AD 419107

[redacted]

MINUTEMAN

GROUND ELECTRONICS SYSTEM FOR WS-133B

MPO-SR-17-3-205

GROUND ELECTRONICS SYSTEM FOR WS-133B (MINUTEMAN)

FACILITIES DESIGN CRITERIA,
NEW OPERATIONAL LAUNCH
AND LAUNCH CONTROL
FACILITIES

This document supersedes previous material published on this subject.

Prepared for

HEADQUARTERS
BALLISTIC SYSTEMS DIVISION
AIR FORCE SYSTEMS COMMAND
NORTON AIR FORCE BASE
San Bernardino, California

Contract Number AF04(694)-261

23 September 1963

Prepared by

SYLVANIA ELECTRONIC SYSTEMS
MINUTEMAN PROGRAM OFFICE

63 Second Avenue
Waltham 54, Massachusetts

Approved by: E. L. Rich
E. L. Rich

Submitted by: D. I. Levin
D. I. Levin

Approved by: M. P. Duffy
M. P. Duffy

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (Continued)

LIST OF ILLUSTRATIONS (Continued)

LIST OF TABLES

SECTION 1

INTRODUCTION

1.1 GENERAL

This release of information defining Facilities Design Criteria is prepared based on objectives and requirements resulting from the following:

1. Technical Interchange Meeting at Sylvania, Waltham, 1, 2 July 1963.
2. Technical Interchange Meetings at STL, Norton Air Force Base, 6 August 1963 and 19 August 1963.
3. Technical Interface Meeting at Boeing, Seattle on 20, 21 August 1963.
4. Decision by BSD/STL to employ the dipole antenna system.
5. Introduction of an additional rack of equipment for message processing at the Launch Control Centers.
6. Cable Interface Meeting at Sylvania, Waltham, 22 August 1963.
7. Technical Interchange Meeting at Sylvania, Waltham on 12, 13 September 1963.

The criteria contained herein is thus a consolidation of the above events and their derived conclusions with existing data already contained in the previous Facilities Design Criteria, Sylvania Document MPO-SR-17-3-204 of 31 May 1963 and Revision to same dated 12 July 1963.

The principal areas of change, addition, deletion, and interface resolution as a result of the above itemized influences are reflected largely within the sections pertaining to the Launch Control Center, Launcher Equipment Room, and Antenna Farm.

Particular attention should be given to Equipment Placement within the LCC, the Cable Tray requirements within the LCC, Cable Routing within the LER, and Antenna Plot Plans and conduit to same at the LCF and LF sites.

Still under development at this writing are the requirements for mounting of ESA devices. This information will be conveyed at a later date either by revision to this issue or in a subsequent release.

Table 1-1. ABBREVIATIONS

Abbreviations	Description
AFBSD	Air Force Ballistic Systems Division
ACP	Alternate Command Post
AGE	Aerospace Ground Equipment
BSD	Ballistic System Division
EI	Electro-Magnetic Interference
EMP	Electro-Magnetic Pulse
ESA	Electrical Surge Arrestor
G & C	Guidance & Control
GES	Ground Electronic System
GFE	Government Furnished Equipment
H & D	Hardened and Dispersed
ICCP	Inside Cable Communications Plant
LCC	Launch Control Center
LCEB	Launch Control Equipment Building
LCF	Launch Control Facility
LCSB	Launch Control Support Building
LEB	Launcher Equipment Building
LER	Launcher Equipment Room
LF	Launcher Facility
LT	Launcher Tube
MCN	Maintenance Communications Network
MG	Motor Generator
MPCU	Message Processing Control Unit
MPCS	Message Processing Control System
OCCP	Outside Cable Communications Plant
RFI	Radio Frequency Interference
RPIE	Real Property Installed Equipment
SAC	Strategic Air Command

Table 1-1. ABBREVIATIONS
(Continued)

Abbreviations	Description
STL	Space Technology Laboratories
SYLVANIA	
SES	Sylvania Electronics System
TELCO	Commercial Telephone Company

Table 1-2. APPLICABLE DOCUMENTS

Number	Description
BSD 61-99	Human Engineering General Specification for the Development of Air Force Ballistic Missile Systems
BSD 62-4 (SECRET)	Ground Electronic System Design Criteria (WS-133A)
BSD 62-46	Minuteman Interface and Space Control Program
BSD 62-51	Environmental Design Criteria (WS-133B)
BSD 62-62	System Requirements Analysis Program for WS-133B Minuteman (Review Draft)
BSD 62-71	Operational Facilities Design Criteria for Minuteman (WS-133B)
BSD 62-75	Electrical Grounding and Bonding Criteria for Minuteman (WS-133B)
BSD 62-77	Design Criteria for Electrical Power Cabling System
BSD 62-79	Life Support Criteria (WS-133B)
BSD 62-80	Design Criteria for (WS-133B) Environmental Control
BSD 62-83 (SECRET)	Weapons Effects Criteria (WS-133B)
BSD 62-84	Standardization Exhibit (WS-133B)
BSD 62-123 (SECRET)	Weapons System Design Criteria (WS-133B)

SECTION 2

LAUNCH CONTROL CENTER

2.1 FUNCTION

The function of the Launch Control Center (LCC) is to house and sustain Sylvania GES and integrated GFE units of equipment associated with the Sylvania recommended WS-133B configuration. This portion of the Minuteman System shall be developed for occupied long duration service. The LCC shall represent the focal point for manned operation in performance of the essential-to-launch functions and control of the Ground Electronics System and SAC Command Communications Systems. At this time, the criteria and requirements are established for the general case in which the LCC is an attribute of an ACP.

2.2 ARCHITECTURAL

Preliminary equipment layout (Figure 2-1) within the LCC has been generated as a result of certain data inputs from STL, TI Meetings, and evaluated Sylvania internal judgment. Relative placement of the assigned units of equipment should again be carefully evaluated prior to making recommendations that may involve their repositioning. Positioning of equipments within the LCC has been effected in accordance with the applicable provisions of BSD Exhibits 62-80, 61-99 and 62-79. It should be noted that considerations have been given to accessibility for servicing, rack and drawer removal, and panel opening for service or monitoring purposes in establishing the LCC Layout.

Preliminary placement of Sylvania and GFE items has thus been made as a result of numerous compromises and acknowledged proximity constraints, many of which are occasioned by observance of critical cable lengths

between racks and other units of equipment. Sizes of equipment to be placed within the LCC are as shown on the Sylvania Equipment List, Figure 2-2.

