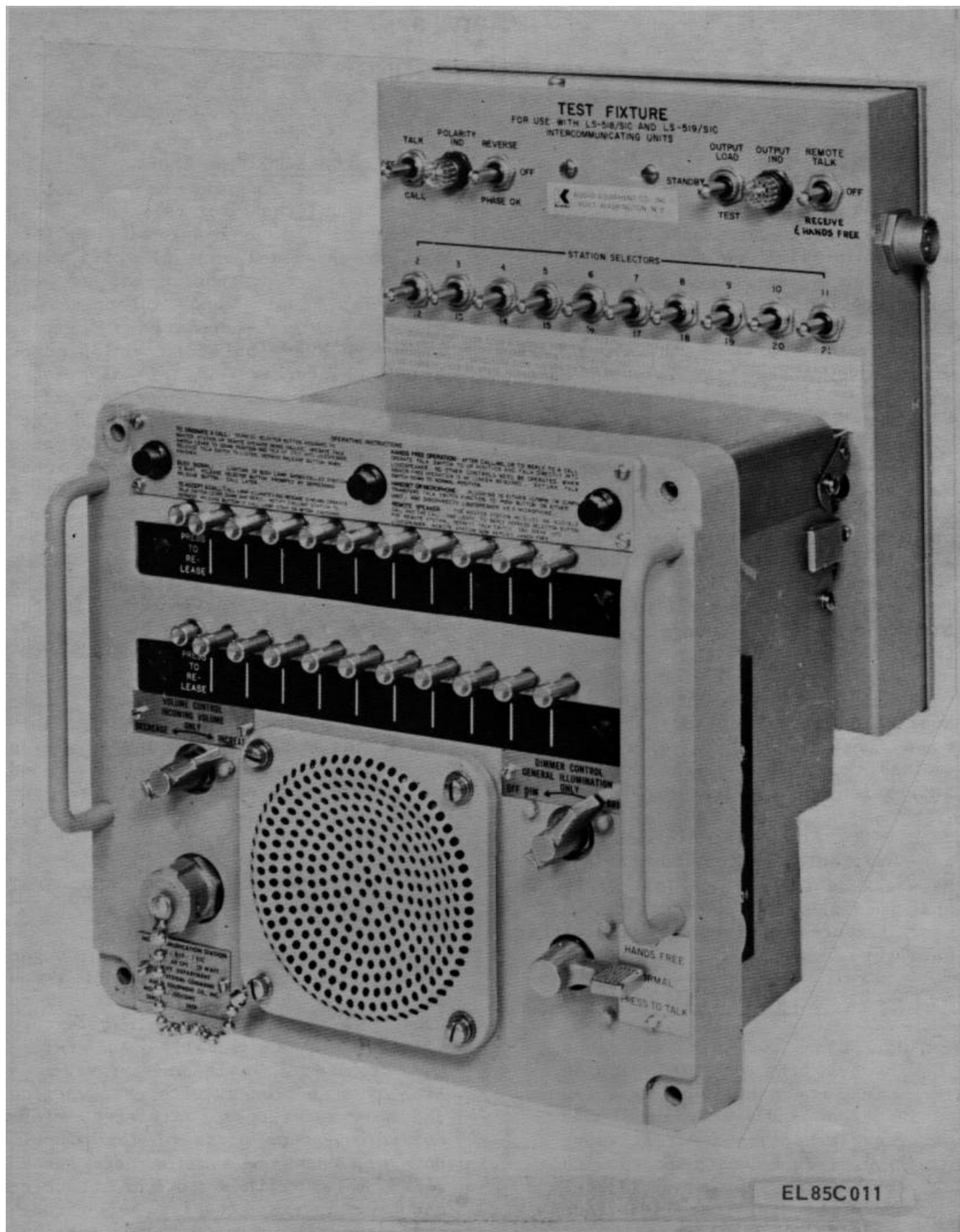


Figure 5-1. Master Station and Test Fixture, Connected.

Table 5-1. Troubleshooting Index.

FUNCTIONAL AREA	TROUBLESHOOTING PARAGRAPH	TROUBLESHOOTING DIAGRAM	FUNCTIONAL DESCRIPTION PARAGRAPH	ALIGNMENT/ ADJUST PARAGRAPH
Power Supply and 22 Volt Regulator	5-10	5-3 7-4	3-10	No adjustments required.
Audio Amplifier	5-12	5-2, 5-3 7-4	3-11	No adjustments required.
Signal Circuits	5-14	3-4	3-13	No adjustments required.*
Parallel Operation	5-19	3-5	3-17	No adjustments required.
Hands Free Operation	5-22	3-6	3-19	No adjustments required.
Remote Loud-speaker Operation	5-24	3-7	3-22	No adjustments required.
Pushbutton Selector Switch	5-26	3-8, 7-5	3-25	6-7

* On equipment manufacturing sequence number 500 and on, R16 in the emitter circuit of Q2 is adjusted for 70 volts output with a .0087 volt input. This is a factory adjustment or whenever 1A3Q1, 1A3Q2, 1A3Q3 or 1A3Q4 are changed.

Table 5-2. Relay and Lamp Indexes.

REFERENCE DESIGNATION	FUNCTIONAL NAME	ENERGIZING VOLTAGE(RATED)	TROUBLESHOOTING DIAGRAM (FIGURE NO.)
1A2K1 1A2K2	Remote SPKR Relays	26.5Vdc	3-7, 7-3
1A2K3 1A2K4	Talk Relays	26.5Vdc	3-7, 7-3
1A2K5 1A2K6	Talk Back Relays	26.5Vdc	3-7, 7-3

Table 5-2. Relay and Lamp Indexes (CONTD.)

REFERENCE DESIGNATION	FUNCTIONAL NAME	ENERGIZING VOLTAGE(RATED)	TROUBLESHOOTING DIAGRAM (FIGURE NO.)
1A2K7 1A2K8	Busy Relays	18.0Vdc	3-4, 7-3
IDS1	Release Lamp	14.OV (#330)	3-4, 7-1, 7-6
1DS2	Call Lamp	14.OV (#330)	3-4, 7-1, 7-6
1DS3	Busy Lamp	14.OV (#330)	3-4, 7-1, 7-6
1DS4 1DS5 1DS6 1DS7	Panel Illumination Lamps	14.OV (#330)	5-3, 7-1, 7-6

Table 5-3. Protective Device Index.

REFERENCE DESIGNATION	FRONT PANEL MARKING	RATING		CIRCUIT PROTECTED	TROUBLESHOOTING DIAGRAM(FIG. NO.)
		VOLTS	AMPS		
1F1 1F2	NONE (Internally Located)	250 Line	1/2	115 Vac Power	5-3, 7-1, 7-6
F3	NONE (Internally Located)	250	1	16 Vac Signal Circuit	5-3, 7-1, 7-6
1A3Q4 1A3CR2 1A3CR3	NONE (Internally Located)	Type 2N2219A Type 1N645 Type 1N645	Limits 22 Volt regulator current when audio output is short circuited.		5-3, 7-1, 7-6

Table 5-4. Maintenance Turn-On and Test Procedure.

STEP	OBSERVE	REFERENCE
1. SETUP a. Assemble master station to test fixture. b. Depress PRESS TO RELEASE push-button.	Locating Pins of master station connector mounting bracket mate with holes in front panel of test fixture. Press together firmly. Secure side straps. All select pushbuttons should be out.	Fig 5-1

Table 5-4. Maintenance Turn-On and Test Procedure (CONTD.)

STEP	OBSERVE	REFERENCE
<p>1. SETUP (CONTD.)</p> <ul style="list-style-type: none"> c. Rotate VOLUME and DIMMER controls to maximum CW positions. d. Connect a microphone type M-132/SIC to the input receptacle of the master station. e. Connect the line cord of the test fixture to a 115Vac, 60Hz outlet. f. Apply power 	<p>A 3-prong plug is provided having a ground which should be connected to ship's ground.</p> <p>Panel illumination circuit will energize. Lamps will be at maximum intensity.</p>	<p>Fig 5-1</p>
<p>2. POLARITY TEST</p> <ul style="list-style-type: none"> a. On test fixture, place REVERSE/OFF/PHASE OK switch to PHASE OK position. b. Place REVERSE/OFF/PHASE OK switch to REVERSE position. c. Place REVERSE/OFF/PHASE OK switch to OFF position. 	<p>POLARITY IND lights to full brilliance.</p> <p>POLARITY IND will be extinguished.</p> <p>POLARITY IND extinguished.</p>	<p>Para 5-10</p>
<p>3. CALL LAMP TEST</p> <ul style="list-style-type: none"> a. On test fixture, place TALK/OFF/ CALL switch to CALL position. b. Place TALK/OFF/ CALL switch to OFF position. 	<p>CALL indicator on master station will light.</p> <p>CALL indicator extinguished.</p>	<p>Table 5-2</p>

Table 5-4. Maintenance Turn-On and Test Procedure (CONTD.)

STEP	OBSERVE	REFERENCE
<p>4. AMPLIFIER AND SPEAKER TEST.</p> <p>a. On master station, operate switch S26 to NORMAL position.</p> <p>b. On test fixture, place TALK/OFF/ CALL switch in TALK position. Speak into the microphone. Keep microphone away from speaker.</p>	<p>Your voice should be clearly reproduced over the speaker in the master station provided acoustical feedback does not cause a microphonic howl. Rotate VOLUME control one or two steps CCW if system howls.</p>	<p>Para 5-12</p>
<p>5. STATION SELECTOR AUDIO CIRCUITS TEST.</p> <p>a. On test fixture place TALK/OFF/ CALL switch to TALK position. Hold microphone close to speaker.</p> <p>b. Place OUTPUT LOAD STANDBY/TEST switch to the TEST position.</p> <p>c. Restore OUTPUT LOAD/STANDBY/TEST switch to STANDBY position.</p> <p>d. On master station, depress select pushbutton No. 1. trunk and lines 2 and 2C.</p> <p>e. Release STATION SELECTOR switch 2/12 on test fixture and depress PRESS TO RELEASE switch on master station.</p>	<p>Produces a microphonic system howl. Reduce VOLUME control to the minimum position at which the howl can be sustained without being objectionable.</p> <p>System howl ceases. Checks Incoming Trunk, lines 1 and 1C.</p> <p>System howl commences. Separate microphone from speaker to interrupt howl if sound is objectionable.</p> <p>System howls with microphone near speaker but howl is inhibited when STATION SELECTOR switch 2/12 on test fixture is held in position 2. Checks outgoing</p> <p>System howls with microphone near speaker.</p>	<p>Fig 5-3</p>

Table 5-4. Maintenance Turn-On and Test Procedure (CONTD.)

STEP	OBSERVE	REFERENCE
<p>5. STATION SELECTOR AUDIO TEST (CONTD.)</p> <p>f. On master station, depress select pushbutton No. 2.</p> <p>g. Release STATION SELECTOR switch 2/12 on test fixture and depress PRESS TO RELEASE on master station.</p> <p>h. Repeat the above sequence for each select pushbutton on the master station, one at a time. Use corresponding STATION SELECTOR switches on the test fixture.</p>	<p>System howls with microphone near speaker but howl is inhibited when S6 on test fixture is held in position 3. Checks outgoing trunk, lines 3 and 3C.</p> <p>System howls with microphone near speaker.</p> <p>Checks outgoing trunk, lines 4 and 4C through 21 and 21C.</p>	Fig 5-3
<p>6. STATION SELECTOR SIGNAL CIRCUITS TEST.</p> <p>a. Place TALK/OFF/ CALL switch to OFF position.</p> <p>b. Place OUTPUT LOAD/ STBY/TEST switch to STANDBY position.</p> <p>c. Depress PRESS TO RELEASE pushbutton on master station.</p> <p>d. On test fixture, press and hold STATION SELECTOR switch 2/12 in position 2. On master station, depress select pushbutton No. 1.</p> <p>e. Release STATION SELECTOR switch 2/12 on test fixture.</p>	<p>All select pushbuttons should be out.</p> <p>The BUSY and REL indicators on the master station should light. Checks 2X signal line.</p> <p>The BUSY and REL indicators on the master station remain lighted. Checks latch circuit.</p>	Table 5-2

Table 5-4. Maintenance Turn-On and Test Procedure (CONTD.)

STEP	OBSERVE	REFERENCE
<p>6. STATION SELECTOR SIGNAL CIRCUITS TEST(CONTD)</p> <p>f. Depress PRESS TO RELEASE pushbutton on master station.</p> <p>g. Repeat above sequence for each select pushbutton on master station, one at a time. Use corresponding switches on test fixture.</p>	<p>The BUSY and REL indicators on the master station extinguish.</p> <p>Checks signal lines 3X through 21X.</p>	<p>Table 5-2</p>
<p>7. REMOTE LOUDSPEAKER CIRCUIT TEST.</p> <p>a. Plug H-186/U Handset into receptacle on test fixture.</p> <p>b. Place TALK/OFF/ CALL switch to TALK position.</p> <p>c. Place REMOTE TALK/OFF/RECEIVE and HANDSFREE switch to REMOTE TALK position.</p> <p>d. Place OUTPUT LOAD/ STBY/TEST switch to OUTPUT LOAD position.</p> <p>e. Speak into handset microphone.</p> <p>f. Place REMOTE TALK/OFF/RECEIVE and HANDSFREE switch to RECEIVE and HANDSFREE position.</p> <p>g. While holding S26 on master station in PRESS TO TALK Position, speak into the speaker.</p>	<p>Your voice should be clearly produced over the speaker of the master station. The OUTPUT IND on the test fixture should flicker on speech peaks.</p> <p>Speech should be heard on the receiver of the handset. The OUTPUT IND should flicker.</p>	<p>Para 5-24</p>

Table 5-4. Maintenance Turn-On and Test Procedure (CONTD.)

STEP	OBSERVE	REFERENCE
<p>8. HANDSFREE OPERATION TEST.</p> <p>a. Place TALK/OFF/ CALL switch to TALK position.</p> <p>b. Place REMOTE TALK/OFF/RECEIVE and HANDSFREE switch to RECEIVE and HANDSFREE position.</p> <p>c. Operate S26 on the master station to the HANDSFREE position.</p> <p>d. Plug the H-186/U Handset into the test fixture receptacle.</p> <p>e. While depressing the PTT switch on the handset, speak into the speaker of the master station.</p>	<p>Speech should be heard in the receiver of the handset. The OUTPUT IND should flicker.</p>	<p>Table 5-1</p>

5-8. GENERAL TROUBLESHOOTING PROCEDURES.

5-9. The primary power input circuits (MC and MCC) of all the master stations in an intercommunication system are connected in parallel from the ship's IC switchboard. If the entire system is inoperative the trouble is obviously in the primary power source. However, if one master station in the system is inoperative, its primary power fuses may be open. Inspect the panel illumination of the faulty unit. If power is available and the fuses, (which are internal) have not failed, the panel should be illuminated. If not, remove the panel/chassis assembly from the case and check the fuses. Replace open fuses at least once, using fuses of proper rating and replace the unit. If the

fuses fail again, do not replace a second time until the cause has been corrected. Remove the faulty panel/chassis assembly and substitute a good unit. Checkout the good unit by performing the tests described in Chapter 4, paragraph 4-6. Refer to paragraph 5-6 and utilize the test fixture and the procedure (outlined in table 5-4) to check out the faulty unit.

5-10. POWER SUPPLY AND 22 VOLT REGULATOR.

5-11. The power supply and 22 volt regulator circuits are shown in detail on the overall schematic diagram (figure 5-3). Typical voltages (under no audio signal conditions) are listed in

table 5-5. The test setup is illustrated on figure 5-2. Before energizing a unit suspected of having a faulty power supply, visually inspect the components for discoloration, blistering, broken leads, etc. Replace or repair any defective parts before proceeding. Using a multimeter, measure the resistance from A3-14 to A3-13. Unless A3C14 or A3R1 are faulty, the meter should read approximately 1350 ohms. If this resistance is obtained, it is relatively safe to apply 115 volts ac to the unit. Turn on the PTT switch in the test setup. Measure the various voltages and compare the results to the nominal (no signal) values listed in table 5-5. Isolate and replace suspected or fault components. Refer to NAVSHIPS publication 0967-000-0120 for theory and operation of similar power supply circuits.

5-12. AUDIO AMPLIFIER.

5-13. The audio amplifier circuitry is shown in detail on the overall schematic diagram (figure 5-3). Typical voltages and audio levels are listed in table 5-6. Refer to figure 5-2 for the test setup. Energize the unit (operate the PTT switch to ON) and make the measurements. Compare the results to the values listed in table 5-6 and replace any suspected or faulty components. Refer to table 1-1 for electrical characteristics of the amplifier. Refer to NAVSHIPS 0967-0000120, pages 6-B-1 through 6-B-9 for theory and operation of similar amplifier circuits.

amplifier is connected in accordance with the test setup in figure 5-2. Dc voltages are nominal no signal values.

Table 5-5. Typical Voltages, Power Supply and 22 Volt Regulator Circuits.

FROM	TO	VOLTAGE
T2-7	T2-8	115 Vac
T2-1	T2-2	23.5 Vac
T2-3	T2-4	6.4 Vac
T2-5	T2-6	10.6 Vac
T2-4	T2-5	16.8 Vac
A3-14	A3-13	28.3 Vdc
A3-8	A3-13	28.3 Vdc
A3Q3-E	A3-13	22.0 Vdc
A3Q3-B	A3-13	22.5 Vdc
A3Q3-C	A3-13	28.3 Vdc
1Q3-E	A3-13	21.4 Vdc
1Q3-B	A3-13	22.0 Vdc
1Q3-C	A3-13	28.3 Vdc
A3Q4-E	A3-13	0
A3Q4-B	A3-13	0
A3Q4-C	A3-13	22.5 Vdc

NOTE

Ac voltages are nominal Rms signal levels at various stages when the

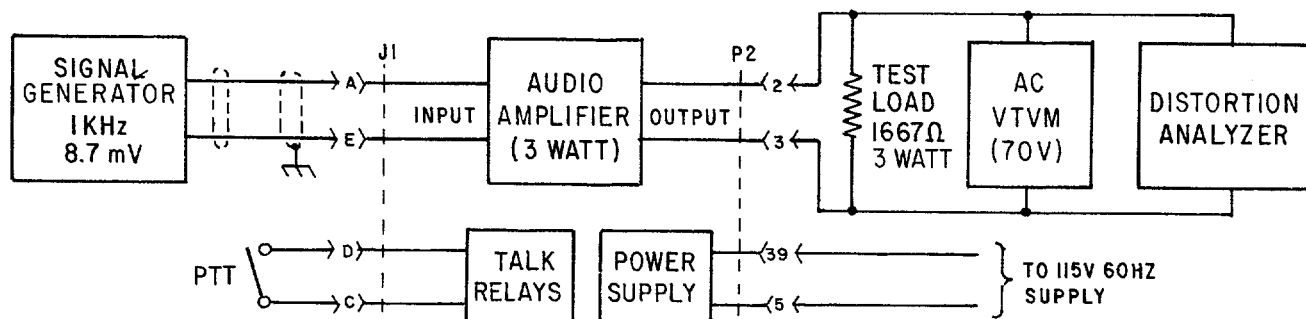


Figure 5-2. Audio Amplifier, Test Setup.

Table 5-6. Typical Voltages, Audio Amplifier Circuits.

FROM	TO	AC VOLTAGE
A3Q1-E	A3-13	12.25 mv
A3Q1-B	A3-13	16.5 mv
A3Q1-C	A3-13	777 mv
A3Q2-E	A3-13	844 mv
A3Q2-B	A3-13	858 mv
A3Q2-C	A3-13	5.92 vo1ts
1Q1-E	A3-13	665 mv
1Q1-B	A3-13	1.62 vo1ts
1Q1-C	A3-13	8.95 vo1ts
1Q2-E	A3-13	706 mv
1Q2-B	A3-13	1.66 vo1ts
1Q2-C	A3-13	8.98 vo1ts
1T1-2	A3-13	580 mv
A3T1-6	A3T1-5	16.4 mv
A3T2-3	A3T2-1	5.97 vo1ts
1T1-1	1T1-3	17.3 vo1ts
1T1-9	1T1-10	8.2 vo1ts
1T1-4	1T1-5	436 mv
1T1-6	1T1-5	3.52 vo1ts
1T1-8	1T1-7	70 vo1ts*

* On equipments with serial numbers 1 through 499, R16 in the emitter circuit of 1A3Q2 is a fixed resistor. For all other equipment serial numbers, R16 is a variable resistor which is adjusted for 70 volts output with a 8.7 millivolt microphone signal input. R16 is adjusted during production and whenever 1A3Q1, 1A3Q2, 1A3Q3 or 1A3Q4 are changed.

5-14. SIGNAL CIRCUITS.

5-15. The components involved in the functions of the signal circuits are best illustrated in figure 3-4. This simplified schematic clearly depicts the signal circuits and should be used initially for the analysis of the malfunction. However, once the inter-relationship of components is understood and the task for isolating the faulty part remains, utilize figures 5-3, 6-1 or 6-2, and 7-5 for locating the various parts and their circuit tiepoints.

5-16. Indicators DS1, DS2 and DS3 should be checked initially without removing the panel/chassis assembly from the case. If these lamps are not faulty, it is most likely that the problem may be associated with dirty or open contacts in the pushbutton or rotary switches. Remove the malfunctioning panel/chassis assembly from the case and make continuity checks of the switch circuits with a multimeter. Except for S23 or S24 (delay switches) all contacts are either open or closed depending on the position of the respective actuator. With regards to S23 or S24, contacts 1-2 should be closed except during the short interval when a select pushbutton is initially depressed. During this interval contact 2 must make with contact 3 for at least 50 milliseconds.

5-17. After the switches have been eliminated as a possible source of malfunction, apply 115 volts ac to the unit and verify that the secondary voltages of T2 are normal. (See table 5-5.) Also check relays A2K7 and A2K8 early in the troubleshooting process by substituting a known good equivalent. Observe that these relays have 18 volts dc coils and all others have 26 volts dc coils.

5-18. If the aforementioned process does not reveal the problem, investigate the busy sense circuit (A2Q2) and the latch circuit (A2CR7). With 115 volts ac applied and any select pushbutton depressed, momentarily jumper terminals 2 to 3 of delay switch S23. A2Q2, which is a silicon controlled rectifier operating in a halfwave rectified circuit, should conduct (the gate momentarily has the same polarity as the anode). In addition, the BUSY indicator DS3 should light and A2K7 should energize and latch through contacts 1-6 and A2CR7. Isolate the

faulty component and replace it. Perform step 6 of table 5-4 to verify that the fault has been corrected.

5-19. PARALLEL OPERATION.

5-20. The components and the interconnections involved in parallel operation of two master stations are shown on figure 3-5. Troubleshoot initially by making continuity checks of S25, S26B, and the wiring between the two stations. Check relays A2K2, A2K4, and A2K6 by the substitution method since these relays are sealed and cannot be adjusted. Refer to table 5-6 for the normal audio signal voltages on transformer 1T1.

5-21. HANDSFREE OPERATION.

5-22. The components involved in the functions of the handsfree circuits are best illustrated on figure 3-6. Examine this simplified schematic and note the path of the control signal. Then, refer to figures 5-3, 6-1 or 6-2 and 7-5 and make continuity checks of the control signal path through the switches and wiring between the two units. Determine which master station is at fault and check relays A2K2, A2K3 and A2K4 by the substitution method since these relays are sealed and cannot be adjusted.

5-23. Under the conditions shown on figure 3-6, station No. 2 is operating handsfree and A2Q1, a PNP transistor operating in the switching mode, is conducting. In order for station No. 2 to receive an audio transmission from station No. 1, A2Q1 must be turned off by sufficiently increasing the emitter impedance. This function is normally accomplished when A2K4 in station No. 1 energizes and A2R21 is unshorted. Investigate this function and replace the faulty component(s). Utilize a multimeter and the test fixture if desired. Refer to step 8 in table 5-4.

5-24. REMOTE LOUDSPEAKER OPERATION.

5-25. The components involved in the function of the remote loudspeaker are best illustrated on figure 3-7. This simplified schematic also shows many other functions and is useful for troubleshooting the relay and push-to-talk circuits. Malfunctions in the remote loudspeaker circuit are most likely to be either faulty select switches or relays. Continuity check switches and interconnection wiring between the master and the remote loudspeaker stations. Replace any suspected or faulty relays.

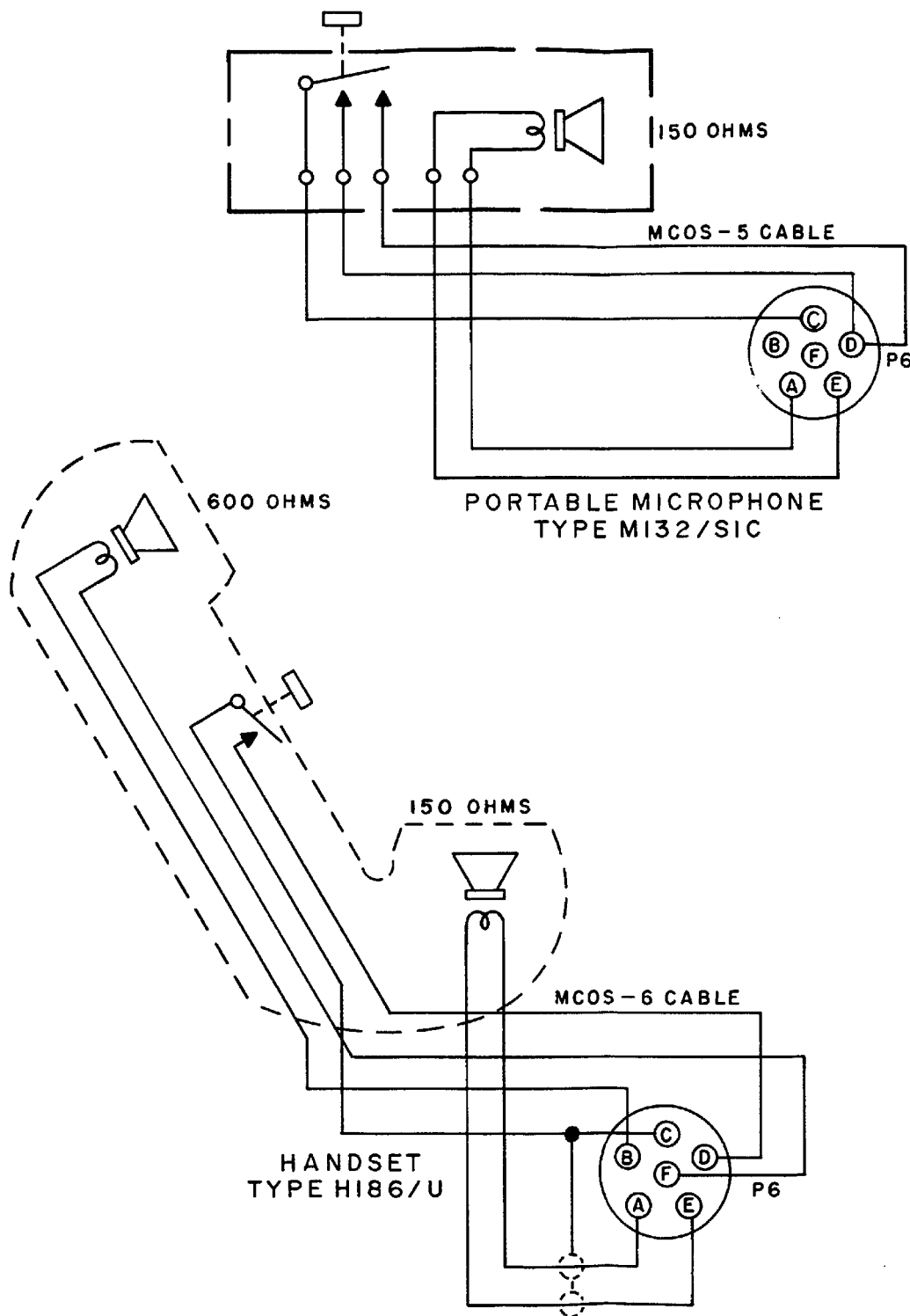
NOTE

Diodes A2CR4, A2CR5, and A2CR6 are not shown on figure 3-7 but are necessary for suppressing the de-energizing transients of the relay coils. (See figure 5-3.) If an ohmmeter is used to measure the coil resistance when the relays are plugged into their sockets, connect the test leads such that the polarity back biases the diode. The normal dc resistance of each relay coil is 675 ohms.

5-26. PUSHBUTTON SELECTOR SWITCH ASSEMBLY.

5-27. Malfunctions which may occur in the pushbutton selector switch assembly could be either mechanical or electrical. If the problem is electrical, determine which switch is malfunctioning. Refer to the overall schematics and wiring diagrams (figures 5-3, 6-1, and 6-2) and make continuity checks of the suspected switch. Clean and adjust if necessary.

5-28. If the problem is mechanical, its most likely to be a condition of dirty or gummy parts or a lack of proper lubrication or adjustment. Examine the operation of the mechanical parts while depressing the pushbuttons. Refer to Chapter 6 for corrective maintenance and lubrication.

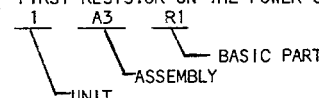


NOTES:

1. LINE VOLTAGE: 115V, 60HZ, A.C.
2. POLARITY: WITH MC CONNECTED TO XX, VOLTAGE FROM MCC TO Y7 IS GREATER THAN THE LINE VOLTAGE.
3. INPUT POWER:
 - A. STANDBY: 7.5 WATTS
 - B. OPERATING: 25.0 WATTS
4. OUTPUT POWER: 3 WATTS WITH MAXIMUM DISTORTION OF 5%.
5. INPUT IMPEDANCE AT MICROPHONE JACK, TERMINALS A AND E: 150 OHMS.
6. OUTPUT IMPEDANCE: 1667 OHMS, TO VOLTS.
7. TERMINAL NUMBERS ON RELAYS REFER TO PIN NUMBERS ON RELAY SOCKETS.
8. K109C SELECTOR SWITCH OPERATION. (SELF LOCKING GANG TYPE PUSHBUTTON ASSEMBLY).
 - A. STATION SWITCHES S2 THRU S11 ARE SHOWN IN THE NON OPERATED POSITION.
 - B. RELEASE SWITCH S1 IS SHOWN IN THE NORMAL "STANDBY" DEPRESSED POSITION (NO STATION SELECTOR SWITCHES OPERATED).
 - C. OPERATION OF ANY STATION SELECTOR SWITCHES S2 THRU S11 AUTOMATICALLY RELEASES S1.
 - D. SWITCH S23 IS MECHANICALLY INTERLOCKED WITH SWITCHES S1 THRU S11 AND IS MOMENTARILY OPERATED WHEN ANY OF THE SWITCHES S1 THRU S11 IS OPERATED, PROVIDING A MINIMUM CLOSURE OF 26 MICROSECONDS.
 - E. ON 20 STATION MODELS AN ADDITIONAL K109C SELECTOR SWITCH ASSEMBLY IS ADDED, PROVIDING AN ADDITIONAL RELEASE CUTTER S22.
9. DESIGNATIONS REFER TO TERMINAL NUMBERS ON EITHER THE 36 OR 50 CONTACT CONNECTORS, WHICH CONNECT THE EQUIPMENT TO THE SHIP'S WIRING TERMINAL BOARD. ON THE 10 STATION MODEL THERE IS ONE 50 CONTACT CONNECTOR. ON THE 20 STATION MODEL, THERE IS AN ADDITIONAL 36 CONTACT CONNECTOR.
10. ALL RESISTORS ARE IN OHMS, 1/2 WATT, +5%, UNLESS OTHERWISE SPECIFIED.
11. ALL CAPACITANCE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.
12. 78 DB, 1000 CYCLE GAIN FROM TERMINALS 2, 3 T1 TO TERMINALS 7, 8 ON T3.
13. JUMPERS SHOWN ON O, OC, OX, OXX TO BE INSTALLED ONLY WHEN WIRING STATION(S) TO A REMOTE SPEAKER STATION(S).
14. CUT JUMPERS, STRAPPING SELECTOR SWITCH TERMINALS AHEAD OF SWITCHES USED FOR REMOTE LOUDSPEAKER STATION(S).
15. TO REDUCE HANDSET VOLUME, CONNECT RESISTOR ACROSS TERMINALS Y1 AND Y5 ON TB1 SHIPS TERMINAL BOARD, BY VALUE AS SHOWN IN TABLE BELOW:

REDUCTION IN DECIBLES	RESISTOR
3	470 OHMS, 1/2 W
6	180 OHMS, 1/2 W
9	100 OHMS, 1/2 W

16. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN FOR COMPLETE DESIGNATION. PREFIX THE BASIC DESIGNATION WITH THE UNIT ASSEMBLY DESIGNATION. THE ASSEMBLY DESIGNATION, AND SUBASSEMBLY DESIGNATION.
EXAMPLE: FIRST RESISTOR ON THE POWER SUPPLY AND AMPLIFIER BOARD 1A3 IS:



17. THE REFERENCE DESIGNATION PREFIX OF THIS ASSEMBLY IS: UNIT 1 (1Q1, 1Q2, AND 1Q3 AND TRANSFORMER (1T1).
18. INDICATES TRANSISTORS ARE NOT ON P.C. BOARD 1A3.
19. AUDIO AND SIGNAL PATH SYMBOL IS:

2 WAY AUDIO PATH

FEEDBACK OR OVERLOAD SENSE PATH

1 WAY AUDIO PATH

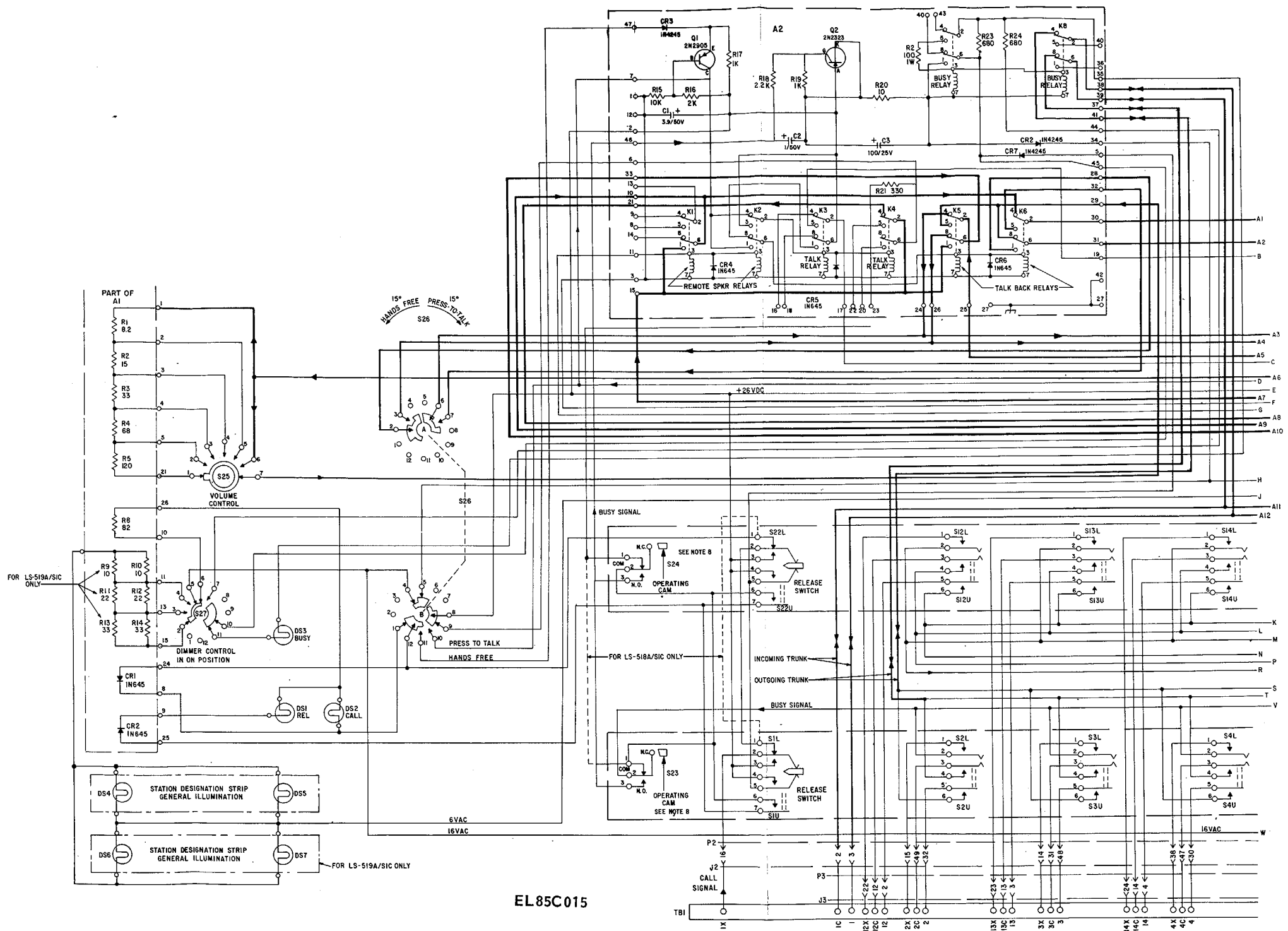
SIGNAL PATH

20. TRANSFORMER DATA:

A3T1			
WINDING	IMPEDANCE	TURNS	WIRE AWG
1 - 4	150 OHMS	188	# 34
2 - 3	8 OHMS	56	# 27
5 - 6	2500 OHMS	1000	# 40
T1			
1 - 3	85.2 OHMS	184	# 29
1 - 2	21.3 OHMS	92	# 29
9 - 10	213 OHMS	92	# 31
4 - 5	1716 OHMS	5	# 24
5 - 6	4 OHMS	40	# 24
8 - 7	1666 OHMS	828	# 36
T2			
1 - 2	N/A	152	# 24
3 - 4	N/A	68	# 26
5 - 6	N/A	41	# 26
7 - 8	N/A	710	# 28