Physical constraints on maximum unit equipment size are imposed for handling purposes. These figures are covered under Section 4, Access Facility, of this criteria.

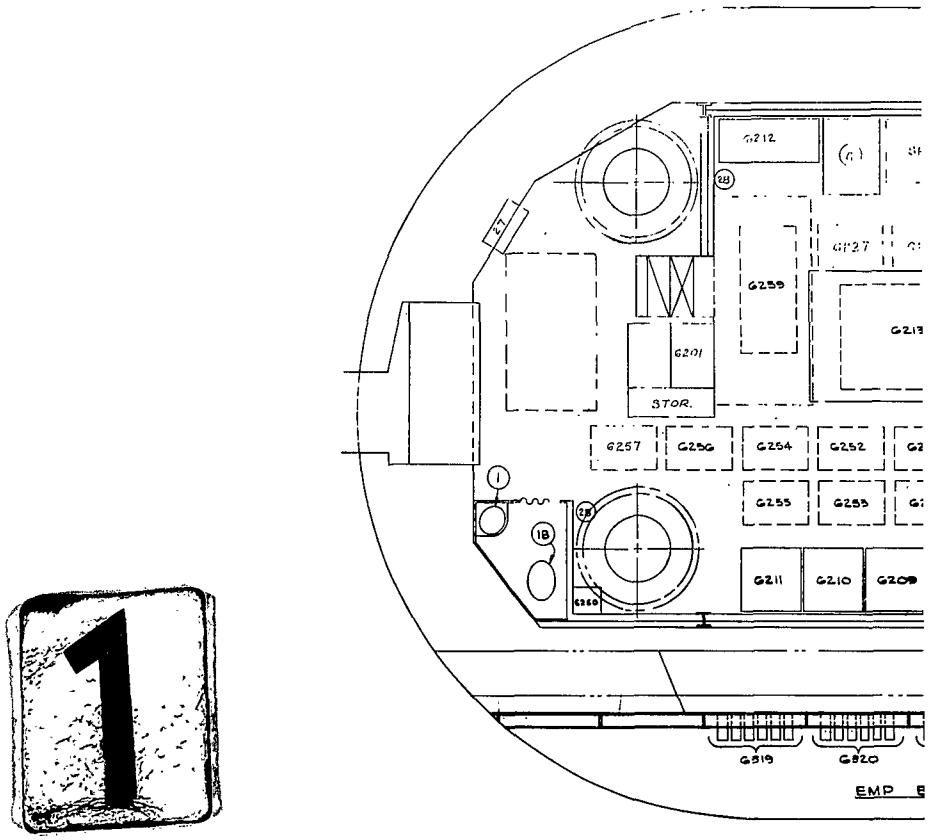
See Figures 2-3 through 2-18 for preliminary rack information.

The basis of design of the LCF evolves from the LCC equipment layout. Major decisions relative to the Sylvania endorsed GES recommendation for the LCF are founded on concepts of design basically compatible with the LCC configuration expressed herein.

Sufficient space shall be provided within the EMP Room (Figure 2-19) to allow a cable splicer and helper adequate room to perform their function. Conduit penetrations into this area shall not impede normal access of personnel for installation or maintenance.

Additional storage volume within the LCC for personal equipment, waste, custodial equipment, survival equipment storage, dry food storage and water storage shall be provided by others in consonance with BSD Exhibit 62-79. These are as follows:

Dry food storage		40 cu. ft
Water storage (includes 300 ga. potable)		2500 gal.
Waste containers		35 gal.
Custodial equipment		5 cu. ft.
Personal equipment		24 cu. ft
Clothing (survival period)	12 cu. ft.	
Convenience storage	6 cu. ft.	
Bedding	6 cu. ft.	
Survival equipment		24 cu. ft.

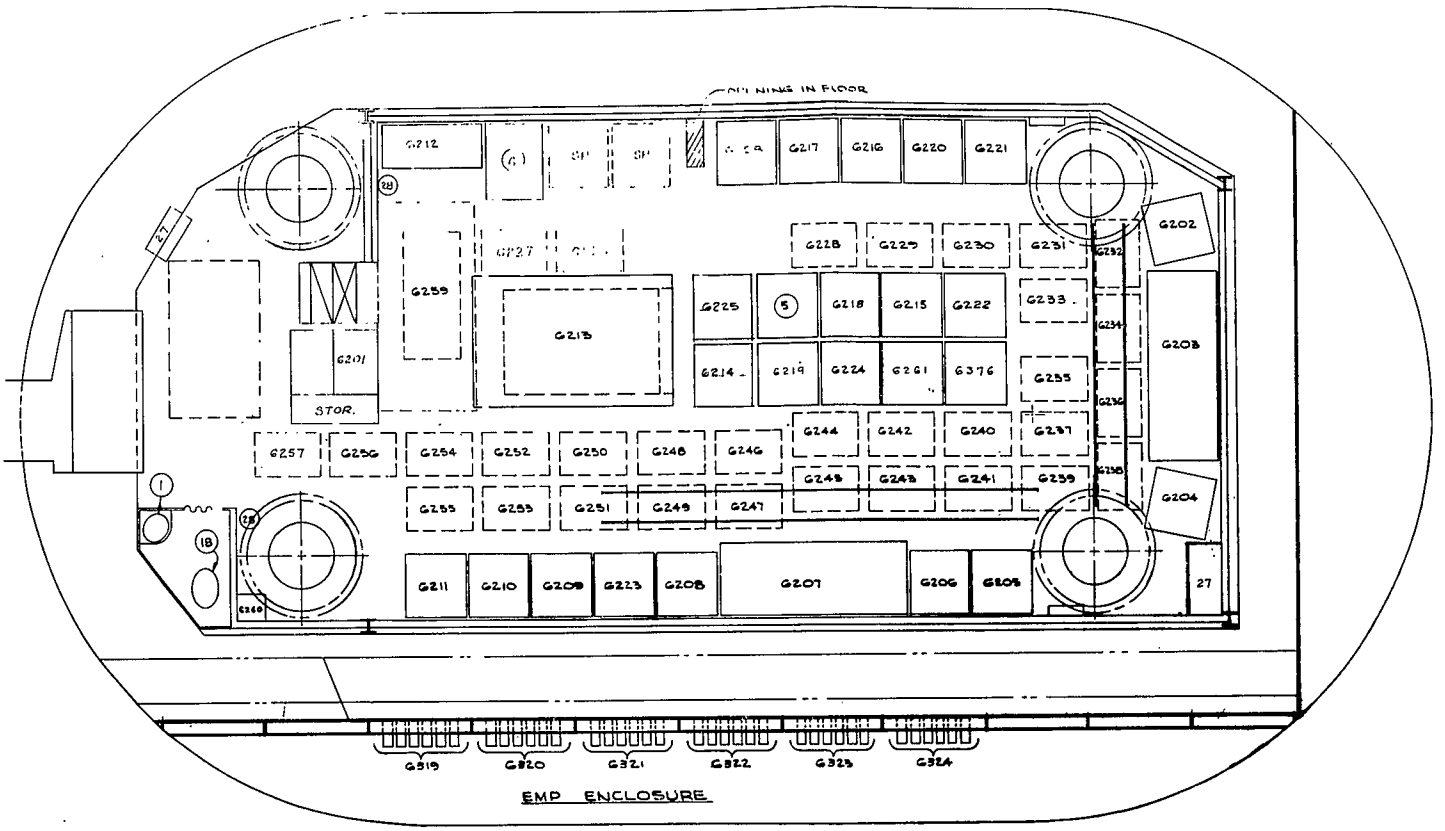


1

EQUIPMENT SCHEDUL

REF DES	EQUIPMENT NAME	FIG. A NO.	SOURCE	REMARKS
G201	OVEN-REFRIGERATOR UNIT		RPIE	
G202	SYSTEM 487L	14043	GFE	
G203	COMMAND CONSOLE (MPCS)	14150	SYL	
G204	4GSL DATA CONVERTER GROUP	14041	GFE	
G205	4GSL DATA CONVERTER GROUP	14041	GFE	
G206	RADIO SET (HF)	14013	GFE/SYL	
G207	LAUNCHER CONTROL CONSOLE	14150	SYL	
G208	ALARM MONITOR	14011	SYL	
G209	TELEPHONE TERMINAL	14045	SYL	
G210	TERMINAL DIGITAL	14000	SYL	
G211	JUNCTION BOX SET	14031	SYL	
G212	POWER PANEL LCDR H&V CONTROL PANEL	1323	GFE/RPIE	
G213	ENVIRONMENTAL CONTROL UNIT		AGE	
G214	POWER AND DISTRIBUTION	14103	SYL	
G215	SYSTEM 279	14042	GFE	
G216	4GSL DATA ANALYSIS GROUP(SRCC)	14041	GFE	
G217	4GSL MODEM CRYPTO GROUP(SRCC)	14041	GFE	
G218	RADIO SET (UHF)	14014	SYL/GFE	
G219	STATUS AUTHENTICATION SYSTEM	14150	SYL	
G220	4GSL DATA TRANSFER GROUP(SRCC)	14041	GFE	
G221	4GSL CONTROL INDICATOR GROUP(SRCC)	14041	GFE	
G222	PAS	14044	GFE	
G223	ANTENNA TUNER	14131	SYL	
G224	RADIO SET (C&S)	14125	SYL	
G225	1GOV BATTERY CHARGER	14102	SYL	
G226	BATTERY 32V SYSTEM	14104	GFE	
G227	BATTERY 32V SYSTEM	14104	GFE	
G228 TO G251	BATTERIES 1GOV SYSTEM	14105	GFE	
G252	32V BATTERY CHARGER	14101	SYL	
G253	MG SET	14106	SYL	
G254	MONITOR-CONTROL GROUP	14150	SYL	
G256	TIMER & BUFFER	14150	SYL	

REF DES	EQUIPMENT
G219 TO G234	ESA MOUNTING
	DRINKING FOUNTA
	LIFE SUPPORT A
	LOCK SAFE & DRU
	WATER CLOSET
	SHOCK ISOLATOR
	FIRE EXTINGUI
G260	OC-I UNIT



FLOOR PLAN

GRAPHIC SCALE (IN FEET)

EQUIPMENT SCHEDULE

NAME	FIG. A NO.	SOURCE	REMARKS
OR UNIT		RPIE	
LE (MPCS)	14043	GFE	
ERTER GROUP	14150	SYL	
ERTER GROUP	14041	GFE	
CONSOLE	14041	GFE	
	14013	GFE/SYL	
NAL	14150	SYL	
	14011	SYL	
T	14045	SYL	
	14000	SYL	
V CONTROL PANEL	14031	SYL	
ONTROL UNIT	1323	GFE/RPIE	
BUTION		AGE	
	14103	SYL	
	14042	GFE	
S GROUP(SRCC)	14041	GFE	
TO GROUP(SRCC)	14041	GFE	
	14014	SYL/GFE	
TION SYSTEM	14180	SYL	
ER GROUP (SRCC)	14041	GFE	
ICATOR GROUP(SRCC)	14041	GFE	
	14044	GFE	
ER	14131	SYL	
)	14125	SYL	
HARGER	14102	SYL	
YSTEM	14104	GFE	
YSTEM	14104	GFE	
SYSTEM	14105	GFE	
ARGER	14101	SYL	
	14106	SYL	
GROUP	14150	SYL	
	14150	SYL	

REF DES	EQUIPMENT NAME	FIG. A NO.	SOURCE	REMARKS
G319 TO G324	ESA MOUNTING ASSEMBLIES	14003	SYL	
	DRINKING FOUNTAIN AND WASH BASIN		RPIE	*1
	LIFE SUPPORT AIR SYSTEM		AGE	*5
	LOCK SAFE 4 DRAWER		GFE	*6
	WATER CLOSET AND ENCLOSURE		RPIE	*18
	SHOCK ISOLATOR SYSTEM PANEL		AGE	*21
	FIRE EXTINGUISHERS		GFE	*28
6260	OC-1 UNIT		AGE	