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Figure 5-3. Intercommunication Stations LS-518A/SIC and LS-519A/SIC, Schematic Diagram (Sheet 1 of 3).
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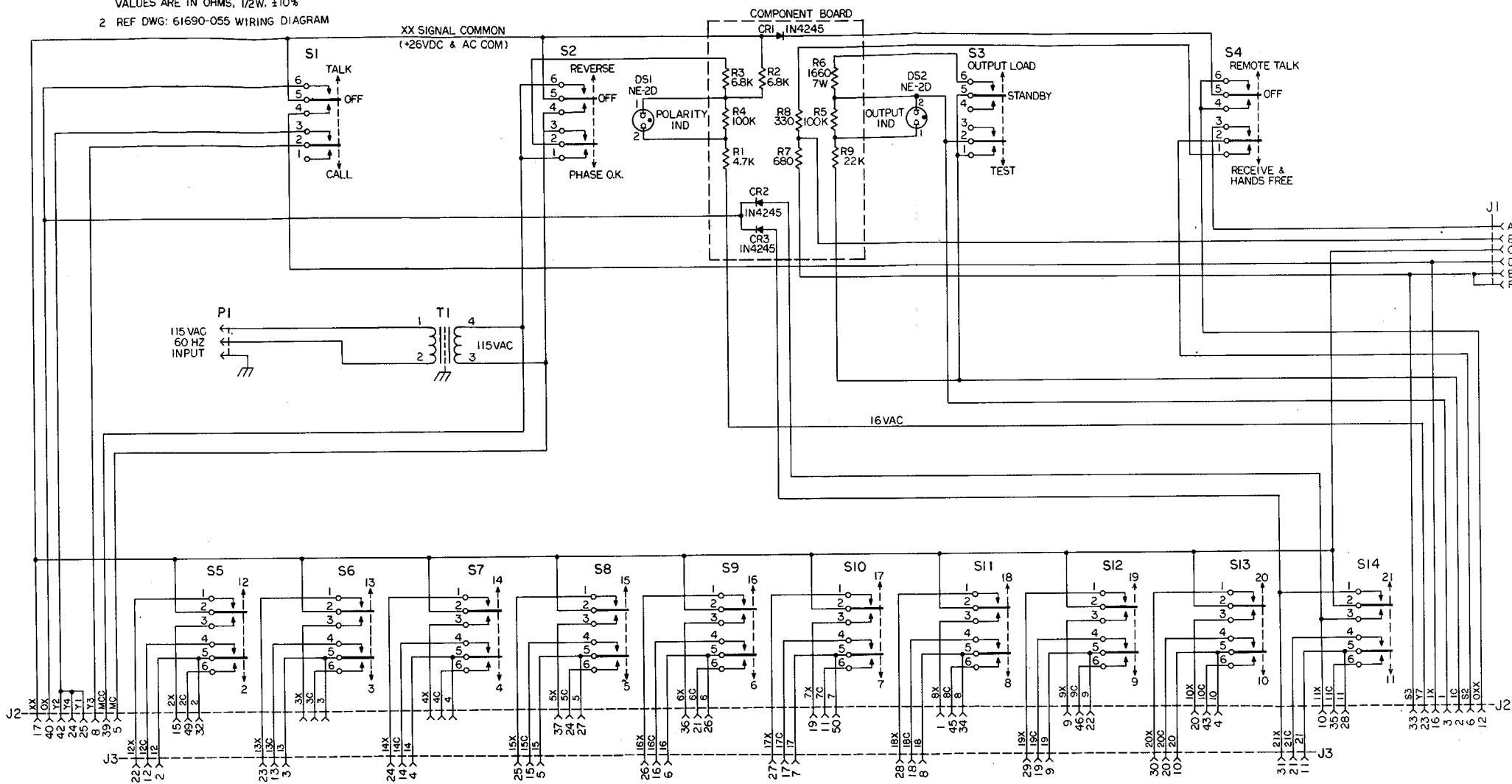


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Figure 5-3. Intercommunication Stations LS-518A/SIC and LS-519A/SIC, Schematic Diagram (Sheet 3 of 3).
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NOTES:

1. UNLESS OTHERWISE NOTED ALL RESISTOR VALUES ARE IN OHMS, 1/2W, ±10%
2. REF DWG: 61690-055 WIRING DIAGRAM

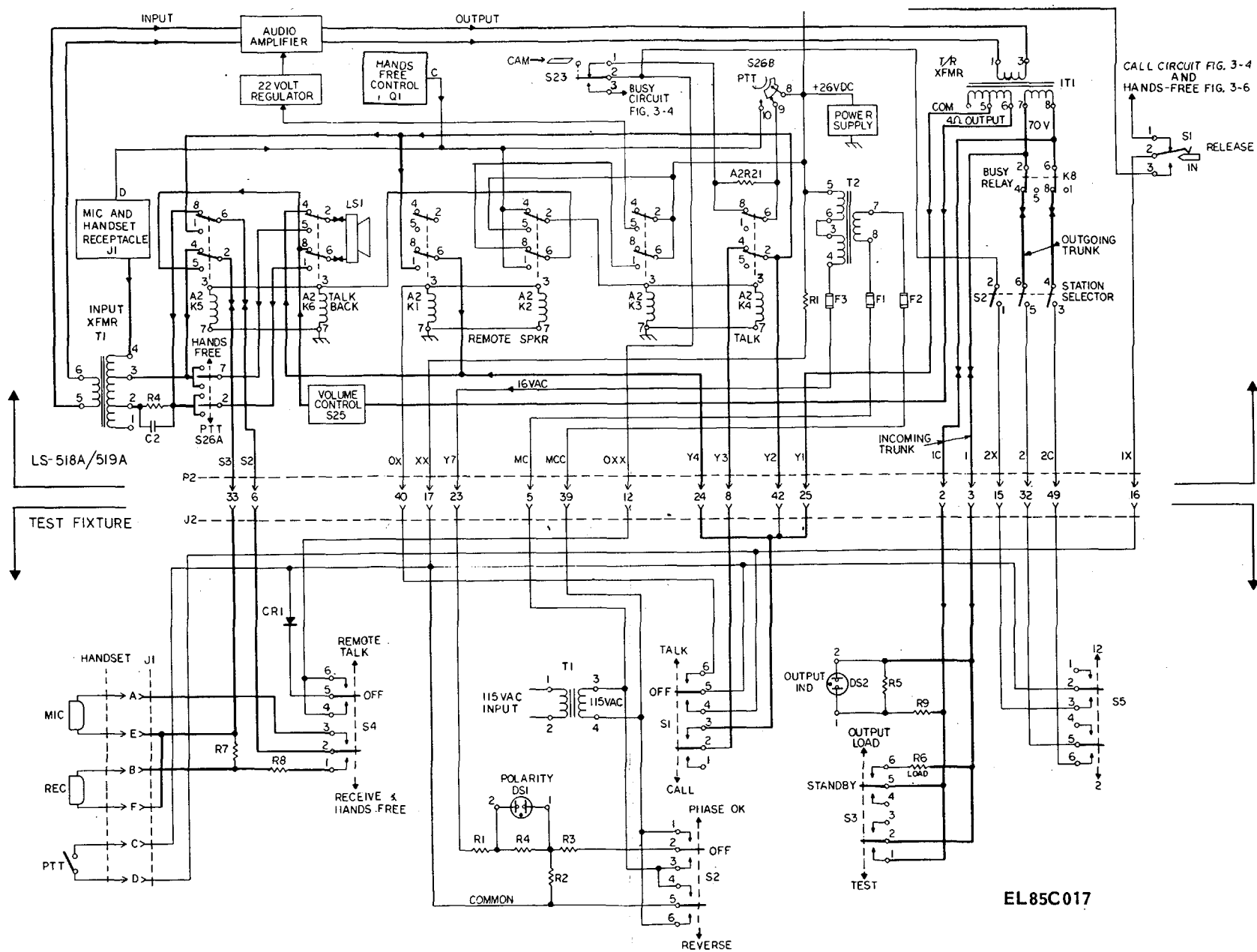


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Figure 5-4. Test Fixture, Schematic Diagram.

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61690-088 A

Figure 5-5. Test Fixture, Simplified Schematic, Interface with Intercommunication Station.

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CHAPTER 6

CORRECTIVE MAINTENANCE

6-1. INTRODUCTION.

6-2. This chapter contains the necessary instructions for repairing the master station after a malfunction is located using the troubleshooting routines described in Chapter 5. There are no special tools required for making electrical or mechanical repairs and the only adjustments which may be necessary are associated with the pushbutton selector switch assembly.

6-3. The master station parts location diagrams are located in Chapter 7. Figures 7-1 through 7-5 are for the LS-518A/SIC and figures 7-6 7-7 and 7-8 are for the LS-519A/SIC. Any references to item numbers in the following paragraphs relates to these figures.

6-4. REMOVAL.

6-5. To remove the panel/chassis assembly from the case, loosen and remove the four slotted hex-head screws (item 72). Grasp the handles and pull the panel/chassis assembly out of the case and place unit on the workbench. The chassis is hinged to the panel and may be opened for accessibility by removing the upper slotted hex-head screws on the sides. In this configuration the lower screws need not be removed.

6-6. ADJUSTMENTS.

6-7. **PUSHBUTTON SELECTOR SWITCH ASSEMBLY.** Loosen four screws, and remove cover (item 48). Upper set of contacts and mechanical motion of switch may be inspected without further disassembly. To inspect lower set of contacts, remove screws and carefully lift switch out of frame, as far as cable slack will allow and perform the operations described in paragraphs 6-8 through 6-11.

6-8. **Leaf Switch Adjustment.** Operate switch and adjust contacts on upper and lower pile-ups, as required. Refer to figure 5-3 for correct positioning of contacts in the normal and operated positions.

6-9. **Leaf Switch Replacement.** To replace either upper or lower switch pile-ups remove two screws and associated hardware.

6-10. **Delay Switch Adjustment.** The delay switch (S23 or S24) is operated by an insulated projection on the slide-bar, when the slide-bar moves laterally, and remains closed during the slide-bar cycle. If for any reason, either inadvertently or through damage, this cycle of operation has changed, the closing and opening sequence can be restored to the original factory adjustment by carefully bending the spring blades by the usual relay adjustment techniques.

6-11. **LUBRICATION.** Lights lubricate working parts of the switch mechanism as described below. Use low temperature instrument grease (specification MIL-G-15793).

a. Lubricate roller cam surface on which lateral slide-bar moves, lift cam on release-bar, and lateral cam on each of ten station selector bars. Also lubricate portion of eleven selector bars which protrude beyond front of frame, and rear portion of each bar where it rides in slot in switch mounting plate.

b. On the pushbutton assembly, work pushbutton back and forth. Motion should be smooth and free from binding. If motion is stiff, or there is evidence of water entrance, replace and lubricate rubber O-ring.

c. To remove rotary switch S25, S26 or S27, remove roll pin and slip knob off shaft. Remove nut and lockwasher from front panel and remove switch from rear.

When reinstalling or replacing switches S25, S26 or S27, be sure orientation lug on switches engages locating hole in casting. Nut should be tightened enough to insure waterseal of O-ring supplied with each switch.

6-12. PARTS INSPECTION AND TEST.

6-13. RESISTORS. Defective resistors can be detected in several ways. A resistor which has been overloaded will become discolored and give off noticeable odors. With the power off, ohmmeter readings across a resistor will reveal resistors that are open or have changed in value. When checking in this manner, refer to the appropriate circuit schematic diagram to determine if other components in parallel with the resistor will affect the measured resistance. In this case, it will be desirable to disconnect one end of the resistor when making these resistance checks. Overloaded resistors are often caused by short capacitors. Check all capacitors in the circuit before replacing resistors.

6-14. CAPACITORS. Capacitors can be checked with the power off. A short-circuited or leaky capacitor is indicated by low resistance. An ohmmeter reading of infinity or very high resistance will be obtained if the capacitor is good or if it has a broken internal lead. A capacitor which gives an ohmmeter reading of infinity and is suspected of being open should be temporarily replaced and the effect of its substitution on voltage checks and operation should be checked. When a coupling capacitor between amplifier stages opens, the amplifier is blocked or does not produce any sound. Check the suspected capacitor by shunting a capacitor known to be good across it and note the effect.

6-15. DIODES. If operation indicates that a diode is defective, disconnect one lead. Check that diode measuring the front to back resistance ratio. The ratio should be at least 100 to one.

6-16. TRANSISTORS. If testing indicates a transistor stage is probably defective, check the transistor by one of the following methods.

- a. A reliable in or out of circuit transistor test set.
- b. By substituting a transistor known to be good.

6-17. SWITCHES. Switches can be checked with the power on by measuring the voltage at the switch terminals. With the power off, continuity checks can be made between switch terminals to determine proper operation.

6-18. RELAYS. All relays in the master station have two-pole, doublethrow contacts. The coils of A2K1 through A2K6 are rated at 26.5 volts dc, 675 ohms. The coils of A2K7 and A2K8 are rated at 18.0 volts dc, 300 ohms. Check suspected faulty relays by applying voltage to the coil and making continuity checks of the contacts or by substituting a relay known to be good.

6-19. PARTS REPLACEMENT.

6-20. Because of the compact design of the master station, it is important to use a soldering iron that is small enough to avoid damage to adjacent wiring when replacing any part with soldered connections. To replace a defective part, proceed as follows:

- a. Mark, or make a chart of, the connections of the defective part that is removed.
- b. Unsolder the connections to the defective part, removing all excess solder from the remaining wires or terminals that are unsoldered.

- c. Replace the defective part with a new part.
- d. Resolder the connections, using only resin-core solder.

- e. Verify proper connections by reference to the wiring diagram (figure 6-1 or 6-2).

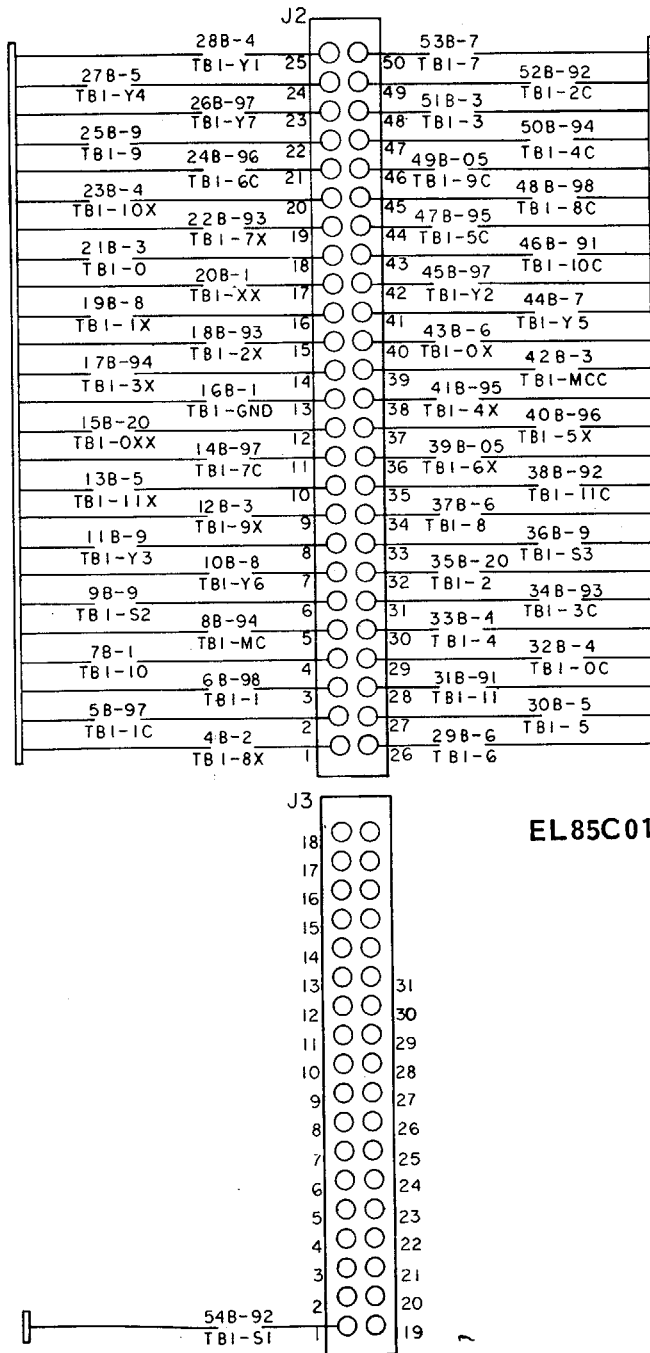
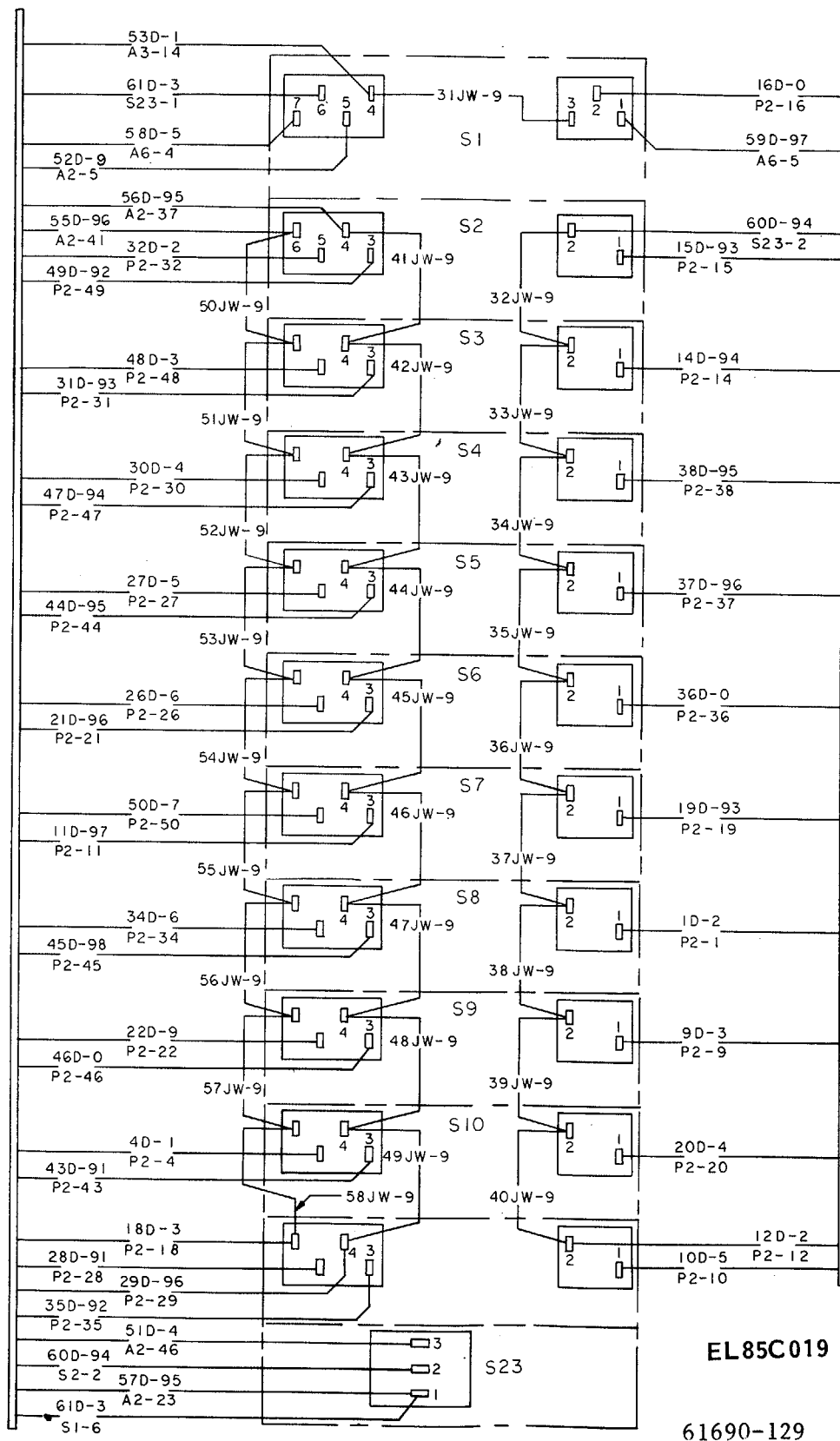


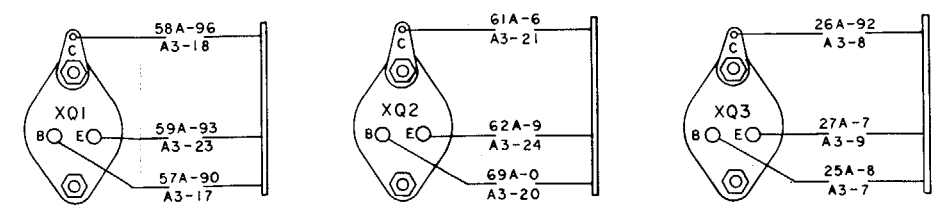
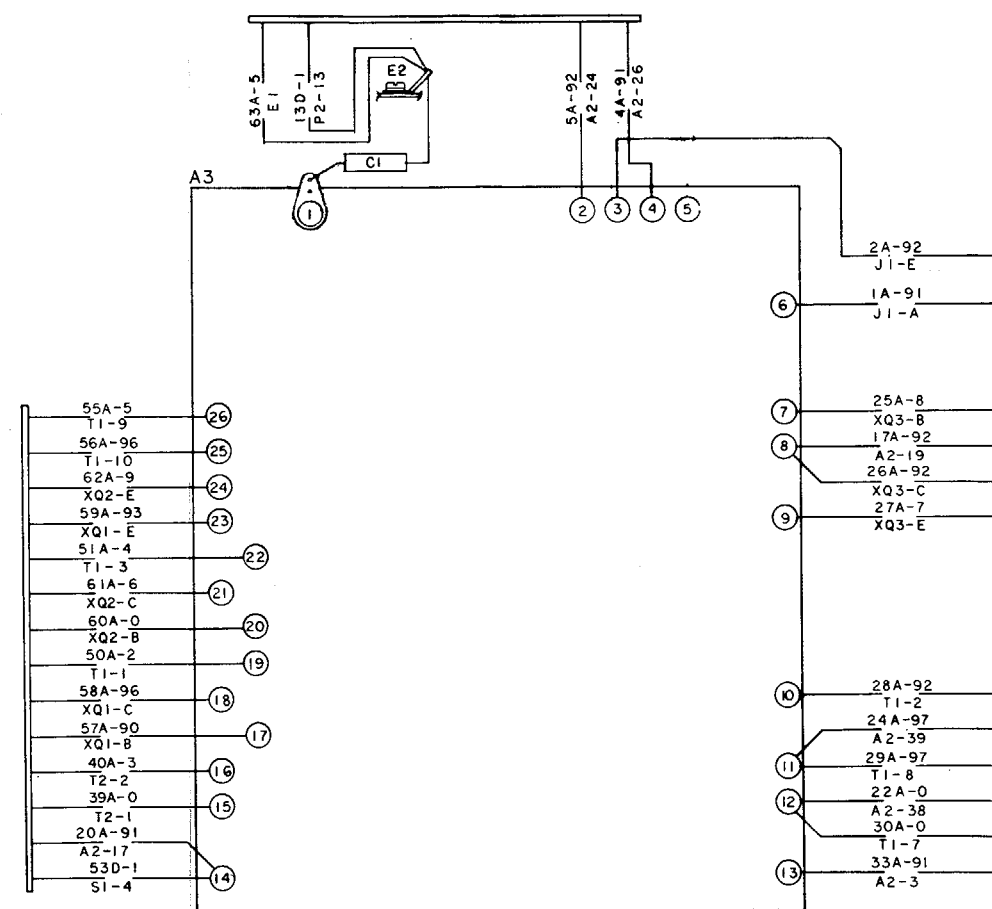
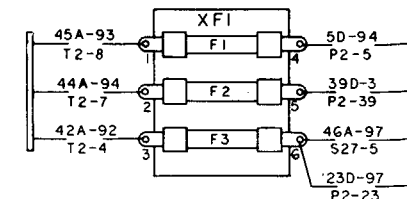
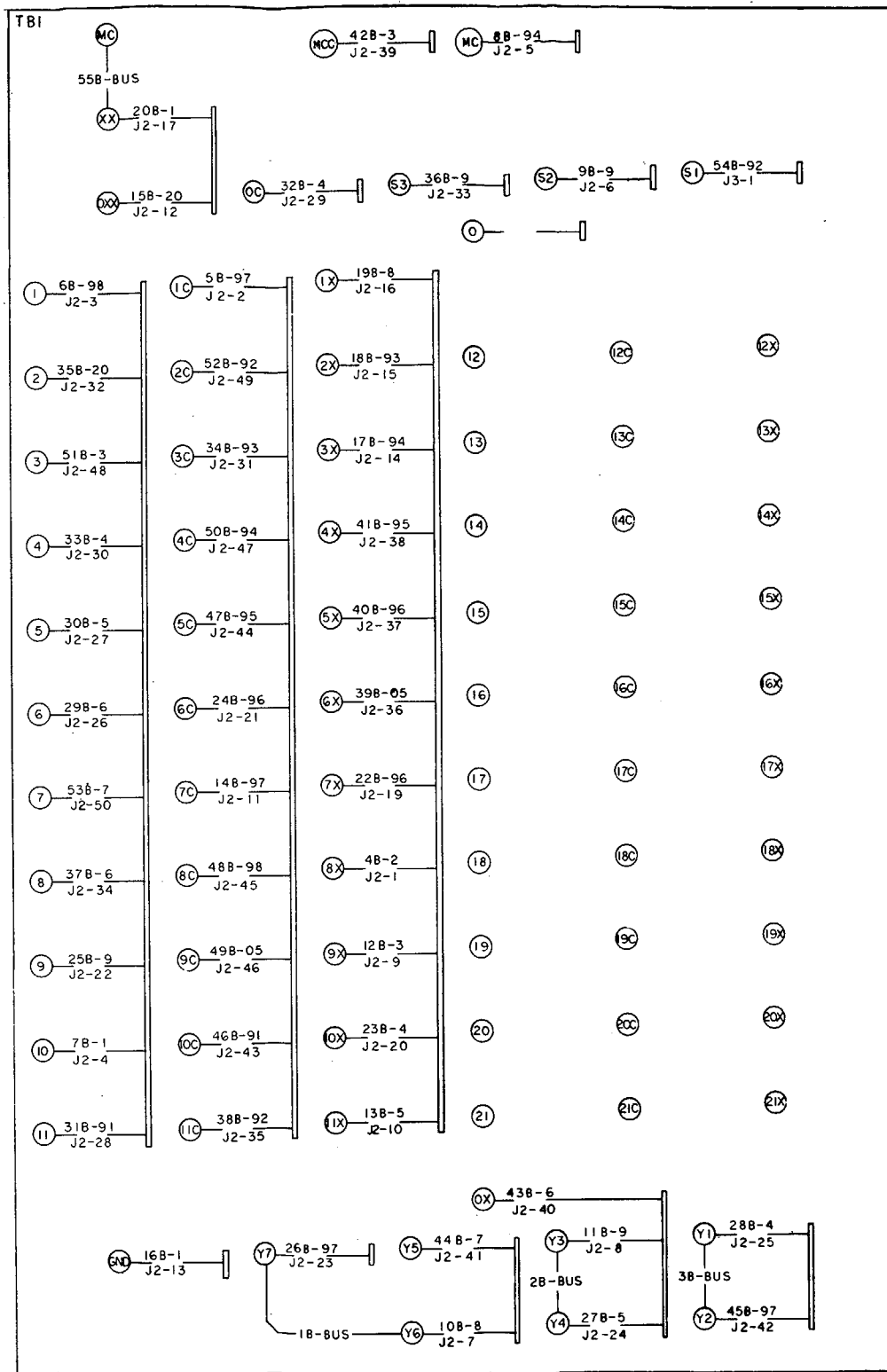
Figure 6-1. Intercommunication Station, LS-518A/SIC, Wiring Diagram (Sheet 1 of 5).



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61690-129 B

Figure 6-1. Intercommunication Station, LS-518A/SIC, Wiring Diagram (Sheet 2 of 5).



EL85C020

Figure 6-1. Intercommunication Station, LS-518A/SIC, Wiring Diagram (Sheet 3 of 5).

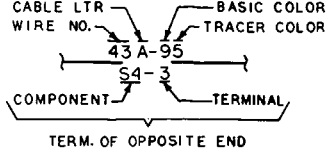
6-5/(6-6 blank)

NOTES:

1. STANDARD COLOR CODE:

- 1 - BROWN
- 2 - RED
- 3 - ORANGE
- 4 - YELLOW
- 5 - GREEN
- 6 - BLUE
- 7 - VIOLET
- 8 - GRAY
- 9 - WHITE
- 0 - BLACK

2. CODE TO WIRE MARKING:



3. REFERENCE DRAWING:

- ASSY DRAWING — 61690-000-1
- SCHEMATIC — 61690-002
- CABLE 'A' ASSY — 61690-120
- CABLE 'B' ASSY — 61690-127
- CABLE 'D' ASSY — 61690-183
- CABLE 'JW' ASSY — 61690-186
- WIRE LIST - A — 61690-124
- WIRE LIST - B — 61690-078
- WIRE LIST - D — 61690-182
- WIRE LIST - JW — 61690-185

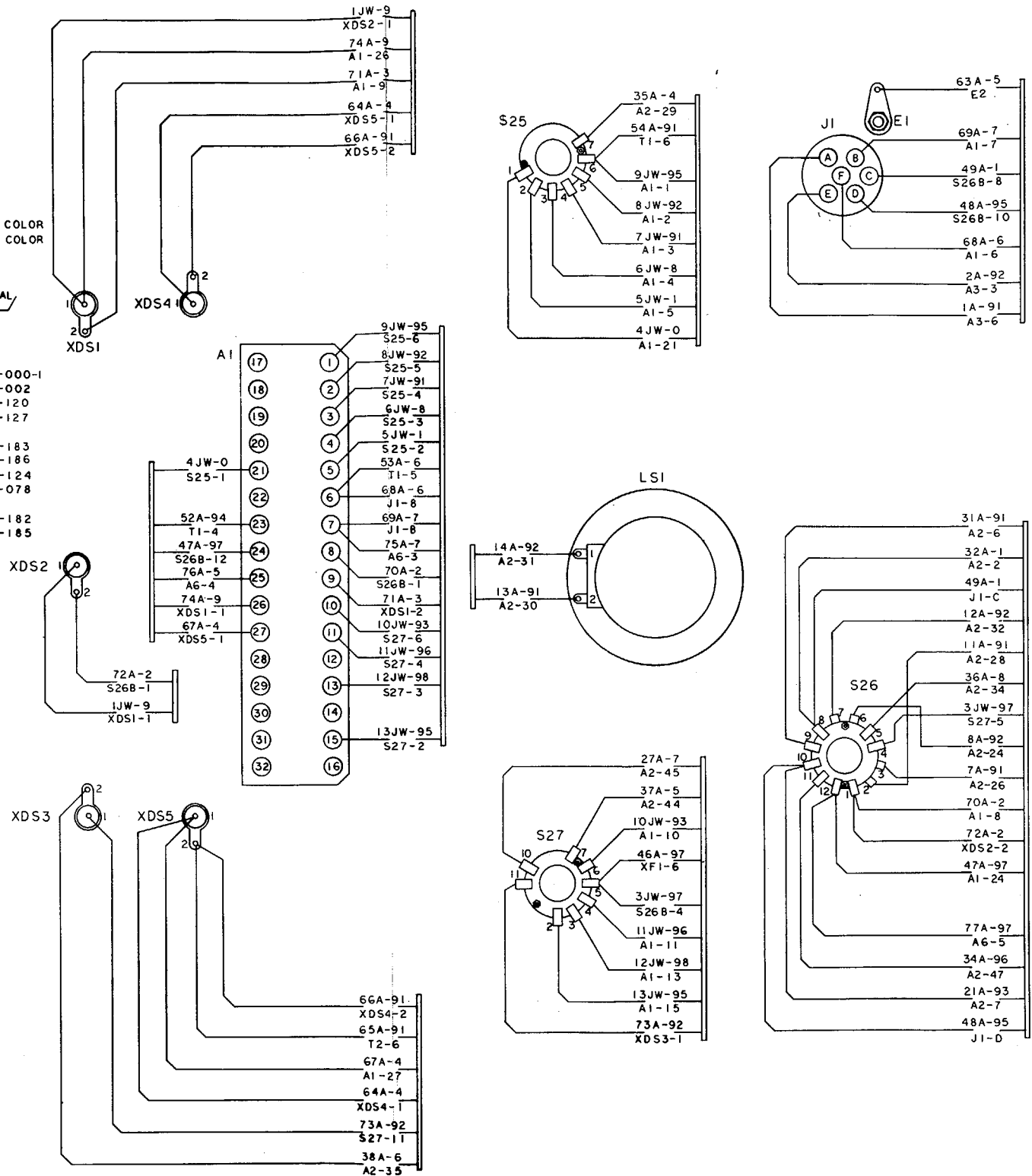


Figure 6-1. Intercommunication Station, LS-518A/ SIC, Wiring Diagram (Sheet 4 of 5).

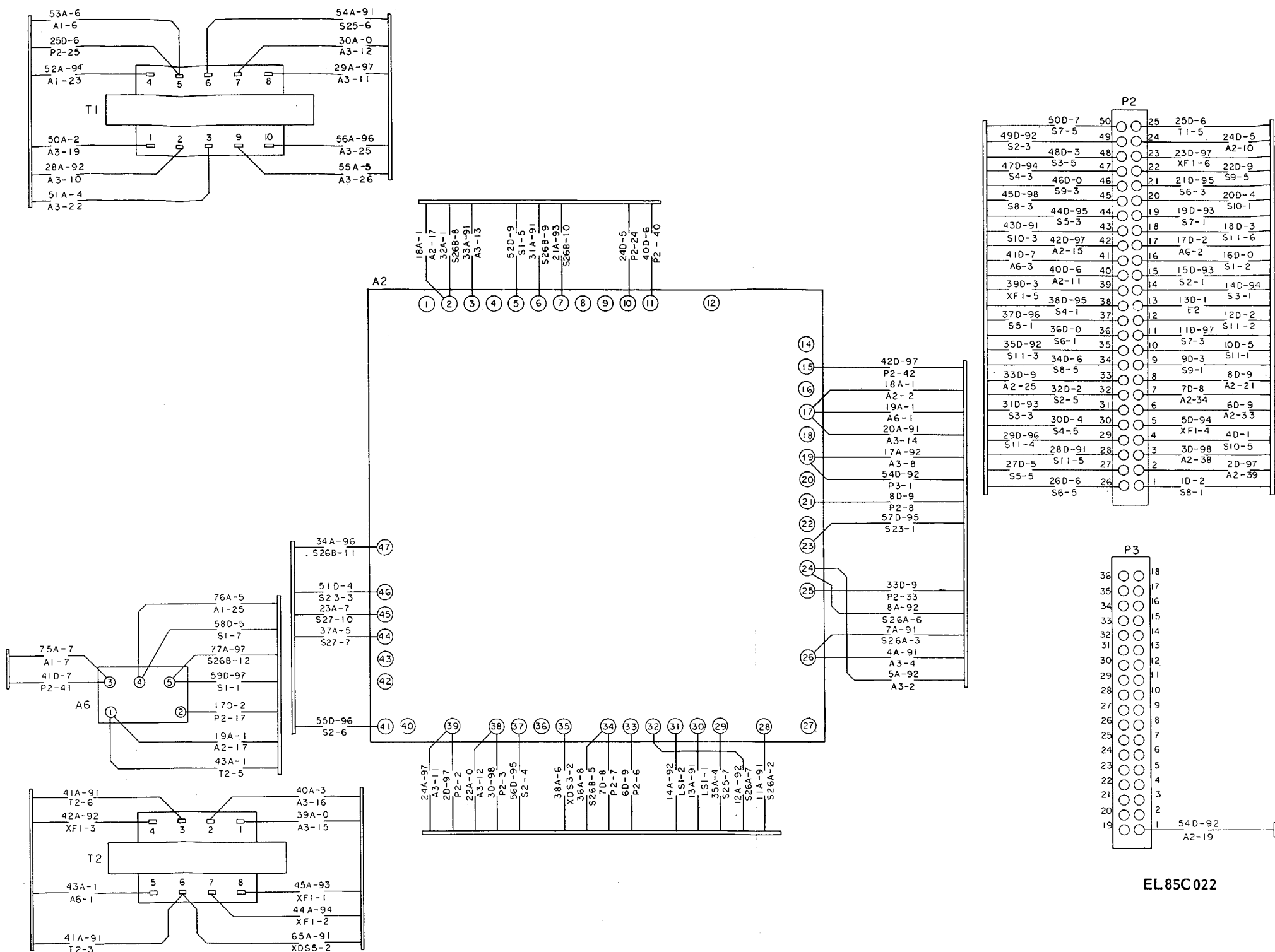


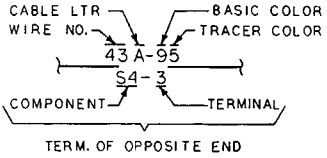
Figure 6-1. Intercommunication Station, LS-518A/ SIC, Wiring Diagram (Sheet 5 of 5).