2

Figure 2-1A. LCC Equipment Layout

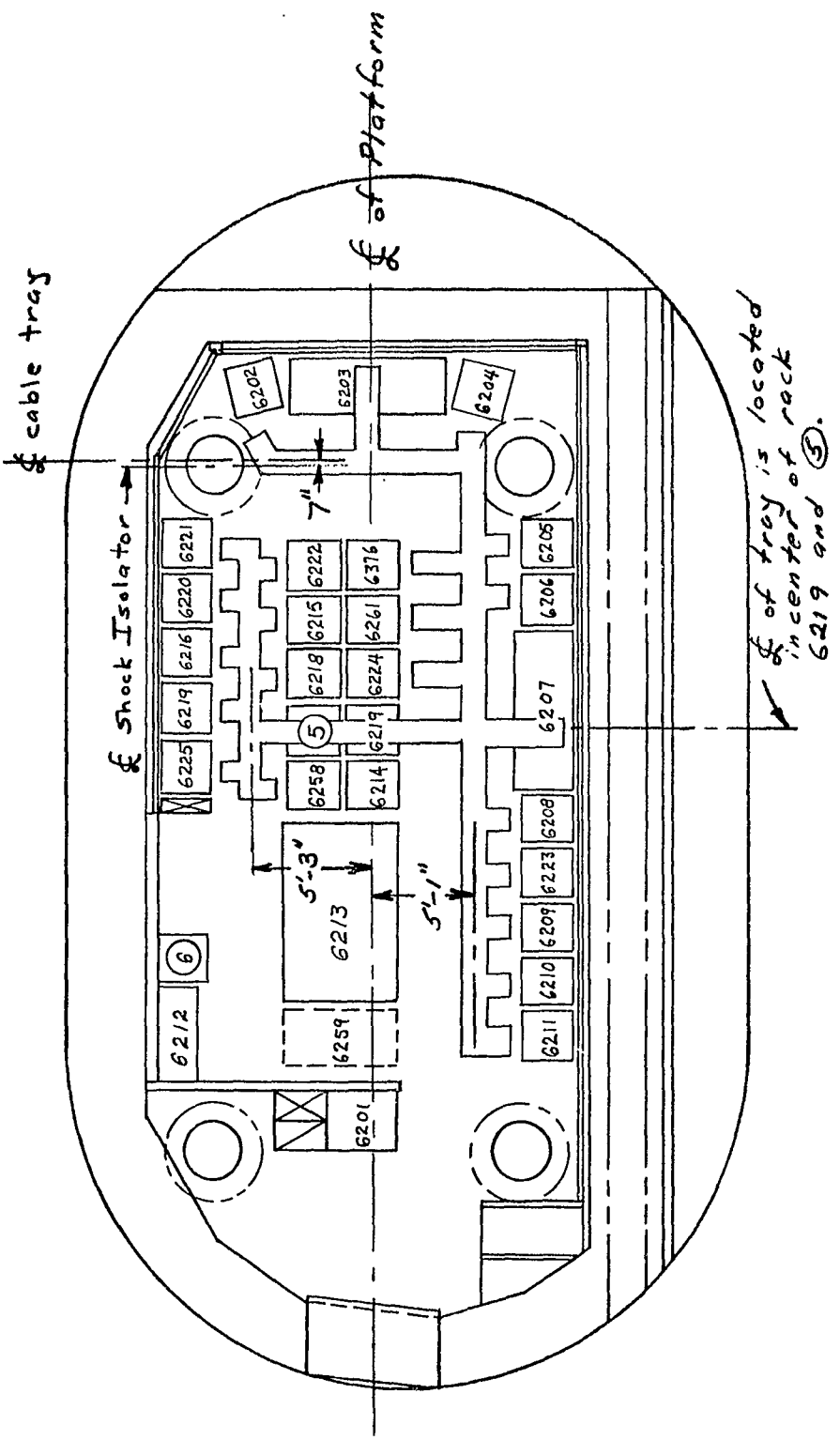


Figure 2-1B. Cable Tray Layout-Signal

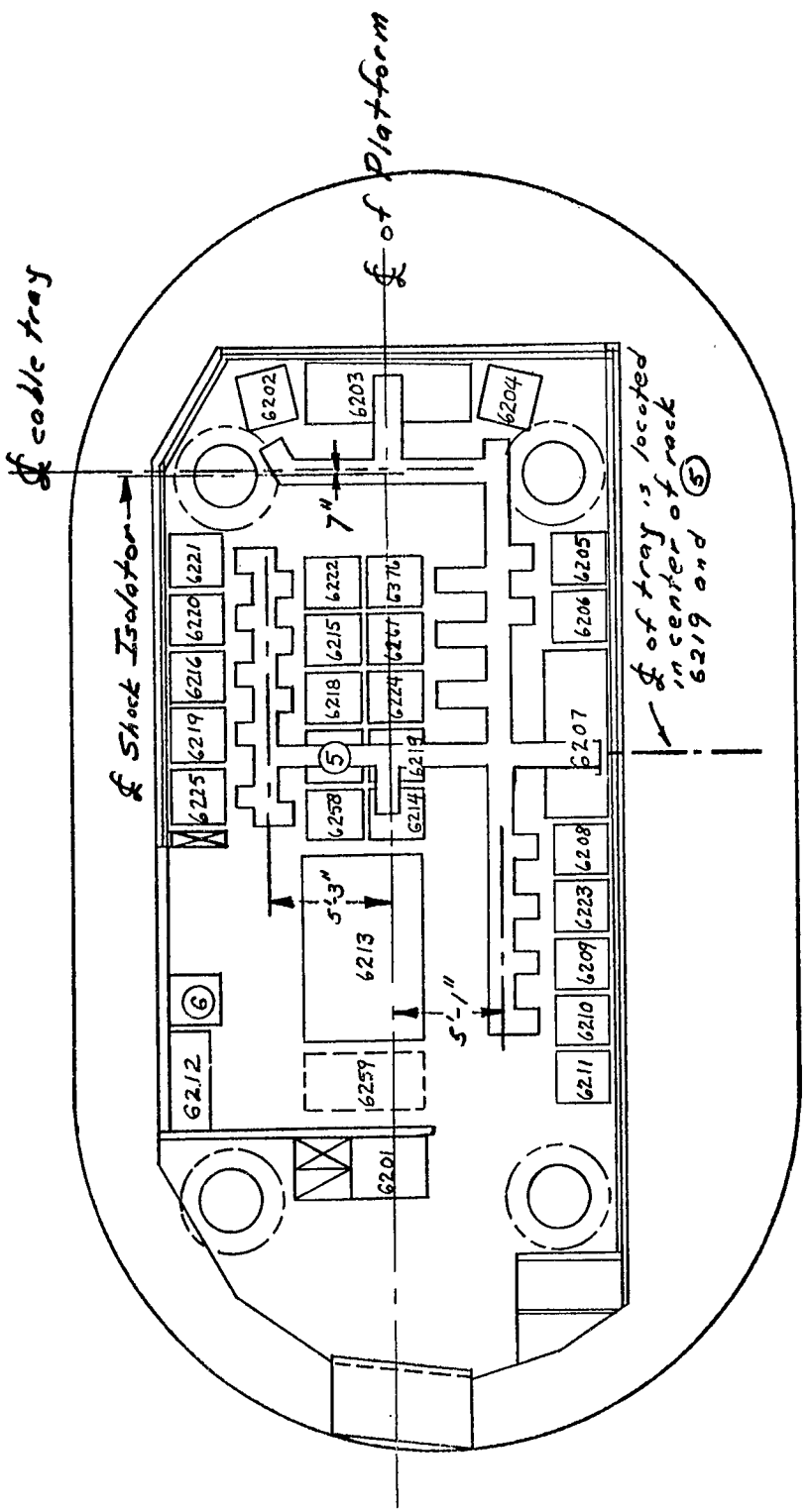
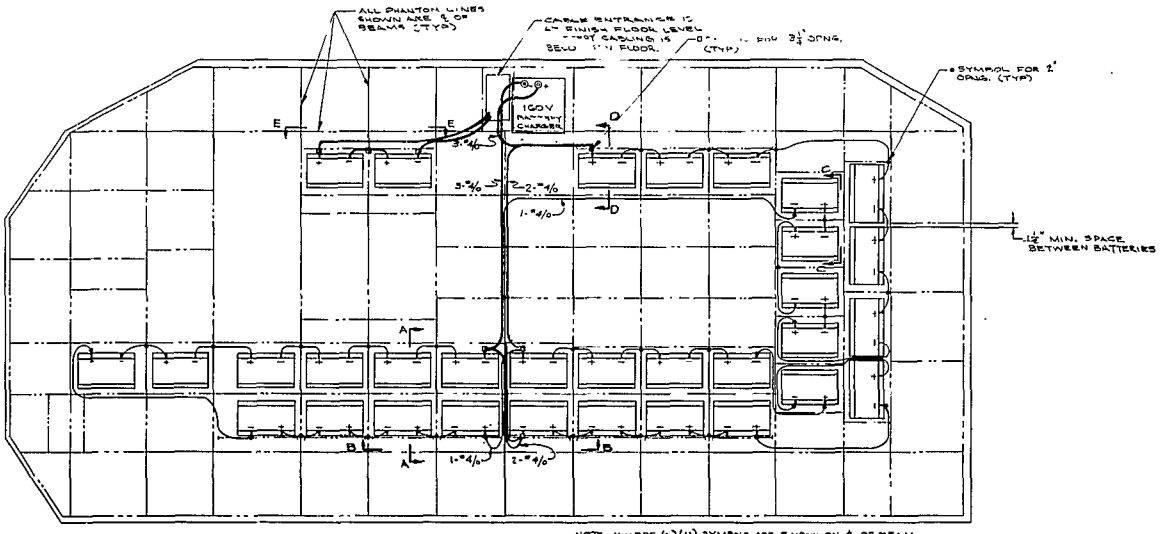
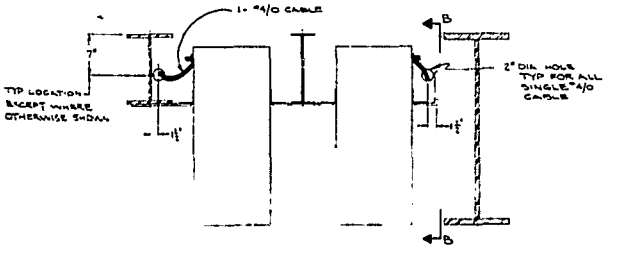


Figure 2-1C. Cable Tray Layout Power

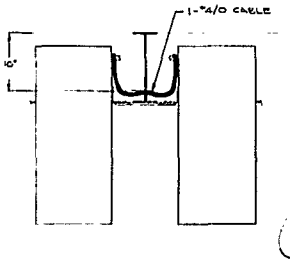


NOTE WHERE (+)(-) SYMBOLS ARE SHOWN ON ℄ OF BEAM THE HOLE FOR BATTERY CONNECTIONS SHALL