NOTES:

1. STANDARD COLOR CODE:

- 1 - BROWN
- 2 - RED
- 3 - ORANGE
- 4 - YELLOW
- 5 - GREEN
- 6 - BLUE
- 7 - VIOLET
- 8 - GRAY
- 9 - WHITE
- 0 - BLACK

2. CODE TO WIRE MARKING:



3. REFERENCE DRAWING:

- ASSY DRAWING — 61690-000-2
- SCHEMATIC — 61690-002
- CABLE 'A' ASSY — 61690-121
- CABLE 'B' ASSY — 61690-128
- CABLE 'C' ASSY — 61690-083
- CABLE 'D' ASSY — 61690-184
- CABLE 'JW' ASSY — 61690-187
- WIRE LIST - A — 61690-124
- WIRE LIST - B — 61690-078
- WIRE LIST - C — 61690-082
- WIRE LIST - D — 61690-182
- WIRE LIST - JW — 61690-185

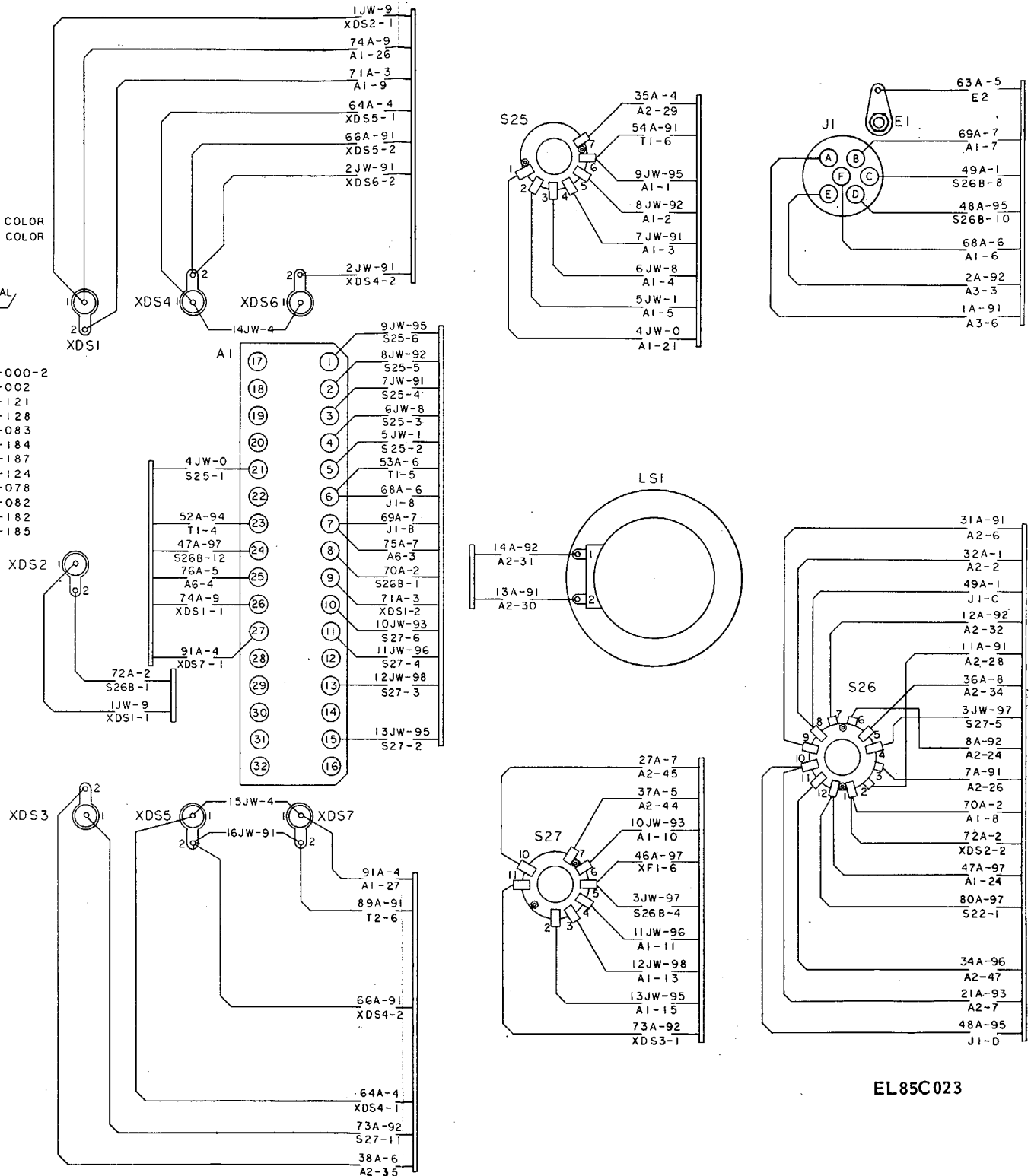


Figure 6-2. Intercommunication Station, LS-519A/SIC, Wiring Diagram (Sheet 1 of 5).

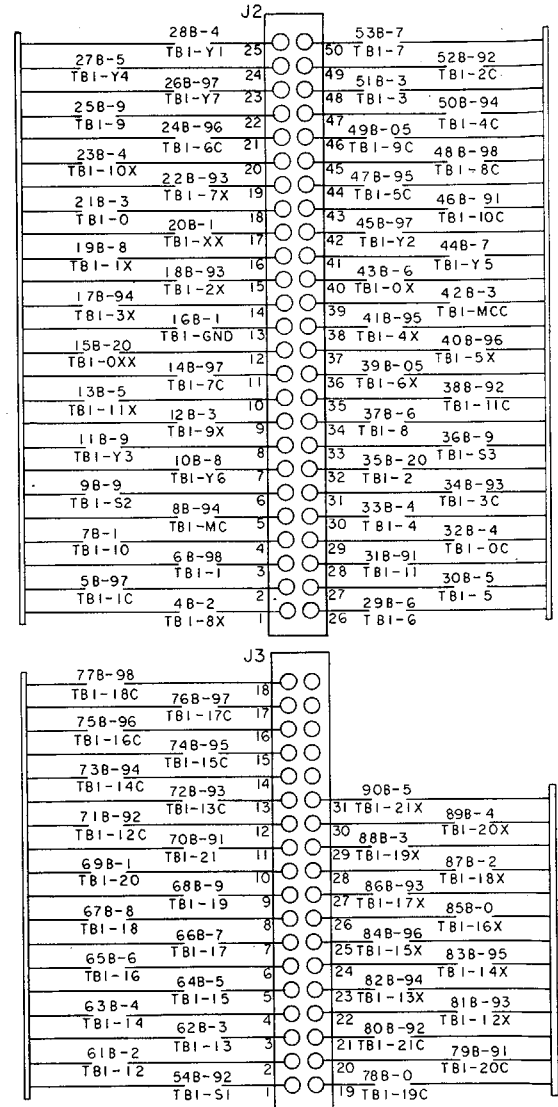
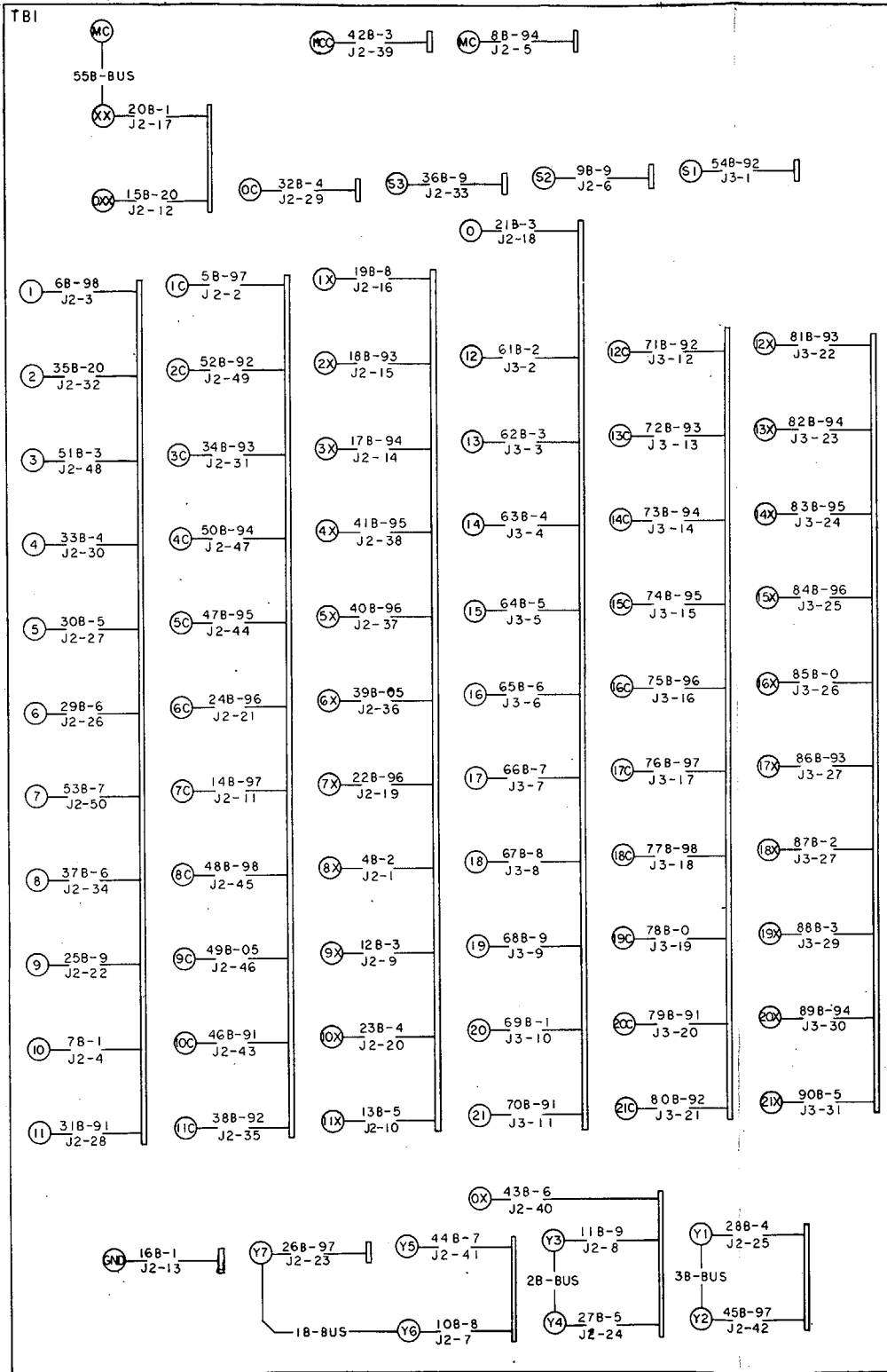
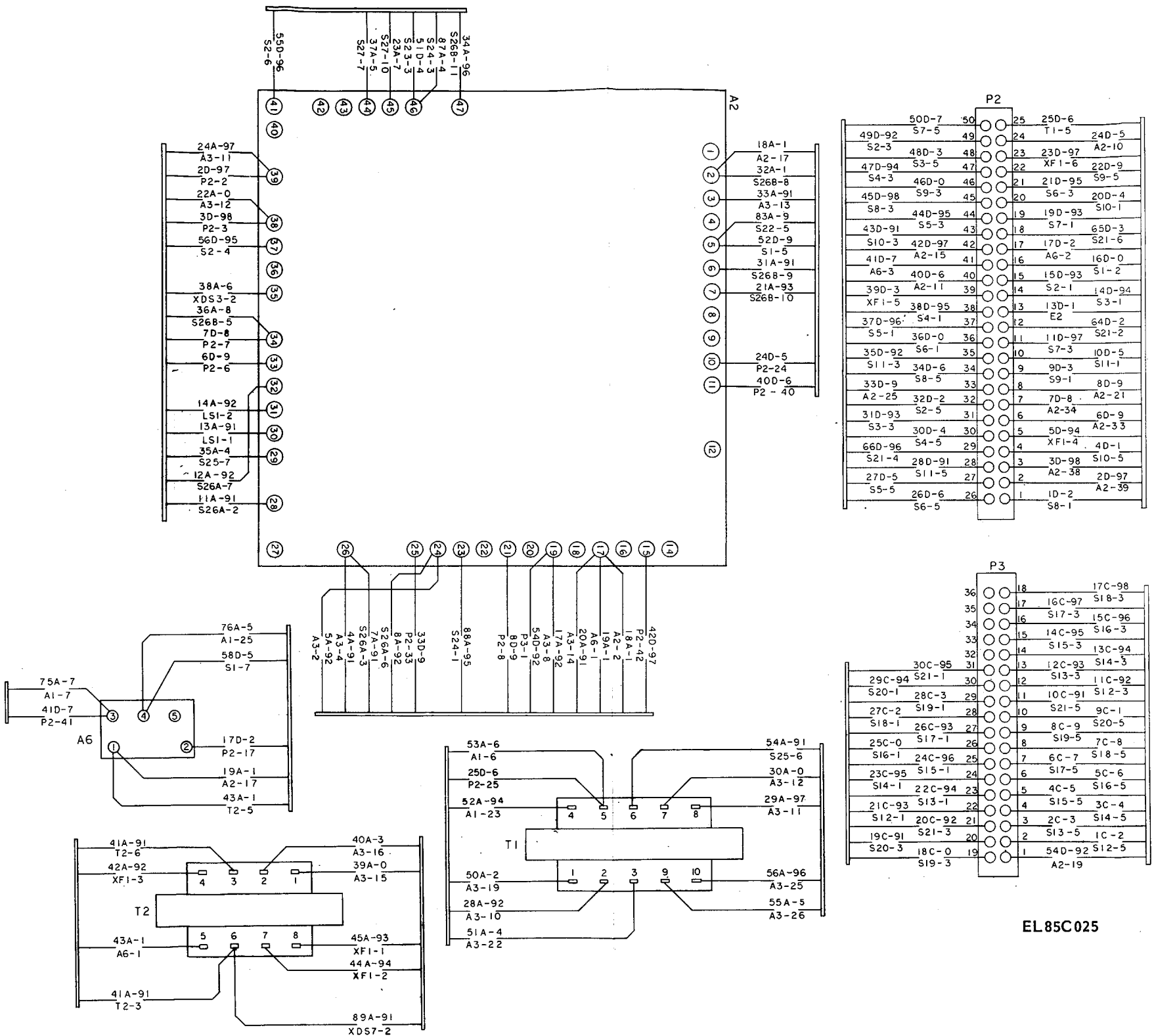


Figure 6-2. Intercommunication Station, LS-519A/SIC, Wiring Diagram (Sheet 2 of 5).

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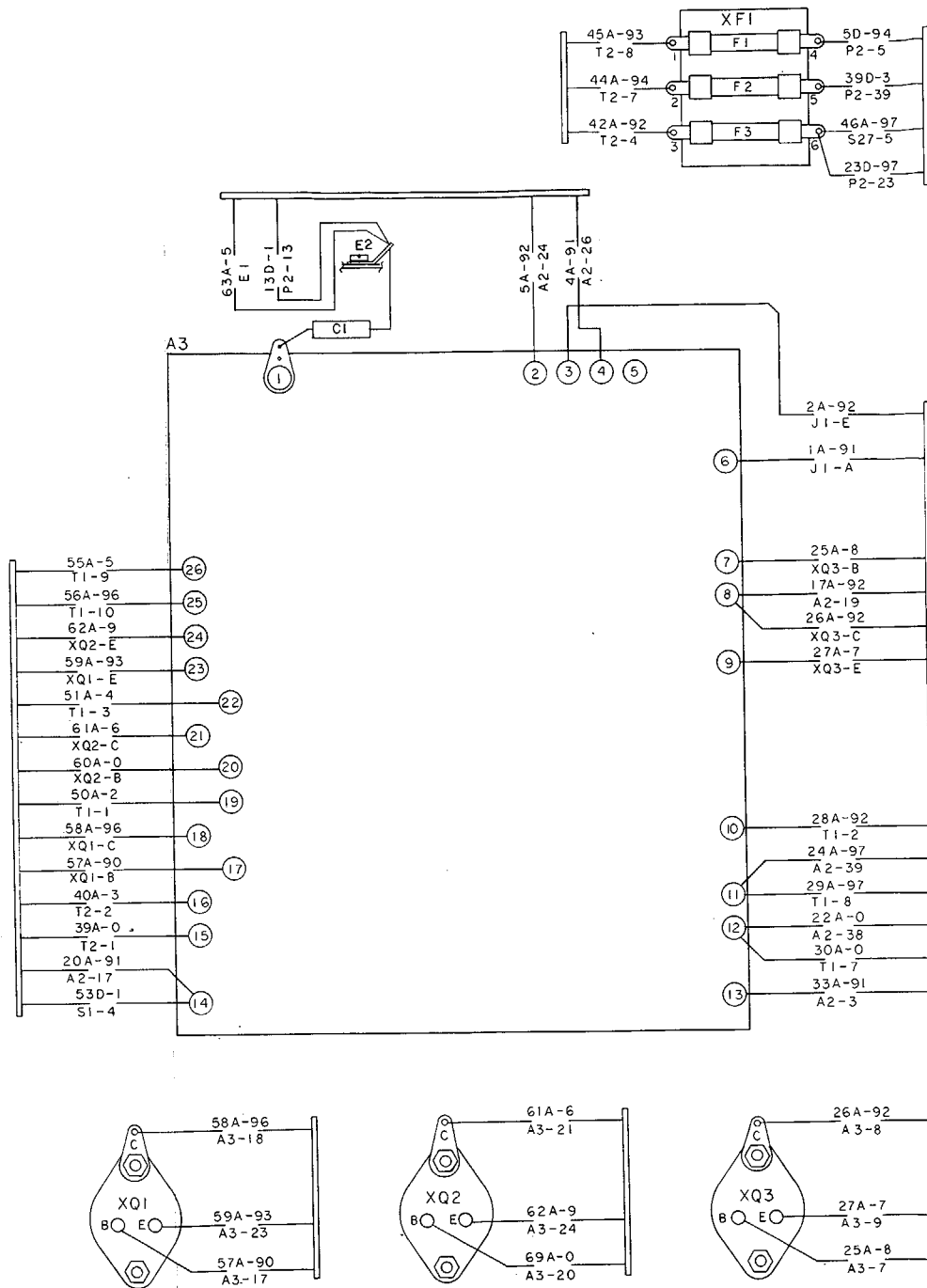


EL85C026

EL85C025

Figure 6-2. Intercommunication Station, LS-519A/SIC, Wiring Diagram (Sheet 4 of 5).

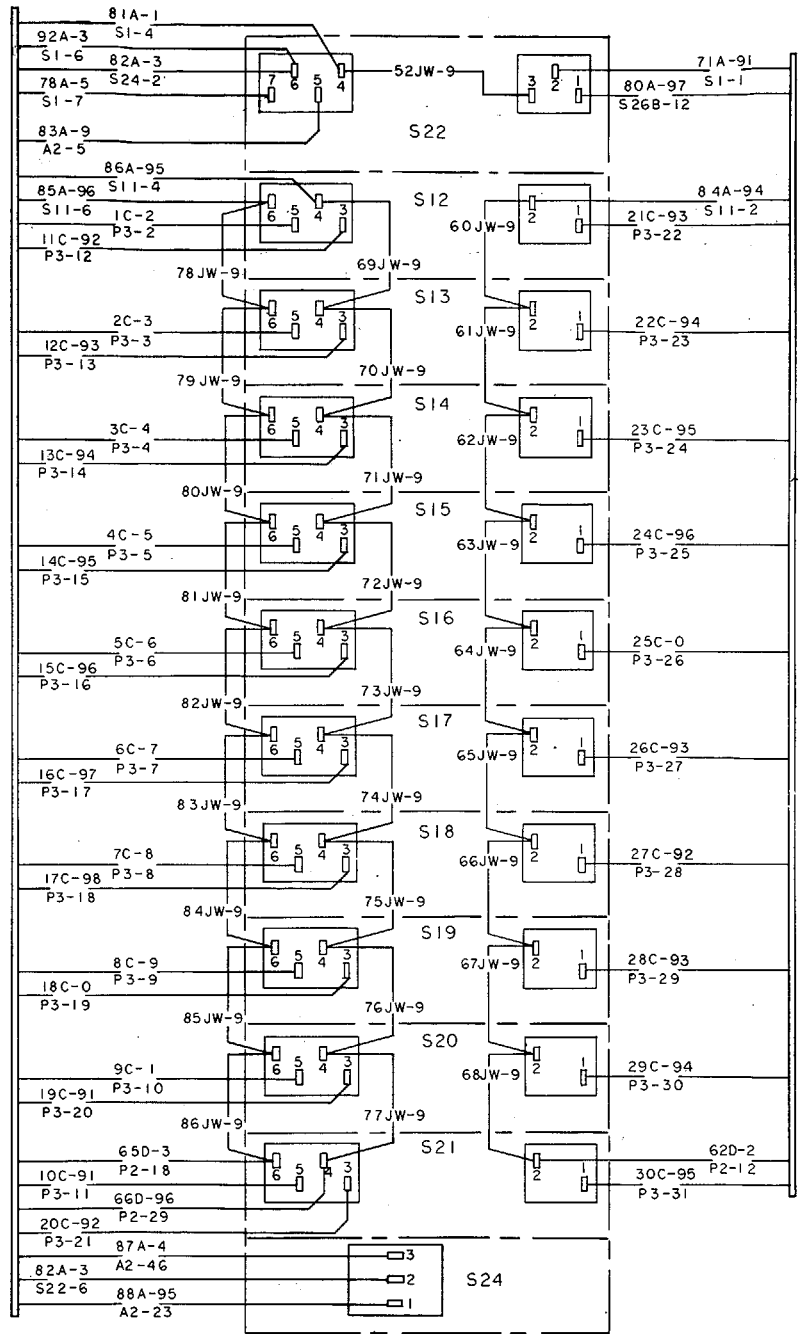
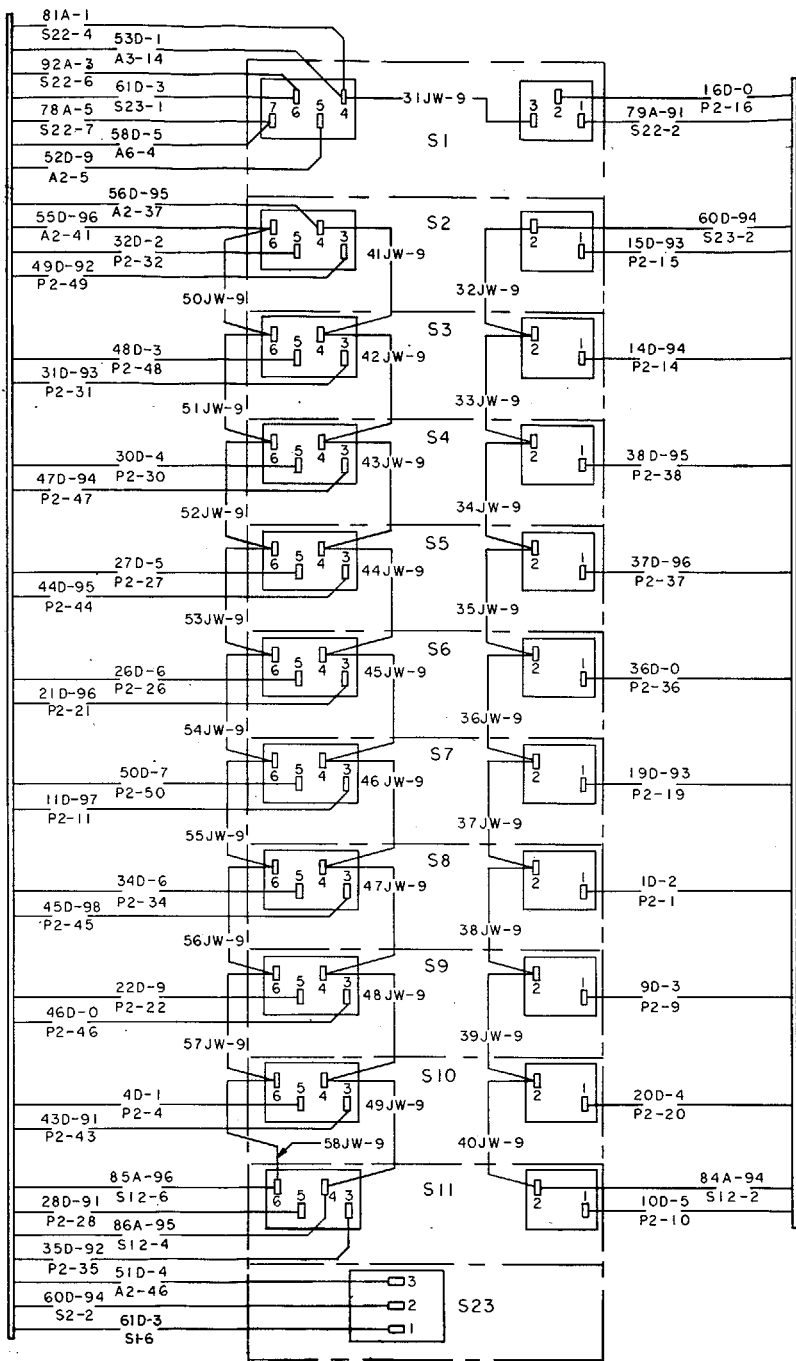
6-17/(6-18 blank)



61690-003 B

Figure 6-2. Intercommunication Station, LS-519A/SIC, Wiring Diagram (Sheet 4 of 5).

6-17/(6-18 blank)



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Figure 6-2. Intercommunication Station, LS-519A/SIC, Wiring Diagram (Sheet 5 of 5).

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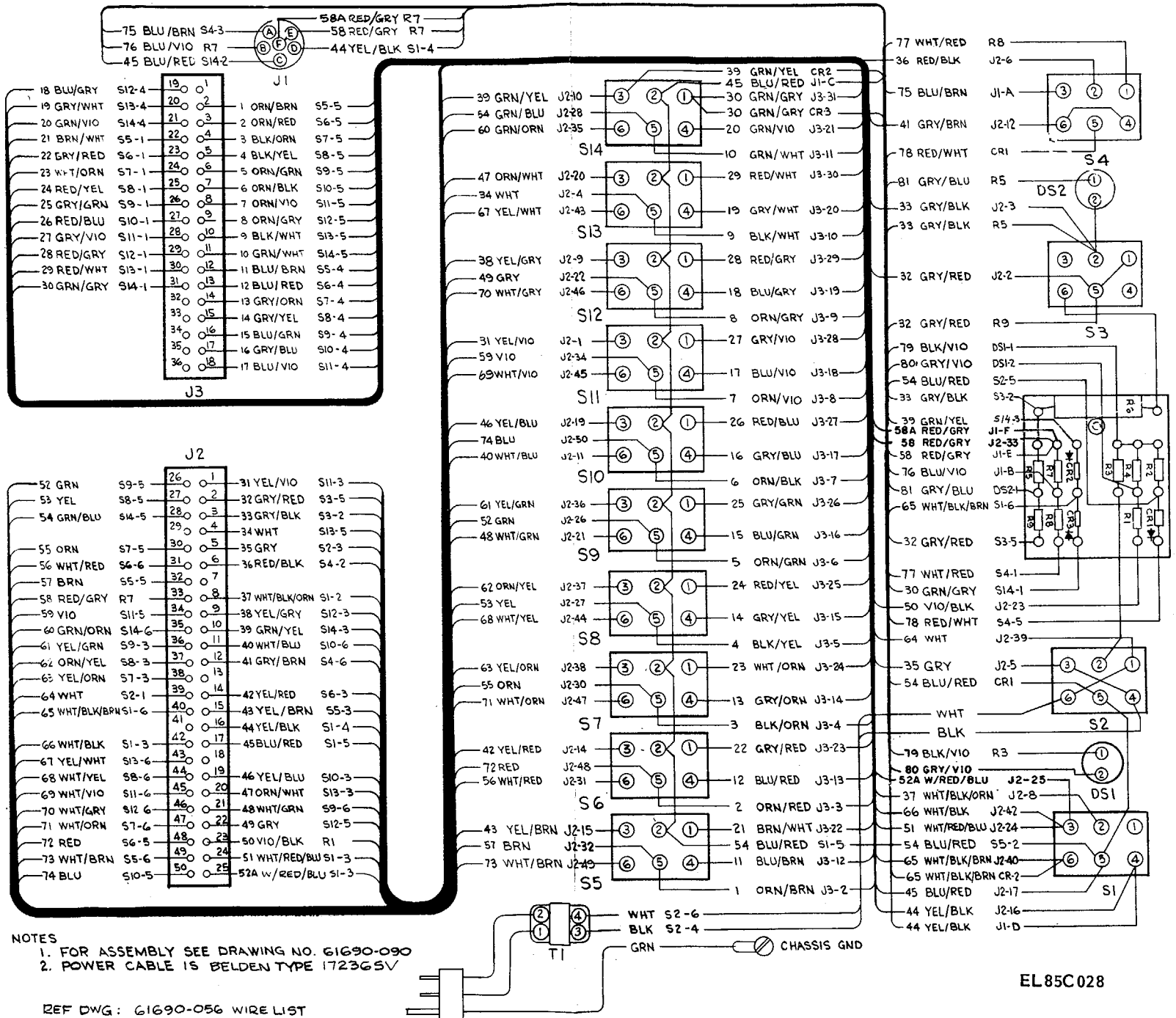


Figure 6-3. Test Fixture, wiring diagram.

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CHAPTER 7**PARTS LIST****7-1. INTRODUCTION.**

7-2. This chapter contains lists and illustrations which identify the replaceable parts of the LS-518A/SIC and LS-519A/SIC Intercommunication Stations.

7-3. LISTS OF MAJOR UNITS.

7-4. Tables 7-1 and 7-2 list the major units of the LS-518A/SIC and LS-519A/SIC Intercommunication Stations, respectively. The tables list the major units in numerical order and provide a cross reference to Military type and part number of each unit.

The page number on which the parts listing for each unit begins is also listed.

7-5. PARTS LIST.

7-6. Tables 7-3 and 7-4 list the parts of the LS-518A/SIC and LS-519A/SIC Intercommunication Stations, respectively. The parts list are arranged alphanumerically by unit number and reference designation, and numerically by item number on the associated illustrations. Those items in the parts lists which have no reference designation are keyed by the letters NRD (no reference designation) in the REFERENCE DESIGNATION column. However, the progressive listing of these parts is still numerical per item number.

7-7. COMMON ITEM LIST.

7-8. Identical parts that are used more than five times in the equipment are listed in table 7-5. These items are referenced by item number in the parts lists; for example, the entry "Item 1" in the NAME AND DESCRIPTION column of a parts list refers to item 1 in table 7-5. Common items are listed alphanumerically.

7-9. ATTACHING HARDWARE.

7-10. Items of attaching hardware used in five or more applications are listed in table 7-6. These items are identified by a letter code (A, B, C, etc.) which is used to key the hardware items to the "used on" items in the parts lists. For example, A(6), B(6) would indicate that six each of attaching hardware items A and B are used to attach the item in the parts list with which the code is associated. Hardware items used fewer than five times are listed in the parts lists.

7-11. LIST OF MANUFACTURERS.

7-12. Table 7-7 lists the name, address, and Federal supply code number of all manufacturers supplying items for the equipment. Code numbers are in accordance with Handbooks H4-1 and H4-2.

Table 7-1. Intercommunication Station LS-518A/SIC, List of Major Components.

UNIT	NOMENCLATURE		PAGE
NO.	NAME	PART NUMBER	NO.
1	Intercommunication Station, Type LS-518A/SIC	61690-000-1	7-3
1A1	Circuit Card Assembly, Resistor Board	61690-140	7-9
1A2	Circuit Card Assembly, Relay Board	61690-096-	7-16
1A3	Circuit Card Assembly, Amplifier and Power Supply Board	61690-099	7-18
1A4	Station Selector Switch Assembly, Upper	61690-119	7-22
1A6	Terminal Board Assembly, Resistor Board	61690-081	7-25

Table 7-2. Intercommunication Station LS-519A/SIC, List of Major Components.

UNIT	NOMENCLATURE		PAGE
NO.	NAME	PART NUMBER	NO.
1	Intercommunication Station, Type LS-519A/SIC	61690-000-2	7-26
1A1	Circuit Card Assembly, Resistor Board	61690-092	7-26
1A2	Circuit Card Assembly, Relay Board	61690-096	7-16
1A3	Circuit Card Assembly, Amplifier and Power Supply Board	61690-099	7-18
1A4	Station Selector Switch Assembly, Upper	61690-119	7-22
1A5	Station Selector Switch Assembly, Lower	61690-161	7-32
1A6	Terminal Board Assembly, Resistor Board	61690-081	7-25

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Intercommunication Station, Type LS-518A/SIC (UNIT 1)).

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A1	CIRCUIT CARD ASSEMBLY, RESISTOR BOARD: mfr 12763, dwg 61690-140. For breakdown, see figure 7-2. (Attaching Hardware) G(2),M(2),P(2)	7-1 (1)
1A2	CIRCUIT CARD ASSEMBLY, RELAY BOARD: mfr 12763, dwg 61690-096. For breakdown, see figure 7-3. (Attaching Hardware) G(4),M(4),P(4)	7-1 (2)
1A3	CIRCUIT CARD ASSEMBLY, AMPLIFIER AND POWER SUPPLY BOARD: mfr 12763, dwg 61690-099. For breakdown, see figure 7-4. (Attaching Hardware) G(4),M(4),P(4)	7-1 (3)
1A4	STATION SELECTOR SWITCH ASSEMBLY, UPPER: mfr 12763, dwg 61690-119. For breakdown, see figure 6-5. (Attaching Hardware) G(4),M(4),P(4)	7-1 (4)
1A6	TERMINAL BOARD ASSEMBLY, RESISTOR BOARD: mfr 12763, dwg 61690-081. For breakdown, see figure 7-6. (Attaching Hardware) B(2),M(2),P(2)	7-1 (5)
1C1	CAPACITOR, FIXED, ELECTROLYTIC: 0.1uf, +10%, 100V, MIL type CP05A1KB104K3, 12763, dwg 11158-204	7-1 (110)
1DS1 THRU 1DS5	ITEM 3. (Refer to table 7-6).	7-1 (6)
1E1	TERMINAL, LUG: no. 4, brass, mfr 83330, part no. 2104-4, 12763, dwg 14055-008	7-1 (7)
1F1 AND 1F2	FUSE, TIME LAG: 1/2 amp, 250 volts, mfr 71400, MIL type F03B250V1/2AS, 12763, dwg 14050-017	7-1 (8)
1F3	FUSE, NORMAL: 1.0 amp, type 3AG, 250 V, mfr 71400, MIL type F03A250V1AS, 12763, dwg 14050-002	7-1 (9)
1J1	CONNECTOR, RECEPTACLE, ELECTRICAL: mfr 77096, MIL part no. 9000-S6502-74117-2, 12763, dwg 13028-001	7-1 (10)
1J2	CONNECTOR, RECEPTACLE, ELECTRICAL: 50 pin, female, mfr 02660, part no. 57-20-500, 12763, dwg 13036-013 (Attaching Hardware) A(2),L(2),O(2)	7-1 (11)

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Intercommunication Station, Type LS-518A/SIC (UNIT 1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1J3	CONNECTOR, RECEPTACLE, ELECTRICAL: 36 pin, female, mfr 02660, part no. 57-20-360, 12763, dwg 13036-006 (Attaching Hardware) A(2),E(2),L(2),O(2)	7-1 (12)
1LS1	LOUDSPEAKER: mfr 87771, MIL type LS-455/U, 12763, dwg 61211-000 (Attaching Hardware) M(4),P(4)	7-1 (13)
1P2	CONNECTOR, RECEPTACLE, ELECTRICAL: 50 pin, male, mfr 02669, part no. 57-10500, 12763, dwg 13036-010 (Attaching Hardware) A(2),E(2),L(2),O(2)	7-1 (14)
1P3	CONNECTOR, RECEPTACLE, ELECTRICAL: 36 pin, male, mfr 02660, part no. 57-10360, 12763, dwg 13036-005 (Attaching Hardware) A(2),E(2),L(2),O(2)	7-1 (15)
1Q1 THRU 1Q3	TRANSISTOR: mfr 81349, MIL type 2N3055, 12763, dwg 16126-011 (Attaching Hardware) F(6)	7-1 (16)
1S25	SWITCH, ROTARY: volume control, mfr 76854, MIL part no. 269658F1E, 12763, dwg 61690-103	7-1 (17)
1S26	SWITCH, ROTARY: handsfree, mfr 76854, MIL part no. 270972F1E, 12763, dwg 61690-101	7-1 (18)
1S27	SWITCH, ROTARY: dimmer, mfr 76854, MIL part no. 269659F1E, 12763, dwg 61690-102	7-1 (19)
1T1	TRANSFORMER, AUDIO: mfr 12763, dwg 61690-005	7-1 (20)
1T2	TRANSFORMER, POWER: mfr 12763, dwg 61690-007	7-1 (21)
1TB1	TERMINAL BOARD: mfr 12763, dwg 61690-070 (Attaching Hardware) G(4),M(4),P(4)	7-1 (22)
1XDS1 THRU 1XDS7	ITEM 4. (Refer to table 7-6).	7-1 (23)
1XF1	FUSEHOLDER, BLOCK: phenolic, mfr 71400, part no. 3823-3, 12763, dwg 61690-108 (Attaching Hardware) B(2),F(2),M(2),P(2)	7-1 (24)
1XQ1 THRU 1XQ3	SOCKET, TRANSISTOR: phenolic, mfr 91506, part no. 8080-1G14, 12763, dwg 14090-009 (Attaching Hardware) A(3),L(3),O(3)	7-1 (25)