BE CUT AS SHOWN IN SECT 'A-A', SECT 'B-B' & SECT 'C-C' ALL OTHER HOLES ARE CUT FROM THE BOTTOM AS SHOWN IN SECT 'D-D' & SECT 'E-E'

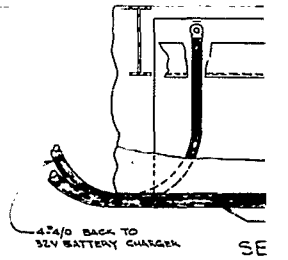
PLAN
SCALE: 1½"=1'-0"



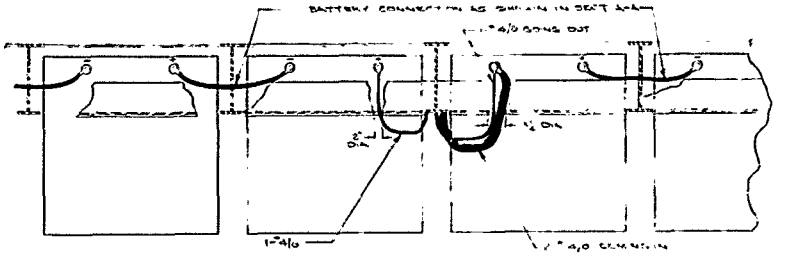
SECTION 'A-A'
SCALE 1½"=1'-0"



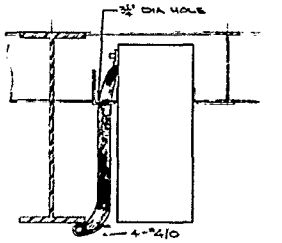
SECTION 'C-C'
SCALE 1½"=1'-0"



SE



SECTION 'B-B'
SCALE 1½"=1'-0"



SECTION 'F-F'
SCALE: 1½"=1'-0"