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Intercommunication Station, Type LS-518A/SIC (UNIT 1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
NRD	LENS, LIGHT: release lamp, mfr 08717, part no. 855D, 12763, dwg 14101-014	7-1 (49)
NRD	LENS, LIGHT: call lamp, mfr 08717, part no. 855D, 12763, dwg 14101-015	7-1 (50)
NRD	LENS, LIGHT: busy lamp, mfr 08717, part no. 855D, 12763, dwg 14101-016	7-1 (51)
NRD	LENS, LIGHT: edgelite, mfr 08717, part no. 8555E, 12763, dwg 14101-017	7-1 (52)
NRD	GRILLE, LOUDSPEAKER: steel, mfr 87771, part no. 60F25-1, 12763, dwg 61691-032	7-1 (53)
NRD	DESIGNATION STRIP, EDGE LIGHT: plastic, mfr 12763, dwg 61690-036	7-1 (54)
NRD	PLATE, INSTRUCTION: aluminum, mfr 12763, dwg 61690-037 (Attaching Hardware) D(4),L(4),O(4)	7-1 (55)
NRD	GASKET, LOUDSPEAKER: neoprene, 12763, dwg 61690-033	7-1 (56)
NRD	BRACKET, ANGLE: connector channel, steel, mfr 12763, dwg 61690-044 (Attaching Hardware) B(4),H(4),M(4),P(4)	7-1 (57)
NRD	PLATE ASSEMBLY: 1h, steel, mfr 12763, dwg 61690-046	7-1 (31)
NRD	BASE, CHANNEL, CONNECTOR: steel, mfr 12763, dwg 61690-051 (Attaching Hardware) N(2),Q(2)	7-1 (32)
NRD	CHANNEL, CONNECTOR: steel, mfr 12763, dwg 61690-050 (Attaching Hardware) N(2),Q(2)	7-1 (33)
NRD	CASE, BOTTOM: aluminum, mfr 12763, dwg 61690-052	7-1 (34)
NRD	COVER ASSEMBLY, TOP: aluminum, mfr 12763, dwg 61690-157 (Attaching Hardware) N(4),Q(4)	7-1 (35)
NRD	MOUNT, RESILIENT: chas, neoprene, mfr 12763, dwg 61690-100	7-1 (36)

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Intercommunication Station, Type LS-518A/SIC (UNIT 1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
NRD	GASKET: edgelite lamp, neoprene, mfr 12763, dwg 61690-076	7-1 (37)
NRD	PIN, SHOULDER, HEADLESS: guide, stainless steel, mfr 12763, dwg 61690-054	7-1 (38)
NRD	BRACKET, ANGLE: pcb mounting, steel, mfr 12763, dwg 61690-093 (Attaching Hardware) I(4),M(4),P(4)	7-1 (39)
NRD	KNOB: PTT switch, zinc alloy, mfr 12763, dwg 61691-014 (Attaching Hardware) K(2)	7-1 (40)
NRD	KNOB: VOL switch, zinc alloy, mfr 12763, dwg 61691-013 (Attaching Hardware) K(4)	7-1 (41)
NRD	RETAINER, ELECTRICAL RELAY: steel, mfr 12763, dwg 61690-107	7-1 (42)
NRD	PAD, ELECTRICAL RELAY RETAINER: neoprene sponge, mfr 12763, dwg 61691-065	7-1 (43)
NRD	PLATE, TRANSISTOR MOUNTING: aluminum, mfr 12763, dwg 61690-146 (Attaching Hardware) I(4),M(4),P(4)	7-1 (44)
NRD	GASKET, CONNECTOR: rubber, mfr 12763, dwg 60171-000	7-1 (45)
NRD	BRACKET, ANGLE: fuseholder mounting, steel, mfr 12763, dwg 61690-143 (Attaching Hardware) B(2),H(2),M(2),P(2)	7-1 (46)
NRD	BRACKET, ANGLE: support, steel, mfr 12763, dwg 61690-048 (Attaching Hardware) H(2),M(2),P(2)	7-1 (47)
NRD	PLATE, IDENTIFICATION: monel, mfr 12763, dwg 61690-144 (Attaching Hardware) D(2),L(2),O(2)	7-1 (48)
NRD	PLUG, MACHINE THREAD: 1-1/2 x 11-1/2 npt, sqh, mfr 23540, part no. TP-15, 12763, dwg 61690-165	7-1 (87)
NRD	PLUG, MACHINE THREAD: 3/4-14 npt, sqh, mfr 23540, part no. TP-9, 12763, dwg 61690-110	7-1 (88)

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Intercommunication Station, Type LS-518A/SIC (UNIT 1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
NRD	GASKET, LOUDSPEAKER: neoprene, 12763, dwg 61690-033	7-1 (56)
NRD	GASKET, SWITCH SEAL: neoprene, 12763, dwg 61691-068	7-1 (82)
NRD	SPACER, STANDOFF: 1/4 x 1-1/4 hex, stainless steel, mfr 06540, part no. 9745-SS-0632-7, 12763, dwg 12520-801	7-1 (89)
NRD	SCREW, MACHINE: hex head, sltd, stainless steel, 1/4-20 x 1.0, mfr 96906, MIL type MS16208, dwg 12148-007	7-1 (60)
NRD	SCREW, MACHINE: pnh, sltd, stainless steel, 4-40 x 1/2, mfr 96906, MIL type MS35233-17, 12763, dwg 12106-003	7-1 (61)
NRD	SCREW, MACHINE: flh, sltd, stainless steel, 4-40 x 5/8, mfr 96906, MIL type MS35249-25, 12763, dwg 12101-004	7-1 (62)
NRD	SCREW, MACHINE: pnh, sltd, 10-24 x 7/8, stainless steel, mfr 96906, MIL type MS35233-66, 12763, dwg 12197-006	7-1 (67)
NRD	SCREW, MACHINE: pnh, sltd, stainless steel, 8-32 x 3/8, mfr 96906, MIL type MS35233-43, 12763, 12126-002	7-1 (68)
NRD	PANEL, BLANK: aluminum, mfr 12763, dwg 61690-106 (Attaching Hardware) F(2),P(2)	7-1 (69)
NRD	SCREW, MACHINE: pnh, sltd, stainless steel, 1/4-20 x 1.00, MIL type MS35233-83, 12763, dwg 12146-007	7-1 (70)
NRD	SCREW, MACHINE: hex hd, stainless steel, 1/4-20 x 1-3/4, mfr 96906, MIL type MS16208, 12763, dwg 12148-010	7-1 (71)
NRD	PIN, ROLL: 0.078 x 3/8, stainless steel, mfr 72962, part no. 79-018-078-0375, 12763, dwg 61690-105	7-1 (72)
NRD	NUT, SELF-LOCKING, HEXAGON: stainless steel, 1/4-20, mfr 96906, MIL type MS35649, 12763, dwg 12304-006	7-1 (73)

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Intercommunication Station, Type LS-518A/SIC (UNIT 1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
NRD	SCREW, MACHINE: pnh, sltd, stainless steel, 6-32 x 9/16, mfr 96906, MIL type MS35233, 12763, dwg 12116-024	7-1 (74)
NRD	ITEM 6. (Refer to table 7-6)	7-1 (75)
NRD	SEAL, COVER SCREW: stainless steel/Buna-N, mfr 02697, part no. 600-430-1/4, 12763, dwg 60172-002	7-1 (78)
NRD	WASHER, FLAT: stainless steel, no. 8, mfr 96906, MIL type MS15795-807, 12763, dwg 12211-007	7-1 (81)
NRD	GASKET, SWITCH SEAL: neoprene, mfr 12763, dwg 61691-068	7-1 (82)
NRD	WASHER, LOCK: stainless steel, no. 8, mfr 96906, MIL type MS35338-80, 12763, dwg 12203-004	7-1 (86)
NRD	LUG, TERMINAL: no. 6, brass, mfr 83330, part no. 2104-6, 12763, dwg 14055-002	7-1 (90)
NRD	PIN, ROLL: 0.078 x 1/2, stainless steel, mfr 72962, part no. 79-018-078-0500, 12763, dwg 61716-069	7-1 (92)
NRD	WASHER, LOCK: no. 10, stainless steel, mfr 81349, MIL type MS35338-81, 12763, dwg 12203-005	7-1 (93)
NRD	SPACER, STANDOFF: 1/4 x 1/2, HEX, stainless steel, mfr 06540, part no. 9793-SS-0623-7, 12763, dwg 12520-725	7-1 (94)
NRD	SPACER: 1/4 x 1/4, stainless steel, mfr 06540, part no. 9224-SS-140-7, 12763, dwg 12400-011	7-1 (95)
NRD	CLAMP, LOOP: nylon, 5/16, mfr 83330, part no. PP4, 12763, dwg 12510-004	7-1 (96)
NRD	SPACER, STANDOFF: nylon, 1/4 HEX, 6-32 x 1/2, nylon, mfr 06540, part no. 9739-N-0632, 12763, dwg 12520-728	7-1 (104)
NRD	SLEEVING, TEFLON: mfr 92194, part no. 20, 12763, dwg 15520-020	7-1 (112)

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Intercommunication Station, Type LS-518A/SIC (UNIT 1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
	NOTE The following items are used for recessed panel installation only.	
NRD	BRACKET, ANGLE: case mounting (top) aluminum, mfr 12763, dwg 61690-038 (Attaching Hardware) C(4)	7-1 (105)
NRD	BRACKET, ANGLE: case mounting (bot) aluminum, mfr 12763, dwg 61690-039 (Attaching Hardware) C(4)	7-1 (106)

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Circuit Card Assembly, Resistor Board (UNIT 1A1)).

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A1CR1 AND 1A1CR2	SEMICONDUCTOR DEVICE, DIODE: mfr 81349, MIL type 1N645, MIL spec MIL-S-19500/240, 12763, dwg 16100-005	7-2
1A1R1	RESISTOR, FIXED, COMPOSITION: 8.2 ohms, +5%, 1/2 w, mfr 81349, MIL type RC20GF8R2J, 12763, dwg 11204-007	7-2
1A1R2	RESISTOR, FIXED, COMPOSITION: 15 ohms, +5%, 1/2 w, mfr 81349, MIL type RC20GF150J, 12763, dwg 11204-012	7-2
1A1R3 AND 1A1R14	RESISTOR, FIXED, COMPOSITION: 33 ohms, +5%, 1/2 w, mfr 81349, MIL type RC20GF330J, 12763, dwg 11204-020	7-2
1A1R4	RESISTOR, FIXED, COMPOSITION: 68 ohms, +5%, 1/2 w, mfr 81349, MIL type RC20GF680J, 12763, dwg 11204-028	7-2
1A1R5	RESISTOR, FIXED, COMPOSITION: 120 ohms, +5%, 1/2 w, mfr 81349, MIL type RC20GF121J, 12763, dwg 11204-034	7-2

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NOTES:

1. FINISH: ANODIC TREATMENT CONFORMING TO: MIL-A-8625 THEN ONE COAT PRIMER PRETREATMENT PER MIL-P-15328 AND ONE COAT GRAY ENAMEL PER MIL-E-15090 TYPE III CLASS 2.
2. FRONT CLEARANCE TO REMOVE PANEL AND AMPLIFIER FOR SERVICING IS 16 INCHES FROM MOUNTING SURFACE.
3. WEIGHT OF ONE: 26 LBS.
4. ITEMS NOT SHOWN ON DRAWING:
 ITEM 26, 61690-120 CABLE ASSY "A"
 ITEM 27, 61690-127 CABLE ASSY "B"
 ITEM 28, 61690-183 CABLE ASSY "D"
 ITEM 29, 61690-186 CABLE ASSY (JUMPERS)
5. RECESSED PANEL INSTALLATION HARDWARE AND SUPPORT ANGLES WILL BE SUPPLIED BY DYNALEC CORPORATION IF SPECIFIED ON ORDER.

REFERENCE DRAWINGS:
 61690-001 OUTLINE DRAWING
 61690-002 SCHEMATIC DIAGRAM
 61690-129 WIRING DIAGRAM

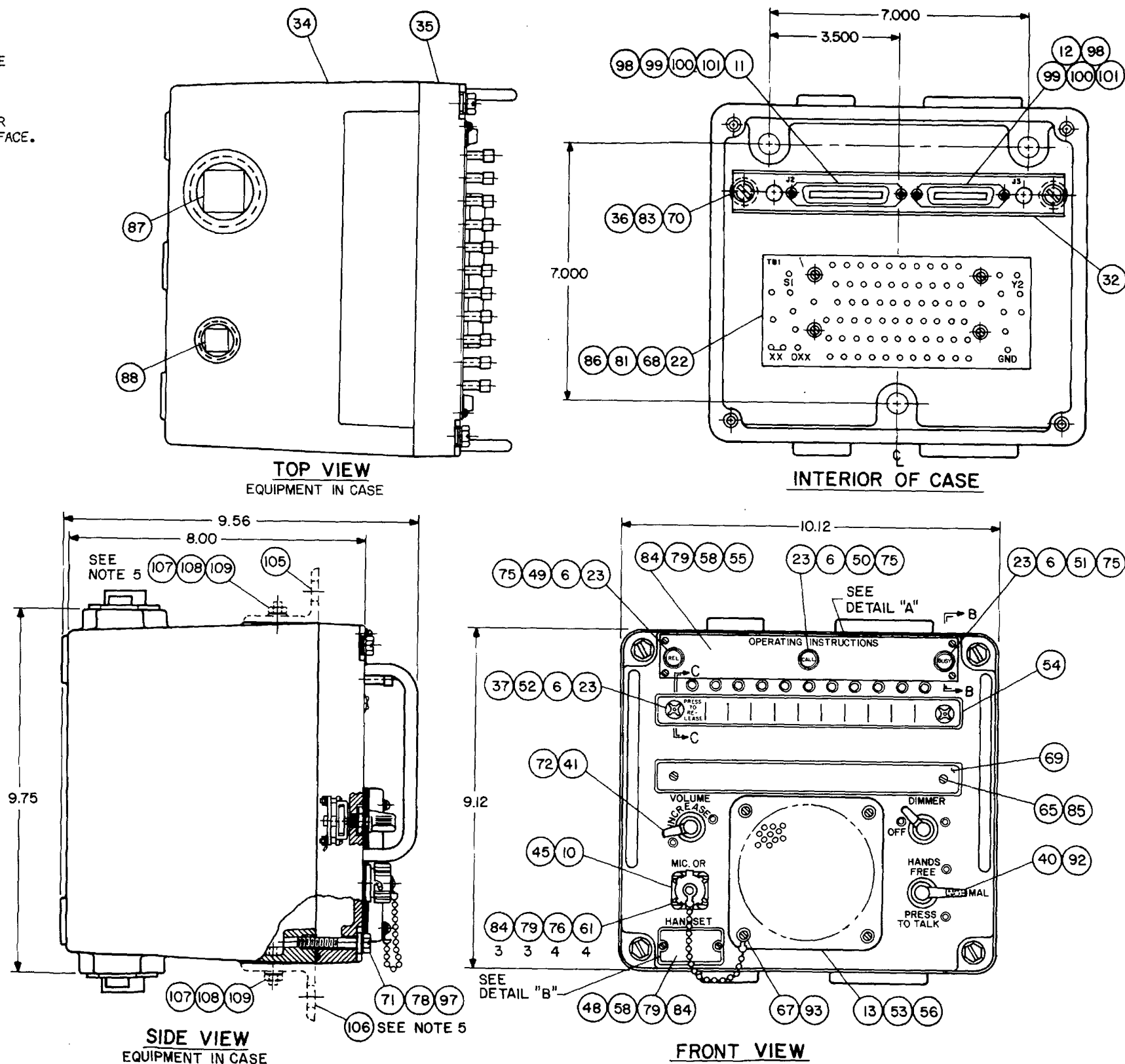


Figure 7-1. Intercommunication Station, Type LS-518A/SIC (UNIT 1), Parts Location diagram (Sheet 1 of 2).

OPERATING INSTRUCTIONS

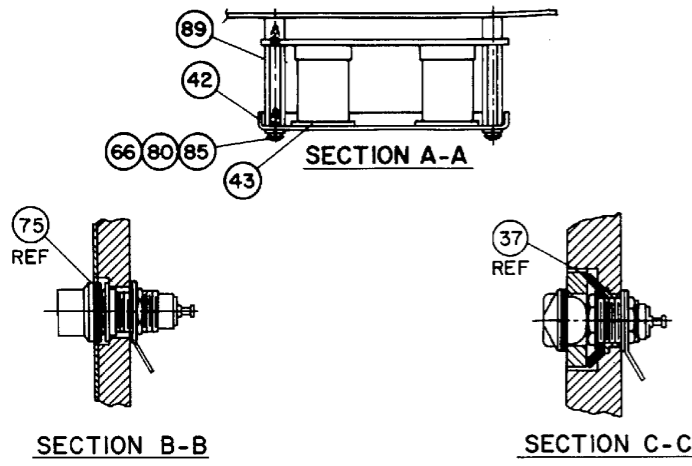
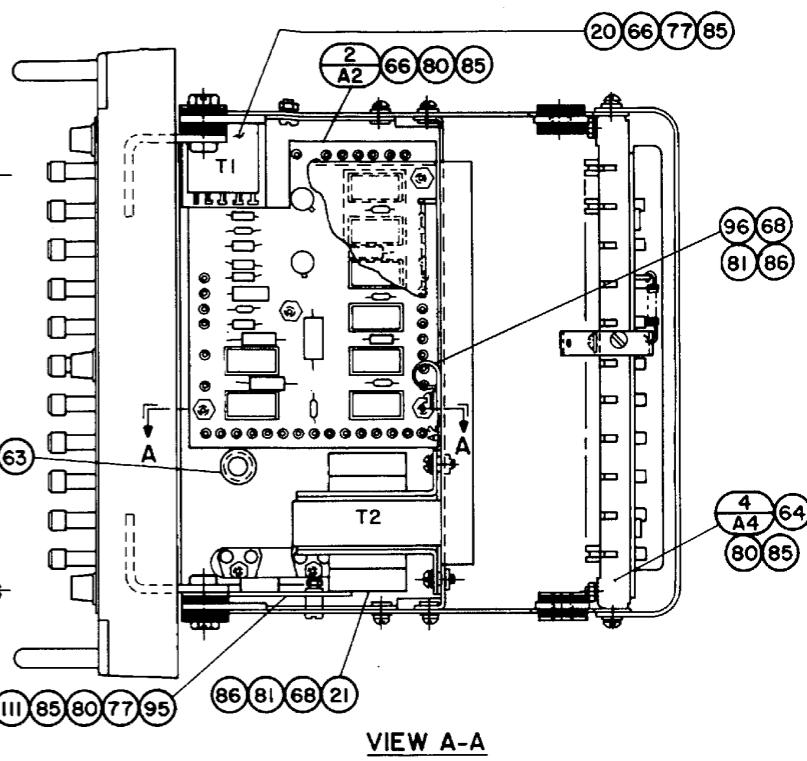
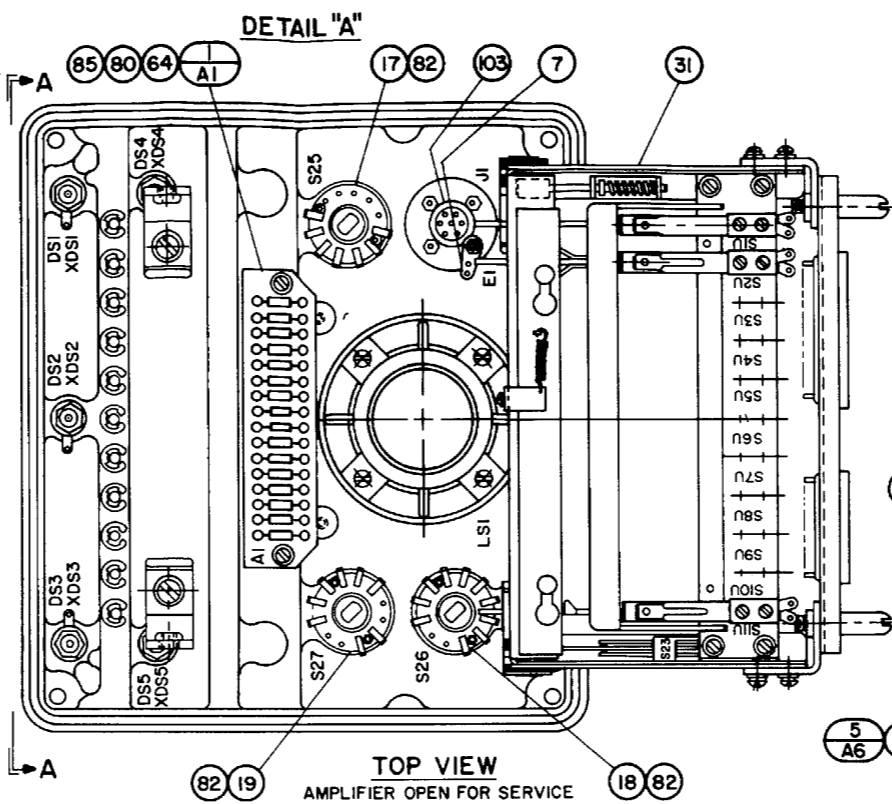
TO ORIGINATE A CALL: DEPRESS SELECTOR BUTTON ASSIGNED TO MASTER STATION OR REMOTE SPEAKER BEING CALLED. OPERATE TALK SWITCH LEVER TO DOWN POSITION AND TALK DIRECTLY INTO LOUDSPEAKER. RELEASE TALK SWITCH TO LISTEN. DEPRESS RELEASE BUTTON WHEN FINISHED.

TO ACCEPT CALL: CALL LAMP ILLUMINATES AND MESSAGE IS HEARD. OPERATE TALK SWITCH LEVER DOWN AND REPLY. NOTIFY CALLING STATION TO DEPRESS RELEASE BUTTON IF CALL LAMP STAYS ON AFTER FINISHING.

HANDS-FREE OPERATION: AFTER CALLING, OR TO REPLY TO A CALL, OPERATE TALK SWITCH TO UP POSITION AND TALK DIRECTLY INTO LOUDSPEAKER. NO OTHER CONTROLS NEED BE OPERATED. WHEN HANDS-FREE OPERATION IS NO LONGER REQUIRED, RETURN TALK SWITCH DOWN TO NORMAL POSITION.

HANDSET OR MICROPHONE: PLUGGING IN EITHER H-186/U OR M-132/SIC TRANSFERS TALK SWITCH FUNCTION TO PUSH BUTTON ON EITHER UNIT, AND DISCONNECTS LOUDSPEAKER AS A MICROPHONE.

REMOTE SPEAKER: THE MASTER STATION RECEIVES AN AUDIBLE CALL AND THE LAMP LIGHTS. TO REPLY, DEPRESS SELECTOR BUTTON FOR REMOTE STATION, DEPRESS TALK SWITCH, AND SPEAK INTO LOUDSPEAKER. REMOTE STATION NOW REPLIES HANDS-FREE.



LS-519 A/SIC
INTERCOMMUNICATION STATION
115 VAC 60Hz 25 WATTS 1Ø
SERNO
MANUFACTURED FOR
NAVAL SEA SYSTEMS COMMAND
CONTRACTOR
DYNALOC CORP., SODUS, NEW YORK
CONTR NO.

DETAIL B

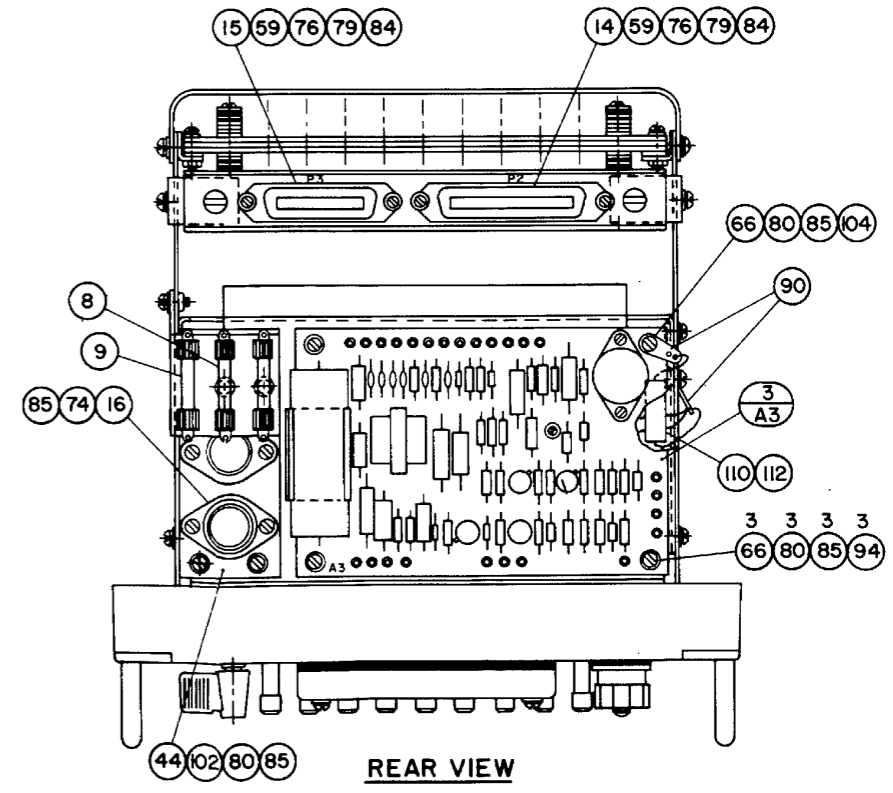
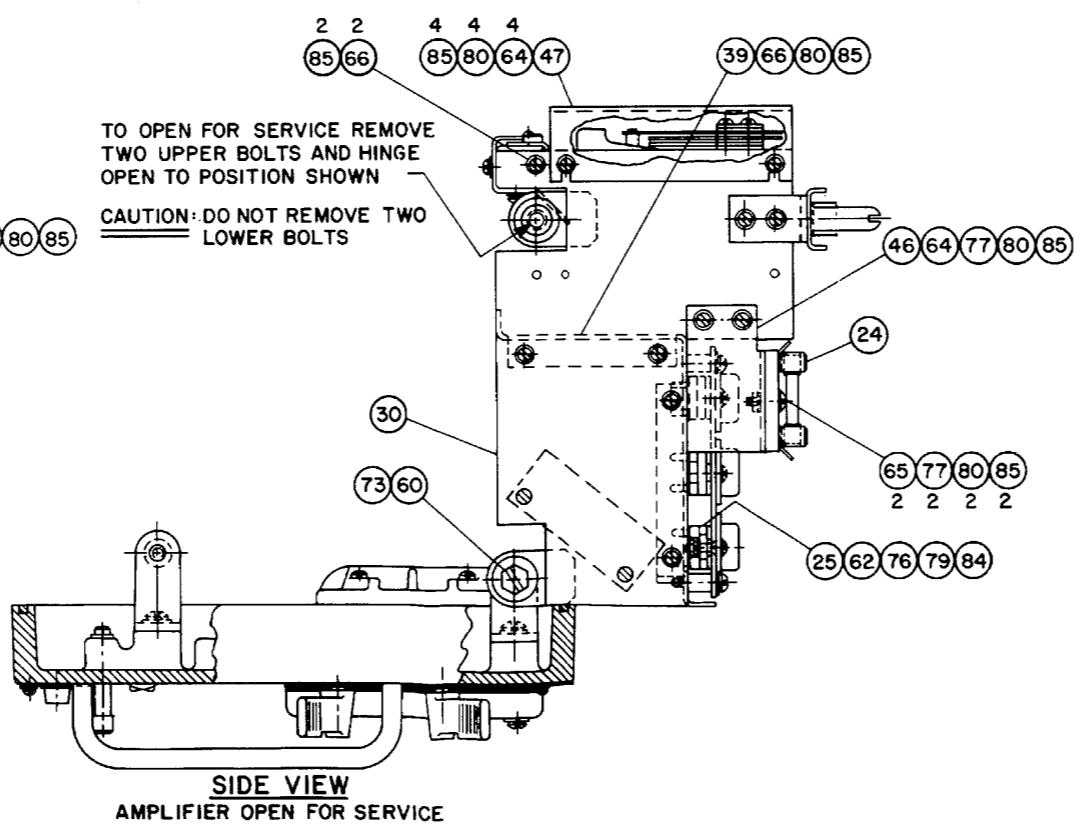
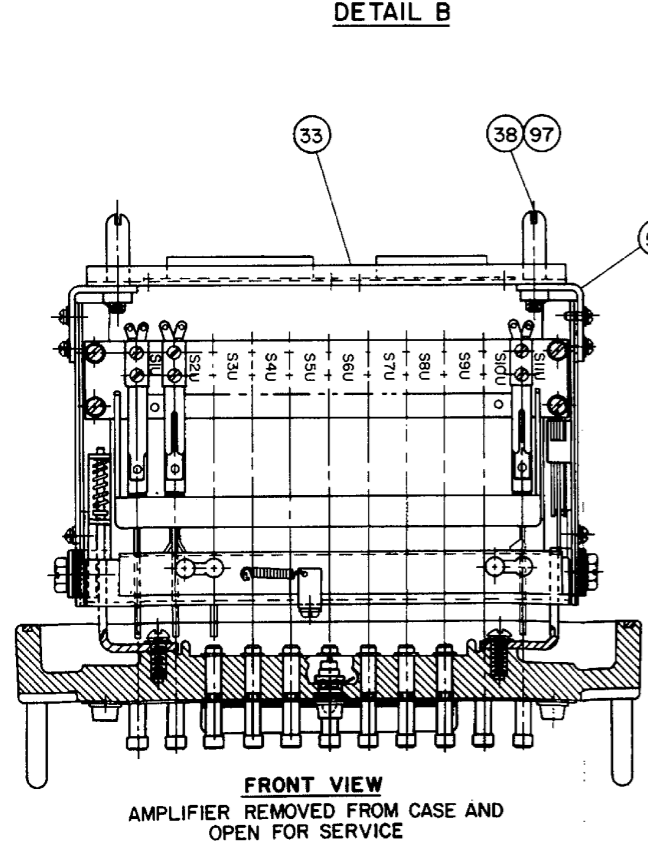


Figure 7-1. Intercommunication Station, Type LS-518A/SIC (UNIT 1), Parts Location Diagram (Sheet 2 of 2).

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Circuit Card Assembly, Resistor Board (UNIT 1A1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A1R6	RESISTOR, FIXED, COMPOSITION: 220 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF221J, 12763, dwg 11204-040	7-2
1A1R7	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF102J, 12763, dwg 11204-056	7-2
1A1R8	RESISTOR, FIXED, COMPOSITION: 82 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF820J, 12763, dwg 11204-030	7-2
1A1R10	RESISTOR, FIXED, COMPOSITION: 10 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF100J, 12763, dwg 11204-008	7-2
1A1R12	RESISTOR, FIXED, COMPOSITION: 22 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF220J, 12763, dwg 11204-016	7-2
NRD	ITEM 13. (Refer to table 7-6)	7-2(12)
NRD	PRINTED WIRING BOARD: plastic, mfr 12763, MIL part no. FL-CE062C2/OAIA, dwg 61690-091	7-2(13)

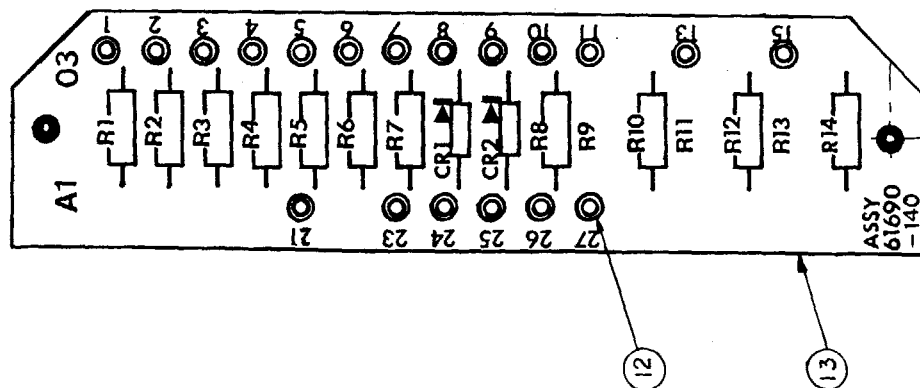


Figure 7-2. Circuit Card Assembly, Resistor Board (UNIT 1A1), Parts Location Diagram.

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Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Circuit Card Assembly, Relay Board (UNIT 1A2)).

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
NRD	PRINTED WIRING BOARD: mfr 12763, dwg 61690-094	7-3(1)
1A2C1	CAPACITOR, FIXED, ELECTROLYTIC: 3.9uf, $\pm 10\%$, 50V, mfr 81349, MIL part no. CSR13G395K-L, 12763, dwg 11175-127	7-3
1A2C2 11175-117	CAPACITOR, FIXED, ELECTROLYTIC: 1.0uf, $\pm 10\%$, 50V, mfr 81349, MIL part no. CSR13G105M-L, 12763, dwg	7-3
1A2C3	CAPACITOR, FIXED, ELECTROLYTIC: 100uf, $\pm 10\%$, 25V, mfr 81349, MIL type M39006/09-4081, 12763, dwg 11143-049	7-3
1A2CR3, 1A2CR7, 1A2CR8	SEMICONDUCTOR DEVICE, DIODE: mfr 81349, MIL type 1N4245, MIL spec MIL-S-19500/286, 12763, dwg 16101-031	7-3
1A2CR4 THRU 1A2CR6	SEMICONDUCTOR DEVICE, DIODE: mfr 93332, MIL type 1N645, MIL spec MIL-S-19500/240, 12763, dwg 16100-005	7-3
1A2K1 THRU 1A2K6	ITEM 8. (Refer to table 7-6)	7-3
1A2K7 AND 1A2K8	RELAY, CRYSTAL CAN: mfr 98927, part no. 30-07E, 12763, dwg 61690-111	7-3
1A2Q1	TRANSISTOR: mfr 81349, MIL type 1N2905, MIL spec MIL-S-19500/290, 12763, dwg 16121-005	7-3
1A2Q2	SILICON CONTROLLED RECTIFIER: mfr 81349, MIL type 2N2323, MIL spec MIL-S-19500/276, 12763, dwg 16107-001	7-3
1A2R15	RESISTOR, FIXED, COMPOSITION: 10k ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF103J, 12763, dwg 11204-080	7-3
1A2R16	RESISTOR, FIXED, COMPOSITION: 2k ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF202J, 12763, dwg 11204-063	7-3
1A2R17 AND 1A2R19	RESISTOR, FIXED, COMPOSITION: 1k ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF102J, 12763, dwg 11204-056	7-3

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Circuit Card Assembly, Relay Board (UNIT 1A2)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A2R18	RESISTOR, FIXED, COMPOSITION: 2,200 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF222J, 12763, dwg 11204-064	7-3
1A2R20	RESISTOR, FIXED., COMPOSITION: 10 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF100J, 12763, dwg 11204-008	7-3
1A2R21	RESISTOR, FIXED, COMPOSITION: 330 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF331J, 12763, dwg 11204-044	7-3
1A2R22	RESISTOR, FIXED, COMPOSITION: 100 ohms, $\pm 5\%$, 1 w, MIL type RC32GF101J, 12763, dwg 11205-032	7-3
1A2R23 AND 1A2R24	RESISTOR, FIXED, COMPOSITION: 680 ohms, $\pm 5\%$, 1/2 w, MIL type RC20GF681J, 12763, dwg 11204-052	7-3
1A2XK1 THRU 1A2XK8	ITEM 10. (Refer to table 7-6)	7-3
NRD	ITEM 13. (Refer to table 7-6)	7-3(19)

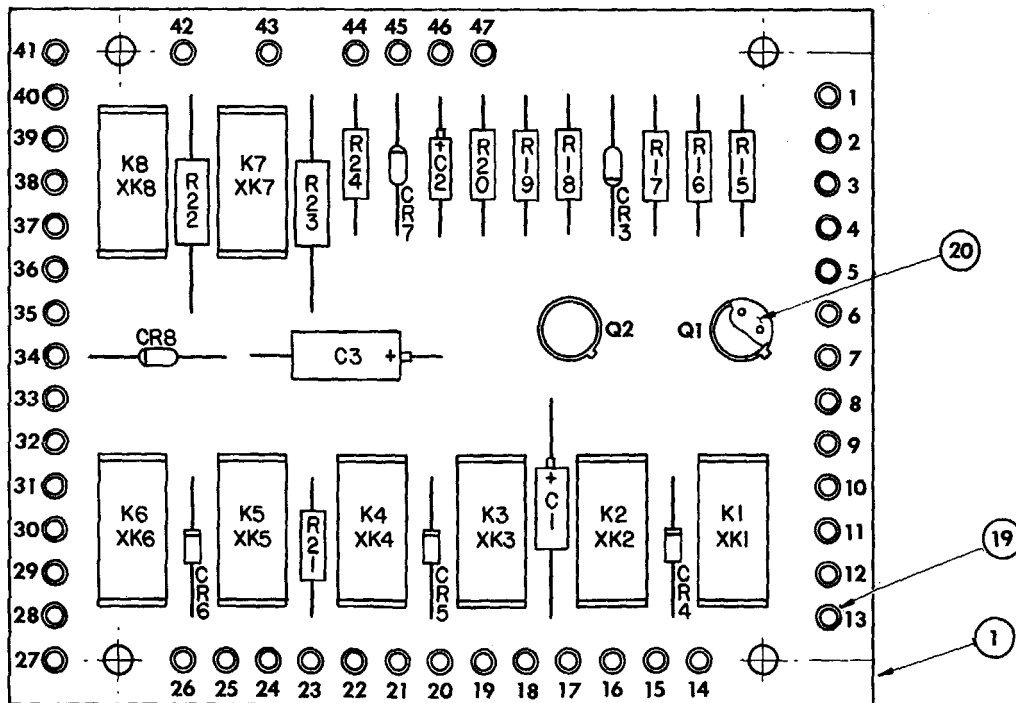


Figure 7-3. Circuit Card Assembly, Relay Board (UNIT 1A2), Parts Location Diagram.

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Circuit Card Assembly, Power Supply and Amplifier Board (UNIT 1A3)).

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE. NO. (ITEM)
NRD	PRINTED WIRING BOARD: mfr 12763, MIL part no. FL-GE062C2/OA1A, dwg 61690-097	7-4(1)
1A3C1	CAPACITOR, FIXED, ELECTROLYTIC: 2.7uf, $\pm 10\%$, 15V, mfr 81349, MIL type M39003/01-2507, 12763, dwg 11175-027	7-4
1A3C2	CAPACITOR, FIXED, ELECTROLYTIC: 4.7uf, $\pm 10\%$, 100V, mfr 81349, MIL type M39003/01-2014, 12763, dwg 11175-014	7-4
1A3C3 AND 1A3C5	CAPACITOR, FIXED, ELECTROLYTIC: 11.0uf, $\pm 20\%$, 50V, mfr 81349, MIL type M39003/01-2597, 12763, dwg 11175-117	7-4
1A3C4 AND 1A3C8	CAPACITOR, FIXED, ELECTROLYTIC: 8.2uf, 30V, mfr 81349, MIL type M39018/01-1124, 12763, dwg 11196-124	7-4
1A3C6 AND 1A3C10	CAPACITOR, FIXED, ELECTROLYTIC: 15uf, $\pm 20\%$, 20V, mfr 81349, MIL type M39003/01-2530, 12763, dwg 11175-050	7-4
1A3C7	CAPACITOR, FIXED, ELECTROLYTIC: 0.0047uf, $\pm 10\%$, 50V, mfr 81349, MIL type M39003/01-2554, 12763, dwg 11175-074	7-4
1A3C9, 1A3C11, 1A3C12	CAPACITOR, FIXED, PAPER DIELECTRIC: 0.01uf, $\pm 10\%$, 400V, mfr 81349, MIL type CP05A1KE103K3, 12763, dwg 11158-240	7-4
1A3C13	CAPACITOR, FIXED, ELECTROLYTIC: 4.7uf, $\pm 10\%$, 50V, mfr 81349, MIL type M39003/01-2608, 12763, dwg 11175-128	7-4
1A3C14	CAPACITOR, FIXED, ELECTROLYTIC: 1,000uf, $\pm 75 - 100\%$, 50V, mfr 81349, MIL type CE13C102G, 12763, dwg 11055-056	7-4
1A3CR1 THRU 1A3CR3	SEMICONDUCTOR DEVICE, DIODE: mfr 93332, MIL type 1N645, MIL spec MIL-S-19500/240, 12763, dwg 16100-005	7-4
1A3CR4, 1A3CR5, 1A3CR7 THRU 1A3CR10	ITEM 9. (Refer to table 7-6)	7-4

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.
 (Circuit Card Assembly, Amplifier and Power Supply Board (UNIT 1A3)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A3CR6	SEMICONDUCTOR DEVICE, DIODE: Zener, mfr 81349, MIL type 1N970B, MIL spec MIL-S-19500/156, 12763, dwg 16109-022	7-4
1A3Q1 AND 1A3Q2	TRANSISTOR: mfr 81349, MIL type 2N1711, MIL spec MIL-S-19500/225, 12763, dwg 16122-008	7-4
1A3Q3 AND 1A3Q4	TRANSISTOR: mfr 81349, MIL type 2N2219A, MIL spec MIL-S-19500/251, 12763, dwg 16122-014	7-4
1A3R1 AND 1A3R2	RESISTOR, FIXED, COMPOSITION: 68 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF680J, 12763, dwg 11204-028	7-4
1A3R3	RESISTOR, FIXED, COMPOSITION: 150 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF151J, 1276, dwg 11204-036	7-4
1A3R4	RESISTOR, FIXED, COMPOSITION: 3.3 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF3R3J, 12763, dwg 11204-002	7-4
1A3R5	RESISTOR, FIXED, COMPOSITION: 6800 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF682J, 12763, dwg 11204-076	7-4
1A3R6	RESISTOR, FIXED, COMPOSITION: 51k ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF513J, 12763, dwg 11204-097	7-4
1A3R7	RESISTOR, FIXED, COMPOSITION: 11k ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF113J, 12763, dwg 11204-081	7-4
1A3R8	RESISTOR, FIXED, COMPOSITION: 4700 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF472J, 12763, dwg 11204-072	7-4
1A3R9	RESISTOR, FIXED, COMPOSITION: 39 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF390J, 12763, dwg 11204-022	7-4
1A3R10, 1A3R11, 1A3R24	RESISTOR, FIXED, COMPOSITION: 1k ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF102J, 12763, dwg 11204-056	7-4

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Circuit Card Assembly, Amplifier and Power Supply Board (UNIT 1A3)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A3R12	RESISTOR, FIXED, COMPOSITION: 62k ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF623J, 12763, dwg 11204-099	7-4
1A3R13	RESISTOR, FIXED, COMPOSITION: 27k ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF273J, 12763, dwg 11204-090	7-4
1A3R14	RESISTOR, FIXED, COMPOSITION: 1800 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF182J, 12763, dwg 11204-062	7-4
1A3R15 AND 1A3R17	RESISTOR, FIXED, COMPOSITION: 330 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF331J, 12763, dwg 11204-044	7-4
1A3R16	RESISTOR, VARIABLE: 100 ohms, 1/4 w, mfr 81349, MIL type RJ50CP101, MIL spec MIL-R-22097/6, 12763, dwg 61691-084	7-4
1A3R18	RESISTOR, FIXED, COMPOSITION: 470 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF471J, 12763, dwg 11204-048	7-4
1A3R19, 1A3R20, 1A3R29	RESISTOR, FIXED, COMPOSITION: 3900 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF392J, 12763, dwg 11204-070	7-4
1A3R21	RESISTOR, FIXED, COMPOSITION: 11 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF110J, 12763, dwg 11204-009	7-4
1A3R22 AND 1A3R23	RESISTOR, FIXED, COMPOSITION: 2.7 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF27J, 12763, dwg 11204-001	7-4
1A3R25	RESISTOR, FIXED, COMPOSITION: 2200 ohms, $\pm 5\%$, 2 w, mfr 01121, MIL type RC42GF222J, 12763, dwg 11206-064	7-4
1A3R26	RESISTOR, FIXED, COMPOSITION: 2200 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF222J, 12763, dwg 11204-064	7-4
1A3R27	RESISTOR, FIXED, COMPOSITION: 680 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF681J, 12763, dwg 11204-052	7-4

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Circuit Card Assembly, Amplifier and Power Supply Board (UNIT 1A3)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A3R28	RESISTOR, FIXED, COMPOSITION: 100 ohms, $\pm 5\%$, 1/2 w, mfr 01121, MIL type RC20GF10J, 12763, dwg 11204-032	7-4
1A3R30	RESISTOR, FIXED, COMPOSITION: 1.0 ohms, $\pm 5\%$, 1 w, mfr 01121, MIL type RC32GF1ROJ, 12763, dwg 11205-161	7-4
1A3R31	RESISTOR, FIXED, COMPOSITION: 2700 ohms, $\pm 5\%$, 1 w, mfr 01121, MIL type RC32GF272J, 12763, dwg 11205-066	7-4
1A3T1	TRANSFORMER, INPUT: mfr 12763, MIL spec MIL-T-27, dwg 61690-006 (Attaching Hardware) A(2),D(2),L(2),O(2)	7-4
1A3T2	TRANSFORMER, DRIVER: mfr 12763, MIL spec MIL-T-27, dwg 62072-006	7-4
1A3XC14	CRADLE, CAPACITOR: mfr 91506, part no. 6020-3CC, 12763, dwg 61691-035	7-4(39.)
NRD	RIVET: 5/32, mfr 12014, part no. R3472, 12763, dwg 12604-005	7-4(40)
NRD	ITEM 13. (Refer to table 7-6)	7-4(41)

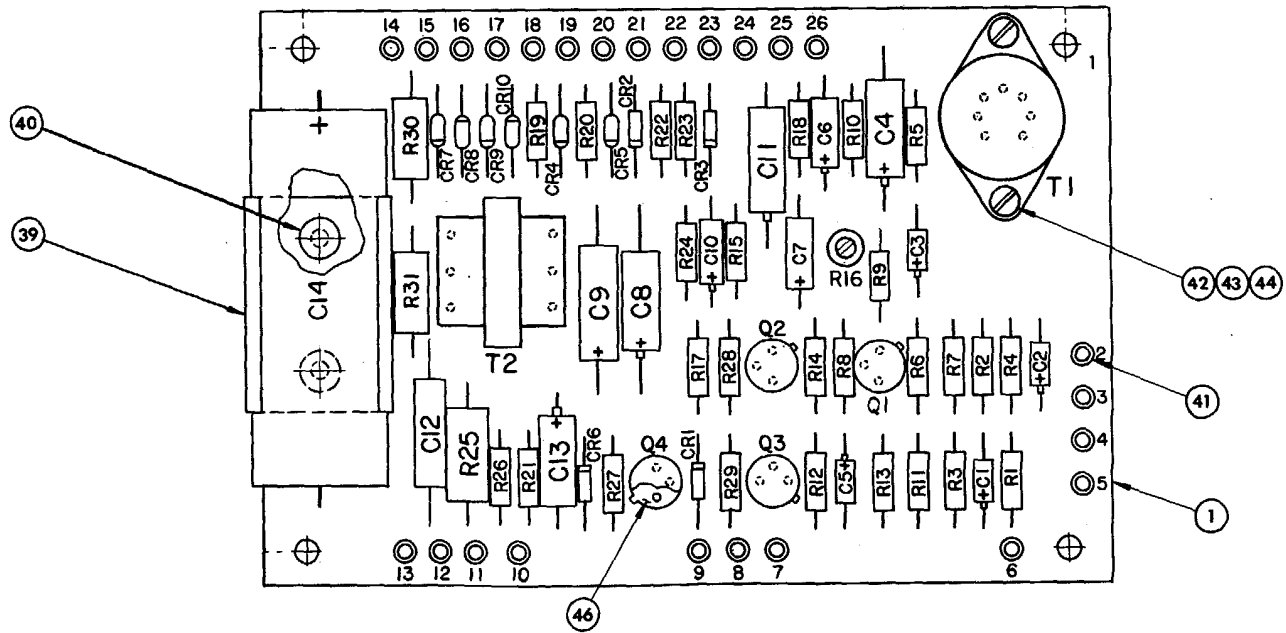


Figure 7-4. Circuit Card Assembly, Amplifier and Power Supply Board (UNIT 1A3), Parts Location Diagram.

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

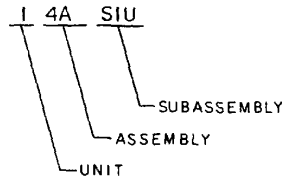
(Switch Assembly (UNIT 1A4)).

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A4S1L	CONTACT ASSEMBLY: lower (restore), mfr 12763, dwg 61690-066 (Attaching Hardware) P(2)	7-5(1)
1A4S1U	CONTACT ASSEMBLY: upper (restore), mfr 12763, dwg 61690-065 (Attaching Hardware) J(2), P(2)	7-5(2)
1A4S2L THRU 1A4S11L	ITEM 1. (Refer to table 7-6)	7-5(3)
1A4S2U THRU 1A4S11U	ITEM 2. (Refer to table 7-6) (Attaching Hardware) J(20)	7-5(4)
1A4S23	CONTACT ASSEMBLY: mfr 12763, dwg 61690-069	7-5(5)
NRD	PLATE ASSEMBLY, BAIL AND CONTACT: mfr 12763, dwg 61690-047	7-5(6)
NRD	FRAME ASSEMBLY: mfr 12763, dwg 61690-027	7-5(7)
NRD	LEVER ASSEMBLY: restore, mfr 12763, dwg 61690-150	7-5(8)
NRD	ITEM 5. (Refer to table 7-6)	7-5(9)
NRD	SPACER, PLATE: stainless steel, mfr 12763, dwg 61690-011	7-5(10)
NRD	SPRING: stainless steel, mfr 12763, dwg 61690-017	7-5(12)
NRD	ITEM 11. (Refer to table 7-6)	7-5(13)
NRD	GUIDE: stainless steel, mfr 12763, dwg 61690-019	7-5(14)
NRD	ITEM 7. (Refer to table 7-6)	7-5(15)
NRD	SUPPORT, SHOCK BAR: stainless steel, mfr 12763, dwg 61690-031 (Attaching Hardware) M(1)	7-5(16)
NRD	BRACKET, SPRING: stainless steel, mfr 12763, dwg 61690-024	7-5(17)
NRD	STOP, SHOCK BAR: stainless steel, mfr 12763, dwg 61690-029	7-5(18)
NRD	SPRING, SHOCK BAR: stainless steel, mfr 12763, dwg 61690-032	7-5(19)

NOTES:

- PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX THE BASIC PART DESIGNATION WITH THE UNIT ASSEMBLY DESIGNATION, THE ASSEMBLY DESIGNATION, AND THE SUBASSEMBLY DESIGNATION.

EXAMPLE-ITEM 2 ON THE PARTS LIST SHALL BE:



- THE REFERENCE DESIGNATION PREFIX OF THIS SUBASSEMBLY IS: 1A4
- REF DWG 61690-126 JUMPER LIST

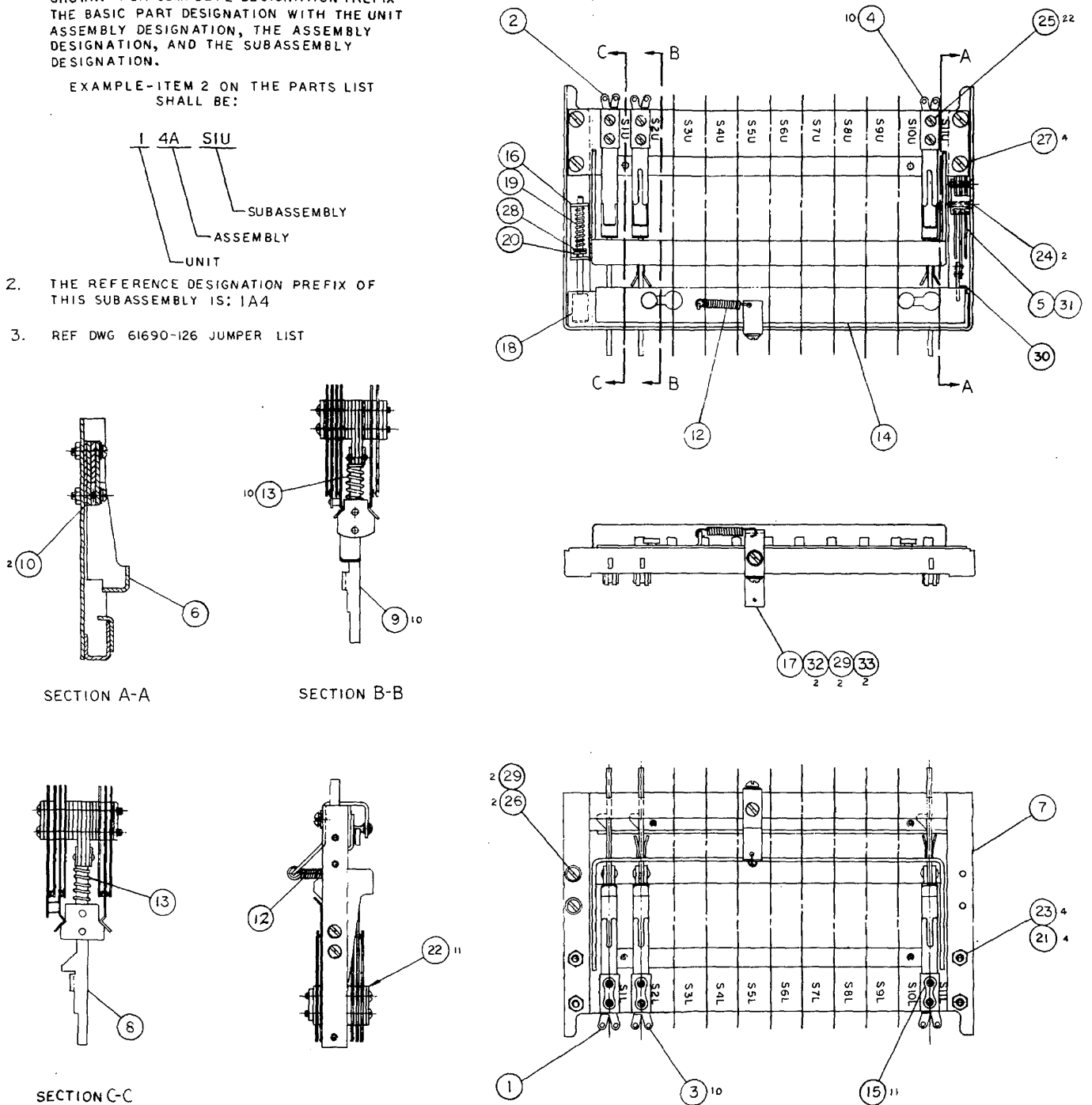


Figure 7-5. Switch Assembly (UNIT 1A4), Parts Location Diagram.

Change 1 7-23/(7-24 blank)

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Switch Assembly (UNIT 1A4)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
NRD	RING, RETAINING: stainless steel, mfr 79139, part no. X5133-12H, 12763, dwg 14212-008	7-5(20)
NRD	WASHER, LOCK: stainless steel, no. 8, mfr 81349, MIL type MS35338-80, 12763, dwg 12203-004	7-5(21)
NRD	PLATE, TOP: steel, mfr 73949, part no. CX-18, 12763, dwg 61690-115	7-5(22)
NRD	NUT, PLAIN, HEXAGON: stainless steel, 8-32, mfr 81349, MIL type MS35649, 12763, dwg 12301-004	7-5(23)
NRD	SCREW, MACHINE: flh, stainless steel, 5-40 x 1/2, mfr 81349, MIL type AN505C, 12763, dwg 12199-003	7-5(24)
NRD	SCREW, MACHINE: pnh, stainless steel, 6-32 x 3/16, mfr 81349, MIL type MS35233-25, 12763, dwg 12116-021	7-5(26)
NRD	SCREW, MACHINE: pnh, stainless steel, 8-32 x 5/8, mfr 81349, MIL type MS35233-46, 12763, dwg 12126-004	7-5(27)
NRD	WASHER, FLAT: no. 5, stainless steel, mfr 12763, dwg 61690-030	7-5(28)
NRD	PLATE, CONTACT: stainless steel, mfr 12763, dwg 61690-060	7-5(31)

Table 7-3. Intercommunication Station Type LS-518A/SIC, Parts List.

(Terminal Board Assembly (UNIT 1A6))

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
NRD	TERMINAL BOARD, STAKED: mfr 12763, dwg 61690-080	7-6(1)
1A6R1	RESISTOR, FIXED, COMPOSITION: 1 ohm, $\pm 5\%$, 1 w, mfr 81349, MIL type RC32GFIROJ, 12763, dwg 11205-161	7-6(2)

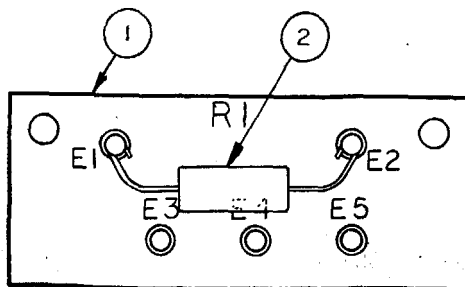


Figure 7-6. Terminal Board Assembly (UNIT 1A6), Parts Location Diagram.

Change 1 7-25

Table 7-4. Intercommunication Station Type LS-519A/SIC, Parts List.

(Intercommunication Station, Type LS-519A/SIC (UNIT 1)).

REFERENCE DESIGNATION	FIGURE NAME AND DESCRIPTION	NO. (ITEM)
NOTE		
Except for the items listed below, replaceable parts for Intercommunication Station Type LS-519A/SIC are the same as those listed for Intercommunication Station LS-518A/SIC in Table 7-3.		
1A1	CIRCUIT CARD ASSEMBLY, RESISTOR BOARD: mfr 12763, dwg 61690-092. For breakdown, see figure 7-8.	7-7 (1)
1A5	STATION SELECTOR SWITCH ASSEMBLY, LOWER: mfr 12763, dwg 61690-161. For breakdown, see figure 7-9. (Attaching Hardware) G(4),M(4),P(4)	7-7 (5)
1DS6 AND 1DS7	ITEM 3. (Refer to table 7-6)	7-7 (6)
1XDS6 AND 1XDS7	ITEM 4. (Refer to table 7-6)	7-7 (23)

Table 7-4. Intercommunication Station, Type LS-519A/SIC, Parts List.

(Circuit Card Assembly, Resistor Board (UNIT 1A1)).

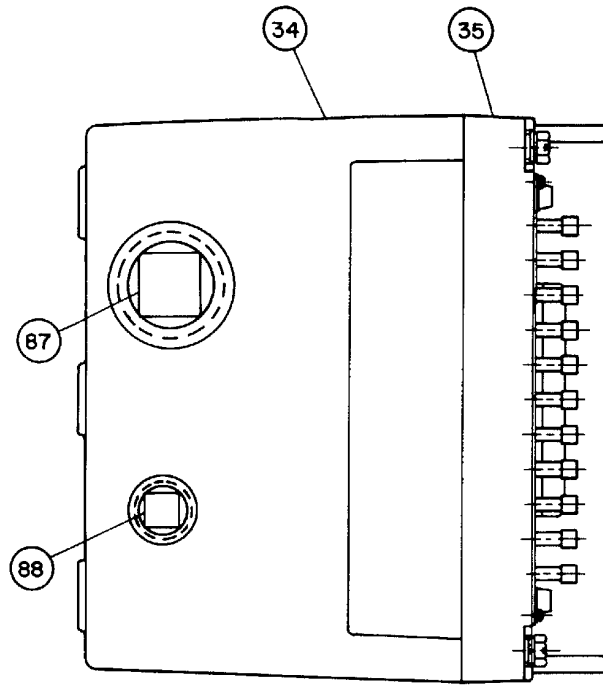
REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A1CRI AND 1A1CR2	SEMICONDUCTOR DEVICE, DIODE: mfr 81349, MIL type 1N645, MIL spec MIL-S-19500/240, 12763, dwg 16100-005	7-8
1A1R1	RESISTOR, FIXED, COMPOSITION: 8.2 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF8R2J, 12763, dwg 11204-007	7-8
1A1R2	RESISTOR, FIXED, COMPOSITION: 15 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF150J, 12763, dwg 11204-012	7-8
1A1R3, 1A1R13, 1A1R14	RESISTOR, FIXED, COMPOSITION: 33 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF330J, 12763, dwg 11204-020	7-8

NOTES:

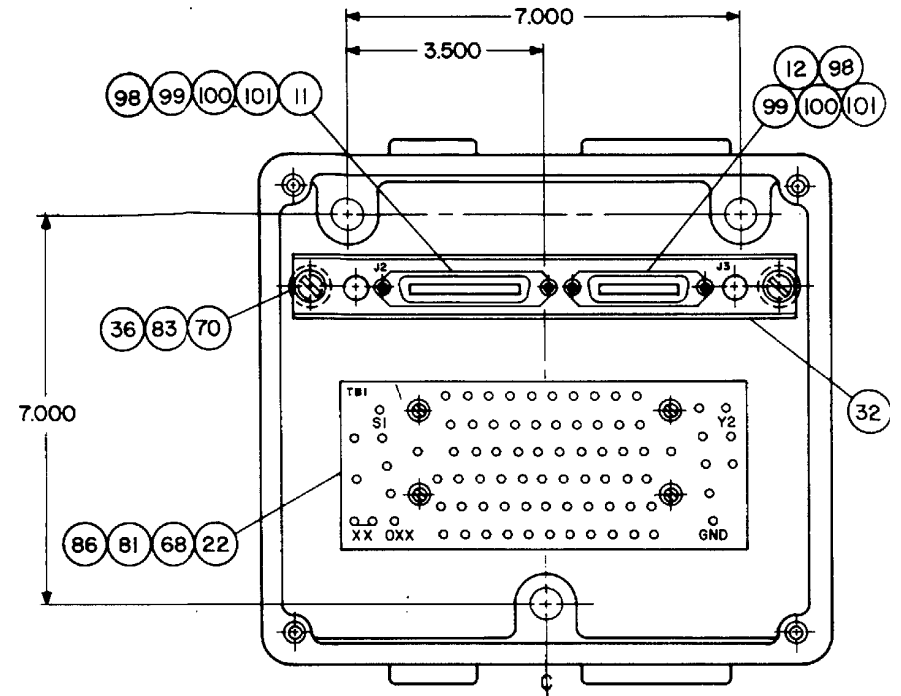
1. FINISH: ANODIC TREATMENT CONFORMING TO MIL-A-8625 THEN ONE COAT PRIMER PRETREATMENT PER MIL-P-15328 AND ONE COAT GRAY ENAMEL PER MIL-E-15090 TYPE III CLASS 2.
2. FRONT CLEARANCE TO REMOVE PANEL AND AMPLIFIER FOR SERVICING IS 16 INCHES FROM MOUNTING SURFACE.
3. WEIGHT OF UNIT: 28 LBS.
4. ITEMS NOT SHOWN ON DRAWING:
 ITEM 26, 61690-121 CABLE ASSY "A"
 ITEM 27, 61690-128 CABLE ASSY "B"
 ITEM 28, 61690-083 CABLE ASSY "C"
 ITEM 29, 61690-184 CABLE ASSY "D"
 ITEM 69, 61690-187 CABLE ASSY (JUMPERS)
5. RECESSED PANEL INSTALLATION HARDWARE AND SUPPORT ANGLES WILL BE SUPPLIED BY DYNALEC CORPORATION IF SPECIFIED ON ORDER.

REFERENCE DRAWINGS:

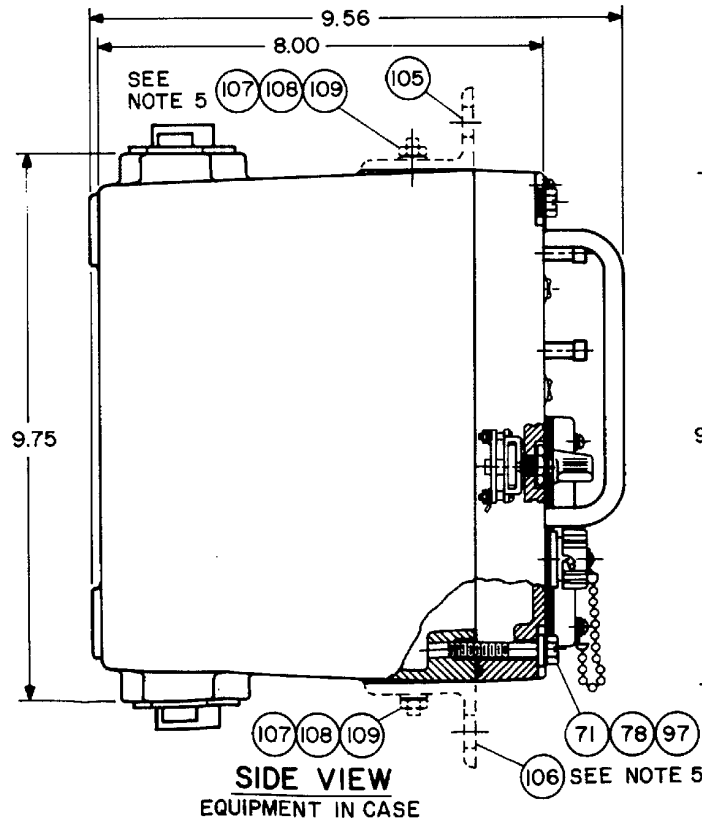
- 61690-001 OUTLINE DRAWING
- 61690-002 SCHEMATIC DIAGRAM
- 61690-003 WIRING DIAGRAM.



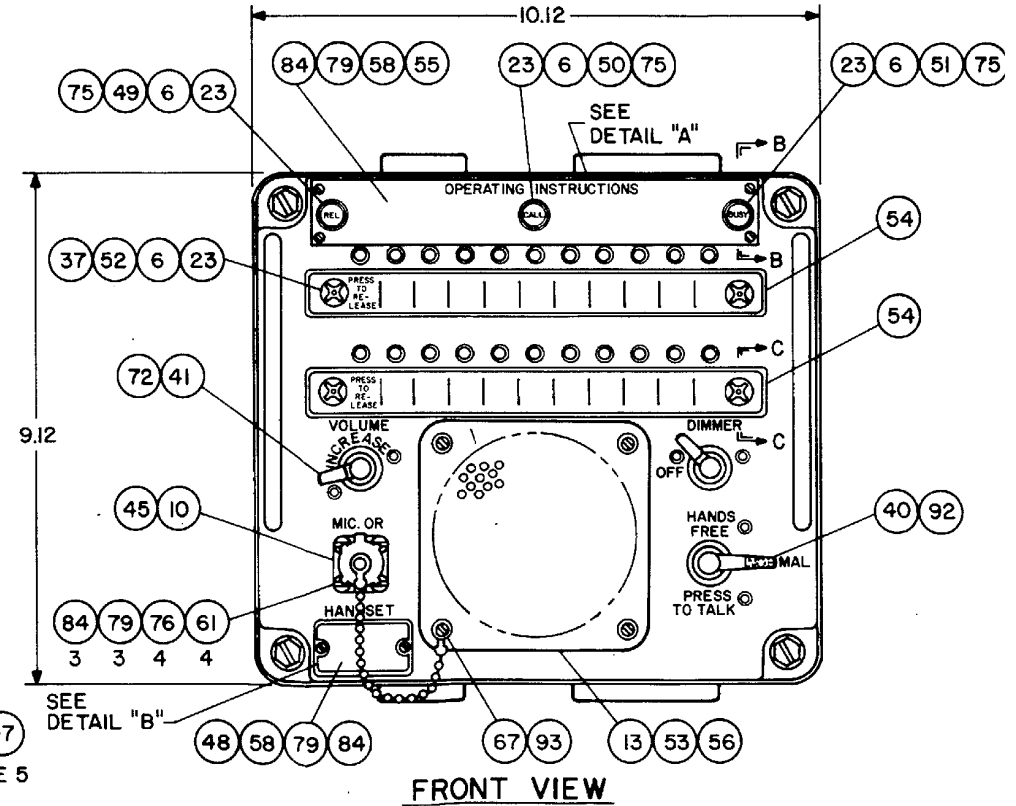
TOP VIEW
EQUIPMENT IN CASE



INTERIOR OF CASE



SIDE VIEW
EQUIPMENT IN CASE



FRONT VIEW

Figure 7-7. Intercommunication Station, Type LS-519A/SIC (UNIT 1), Parts location Diagram (sheet 1 of 2).

OPERATING INSTRUCTIONS

TO ORIGINATE A CALL: DEPRESS SELECTOR BUTTON ASSIGNED TO MASTER STATION OR REMOTE SPEAKER BEING CALLED. OPERATE TALK SWITCH LEVER TO DOWN POSITION AND TALK DIRECTLY INTO LOUDSPEAKER. RELEASE TALK SWITCH TO LISTEN. DEPRESS RELEASE BUTTON WHEN FINISHED.

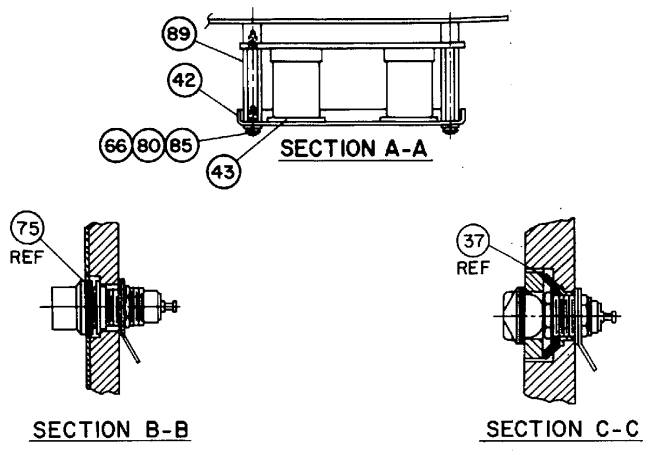
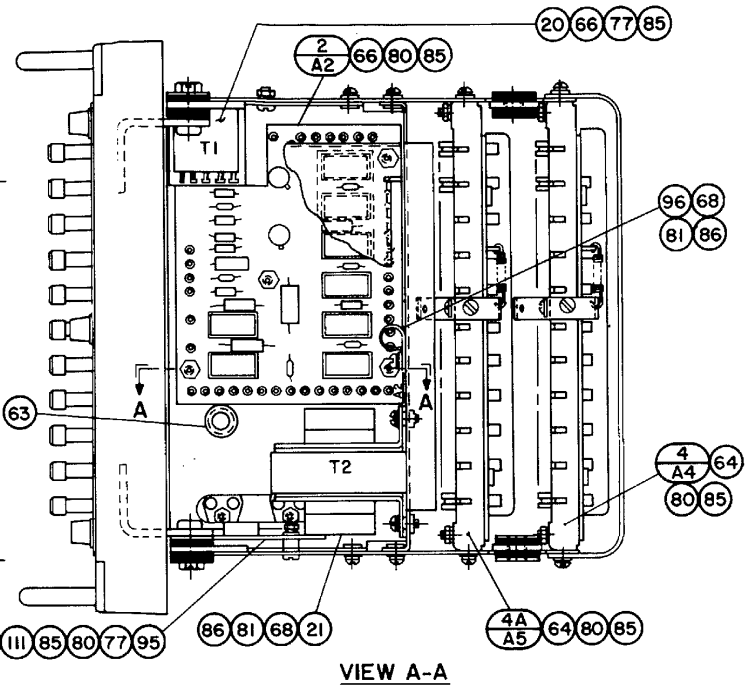
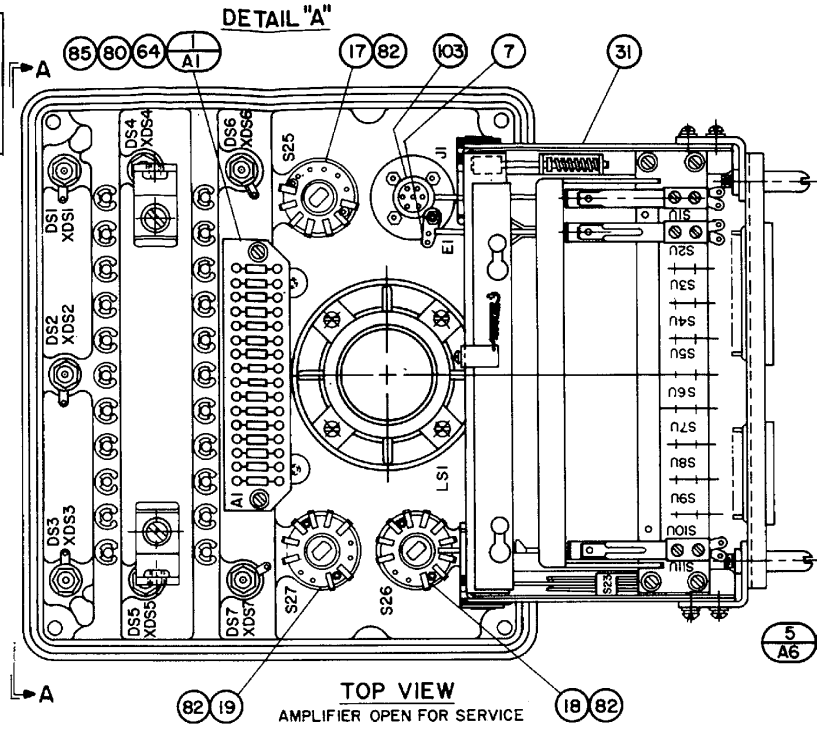
BUSY SIGNAL: LIGHTING OF BUSY LAMP SHOWS CALLED STATION IS BUSY. RELEASE SELECTOR BUTTON PROMPTLY BY DEPRESSING RELEASE BUTTON CALL LATER.

TO ACCEPT CALL: CALL LAMP ILLUMINATES AND MESSAGE IS HEARD. OPERATE TALK SWITCH LEVER DOWN AND REPLY. NOTIFY CALLING STATION TO DEPRESS RELEASE BUTTON IF CALL LAMP STAYS ON AFTER FINISHING.

HANDS-FREE OPERATION: AFTER CALLING, OR TO REPLY TO A CALL, OPERATE TALK SWITCH TO UP POSITION AND TALK DIRECTLY INTO LOUDSPEAKER. NO OTHER CONTROLS NEED BE OPERATED WHEN HANDS-FREE OPERATION IS NO LONGER REQUIRED, RETURN TALK SWITCH DOWN TO NORMAL POSITION.

HANDSET OR MICROPHONE: PLUGGING IN EITHER H-86/A1 OR H-132/SIC TRANSFERS TALK SWITCH FUNCTION TO PUSH BUTTON ON EITHER UNIT, AND DISCONNECTS LOUDSPEAKER AS A MICROPHONE.

REMOTE SPEAKER: THE MASTER STATION RECEIVES AN AUDIBLE CALL AND THE LAMP LIGHTS TO REPLY. DEPRESS SELECTOR BUTTON FOR REMOTE STATION, DEPRESS TALK SWITCH, AND SPEAK INTO LOUDSPEAKER. REMOTE STATION NOW REPLIES HANDS-FREE.



LS-519 A/SIC
INTERCOMMUNICATION STATION
115 VAC 60 HZ 25 WATTS 1P
SERNO
MANUFACTURED FOR
NAVAL SEA SYSTEMS COMMAND
CONTRACTOR
DYNALOC CORP., SODUS, NEW YORK
CONTR NO.