1

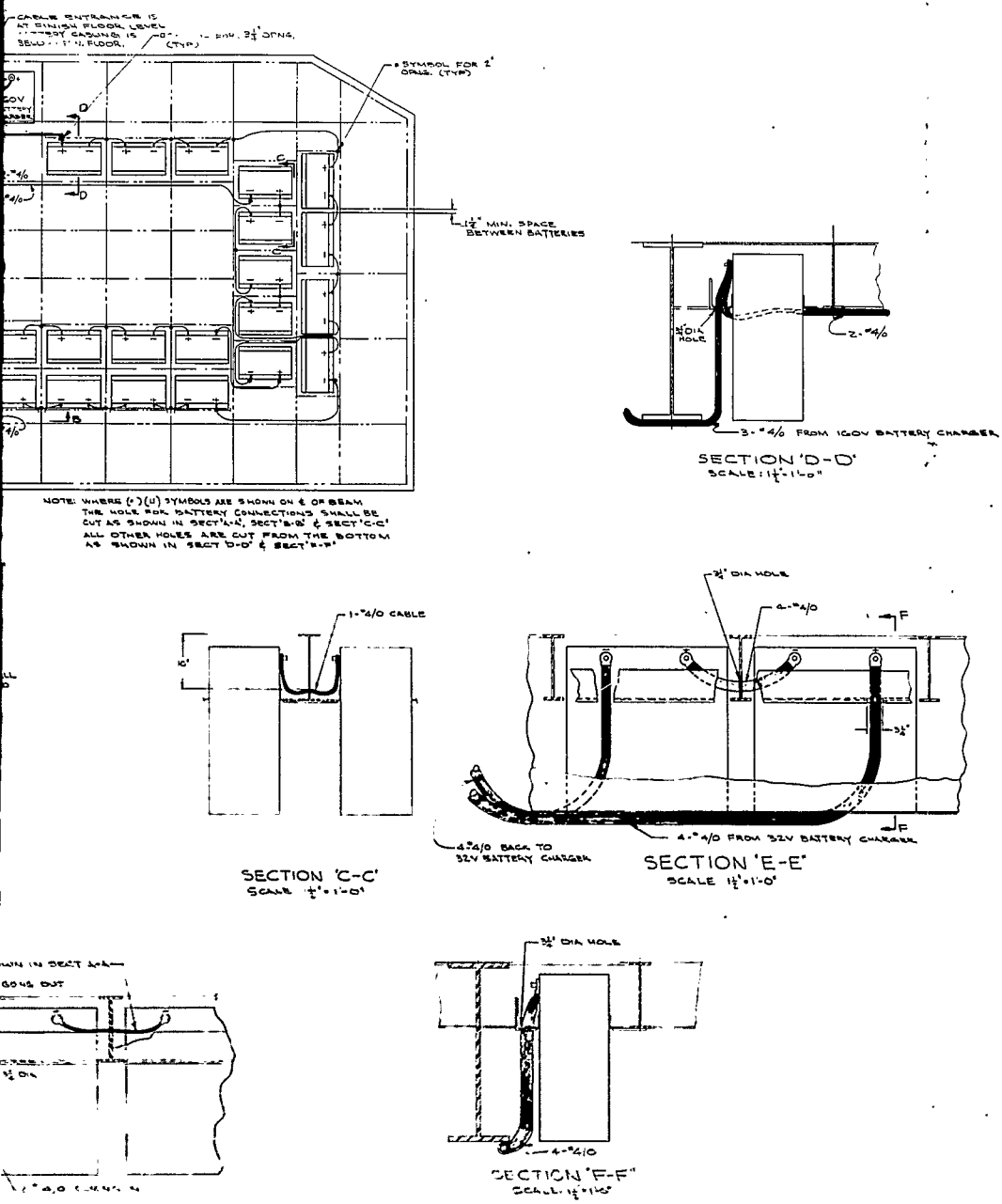


Figure 2-1D. Battery Cable Routing in LCC

REF DES NO.	LCC EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	AC	DC
1	DRINKING FOUNTAIN & WASH BASIN	RPIE		50				
6201	OVEN-REFRIGERATOR UNIT	RPIE A 1336	30 x 24 x 45	200		2.4K		
5	LIFE SUPPORT AIR SYSTEM	AGE		900				
6	4 DRAWER LOCK SAFE	GFE	17-1/4 x 30-1/4 x 52	400				
6216	465L DATA ANALYSIS GROUP (SRCC)	GFE 14041	28-1/4 x 29 x 76	900				
6221	465L CONTROL (SRCC) INDICATOR GROUP	GFE 14041	28-1/4 x 29 x 76	920			60~	
6220	465L DATA TRANSFER GROUP (SRCC)	GFE 14041	28-1/4 x 29 x 76	980			60~	
6217	465L MODEM CRYPTO GROUP (SRCC)	GFE 14041	28-1/4 x 29 x 76	980			60~	
6205	465L DATA CONVERTER GROUP (SRCC)	GFE 14041	28-1/4 x 29 x 76	780			60~	
6204	465L DATA CONVERTER GROUP (SRCC)	GFE 14041	28-1/4 x 29 x 76	840			60~	
6277	465L (SUBSCRIBER C) DATA TRANSFER GROUP	GFE 14040	28-1/4 x 29 x 76	770			60~	

MP

SIZE W X D X H (INCHES)	WT (LBS)	POWER REQUIREMENTS												NORMAL COOLING REQUIREMENT				
		PRIME		REGULATED														
				NORMAL					EMERGENCY									
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	
		AVG	PEAK				AVG	PEAK				AVG	PEAK					
	50																	
30 x 24 x 45	200		2.4K											1450	CONV			
	900																	
17-1/4 x 30-1/4 x 52	400																	
28-1/4 x 29 x 76	900														FA	55	75	
28-1/4 x 29 x 76	920			60~		120	1400	1400	60~		120	1400	1400		FA	55	75	
28-1/4 x 29 x 76	980			60~		120	750	750	60~		120	750	750		FA	55	75	
28-1/4 x 29 x 76	980			60~		120	550	550	60~		120	550	550		FA	55	75	
28-1/4 x 29 x 76	780			60~		120	395	395	60~		120	395	395		FA	55	75	
28-1/4 x 29 x 76	840			60~		120	250	250	60~		120	250	250		FA	55	75	
28-1/4 x 29 x 76	770			60~		120	(250)	(250)	60~		120	(250)	(250)		FA	55	75	

Figure 2-2. LCC Equipment

ME	POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
	REGULATED															
	NORMAL					EMERGENCY										
R-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
2.4K											1450	CONV				WS 133A
																Estimated
												FA	55	75		
	60~		120	1400	1400	60~		120	1400	1400		FA	55	75		Power for 6216 originates in 6221 System Power Input 3345 Watts. BTU's will be shown by air proportion to total input power.
	60~		120	750	750	60~		120	750	750		FA	55	75		
	60~		120	550	550	60~		120	550	550		FA	55	75		
	60~		120	395	395	60~		120	395	395		FA	55	75		
	60~		120	250	250	60~		120	250	250		FA	55	75		
	60~		120	(250)	(250)	60~		120	(250)	(250)		FA	55	75		Not at ACP

Figure 2-2. LCC Equipment List (Sheet 1 of 10)

REF DES NO	LCC EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	AC	DC
6276	465L (SUBSCRIBER C) DATA CONVERTER GROUP	GFE 14040	28-1/4 x 29 x 76	840			60~	
6203	CONSOLE, CONTROL LAUNCHER (COMMAND CONSOLE)	SYL 14150	87-5/8 x 32-1/2 x 60-1/2	2000			400~	
	1. PROGRAMMER							
	2. PAS MONITOR PANEL	14012						●
	3. LAUNCH CONTROL							
	4. PANEL SIGNAL DISTRIBUTION RADIO							
	5. MESSAGE MONITOR							
	6. COMM. CTRL. PANEL	14002						●
	7. CONTROL INDICATOR							
	8. CONNECTOR & AIR DUCT PANELS							
	9. 24 HOUR CLOCK							
	10. L. C.	14052						
	11. LAUNCH CONTROL							
	12. COMMAND GEN UNIT-1			45				
	13. COMMAND GEN UNIT-2			42				
	14. POWER SUPPLY			77				
	15. CONSOLE LOGIC			38				

SIZE W X D X H (INCHES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREMEN			
		PRIME		REGULATED												
				NORMAL					EMERGENCY							
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX
		AVG	PEAK				AVG	PEAK				AVG	PEAK				
28-1/4 x 29 x 76	840			60~		120	(500)	(500)				(500)	(500)		FA	55	75
87-5/8 x 32-1/2 x 60-1/2	2000			400~		120/ 208	166	166	400~		120/ 208	166	166	680	FA	55	67
					●		10	10				10	10	34			
					●		10	10				10	10	34			
							10	10				10	10	34			
	45																
	42																
	77						166	166				166	166	282			
	38																

Figure 2-2. LCC Equipmen

ME R-W PEAK	POWER REQUIREMENTS: REGULATED NORMAL AC	NORMAL DC	NORMAL VOLT	NORMAL POWER-W AVG	NORMAL POWER-W PEAK	EMERGENCY AC	EMERGENCY DC	EMERGENCY VOLT	EMERGENCY POWER-W AVG	EMERGENCY POWER-W PEAK	NORMAL COOLING REQUIREMENT: HT LOSS BTU/HR	TYPE COOLING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	REMARKS
	60~		120	(500)	(500)				(500)	(500)		FA	55	75		Not at ACP
	400~		120/208	166	166	400~		120/208	166	166	680	FA	55	67		
		●		10	10				10	10	34					Power from Rack 6208
		●		10	10				10	10	34					Power from Rack 6209
				10	10				10	10	34					Power from Rack 6210
				166	166				166	166	282					50% Eff.

Figure 2-2. LCC Equipment List (Sheet 2 of 10)

REF DES NO.	LCC EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	P				
					PRIME		NORM		
					POWER-W		AC	DC	VOL
					AVG	PEAK			
6208	ALARM MONITOR	SYL 14011	28-1/4 x 29 x 76	947.9			400~		120, 208
	1. POWER SUPPLY			70					
	2. FAULT LOCATOR INDICATOR			60					
	3. FAULT LOCATOR LCF			60					
	4. CABLE PRESS. ALARM			48					
	5. TELE. REPEATER			64.7					
	6. TELE. REPEATER			69.2					
	7. STATION INTERCOM.			55.3					
6260	OC-1 UNIT	AGE		50	200W 60~ 120 V				
6207	LAUNCHER CONTROL CONSOLE (STATUS CONSOLE)	SYL 14150	87-5/8 x 32-1/2 x 60-1/2	2000			400~		120 208
	1. EXTERNAL COMM. CONTROL	14019							
	2. PAS	14044						●	
	3. INDICATOR PANEL								
	4. PANEL STATUS CONTROL								
	5. COMM. CONTROL PNL.	14002						●	
	6. INDICATOR CALL-UP PANEL								
	7. INDICATOR PANEL								
	8. CON. & AIR DUCT COOL. PNL.								
	9. RECORDER								
	10. PANEL CONTROL SW.								

SIZE W X D X H (INCHES)	WT (LBS)	POWER REQUIREMENTS												NORMAL COOLING REQUIREMENT				
		PRIME		REGULATED														
				NORMAL					EMERGENCY									
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	IN
		AVG	PEAK				AVG	PEAK				AVG	PEAK					
28-1/4 x 29 x 76	947.9			400~		120/208	160	160				160	160	550	FA	55	67	
	70						160	160				160	160	275				
	60																	
	60																	
	48																	
	64.7																	
	69.2																	
	55.3																	
	50	200W 60~ 120 V												680	CONV			
87-5/8 x 32-1/2 x 60-1/2	2000			400~		120/208	1038	1038	400~		120/208	1038	1038	3631	FA	55	67	
							10	10				10	10	34				
					●		10	10				10	10	34				
					●		10	10				10	10	34				

Figure 2-2. LCC Equipment L

E	POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
	REGULATED															
	NORMAL					EMERGENCY										
-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	HT LOSS BTU/HR	TYPE COOLING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
	400~		120/208	160	160				160	160	550	FA	55	67		
				160	160				160	160	275					
											680	CONV				Estimated
	400~		120/208	1038	1038	400~		120/208	1038	1038	3631	FA	55	67		
				10	10				10	10	34					Power from Rack 6206
		●		10	10				10	10	34					Power from Rack 6222
		●		10	10				10	10	34					Power from Rack 6209

Figure 2-2. LCC Equipment List (Sheet 3 of 10)