DETAIL B

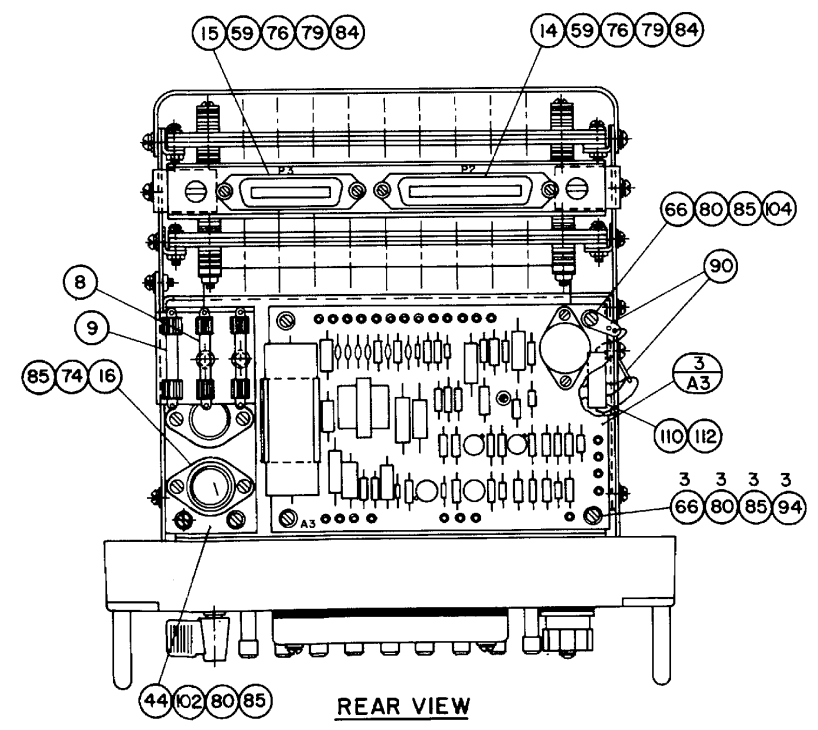
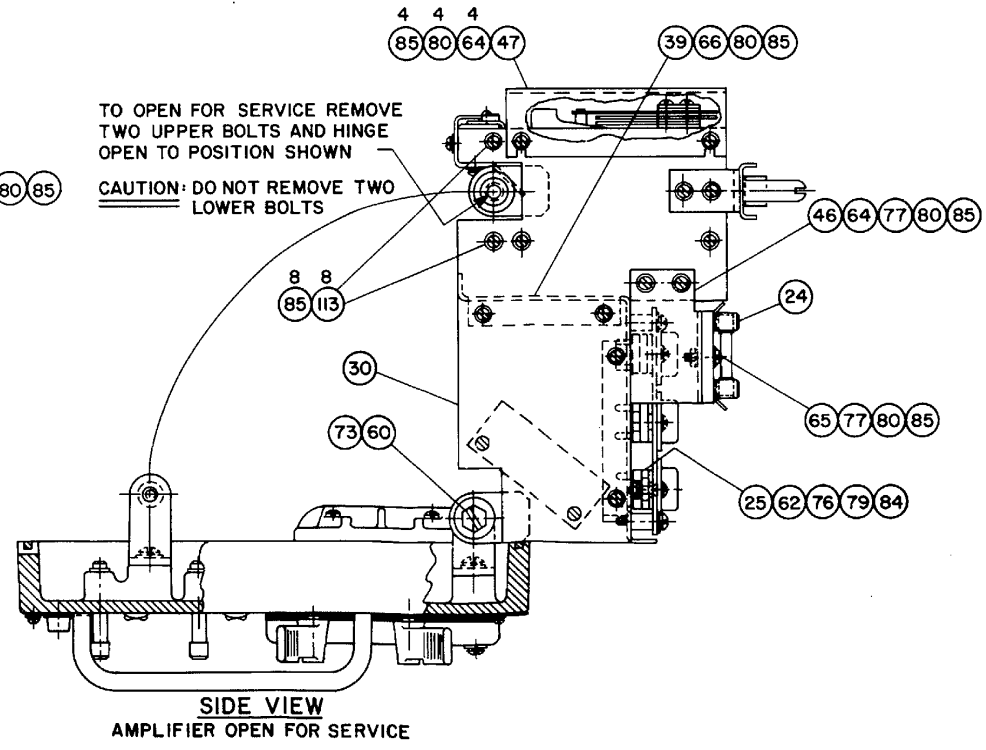
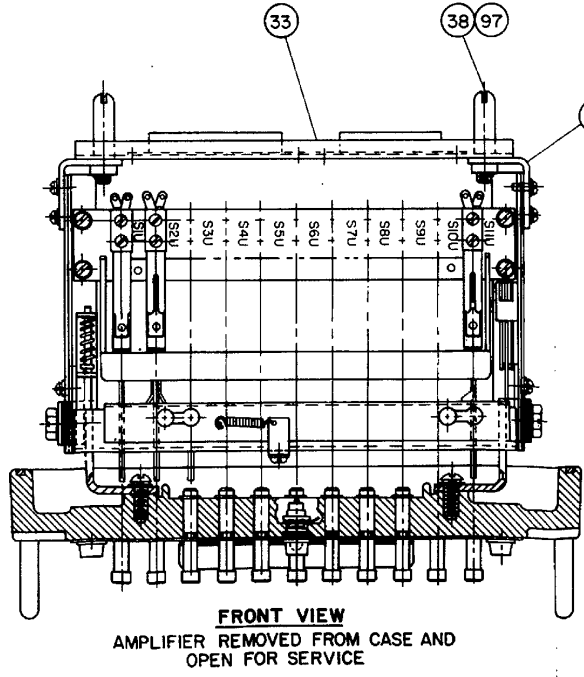


Figure 7-7. Intercommunication Station, Type LS-519A/SIC (UNIT 1), Parts Location Diagram (Sheet 2 of 2).

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Table 7-4. Intercommunication Station, Type LS-519A/SIC, Parts List.

(Circuit Card Assembly, Resistor Board (UNIT 1A1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A1R4	RESISTOR, FIXED, COMPOSITION: 68 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF680J, 12763, dwg 11204-028	7-8
1A1R5	RESISTOR, FIXED, COMPOSITION: 120 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF121J, 12763, dwg 11204-034	7-8
1A1R6	RESISTOR, FIXED, COMPOSITION: 220 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF221J, 12763, dwg 11204-040	7-8
1A1R7	RESISTOR, FIXED, COMPOSITION: 1000 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF102J, 12763, dwg 11204-056	7-8
1A1R8	RESISTOR, FIXED, COMPOSITION: 82 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF820J, 12763, dwg 11204-030	7-8
1A1R9 AND 1A1R10	RESISTOR, FIXED, COMPOSITION: 10 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF100J, 12763, dwg 11204-008	7-8
1A1R11 AND 1A1R12 11204-016	RESISTOR, FIXED, COMPOSITION: 22 ohms, $\pm 5\%$, 1/2 w, mfr 81349, MIL type RC20GF220J, 12763, dwg 11204-016	7-8
NRD	ITEM 13. (Refer to table 7-6)	7-8(12)
NRD	PRINTED CIRCUIT BOARD: plastic, mfr 71263, MIL part no. FL-GE062C2/OAIA, dwg 61690-091	7-8(13)

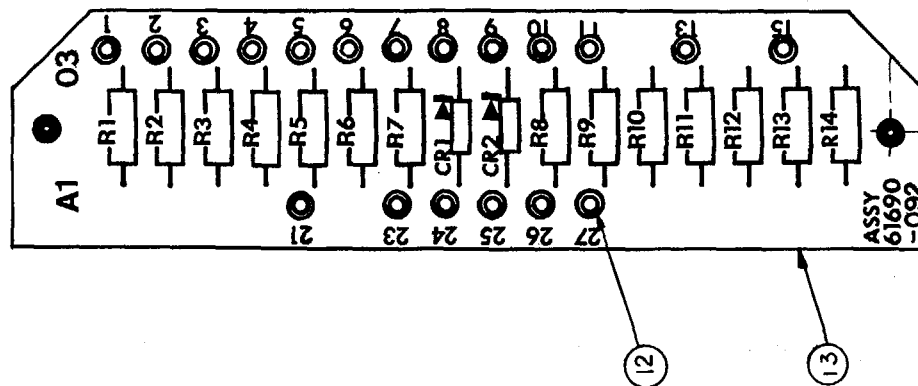


Figure 7-8. Circuit Card Assembly, Resistor Board (UNIT 1A1), Parts Location Diagram.

Table 7-4. Intercommunication Station, Type LS-519A/SIC, Parts List.

(Switch Assembly (UNIT 1A5)).

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE. NO. (ITEM)
	NOTE	
	Except for the items listed below, replaceable parts for this unit are the same as those listed for Switch Assembly (UNIT 1A4) in Table 7-3.	
NRD	PLATE ASSEMBLY, BAIL AND CONTACT: mfr 12763, dwg 61690-162	7-9(6)

Table 7-5. Intercommunication Station, Type LS-518A/SIC and LS-518A/SIC, Test Fixture, Parts List.

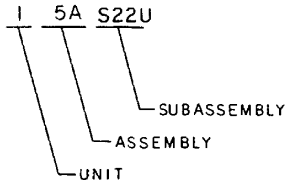
(Test Fixture, (UNIT 1)).

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE. NO. (ITEM)
A1	CIRCUIT CARD ASSEMBLY, RESISTOR BOARD: mfr 12763, dwg 61690-086. For breakdown, see figure 7-11.	7-10 (1)
DS1 AND DS2	LAMP, NEON: mfr 72619, part no. NE-2D, 12763, dwg 16053-000	7-10 (2)
E1	TERMINAL STUD: mfr 83330, no. 6, 12763, dwg 14055-002	7-10 (3)
J1	CONNECTOR, RECEPTACLE, ELECTRICAL: w/cap and chain, mfr 77096, part no. 900-S6502-74117-2, 12763, dwg 13028-001	7-10 (4)
S1 AND S3	SWITCH, TOGGLE: dpdt, MIL type MS35059-31, 12763, dwg 14152-011	7-10 (5)
S2 AND S5	ITEM 12. (Refer to table 7-6) THRU S14	7-10 (6)
S4	SWITCH, TOGGLE: dpdt, MIL type MS35059-21, 12763, dwg 14152-001	7-10 (7)
T1	TRANSFORMER, ISOLATION: mfr 12763, dwg 61690-104	7-10 (8)
W1	CABLE ASSEMBLY: mfr 12763, dwg 61690-085	7-10 (9)

NOTES:

- PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX THE BASIC PART DESIGNATION WITH THE UNIT ASSEMBLY DESIGNATION, THE ASSEMBLY DESIGNATION, AND THE SUBASSEMBLY DESIGNATION.

EXAMPLE-ITEM 2 ON THE PARTS LIST SHALL BE:



- THE REFERENCE DESIGNATION PREFIX OF THIS SUBASSEMBLY IS: 1A5
- REF DWG 61690-133 JUMPEP LIST

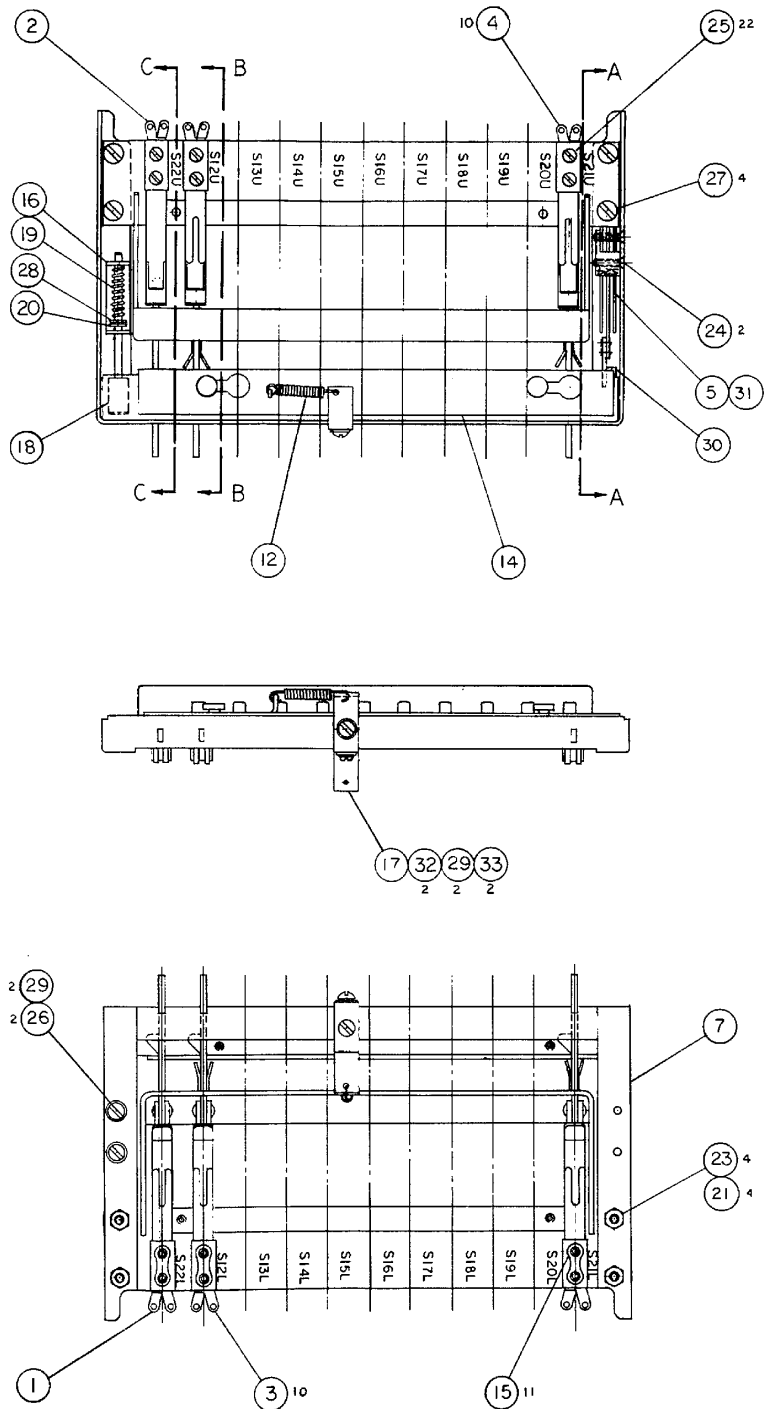
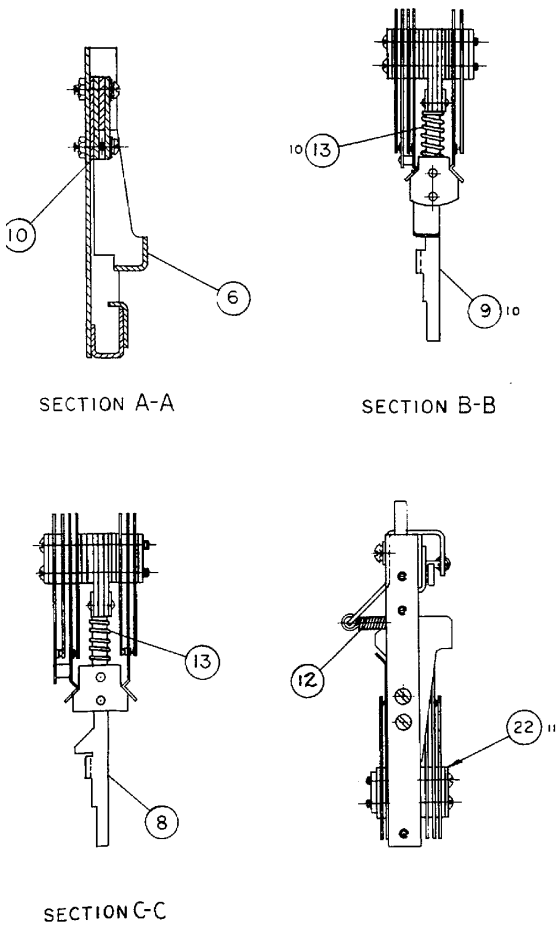


Figure 7-9. Switch Assembly (UNIT 1A5), Parts Location Diagram.

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Table 7-5. Intercommunication Station, Type LS-518A/SIC and LS-519A/SIC, Test Fixture, Parts List.

(Test Fixture, (UNIT 1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE. NO. (ITEM)
XDS1 AND XDS2	LAMPHOLDER: mfr 72619, part no. 145-3836-0997-201, 12763, dwg 14101-021	7-10 (10)
NRD	CORD, POWER: 6 ft, mfr 70903, part no. 17236SV, 12763, dwg 61690-067	7-10 (11)
NRD	BUSHING, STRAIN RELIEF, CABLE: mfr 28520, part no. SR-5N-4, 12763, dwg 65011-044	7-10 (12)
NRD	CASE: mfr 12763, dwg 61690-075	7-10 (13)
NRD	COVER: mfr 12763, dwg 61690-077	7-10 (14)
NRD	CHANNEL, CONNECTOR: mfr 12763, dwg 61690-068	7-10 (15)
NRD	BRACKET, ANGLE: mfr 12763, dwg 61690-073	7-10 (16)
NRD	CLAMP, HOLDING: mfr 12763, dwg 61690-074	7-10 (17)
NRD	SPACER: mfr 06540, part no. 9317-SS-140-7, 12763, dwg 12400-086	7-10 (18)
NRD	SCREW, MACHINE: pnh, sltd, stainless steel, 2-56 x 3/8, mfr 81349, MIL type MS35233, 12763, dwg 12156-002	7-10 (19)
NRD	SCREW, MACHINE: pnh, sltd, stainless steel, 4-40 x 3/8, mfr 81349, MIL type MS35233, 12763, dwg 12106-002	7-10 (20)
NRD	SCREW, MACHINE: pnh, sltd, stainless steel, 8-32 x 3/8, mfr 81349, MIL type MS35233, 12763, dwg 12126-002	7-10 (22)
NRD	WASHER, LOCK: stainless steel, no. 2, mfr 81349, MIL type MS35338, 12763, dwg 12203-001	7-10 (23)
NRD	WASHER, LOCK: stainless steel, no. 8, mfr 81349, MIL type MS35338, 12763, dwg 12203-004	7-10 (26)
NRD	WASHER, FLAT: stainless steel, no. 2, mfr 81349, MIL type MS15795, 12763, dwg 12211-002	7-10 (27)
NRD	WASHER, FLAT: stainless steel, no. 8, mfr 81349, MIL type MS15795, 12763, dwg 12211-007	7-10 (29)

Table 7-5. Intercommunication Station, Type LS-518A/SIC and LS-519A/SIC, Test Fixture, Parts List.

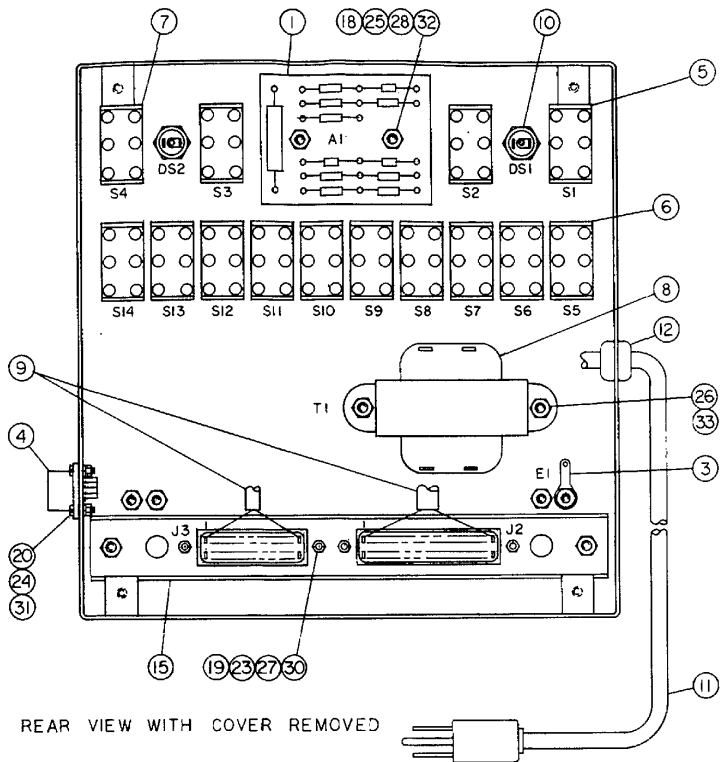
(Test Fixture, (UNIT 1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE. NO. (ITEM)
NRD	NUT, PLAIN, HEXAGON: stainless steel, 2-56, mfr 81349, MIL type MS35649, 12763, dwg 12301-001	7-10 (30)
NRD	NUT, PLAIN, HEXAGON: stainless steel, 8-32, mfr 81349, MIL type MS35649, 12763, dwg 12301-004	7-10 (33)
NRD	NUT, HEXAGONAL, LOCKING: stainless steel, 6-32, mfr 72962, part no. F22NTM62, 12763, dwg 12304-003	7-10 (34)

Table 7-5. Intercommunication Station, Type LS-518A/SIC and LS-519A/SIC, Test Fixture, Parts List.

(Circuit Card Assembly, Resistor Board (UNIT IAI))

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE. NO. (ITEM)
NRD	TERMINAL BOARD, STAKED: mfr 12763, dwg 61690-126	7-11(1)
1A1CR1 THRU 1A1CR3	ITEM 9. (Refer to table 7-6)	7-11
1AIR1	RESISTOR, FIXED, COMPOSITION: 4.7k ohms, $\pm 10\%$, 1/2 w, mfr 81349, MIL type RC20GF472K, 12763, dwg 11201-072	7-11
1A1R2 AND 1A1R3	RESISTOR, FIXED, COMPOSITION: 6.8k ohms, $\pm 10\%$, 1/2 w, mfr 81349, MIL type RC20GF682K, 12763, dwg 11201-076	7-11
1A1R4 AND 1AIR5	RESISTOR, FIXED, COMPOSITION: 100k ohms, $\pm 10\%$, 1/2 w, mfr 81349, MIL type RC20GF104K, 12763, dwg 11201-104	7-11
1A1R6	RESISTOR, FIXED, COMPOSITION: 1660 ohms, $\pm 10\%$, 7 w, mfr 07675, part no. HR7W1660, 12763, dwg 61690-123	7-11
1A1R7	RESISTOR, FIXED, COMPOSITION: 680 ohms, $\pm 10\%$, 1/2 w, mfr 81349, MIL type RC20GF681K, 12763, dwg 11201-052	7-11



- OPERATING INSTRUCTIONS**
- NOTE: STAR WITH ALL TOGGLE SWITCHES IN CENTER POSITION EXCEPT OUTPUT LOAD TOGGLE TO BE ON OUTPUT LOAD. DEPRESS STATION RELEASE BUTTON(S) BEFORE EACH TEST.
1. **CALL LAMP TEST:** OPERATE CALL-TALK TOGGLE TO CALL. CALL LAMP SHOULD LIGHT.
 2. **POLARITY TEST:** POLARITY INDICATOR LAMP SHOULD LIGHT ONLY WITH POLARITY TOGGLE IN DOWN POSITION.
 3. **VOICE TEST:** INSERT HANDSET CONNECTOR INTO STATION MIC RECEPTACLE. OPERATE CALL-TALK TOGGLE TO TALK. SPEAK INTO HANDSET. SHOULD BE HEARD ON STATION REPRODUCER WITH LOUDNESS ADJUSTABLE BY VOLUME CONTROL. OUTPUT INDICATOR SHOULD GLOW ON SPEECH PEAKS. PLACE HANDSET NEAR REPRODUCER TO PRODUCE A HOWL. DEPRESS OUTPUT TOGGLE TO TEST TO STOP HOWL. WITH LS-518A STATION, OPERATE EACH STATION SELECTOR TOGGLE IN TURN TO UP POSITION. WITH LS-519A STATION, ALSO DEPRESS EACH STATION SELECTOR TOGGLE IN TURN. THE HOWL SHOULD STOP EACH TIME A TOGGLE IS SO OPERATED.
 4. **RELEASE AND BUSY TEST:** OPERATE EACH STATION SELECTOR TOGGLE IN TURN (2 TO 11 UP FOR LS-518A, 2 TO 11 UP AND 12 TO 21 DOWN FOR LS-519A) WHILE DEPRESSING CORRESPONDING SELECTOR BUTTON ON STATION AFTER OPERATING THE TOGGLE LEVER. **RELEASE** AND **BUSY** LAMPS LIGHT EACH TIME. DEPRESS RELEASE BUTTON AFTER EACH SELECTOR POSITION IS TESTED TO EXTINGUISH THESE LAMPS. USE THE LOWER RELEASE BUTTON ON THE LS-519A STATION. SELECT SELECTOR BUTTONS WIRED FOR REMOTE SPEAKER STATIONS WILL NOT LIGHT THE BUSY LAMP.
 5. **REMOTE SPEAKER CIRCUIT TEST:** PLUG HANDSET INTO TEST FIXTURE RECEPTACLE. OPERATE APPROPRIATE TOGGLES TO **TALK**, **REMOTE** AND **OUTPUT LOAD**. SPEECH INTO MICROPHONE AUDIBLE AT REPRODUCER, AND OUTPUT INDICATOR FLASHES. SET **REMOTE-TALK** TOGGLE TO **RECEIVE**, OPERATE STATION P/T SWITCH, AND SPEAK INTO REPRODUCER. SPEECH HEARD AT HANDSET. PEAKS FLASH INDICATOR.
 6. **HANDS-FREE OPERATIONAL TEST:** OPERATE **CALL-TALK** TOGGLE TO **TALK**, AND **REMOTE-TALK** TOGGLE TO **HANDS-FREE-RECEIVE**. PLUG HANDSET IN TEST FIXTURE RECEPTACLE. SET P/T LEVER ON STATION TO **HANDS-FREE**. PRESS HANDSET BUTTON. SPEECH AT REPRODUCER HEARD IN HANDSET.
 7. **TROUBLE SHOOTING:** PLACE **CALL-TALK** TOGGLE ON **TALK** WHEN MAKING VOLTAGE MEASUREMENTS.

VIEW "A"
SCALE: NONE

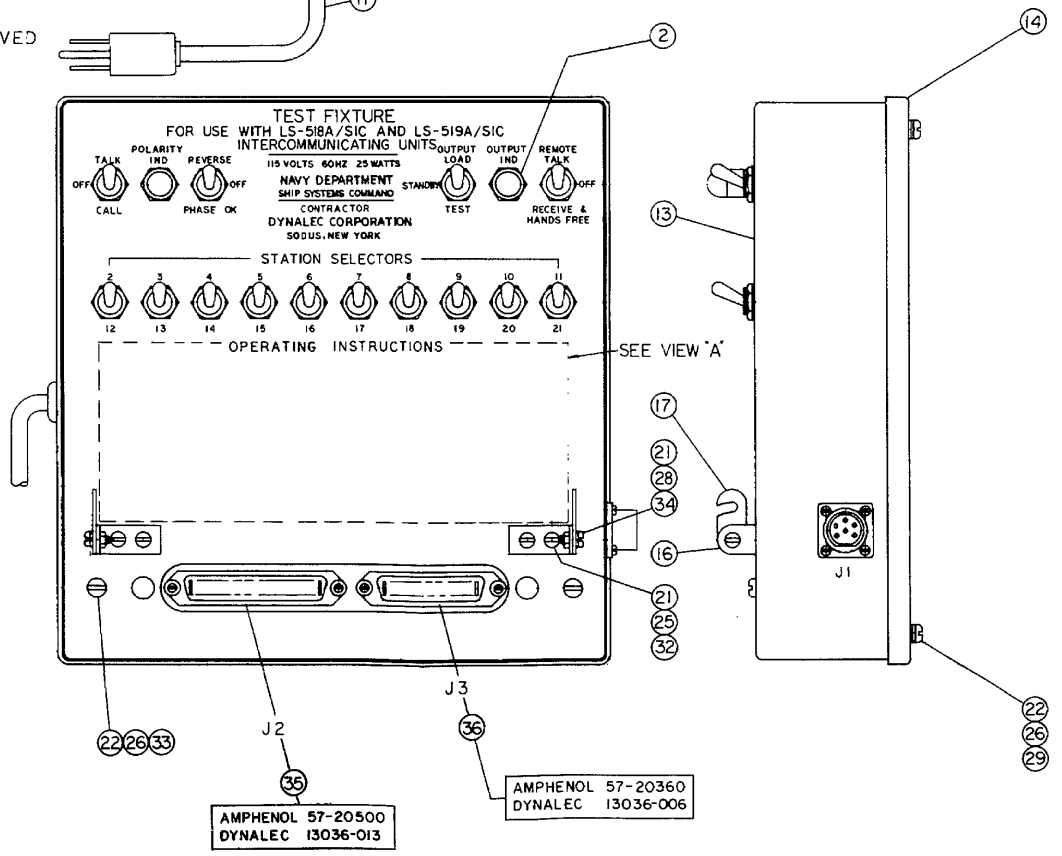


Figure 7-10. Test Fixture, Parts Location Diagram.

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Table 7-5. Intercommunication Station, Type LS-518A/SIC and LS-519A/SIC, Test Fixture, Parts List.

(Circuit Card Assembly, Resistor Board (UNIT 1A1)) (CONTD.)

REFERENCE DESIGNATION	NAME AND DESCRIPTION	FIGURE NO. (ITEM)
1A1R8	RESISTOR, FIXED, COMPOSITION: 330 ohms, +10%, 1/2 w, mfr 81349, MIL type RC20GF331K, 12763, dwg 11201-044	7-11
1A1R9	RESISTOR, FIXED, COMPOSITION: 22k ohms, ±10%, 1/2 w, mfr 81349, MIL type RC20GF223K, 12763, dwg 11201-088	7-11

NOTES:

1. SOLDER AFTER ASSEMBLY.
2. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX THE BASIC PART DESIGNATION WITH THE UNIT NUMBER (1) AND DESIGNATION OF THIS ASSEMBLY (A1).
EXAMPLE: COMPLETE DESIGNATION OF CR1 IS 1A1CR1.

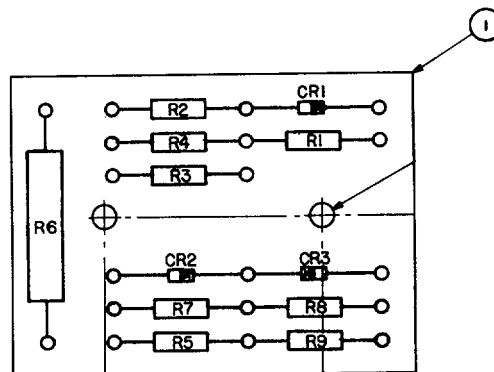


Figure 7-11. Circuit Card Assembly, Resistor Board (UNIT 1A1), Parts Location Diagram.

Table 7-6. List of Common Items.

ITEM NUMBER	DESCRIPTION
1	CONTACT ASSEMBLY: lower, mfr 12763, dwg 61690-059
2	CONTACT ASSEMBLY: upper, mfr 12763, dwg 61690-058
3	LAMP, INCANDESCENT: 14 Vac, 0.06 amp, mfr 24493, part no. 330, 12763, dwg 14118-007
4	LAMPHOLDER: mfr 08717, part no. 855S1, 12763, dwg 14101-013
5	LEVER ASSEMBLY: operator, mfr 12763, dwg 61690-149
6	GASKET, LAMP LENS: neoprene, 12763, dwg 61691-071
7	PLATE, MOUNTING: bottom, stainless steel, mfr 12763, dwg 61690-116
8	RELAY, CRYSTAL CAN: mfr 98927, part no. 30-07G-P, 12763, dwg 60309-000
9	SEMICONDUCTOR DEVICE, DIODE: mfr 81349, MIL type 1N4245, MIL spec MIL-S-19500/286, 12763, dwg 16101-031
10	SOCKET, RELAY: mfr 91506, part no. 8026-IGI, 12763, dwg 61690-112
11	SPRING: stainless steel, mfr 12763, dwg 61690-018
12	SWITCH, TOGGLE: dpdt, MIL type MS35059-27, 12763, dwg 14152-007
13	TERMINAL: component mounting, mfr 71279, part no. 2034-2, 12763, dwg 14096-004

Table 7-7. List of Attaching Hardware.

LETTER CODE	DESCRIPTION
A	NUT, PLAIN, HEXAGON: stainless steel, 4-40, mfr 81349, MIL type MS35649-44, 12763, dwg 12301-002
B	NUT, PLAIN, HEXAGON: stainless steel, 6-32, mfr 96906, MIL type MS35649, 12763, dwg 12301-003
C	SCREW, MACHINE: hex head, sltd, stainless steel, 1/4-20 x 3/4, mfr 96906, MIL type MS16208, 12763, dwg 12148-005
D	SCREW, MACHINE: pnh, sltd, stainless steel, 4-40 x 1/4, mfr 96906, MIL type MS35233-13, 12763, dwg 12106-001
E	SCREW, MACHINE: pnh, sltd, stainless steel, 4-40 x 5/16, mfr 96906, MIL type MS35233-14, 12763, dwg 12106-022

Table 7-7. List of Attaching Hardware (CONTD.)

LETTER CODE	DESCRIPTION
F	SCREW, MACHINE: pnh, sltd, stainless steel, 6-32 x 1/2, mfr 96906, MIL type MS35233-30, 12763, dwg 12116-003
G	SCREW, MACHINE: pnh, sltd, stainless steel, 6-32 x 1/4, mfr 96906, MIL type MS35233-26, 12763, dwg 12116-001
H	SCREW, MACHINE: pnh, sltd, stainless steel, 6-32 x 3/8, mfr 96906, MIL type MS35233-28, 12763, dwg 12116-002
I	SCREW, MACHINE: pnh, sltd, stainless steel, 6-32 x 5/16, mfr 96906, MIL type MS35233-27, 12763, dwg 12116-022
J	SCREW, MACHINE: rdh, sltd, stainless steel, 5-40 x 1-1/4, mfr 81349, MIL type AN515C, 12763, dwg 12198-008
K	SETSCREW: cup pt, 6-32 x 1/8, MIL type MS51021, 12763, dwg 12521-009
L	WASHER, FLAT: stainless steel, no. 4, mfr 96906, MIL type MS15795-804, 12763, dwg 12211-004
M	WASHER, FLAT: stainless steel, no. 6, mfr 96906, MIL type MS15795-805, 12763, dwg 12211-005
N	WASHER, FLAT: stainless steel, 1/4, mfr 96906, MIL type MS15795-810, 12763, dwg 12211-010
O	WASHER, LOCK: stainless steel, no. 4, mfr 96906, MIL type MS35338-78, 12763, dwg 12203-002
P	WASHER, LOCK: stainless steel, no. 6, mfr 96906, MIL type MS35338-79, 12763, dwg 12203-003
Q	WASHER, LOCK: stainless steel, 1/4, mfr 96906, MIL type MS35338-82, 12763, dwg 12203-006

Table 7-8. List of Manufacturers.

FEDERAL SUPPLY CODE NUMBER	NAME AND ADDRESS
01121	ALLEN-BRADLEY COMPANY, 1201 South 2nd Street, Milwaukee, WISCONSIN 53204
02660	AMPHENOL CORPORATION, 2801 South 25th Avenue, Broadview, ILLINOIS 60153
02697	PARKER SEAL COMPANY, Division of Parker-Hannifin Corporation, 2360 Palumbo Drive, Lexington, KENTUCKY 40509

Table 7-8. List of Manufacturers (CONTD.)

FEDERAL SUPPLY CODE NUMBER	NAME AND ADDRESS
06540	AMATOM ELECTRONIC HARDWARE, Division of Mite Corporation, 81 Rockdale Avenue, New Rochelle, NEW YORK 10802
06776	ROBINSON NUGET, INCORPORATED, 802 East Eight Street, PO Box 486, New Albany, INDIANA 47150
07675	HAMILTON AND HALL MANUFACTURING COMPANY, 225 and 29 North Water, Milwaukee, WISCONSIN 53202
08717	THE SLOAN COMPANY, PO Box 367, 7704 San Fernando Road, Sun Valley, CALIFORNIA 91352
12014	CHICAGO RIVET AND MACHINE COMPANY, 950 South 25th Avenue, Bellwood, ILLINOIS 60104
12763	DYNALEC CORPORATION, 87 West Main Street, P.O Box 188, Sodus, NEW YORK 14551
23540	NIAGARA PLASTICS COMPANY, INCORPORATED, RD#3 Edinboro Road, PO Box 3264, Erie, PENNSYLVANIA 16509
24493	GENERAL ELECTRIC COMPANY, Vacuum Products Business Section of Tube Department, Schenectady, NEW YORK
28520	HEYMAN MANUFACTURING COMPANY, 147 North Michigan Avenue, Kenilworth, NEW JERSEY 07033
70903	BELDEN CORPORATION, 415 South Kilpatrick, Chicago, ILLINOIS 60644
71279	CAMBRIDGE THERMONIC CORPORATION, 445 Concord Avenue, Cambridge, MASSACHUSETTS 02138
71400 2536	BUSSMAN MANUFACTURING, Division of McGraw and Edison Company, West University Street, St. Louis, MISSOURI 63017
72619	DIALIGHT CORPORATION, 60 Stewart Avenue, Brooklyn, NEW YORK 11237
76854	OAK MANUFACTURING COMPANY, Division of Oak Electro/Netics Corporation, South Main, Crystal Lake, ILLINOIS 60014
70096	PALMER ELECTRIC, Division of Simmons Precision Products, Incorporated, 90 Broadway, Saugus, MASSACHUSETTS 01906
79136	WALDES KOHINOOR, INCORPORATED, 47-16 Austel Place, Long Island City, NEW YORK 11101

Table 7-8. List of Manufacturers (CONTD.)

FEDERAL SUPPLY CODE NUMBER	NAME AND ADDRESS
81349	MILITARY SPECIFICATION PROMULGATED BY STANDARDIZATION DIVISION DIRECTORATE OF LOGISTICS SERVICES DSA
83330	SMITH, HERMAN H., INCORPORATED, 812 Snediker Avenue, Brooklyn, NEW YORK 11207
87771 .	UNIVERSITY SOUND Division of LTV Ling Altec, Incorporated, P.O Box 1056, Oklahoma City, OKLAHOMA 73101
91506	AUGAT, INCORPORATED, 33 Perry Avenue, Attleboro, MASSACHUSETTS 02703
96906	MILITARY SPECIFICATION PROMULGATED BY STANDARDIZATION DIVISION DIRECTORATE OF LOGISTICS SERVICES DSA
98927 .	ELECTRONIC SPECIALTY COMPANY, Portland Electronics Division, 18900 East Sandy Road, P.O Box 20055, Portland, OREGON 97220

7-13. PART NUMBER CROSS REFERENCE INDEX FOR LS-518A/SIC AND LS-519A/SIC.

a. This Cross Reference Index is arranged in alphanumeric sequence order of part numbers.

b. To locate an item in the Index proceed as follows:

(1) Determine the required part number in chapter 7 of the Technical Manual.

(2) Locate the part number in the alphanumeric sequenced index to determine the National Stock Number and Source Maintenance and Recoverability code assigned.

Table 7-9. Part Number Cross Reference Index For LS-518A/SIC And LS-519A/SIC

PART NUMBER	FSCM	NATIONAL STOCK NUMBER	SMR CODE
AN505C5-4	92914	5305005889761	PAHZZ
AN515C5-20	81349		PAHZZ
CE13C102G	81349	5910004988467	PCHZZ
CP05A1KB104K3	81349	5910006882822	PAFZZ
CP05A1KE103K3	81349	5910008214702	PAHZZ
F03B250V1/2AS	81349	5920002805038	PAOZZ
HG009	84792		XBFZZ.
JAN1N4245	81349	5961009246981	PAHZZ.
JAN1N645	81349	5961000876047	PAHZZ.
JAN1N970B	04713	5961008784287	PAHZZ.
JAN2N1711A	04713		PAHZZ
JAN2N2219A	81349	5961009491432	PAHZZ
JAN2N2905	81349	5961008804779	PAHZZ
JAN2N355	81349	5961001996008	PAFZZ
LS-445-U	80058.	5965008923665	PAFZZ
MS25238-330	71744	6240008514352	PAOZZ
MS-15795-802	96906	5310005956761	PAFZZ
MS-15795-804	96906	5310007821349	PAFZZ
MS-15795-805	96906	5310007225998	PAFZZ
MS-15795-807	96906	5310008805978	PAFZZ
MS35233-14	96906	5305006380653	PAFZZ
MS35233-17	96906	5305000545651	PAFZZ
MS35233-27	96906	5305000546651	PAFZZ

Table 7-9. Part Number Cross Reference Index For LS-518A/SIC And LS-519A/SIC (continued)

PART NUMBER	FSCM	NATIONAL STOCK NUMBER	SMR CODE
MS35233-28	96906	5305000686529	PAFZZ
MS35233-30	96906	5305000546654	PAFZZ
MS35233-43	96906	5305000546668	PAFZZ
MS35233-5	96906	5305000545639	PAFZZ
MS35338-66	96906	5305005432801	PAFZZ
MS35338-134	96906	5310009282690	PAFZZ
MS35338-135	96906	5310009338118	PAFZZ
MS35338-136	96906	5310009296395	PAFZZ
MS35338-137	96906	5310009338119	PAFZZ
MS35649-224	96906	5310009382013	PAFZZ
MS35649-244	96906	5310009249748	PAFZZ
MS35649-264	96906	5310009349761	PAFZZ.
M39003/01-2254	81349	5910002368740	PAFZZ
M39003/01-2267	81349		PAHZZ
M39003/01-2290	81349	5910009324455	PAHZZ
M39003/01-2314	81349	5910001827512	PAHZZ
M39003/01-2357	81349	5910004950042	PAHZZ
M39003/01-2367	81349		PAHZZ
M39003/01-2368	81349	5910009962259	PAHZZ
MS39006/01-8286	81349		PAHZZ
RC20GF100J	81349	5905001908883	PAHZZ
RC20GF101J	81349	5905001069344	PAHZZ
RC20GF102J	81349	5905001100196	PAHZZ

Table 7-9. Part Number Cross Reference Index For LS-518A/SIC And LS-519A/SIC (continued)

PART NUMBER	FSCM	NATIONAL STOCK NUMBER	SMR CODE
RC20GF103J	81349	5905001858510	PAHZZ
RC20GF110J	81349	5905002793524	PAHZZ
RC20GF113J	81349	5905002792667	PAHZZ
RC20GF121J	81349	5905001145361	PAHZZ
RC20GF150J	81349	5905002793521	PAHZZ
RC20GF151J	81349	5905001086922	PAHZZ
RC20GF182J	81349	5905001908881	PAHZZ
RC20GF2R7J	81349	5905001114852	PAHZZ
RC20GF202J	81349	5905001908887	PAHZZ
RC20GF220J	81349	5905002793519	PAHZZ
RC20GF221J	81349	5905001048350	PAHZZ
RC20GF222J	81349	5905002791876	PAHZZ
RC20GF273J	81349	5905002793499	PAHZZ
RC20GF3R3J	81349	5905007807571	PAHZZ
RC20GF330J	81349		PAHZZ
RC20GF331J	81349	5905010336528	PAHZZ
RC20GF390J	81349	5905001955546	PAHZZ
RC20GF392J	81349	5905001100310	PAHZZ
RC20GF471J	81349	5905001923973	PAHZZ
RC20GF472J	81349	5905002793504	PAHZZI
RC20GF513J	81349	5905002793496	PAHZZ.
RC20GF623J	81349	5905001168565	PAHZZ.
RC20GF680J	81349	5905001168566	PAHZZ
RC20GF681J	81349	5905001118357	PAHZZ

Table 7-9. Part Number Cross Reference Index For LS-518A/SIC And LS-519A/SIC (continued)

PART NUMBER	FSCM	NATIONAL STOCK NUMBER	SMR CODE
RC20GF682J	81349	5905002793503	PAHZZ
RC20GF8R2J	81349	5905001114846	PAHZZ
RC20GF820J	81349		PAHZZ
RC32GF1ROJ	81349	5905000603731	PAHZZ
RC32GF1ROJ	81349	5905008649240	PAHZZ.
RC32GF101J	81349		PAHZZ
RC32GF272J	81349	5905002793837	PAHZZ
RC42GF222J	81349	5905002792529	PAHZZ
RJ50CP101	81349		PAHZZ
S650274117-21	12763	5935011253404	PAFZZ
TF4S21YY	12763	5950010576839	PAHZZ
TF5S03ZZ	12763	5950010576838	PAFZZ
TF5S21ZZ	12763	5950010576840	PAFZZ
X8015-6G25	91506		PAFHH
12116-024	12763	5305000546654	PAFZZ
1416-4	83330		PAFZZ
1416-6	83330	5940001567344	PAFZZ
14101-014	12763		PAOZZ
14101-015	12763		PAOZZ
14101-016	12763		PAOZZ
15520-020	92194		XBFZZ
2S4117	82389	5999010573433	PAHZZ
2S4118A	82389	5999010574614	PAHZZ

Table 7-9. Part Number Cross Reference Index For LS-518A/SIC And LS-519A/SIC (continued)

PART NUMBER	FSCM	NATIONAL STOCK NUMBER	SMR CODE
2S4119	82389	5999010574613	PAHZZ
2S4120	82389	5999010574612	PAHZZ
2S4128A	82389	5999010574611	PAHZZ
269658FIE	76854	5930010589603	PAFZZ
269659FIE	76854	5930010578272	PAFZZ
270971FIE	76854	5930010580867	PAFZZ
3823-3	71400	5920002804058	PAFZZ
57-10360	13511	5935000278917	PAFZZ
57-10500	13511	5935008663010	PAFZZ
57-20360	13511	5935006872205	PAFZZ
57-20500	13511	5935008659237	PAFZZ
60171	12763	5330011203008	PAFZZ
6020-3CC	91506	5999010574558	PAHZZ
61690-033	12763	5330010563435	PAFZZ
61690-060	12763		XBFZZ
61690-070	12763	5940010639789	PAFZZ
61690-076	12763	5330011256277	PAOZZ
61690-081	12763		PAFZZ
61690-092 **	12763		PAFZZ
61690-096	12763		PAFHH
61690-099	12763		PAFHH
61690-119	12763		XBHHH
61690-140 *	12763		PAFZZ

Table 7-9. Part Number Cross Reference Index For LS-518A/SIC And LS-519A/SIC (continued)

PART NUMBER	FSCM	NATIONAL STOCK NUMBER	SMR CODE
61690-161	12763		XBHHH
61691-068	12763	5330011264564	PAFZZ
61691-071	12763	5330010565061	PAOZZ
62072-006	12763	5950001663359	PAHZZ
79GBON-1A320(4)	98927		PAHZZ
79GBON-1AA675(2)	98927	5945009098537	PAHZZ
8080-1G14	91506	5935010165143	PAFZZ
855SE	08717		PAOZZ
855SI-1	08717	6210011249987	PAFZZ
9224-SS-140-7	06540	5365008628128	PAFZZ
9739-N-0632	06540		XBFZZ
9739-SS-0643-7	06540	5340001105095	PAFZZ

* Denotes unique to LS-518A/SIC

** Denotes unique to LS-519A/SIC

CHAPTER 8
INSTALLATION

8-1. INTRODUCTION.

8-2. The LS-518A/SIC and LS-519A/SIC Intercommunication Stations are designed for either bulkhead, desk, or panel mounting. (See figures 8-1 and 8-2.) The units are wired in parallel to the primary power supply and wired together by the inter-unit cable as shown on figure 8-3 or 8-4. All ships cable (TTSU and DSGU) connections to the units are solder type connections.

8-3. TOOLS AND TEST EQUIPMENT REQUIRED.

8-4. The tools and test equipment required to install the LS-518A/SIC and LS-519A/SIC Intercommunication Stations are listed in table 8-1.

8-5. SITE SELECTION AND PREPARATION.

8-6. The proper location of each intercommunication unit will be specified in ship's plans. Mark the exact location of each unit. Cover the markings with transparent tape so they do not become obliterated prior to final site preparation and placement of units.

8-7. UNPACKING AND HANDLING.

8-8. Each LS-518A/SIC and LS-519A/SIC is individually packed in a fiberboard carton. To unpack, place carton in an upright position, slit tape on top and open. Remove top, side and end fillers. Grip handles on unit and lift out. Check unit for any external

Table 8-1. Tools and Test Equipment Required.

ITEM	DESCRIPTION	NATIONAL STOCK NUMBER
Multimeter	Triplet Model 601, or equivalent	
Test Fixture	DYNALEC Drawing Number 61690-090	
Desoldering/ Resoldering Kit	Enterprise Development Corporation Part No. 300 MDK, or equivalent	
Power Drill		
Drill Bit	5/8-inch	
Screwdriver	5/32-inch, Flat Tip	5120-00-618-3193
Pliers	Needle-Nose, 6-1/2-inch	5120-00-144-9403
Pliers	Flat-Nose, 5-1/2-inch	5120-00-541-4106
Cutting Nippers Part No.	Midget, Baker Manufacturing Company XA782-4-1-2, or equivalent	
Wire Stripping Tool		

damage which may have been incurred during shipment. Notify the manufacturer (paragraph 1-2) immediately if there is a discrepancy in equipments received and equipments listed on the shipping order.

8-9. POWER REQUIREMENTS AND DISTRIBUTION.

8-10. Each intercommunicating unit must be connected to ship's 115V 60Hz single phase power at the IC switchboard. Power requirements are listed in table 1-1.

8-11. INSTALLATION REQUIREMENTS.

8-12. REMOVAL OF FRONT PANEL. Before a unit can be connected to ship's wiring, the front panel/chassis assembly must be removed. Back off the four assembly bolts until the threads disengage. Remove bolts from front panel holes. Place the unit on a bench, back of case down, grasping the handles near the top of unit and pull upward slowly. The complete assembly will slide out of the case. It should be placed back in the packing case for protection until needed.

8-13. DRESSING OF SHIP'S CABLE. Care must be taken after the multiconductor ship's cables TTSU and DSGU are soldered to the terminal boards on the back of the case, that the wires are dressed properly. The wires should be dressed between the terminal boards and the terminal tube entrances and close to the surfaces of the case. This is to insure that no part of the chassis panel assembly will rise on or catch any of the cable wires when it is reinstalled in the enclosure.

8-14. MOUNTING OF UNITS.

8-15. MOUNTING ON BULKHEAD. Mounting details for both intercommunicating units LS-518A/SIC and LS-519A/SIC are incorporated on the outline drawing (figure 8-1).

8-16. MOUNTING IN PANEL. The method of mounting the intercommunicating units in a panel is shown on figure 8-2. The dimensions of the required cut-out in the panel, and the mounting holes, the angles, and hardware to be added to the case are also shown in detail.

8-17. TERMINAL TUBES. Ship's cable may enter through terminal tubes at either the top or bottom of the case. Remove the terminal tube closures from the selected side and discard them. Install terminal tubes through the top or bottom of the case as follows:

- a. Type LS-518A/SIC: One side 2 and one size 5.
- b. Type LS-519A/SIC: One size 2 and one size 5.

8-18. INSPECTION.

8-19. Before replacing front panel chassis, check all cable connections for accuracy, good soldered joints, condition of insulation, and proper dress within the case. Electrical and operational tests are then to be made in accordance with the following.

8-20. INSTALLATION CHECKOUT.

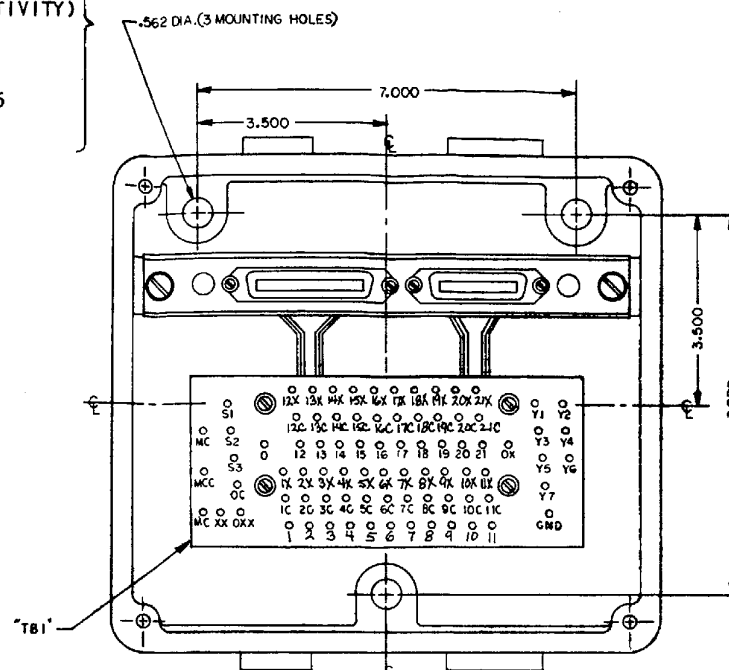
8-21. TESTING OF LINES. When the installation is complete and before the units are installed in their case, all wiring lines should be checked for continuity, ground, and accuracy of connection in accordance with the installation wiring diagram.

WARNING

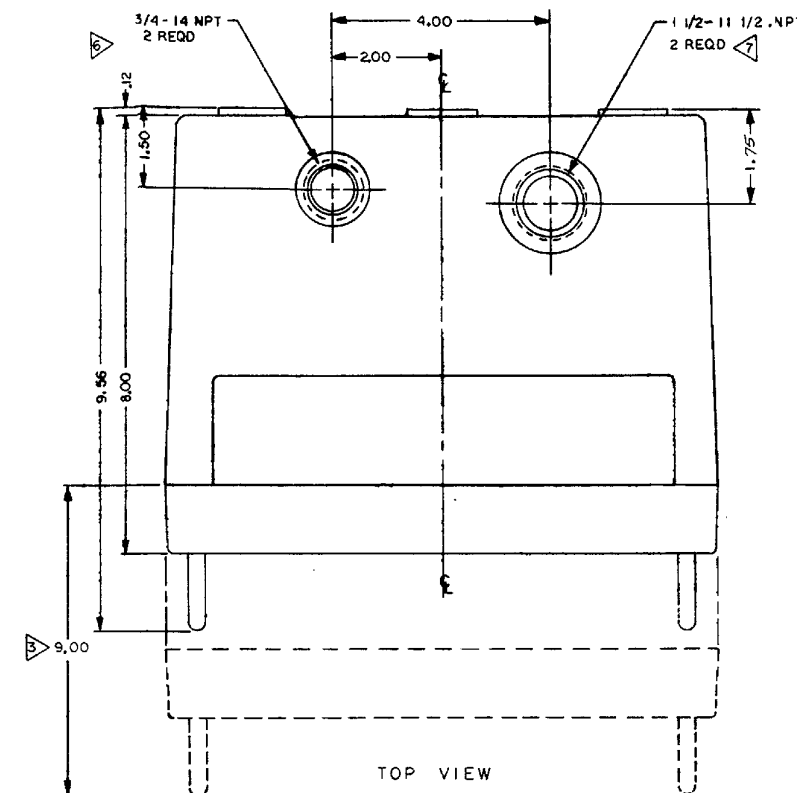
Be sure the power switch has been turned off and fuses have been removed at the IC switchboard.

8-22. REPLACING FRONT PANEL CHASSIS ASSEMBLY. Replace this assembly in the case before proceeding with further tests. Reverse the operations

- 1/2 - 13 UNC CRES CAP SCREW - MS 35307 -
(TO BE DETERMINED BY INSTALLING ACTIVITY)
- 1/2 CRES FLAT WASHER - MS 15795-319
- 1/2 CRES SPLIT LOCKWASHER - MS 35338-86
- 1/2 13 UNC CRES HEX NUT - MS 35690-810



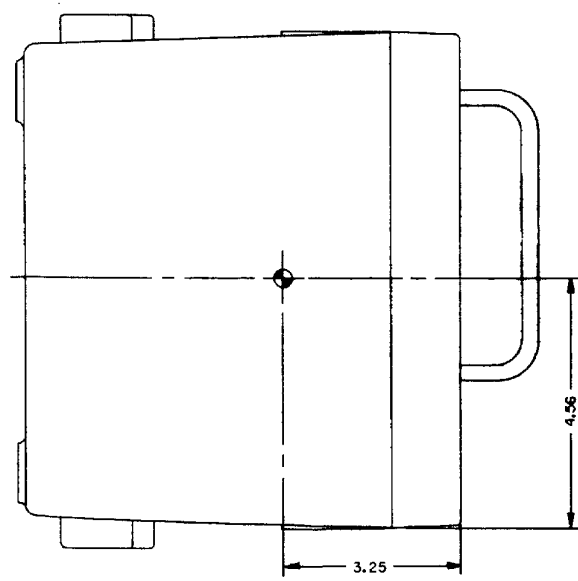
FRONT VIEW OF CASE WITH FRONT PANEL REMOVED



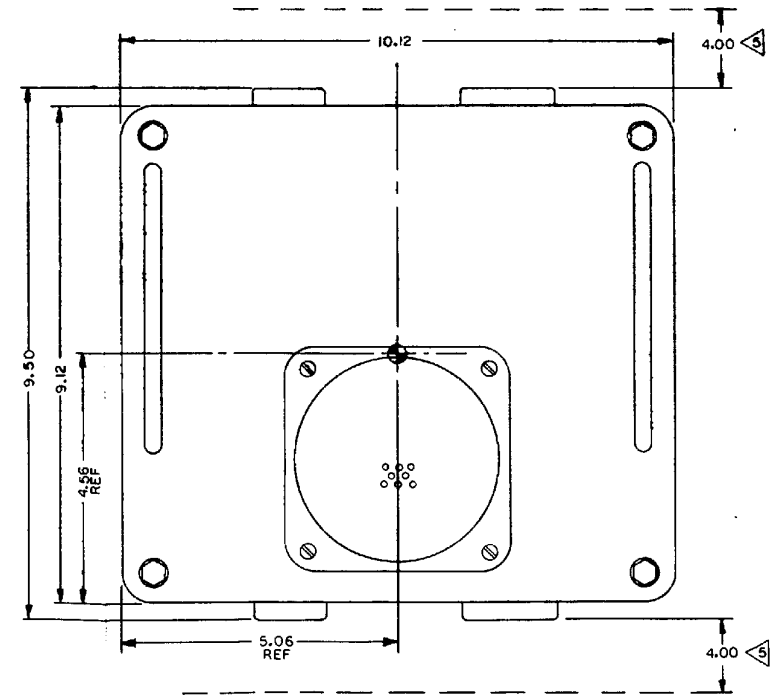
TOP VIEW

- NOTES:
1. ENCLOSURE MATERIAL IS ALL ALLOY 356.T51.
 2. ⊕ INDICATES CENTER OF GRAVITY.
 3. MINIMUM CLEARANCE DIMENSIONS FOR COMPLETE REMOVAL OF FRONT PANEL OF CASE.
 4. GROUND CABINET IN ACCORDANCE WITH MIL-STD-1310.
 5. MINIMUM CLEARANCE DIMENSION FOR STUFFING TUBE.
 6. NPT TYPE (NYLON) STUFFING TUBE SIZE 2, MILITARY PART NUMBER M19622/3-002 (2 REQUIRED).
 7. NPT TYPE (NYLON) STUFFING TUBE SIZE 5, MILITARY PART NUMBER M19622/3-005 (2 REQUIRED).

TABULATION OF DATA		
WEIGHT		28 LBS.
CRATED WEIGHT		31 LBS.
OVERALL CRATED DIMENSIONS		15 H x 15-1/4 W x 16 D
CUBICAL CONTENT: 085 CU.FT.		CRATED: 2.5 CU. FT.
POWER REQUIREMENT PER MIL-STD-761		.0276 KVA, TYPE I
VOLTS, FREQUENCY AND TOLERANCE	TYPE I	115± 6VAC, 60± 3HZ
	TYPE III	N.A.
CURRENT (LINE)	TYPE I	0.24 AMP
	TYPE III	N.A.
PHASE	TYPE I	1∅
	TYPE III	N.A.
POWER FACTOR		0.9
HEAT DISSIPATION TO AIR		75 BTU/HR
AMBIENT OPERATING TEMP.		0°C to +65°C
RELATIVE HUMIDITY		95% MAXIMUM

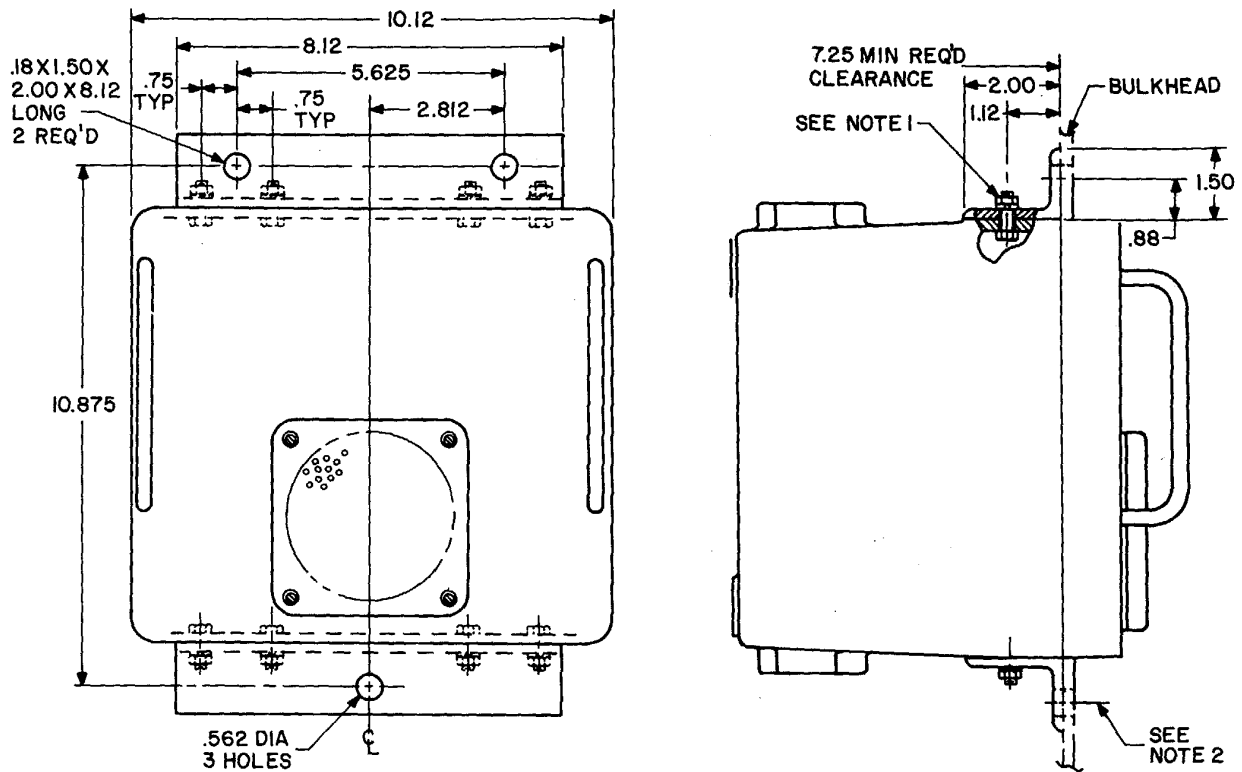


LEFT SIDE VIEW



FRONT VIEW

Figure 8-1. Intercommunication Station LS-518A/SIC, and LS-519A/SIC Bulkhead Mounting Dimensions and Centers. Change 1 8-3/(8-4 blank)



NOTES:

1. 1/4-20 X 3/4 LONG HEX MACH SCREW, 1/4-20 HEX HEAD MACH SCREW NUT, AND 1/4 SPLIT LOCKWASHER, TO PREVENT INTERNAL INTERFERENCE PLACE SCREW HEAD INSIDE OF CASE AS SHOWN.
2. MOUNT UNIT WITH 1/2" STEEL BOLTS.

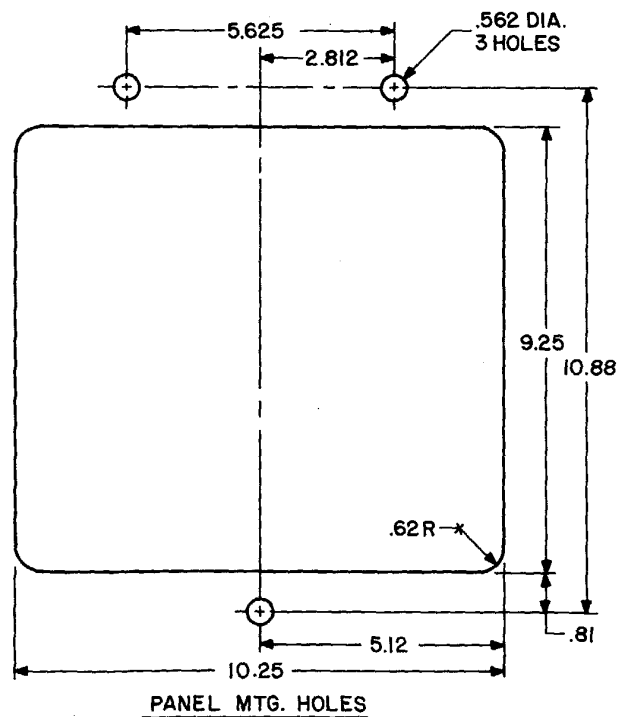


Figure 8-2. Intercommunication Station LS-518A/SIC, and LS-519A/SIC Recessed Panel Mounting Dimensions and Centers.

NOTE:

1. WHEN REQUIRED FOR A PARTICULAR INSTALLATION, PREFIX LINE DESIGNATIONS WITH THE SYSTEM DESIGNATION, E.G., ON A 2I MC SYSTEM, LINE MCI BECOMES 2IMCI.
2. SYMBOLS SUCH AS IC INSIDE SOLID LINES REFER TO TERMINAL BOARD DESIGNATIONS, NUMBERS OUTSIDE SOLID LINES DESIGNATES INDIVIDUAL CONDUCTORS IN THE INTERCONNECTING CABLES.
3. TERMINALS MC AND MCC ARE FOR 115 VOLTS A.C. AND SHALL BE INTERCONNECTED WITH TYPE DSGU CABLE.
4. ALL UNITS TO BE CONNECTED TO THE IC SWITCHBOARD FOR 115VOLTS, 60Hz, 25WATTS PER UNIT, TO THE SAME PHASE OF THE POWER SUPPLY. POLARITY MUST BE OBSERVED.
5. LINES MCI AND MCIC, MC2 AND MC2C, ETC., ARE AUDIO LINES AND SHALL BE TWISTED PAIRS. LINES MCIX, MC2X, ETC., AND MCXX ARE SIGNALLING LINES. ALL SHALL BE TYPE TTSU CABLE.
6. JUMPERS ARE FACTORY INSTALLED FROM TERMINALS Y1 TO Y2, Y3 TO Y4, AND Y6 TO Y7 FOR NORMAL OPERATION.
7. PARALLEL OPERATION OF UNITS.
UNITS MAY BE CONNECTED IN PARALLEL TO RECEIVE MESSAGES SIMULTANEOUSLY. REPLIES MAY BE MADE (OR CALLS ORIGINATED) FROM EITHER UNIT, BUT BOTH UNITS MAY NOT BE USED AT THE SAME TIME.
ALL TERMINALS ARE CONNECTED IN PARALLEL, EXCEPT THE S AND Y TERMINALS. STATIONS 3 AND 3A ARE SHOWN CONNECTED IN PARALLEL TO ILLUSTRATE THE CROSS CONNECTIONS TO THE Y TERMINALS. JUMPER Y1 TO Y2 MUST BE REMOVED ON BOTH UNITS.
8. BUSY OVERRIDE FEATURE.
TO OVERRIDE BUSY SIGNAL AND SUPERIMPOSE SPEECH ON A CONVERSATION IN PROGRESS, REMOVE JUMPER FROM TERMINALS Y6 TO Y7.
9. TO DISABLE LOUDSPEAKER, REMOVE JUMPER FROM TERMINALS Y3 TO Y4.
10. REMOTE SPEAKERS MAY BE CONNECTED TO ANY MASTER STATION. TERMINALS S2, S3, 0, OC, OX, AND OXX ARE INCLUDED TO PROVIDE THIS FACILITY WHEN REQUIRED. SEE TECHNICAL MANUAL.

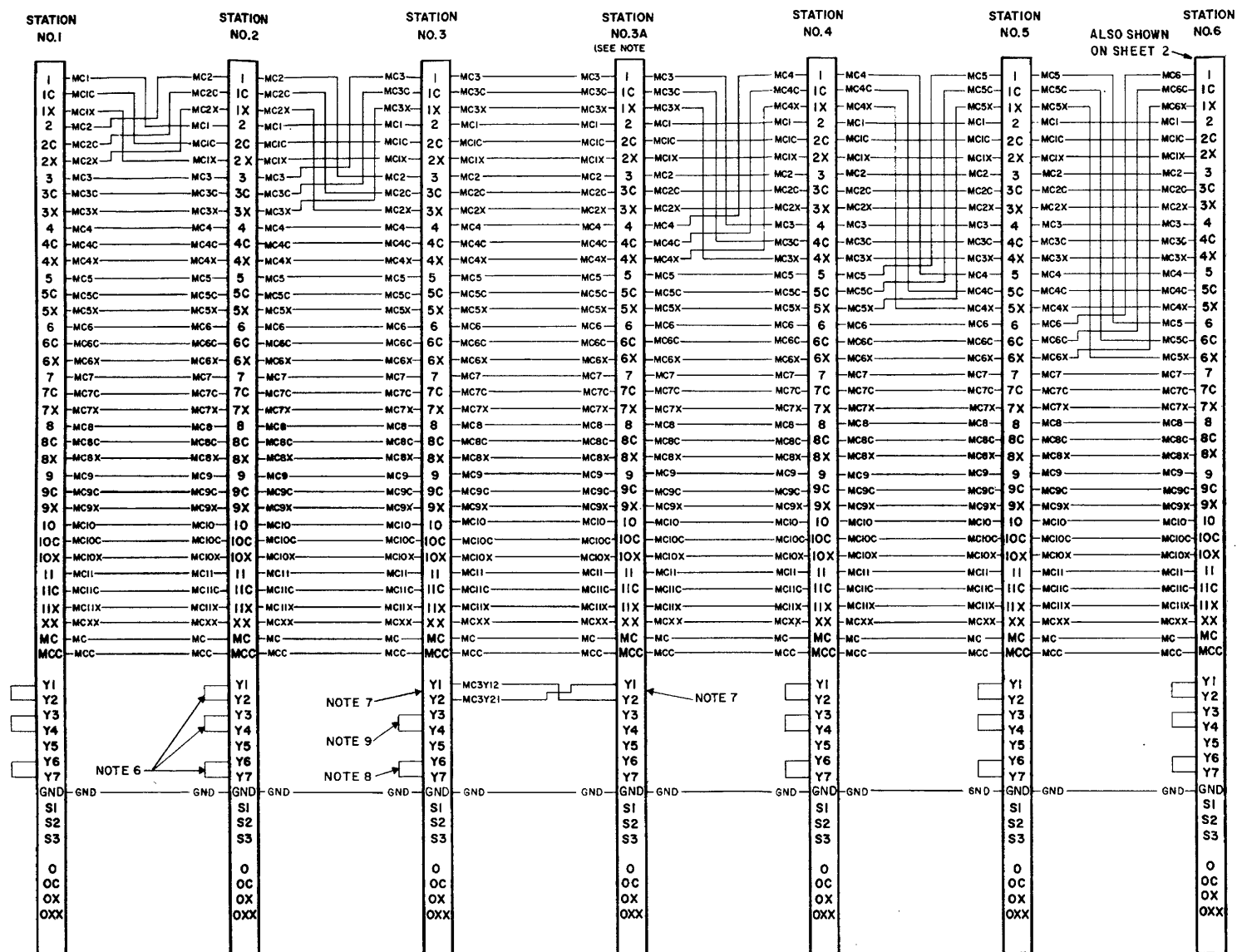


Figure 8-3. Intercommunication Station LS-518A/SIC, (11 Units), Installation Wiring Diagram (Sheet 1 of 2).

Change 1 8-7/(8-8 blank)

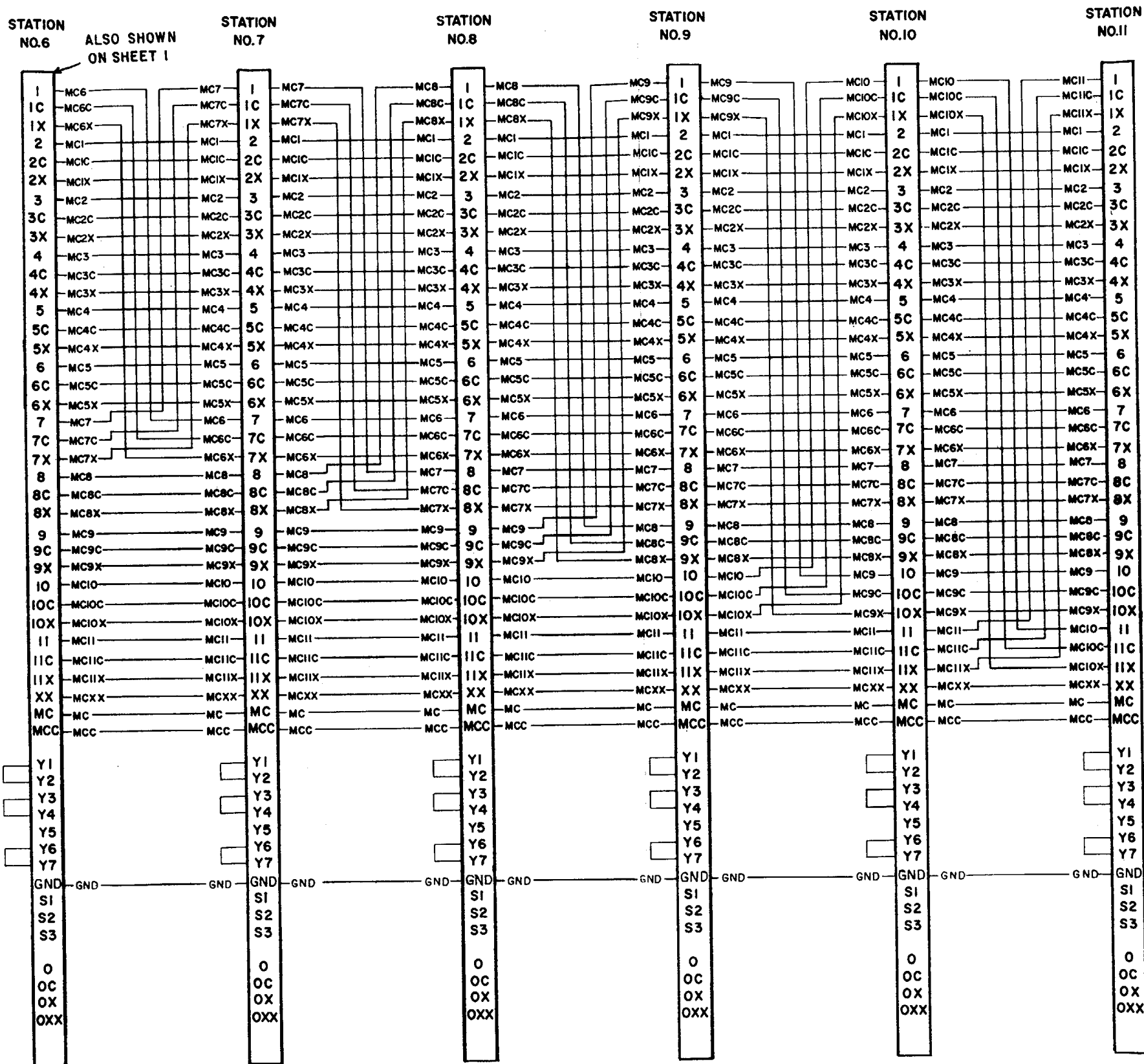


Figure 8-3. Intercommunication Station LS-518A/SIC, (11 Units), Installation Wiring Diagram (Sheet 2 of 2).
Change 1 8-9/(8-10 blank)

NOTE:

1. WHEN REQUIRED FOR A PARTICULAR INSTALLATION, PREFIX LINE DESIGNATIONS WITH THE SYSTEM DESIGNATION, E.G., ON A 21 MC SYSTEM, LINE MCI BECOMES 21MCI.
2. SYMBOLS SUCH AS IC INSIDE SOLID LINES REFER TO TERMINAL BOARD DESIGNATIONS. NUMBERS OUTSIDE SOLID LINES DESIGNATES INDIVIDUAL CONDUCTORS IN THE INTERCONNECTING CABLES.
3. TERMINALS MC AND MCC ARE FOR 115 VOLTS A.C. AND SHALL BE INTERCONNECTED WITH TYPE DSGU CABLE.
4. ALL UNITS TO BE CONNECTED TO THE IC SWITCHBOARD FOR 115VOLTS, 60Hz, 25WATTS PER UNIT, TO THE SAME PHASE OF THE POWER SUPPLY. POLARITY MUST BE OBSERVED.
5. LINES MCI AND MCIC, MC2 AND MC2C, ETC., ARE AUDIO LINES AND SHALL BE TWISTED PAIRS. LINES MCIX, MC2X, ETC., AND MCXX ARE SIGNALLING LINES. ALL SHALL BE TYPE TTSU CABLE.
6. JUMPERS ARE FACTORY INSTALLED FROM TERMINALS Y1 TO Y2, Y3 TO Y4, AND Y6 TO Y7 FOR NORMAL OPERATION.
7. PARALLEL OPERATION OF UNITS
UNITS MAY BE CONNECTED IN PARALLEL TO RECEIVE MESSAGES SIMULTANEOUSLY. REPLIES MAY BE MADE (OR CALLS ORIGINATED) FROM EITHER UNIT, BUT BOTH UNITS MAY NOT BE USED AT THE SAME TIME. ALL TERMINALS ARE CONNECTED IN PARALLEL, EXCEPT THE S AND Y TERMINALS. JUMPER Y1 TO Y2 MUST BE REMOVED ON BOTH UNITS.
8. BUSY OVERRIDE FEATURE
TO OVERRIDE BUSY SIGNAL AND SUPERIMPOSE SPEECH ON A CONVERSATION IN PROGRESS, REMOVE JUMPER FROM TERMINALS Y6 TO Y7.
9. TO DISABLE LOUDSPEAKER, REMOVE JUMPER FROM TERMINALS Y3 TO Y4.
10. REMOTE SPEAKERS MAY BE CONNECTED TO ANY MASTER STATION. TERMINALS S2, S3, O, OC, OX, AND OXX ARE INCLUDED TO PROVIDE THIS FACILITY WHEN REQUIRED. SEE TECHNICAL MANUAL.

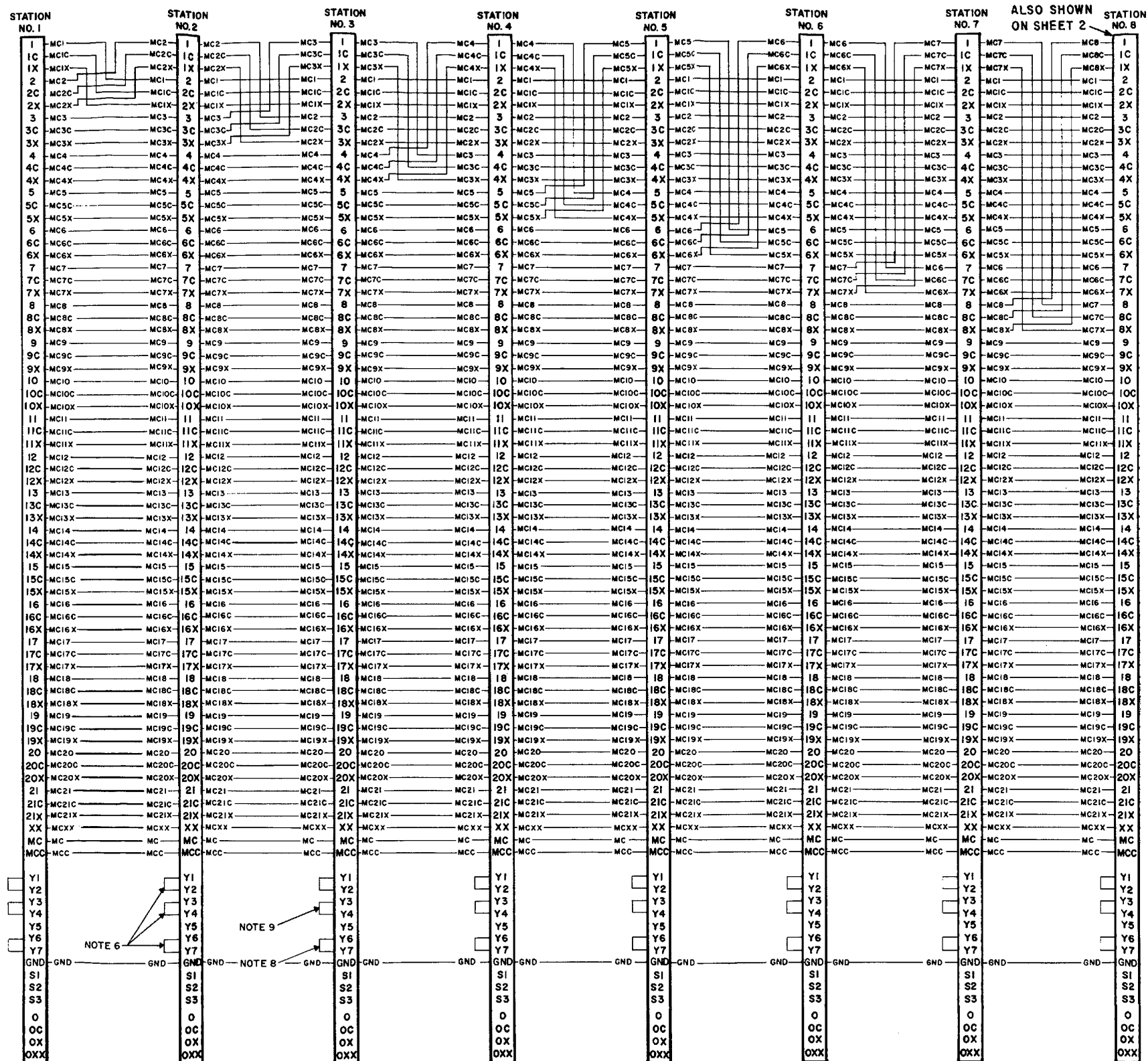


Figure 8-4. Intercommunication Station LS-519A/SIC, (11 Units), Installation Wiring Diagram (Sheet 1 of 3).

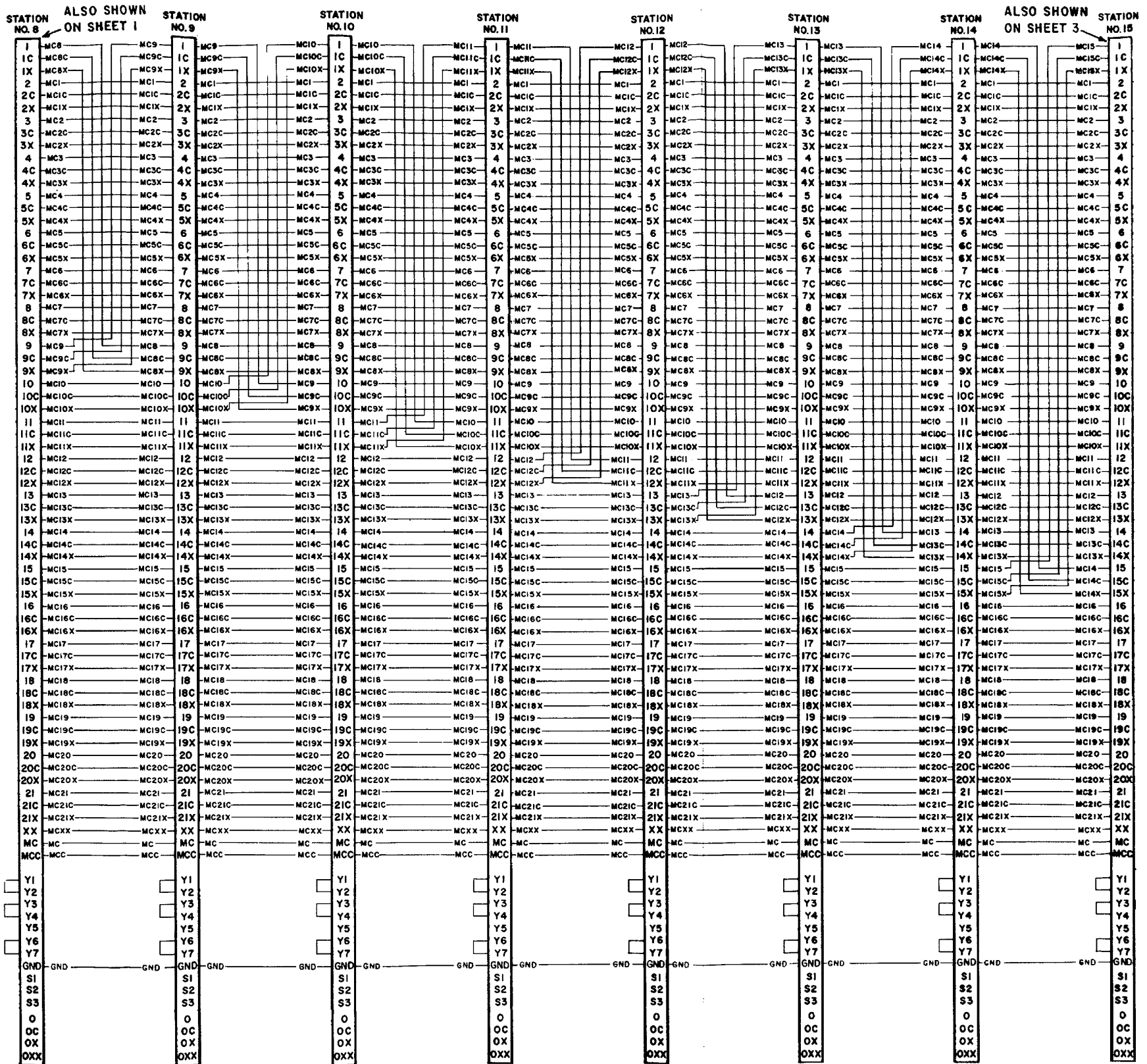


Figure 8-4. Intercommunication Station LS-519A/SIC (11 Units), Installation Wiring Diagram (Sheet 2 of 3).
Change 1 8-13/(8-14 blank)

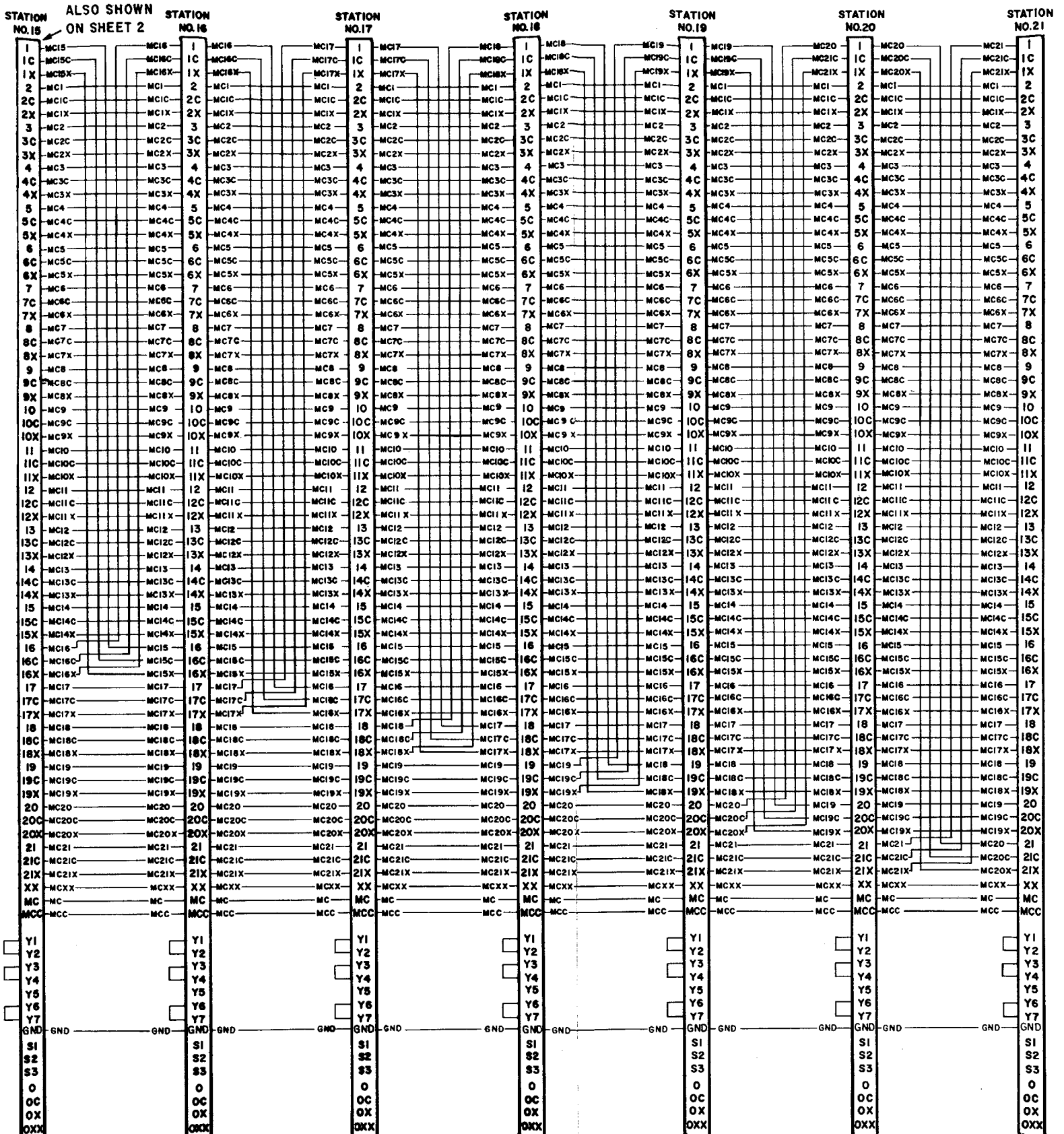


Figure 8-4. Intercommunication Station LS-519A/SIC (11 Units), Installation Wiring Diagram (Sheet 3 of 3).

Change 1 8-15/(8-16 blank)

outlined in paragraph 8-12. Care should be taken to apply equal pressure to the upper portion of each handle so that the connector guides align squarely and permit smooth engagement of the corresponding plugs and receptacles. As soon as the gasket of the panel comes to rest on the case, tighten the four assembly bolts at the corners with equal force so that the gasket will be compressed uniformly all around.

8-23. OPERATIONAL CHECKS. Upon completion of installation, perform the operational checks described in paragraph 4-5.

8-24. STATION DESIGNATION STRIP.

8-25. This is an edge-lite plastic illuminated type designation strip (item 25 on figure 7-1 or item 26 on figure 7-2). It is removed from its recess in the panel for engraving by

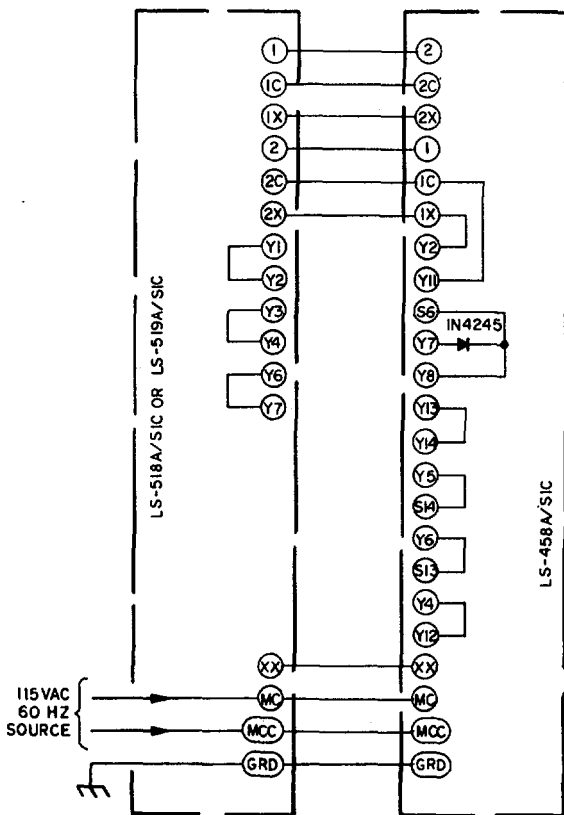


Figure 8-5. Installation Wiring Diagram, Master Station and LS-458/SIC.

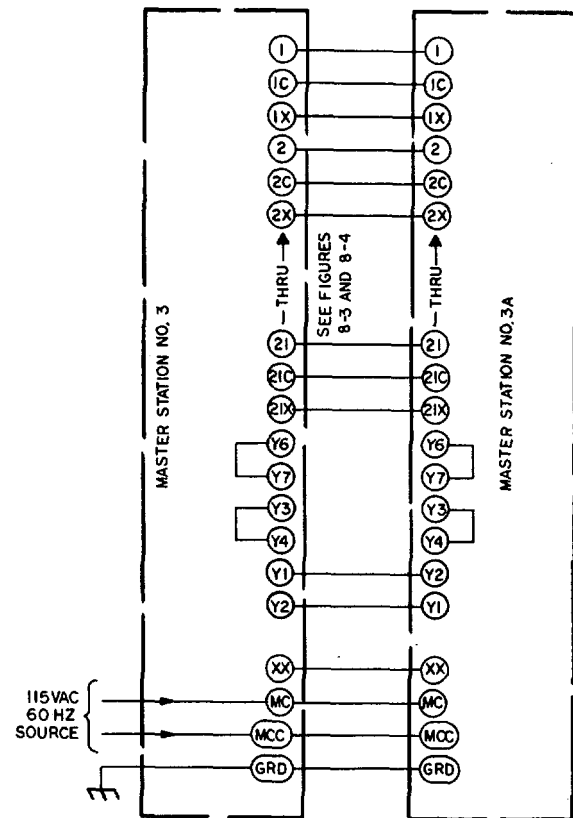


Figure 8-6. Installation Wiring Diagram, Parallel Operation of Master Stations

removing the lens caps from the sockets (item 6 on figure 7-1 or item 7 on figure 7-2). Guide lines are already lightly engraved on the strip to enable centering of the subsequent designation engraving between the guide lines under the selector pushbuttons.

8-26. SYSTEM VARIATIONS.

8-27. Certain variations of intercommunication systems, utilizing equipment which is not described in this manual, are feasible. Refer to figures 8-5, 8-6, 8-7, and 8-8 for the necessary interconnection wiring for these variations. If additional information, regarding the operation and functional descriptions of the LS-458/SIC or LS-386/SIC and Remote Loudspeakers is necessary, refer to Technical Manuals NAVSHIPS 0965-079-7010, NAVSHIPS 365-2750, and NAVSHIPS 3652739.

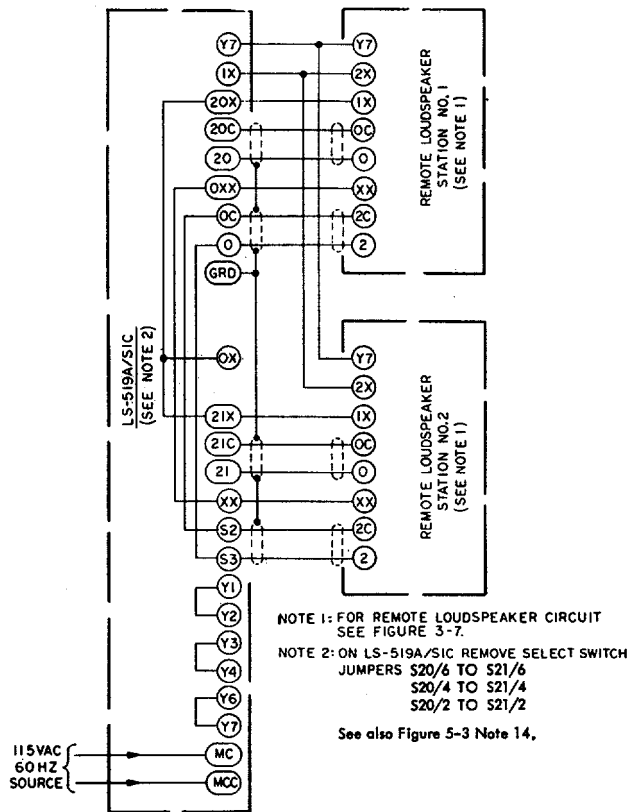


Figure 8-7. Installation Wiring Diagram, Master Station and Remote Loudspeaker.

NOTES:

- 1). These instructions provide capability for hands free reply from LS-518A/SIC or LS-519A/SIC intercom unit (called station) when calling station is an LS-385/SIC or LS-386/ SIC unit. In systems which have all types of intercoms only LS-518A/SIC or LS-519A/SIC units can reply hands free. LS-385/SIC and LS-386/SIC units can not reply hands free.
- 2). General: Description of Instructions. These instructions consist of internal wiring changes to type LS-385/SIC or LS-386/SIC intercom units. When the change is completed the modified unit can control talk/listen switching of any LS-518A/SIC or LS-519A/SIC unit in the system when the called station is in the hands free mode.

NOTE

This modification can not be applied to LS-385/SIC or LS-386/SIC units which are connected for parallel operation.

- 3). Instructions: Control of talk/listen switching of called station is provided by spare contacts 5 and 6 on LS-385/SIC or LS-386/SIC talk relay K1. The relay contacts are connected in parallel with a 330 ohm resistor. Since terminal 1X of the called station is connected to signal circuit common through this parallel combination, the necessary control is provided for hands free operation of the called station.

Material List

Item Number	Dynalec P/N	
1. Resistor 330 1/2W	11204-044	1 Each
2. Wire, black teflon 22 ga.		20 Inch
3. Teflon sleeving 16 ga.	15520-016	4 Inch

Tools List

1. Soldering iron and solder
2. Screw driver
3. Long nose pliers
4. Diagonal cutters
5. Wire strippers

Installation

1. Remove the P1-P2, (P3) connector bracket(s) at rear of unit to expose pushbutton switches wiring.
- 2A. LS-386 Units
Locate the wire from connector P1 pin 7 at switch S1 terminal 1; wire usually wht/blk. Disconnect this wire at switch S1. Using ohmmeter check for continuity from wire removed at switch S1 step 2A, and connect P1 pin 7. Switch S1 terminal 1, leave other wire connected; wire usually blk/wht, from resistor R19.

- 2B. LS-385 Units
Locate the wire from connector P1 pin 7 at switch S22 terminal 1. Wire usually wht/blk. Disconnect this wire at switch S22. Using ohmmeter check for continuity from wire removed at switch S22 step 2B and connector P1 pin 7. Switch S22 terminal 1, leave other wire connected; wire usually blk/wht, from resistor R19.

- 3A. LS-386 Units
Locate the wire from switch S23 terminal 1 N/C at switch S1 terminal 3 or 6. Wire usually blk. Disconnect wire at switch S1. Using an ohmmeter check for continuity from wire removed at switch S1 step 3A and switch S23 terminal 1 N/C. Switch S1 terminal 3 or 6, leave other wire connected; wire usually wht.

- 3B. LS-385 Units
Locate the wire from switch S24 terminal 1 N/C at switch S22 terminal 3 or 6. Wire usually blk. Disconnect wire at switch S22. Using an ohmmeter check for continuity from wire removed at switch S22 step 3B and switch S24 terminal 1 N/C. Switch S22 terminal 3 or 6, leave other wire connected; wire usually wht.

4. Slip about 2 inches of 16 gauge teflon sleeving on the wht/blk wire removed in step 2A or 2B.

5. Splice the wht/blk and blk wires removed in either steps 2A, 3A, or 2B, 3B together. Slip sleeving, step 4, over splice to insulate.

6. On the terminal board located in the back of the case, remove jumper wires Y1 to Y2 and Y3 to Y4.

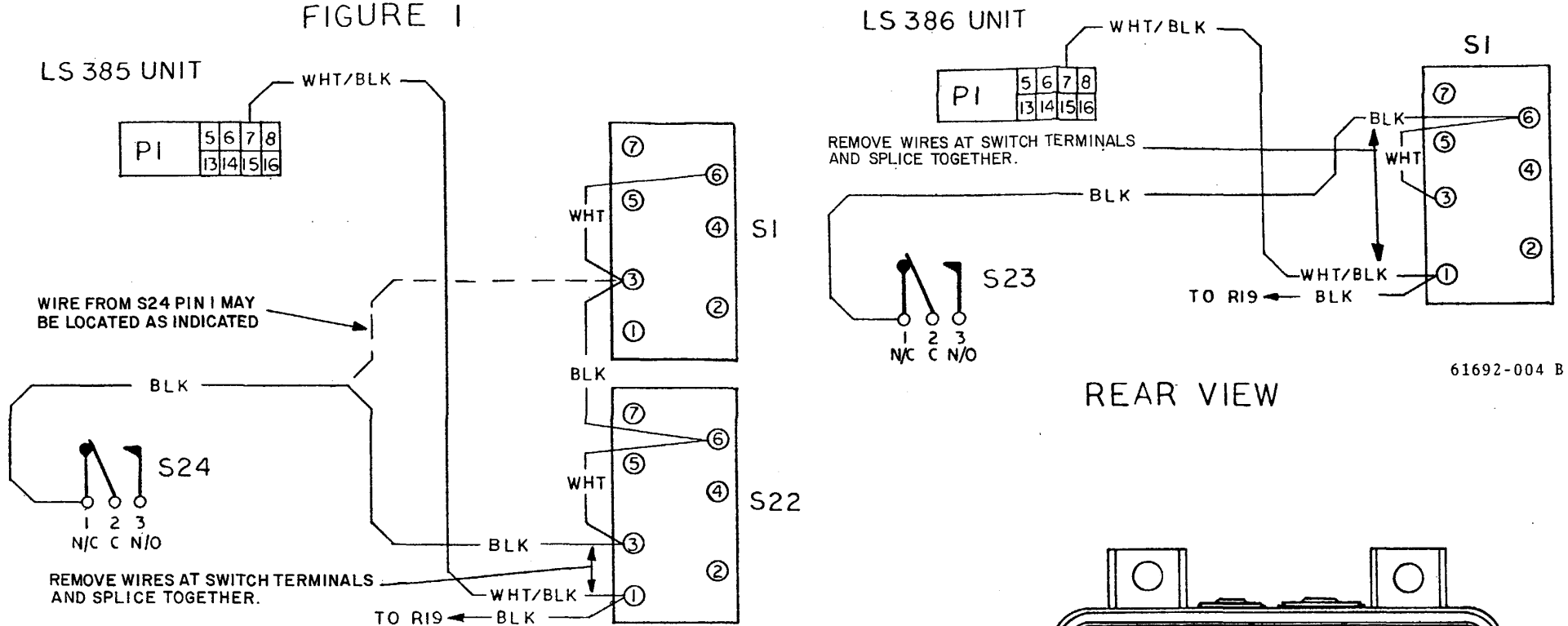
7. On terminal board located in the back of case, connect a 330 1/2W resistor from terminal MCXX to S1; add jumper wire S1 to Y2, MCXX to Y3, Y1 to Y4.

Final Checks

1. Install the modified unit in a system containing an LS-518A (LS-519A).
2. Select and call the LS-518A station and request that the operator place his PTT switch in the HANDS FREE position.
3. The "calling" station should now receive sound from the called station.
4. Depressing the PTT switch on the calling station should now permit transmitting to the called station.
5. Repeat steps 2 through 4 for remaining LS-518A and LS-519A units in circuit.

Figure 8-8. Installation Wiring Diagram, Master Station and LS-386/SIC (Sheet 1 of 2).

FIGURE 1



REAR VIEW

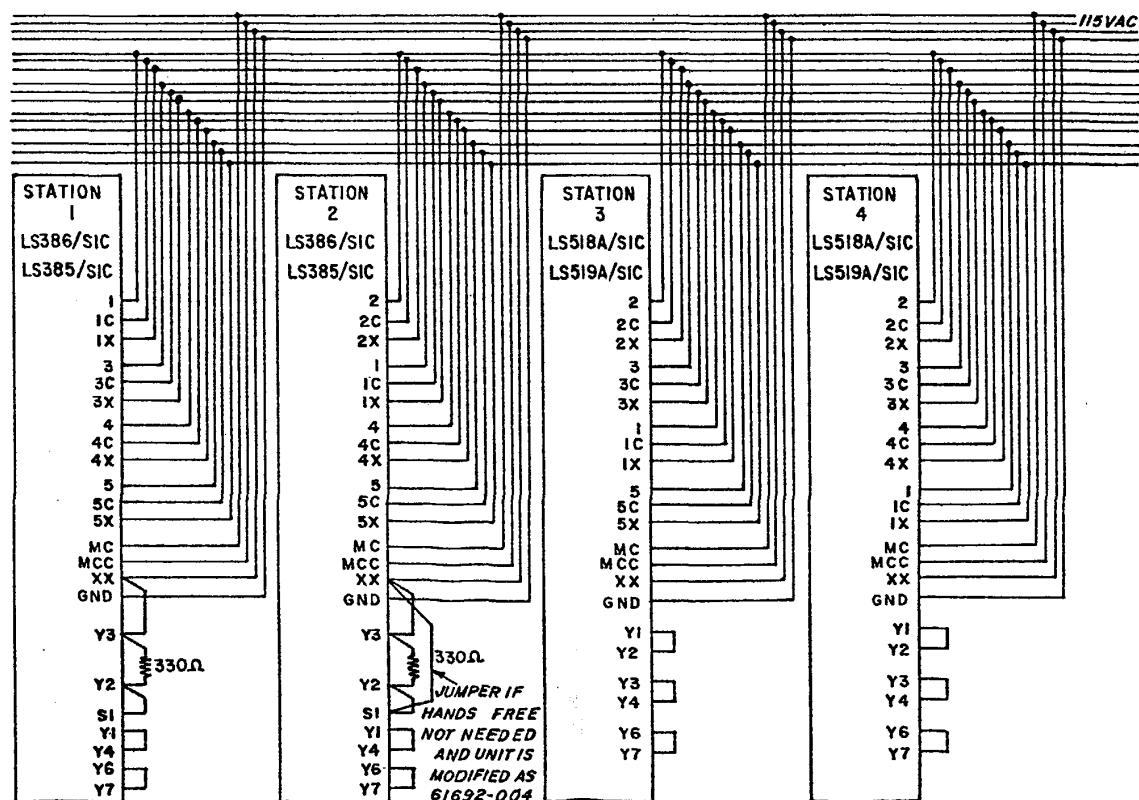
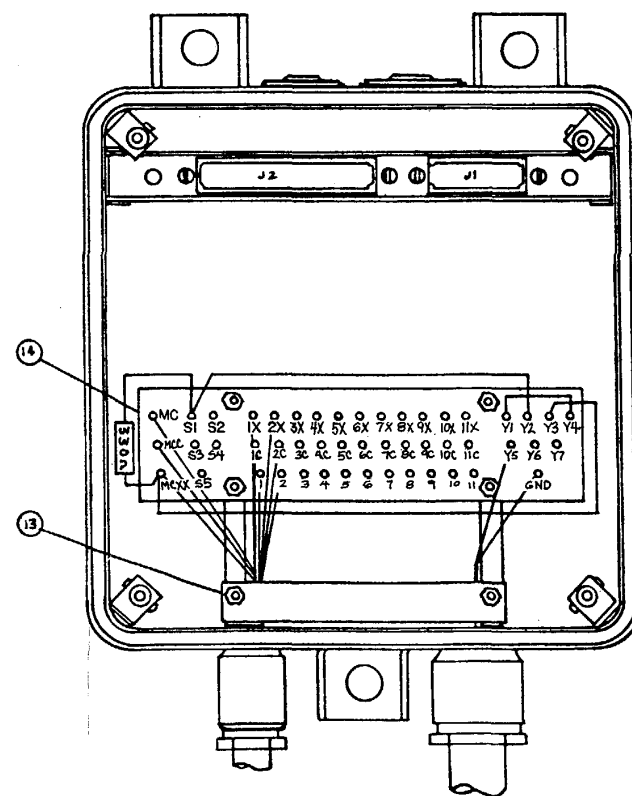


Figure 8-8. Installation Wiring Diagram, Master Station and LS-386/SIC (Sheet 2 of 2)
Change 1 8-21/(8-22 blank)

APPENDIX A REFERENCES

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms. TM 11-5830-258-24P Operator's, Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tool List for Intercommunication Stations LS-518A/SIC and LS-519A/SIC and Test Set, Intercommunication TS-3990/SIC (To be published).
TM 11-6625-320-12	Operator's and Organizational Maintenance Manual: Voltmeter, Meter ME-30A/U and Voltmeters, Electronic ME-30B/U, ME-30C/U, and ME-30E/U.
TM 11-6625-320-35	Direct Support, General Support and Depot Maintenance Manual: Voltmeter, Meter ME-30A/U and Voltmeters, Electronic ME-30B/U and ME-30C/U.
TM 11-6625-539-14-4	Operator's, Organizational, Direct Support and General Support Maintenance Manual: Test Set, Transistor TS-1836D/U, (NSN 6625-00-138-7320).
TM 11-6625-539-24P-4	Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools) for Transistor Test Set TS-1836D/U (NSN 6625-00-138-7320).
TM 11-6625-654-14	Operator's, Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools List) for Multimeter AN/USM-223.
TM 11-6625-654-24P	Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Multimeter AN/USM-223 (NSN 6625-00-999-7465).
TM 11-6625-683-15	Operator's Organizational, Direct Support, General Support and Depot Maintenance Manual: Signal Generator AN/URM-127 (NSN 6625-00-783-5965)
TM 11-6625-683-24P	Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Signal Generator AN/URM-127 (NSN 6625-00-783-5965).
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 MAINTENANCE ALLOCATION

SECTION I. INTRODUCTION

1. General.

This appendix provides a summary of the maintenance operations for Intercommunication Stations LS-518A/SIC and LS-519A/SIC. 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.

2. Maintenance Function.

Maintenance functions will be limited to and defined as follows:

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

b. 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.

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

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by

setting the operating characteristics to the specified parameters.

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

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments 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.

g. 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 or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (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 or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate 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.

i. 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 material 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 equipments/components.

3. Column Entries.

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

b. Column 1, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of task-hours specified by the "worktime" figures represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

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

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets, (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in Section IV, Remarks, which is pertinent to the item opposite the particular code.

4. Tool and Test Equipment Requirements (Section III).

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

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

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parenthesis.

5. Remarks (Section IV).

a. Reference Code. This code refers to the appropriate item in Section II, Column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in Section II.

**SECTION II. MAINTENANCE ALLOCATION CHARTS
FOR
INTERCOMMUNICATION STATIONS LS-518A/SIC AND LS-519A/SIC
INTERCOMMUNICATION STATION LS-518A/SIC**

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	(3)	(4) MAINTENANCE LEVEL					(5) AND EQPT.	(6) TOOLS REMARKS
				C	O	F	H	D		
00	INTERCOMMUNICATION STATION, LS-518A/SIC,	INSPECT		0.3						
		TEST			1.0				1,5,6,7	
		SERVICE		0.3						1,5,6,7,8
01	CIRCUIT CARD ASSEMBLY, RESISTOR BOARD	TEST			0.4				1	
		REPLACE			1.5				1,4,8	
02	CIRCUIT CARD ASSEMBLY, RELAY BOARD	TEST			0.4				1,3	
		REPLACE			1.5				8	
		REPAIR				2.0			1,2,3,4,8	
03	CIRCUIT CARD ASSEMBLY, AMPLIFIER AND POWER SUPPLY BOARD	TEST			0.4				1,3	
		REPLACE			1.5				8	
		REPAIR				2.0			1,2,3,4,8	
04	STATION SELECTOR SWITCH ASSEMBLY, UPPER	TEST			0.3				1	
		REPAIR				1.5			1,8	
05	TERMINAL BOARD ASSEMBLY, RESISTOR BOARD	TEST			0.2				1	
		REPLACE			1.0				1,8	

INTERCOMMUNICATION STATION LS-518A/SIC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	(3)	(4) MAINTENANCE LEVEL					(5) AND EQPT.	(6) TOOLS REMARKS
				C	O	F	H	D		
00	INTERCOMMUNICATION STATION, LS-519A/S IC	INSPECT		0.3						
		TEST			1.0				1,5,6,7	
		SERVICE		0.3					1,5,6,7,8	
01	CIRCUIT CARD ASSEMBLY, RESISTOR BOARD	TEST			0.4				1	
		REPLACE			1.5				1,4,8	
02	CIRCUIT CARD ASSEMBLY, RELAY BOARD	TEST			0.4				1,3	
		REPLACE			1.5				8	
		REPAIR			2.0				1,2,3,4,8	
03	CIRCUIT CARD ASSEMBLY, AMPLIFIER AND POWER SUPPLY BOARD	TEST			0.4				1,3	
		REPLACE			1.5				8	
		REPAIR						2.0	1,2,3,4,8	
04	STATION SELECTOR SWITCH ASSEMBLY, UPPER	TEST			0.3				1	
		REPAIR						1.5	1,8	
05	STATION SELECTOR SWITCH ASSEMBLY, LOWER	TEST			0.3				1	
		REPAIR						1.5	1,8	
06	TERMINAL BOARD ASSEMBLY, RESISTOR BOARD	TEST			0.2				1	
		REPLACE			1.0				1,8	

SECTION III. TOOLS AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	F, H	MULTIMETER, AN/USM-223	6625-00-999-7465	
2	H	TEST SET, SEMICONDUCTOR DEVICE TS-1836D/U	6625-00-138-7320	
3	F, H	AUDIO SIGNAL GENERATOR, AN/URM-127	6625-00-783-5965	
4	H	ELECTRONIC VOLTMETER, ME-30A/U	6625-00-643-1670	
5	F	TEST SET, INTERCOMMUNICATION STATION, TS-3990/SIC		
6	F	CABLE ASSEMBLY, AUDI P/N: 1018-1		
7	F	CABLE ASSEMBLY, AUDI P/N: 1029-1		
8	F, H	TOOLKIT, ELECTRONIC EQUIPMENT, TK-100 /G	5180-00-605-00791	

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By Order of the Secretary of the Army:

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THE METRIC SYSTEM AND EQUIVALENTS

WEIGHT MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 lb.
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

$5/9(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $9/5^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
its	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
ometers per Liter	Miles per Gallon	2.354
ometers per Hour	Miles per Hour	0.621



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