REF DES NO.	LCC EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	AC	DC
	11. CONVERTER PROG. DIGITAL DATA			45				
	12. AMPLIFIER OSCILLATOR			65				
	13. BUFFER STORAGE UNIT			42				
	14. POWER SUPPLY			77				
6224	RADIO SET (C & S)	SYL 14125	28-1/4 x 29 x 76	940				●
	1. AMPLIFIER CTR.			50				
	2. RF AMPLIFIER			75				
	3. RF AMPLIFIER			75				
	4. UNIDENTIFIED			20				
	5. GENERATOR SYNTHESIZER			45				
	6. RECVR. OSCILLATOR			39				
	7. POWER SUPPLY			75				
6223	MF ANTENNA TUNER SET	SYL 14131	28-1/4 x 29 x 76	750				
	1. ANTENNA TUNER UNIT (TRIPLE DRAWER)			100				
	2. UNIDENTIFIED			20				
	3. UNIDENTIFIED			20				
	4. UNIDENTIFIED			20				
	5. UNIDENTIFIED			20				

SIZE W X D X H (INCHES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT			
		PRIME		REGULATED												
				NORMAL					EMERGENCY							
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX
		AVG	PEAK				AVG	PEAK				AVG	PEAK				
	45																
	65																
	42																
	77						1038	1038				1038	1038	1765			
28-1/4 x 29 x 76	940				•	32	3506	6706		•	32	3506	6706	5400	FA	55	67
	50						140	140				140	140	475			
	75						1600	3200				1600	3200				
	75						1600	3200				1600	3200				
	20																
	45						30	30				30	30	102			
	39						30	30				30	30	102			
	75						306	306				306	306	345			
28-1/4 x 29 x 76	750													1025	FA	55	67
	100																
	20																
	20																
	20																
	20																

2

Figure 2-2. LCC Equipmer

POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT					REMARKS
ΛE	REGULATED															
	NORMAL					EMERGENCY										
R-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
				1038	1038				1038	1038	1765					50% Eff.
		•	32	3506	6706		•	32	3506	6706	5400	FA	55	67	1.5"	50% duty cycle 60% efficiency at 36 V input
				140	140				140	140	475					
				1600	3200				1600	3200						~~183 AMPS.~~
				1600	3200				1600	3200						
				30	30				30	30	102					Rcvr. pwr. separate input at 8.5 AMPS
				30	30				30	30	102					
				306	306				306	306	345					65% Eff.
											1025	FA	55	67		300 W RF peak heat dissipation for reflected RF power

3

Figure 2-2. LCC Equipment List (Sheet 4 of 10)

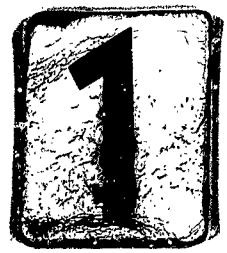
REF DES NO.	LCC EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	N AC	N DC	N
6214	POWER & DISTRIBUTION	SYL 14103	28-1/4 x 29 x 76	750			60~ 400~	● ●	1 120 3
	1. FOR POWER BRKOUT (DOUBLE DRAWER)								
	2. 400 CYCLE								
	3. 400 CYCLE								
	4. 60 CYCLE								
	5. 60 CYCLE								
	6. 60 CYCLE								
6212	POWER PANEL LCDB	GFE/RPIE		400	400 Estd.				
18	WATER CLOSET	RPIE	30 x 36 x 80	200					
6259	MG SET	SYL 14106	26 x 58 x 36	3200	35KW				
	AC MOTOR				35K				
	DC MOTOR							●	
6211	JUNCTION BOX SET	SYL 14031	28-1/4 x 29 x 76	829.4					
	1. TERMINAL BOX			75					
	2. TERMINAL BOX (FOUR DRAWER SECTION)			75					
	3. TELE. REPEATER			64.7					
	4. TELE. REPEATER			64.7					
6213	ENVIRONMENTAL CONTROL UNIT	AGE			16KW				

SIZE W X D X H (INCHES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT				
		PRIME		REGULATED													
				NORMAL					EMERGENCY								
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	IN
		AVG	PEAK				AVG	PEAK				AVG	PEAK					
28-1/4 x 29 x 76	750			60~ 400~	● 120/208 ● 32 120 160		250					250		850	CONV	—	—	
VER)																		
	400	400 Estd.												1370	CONV	—	—	
30 x 36 x 80	200																	
26 x 58 x 36	3200	35KW												44,800	FA	55	79	1
		35K																
					●	160	500			●	160	35K						
28-1/4 x 29 x 76	829.4						30							102	CONV			
	75																	
CTION)	75																	
	64.7						15											
	64.7						15											
		16KW								●	160	16KW						

Figure 2-2. LCC Equipment L

POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT					REMARKS
IME		REGULATED														
		NORMAL					EMERGENCY									
VER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W	HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
	PEAK				AVG	PEAK				AVG	PEAK						
		60~ 400~	● ●	120 120/208 32 160	250					250		850	CONV	—	—		Dissipation Load Estimated
												1370	CONV	—	—		To be defined. Heat loss estimated.
																	Size from 62-79 for enclosed rm Fixture wt. est'd.
W												44,800	FA	55	79	1.5	Cooling incld. 500 watts DC load in addition to prime power input. 208V, 3ϕ, 60~overall efficiency 63%
			●	160	500			●	160	35K							
					30							102	CONV				
					15												Power being supplied from rack 6209
					15												
W								●	160	16KW							Power budget allowance

Figure 2-2. LCC Equipment List (Sheet 5 of 10)



REF DES NO	LCC EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	AC	DC
6209	TELEPHONE TERM.	SYL 14045	28-1/4 x 29 x 76	960.			400~	
	1. POWER SUPPLY			70				
	2. TELE,			49.5				
	3. TELE.			53.5				
	4. COM. CONTROL			52.5				
	5. BRIDGE REP. TELE.			52.5				
	6. TELE. SELEC. SWITCH			66.7				
	7. TELE. REPEATER			64				
6218	RADIO SET (SAC UHF RACK)	SYL/GFE 14014	28-1/4 x 29 x 76	1017			60~	
	1. INTERCON. BOX			50				
	2. UNIDENTIFIED			5				
	3. UNIDENTIFIED			5				
	4. RECEIVER TRANS. (DOUBLE DRAWER)			157				
	5. AMP., RADIO FREQ. (DOUBLE DRAWER)			230				
6210	TERMINAL DIGITAL	SYL 14000	28-1/4 x 29 x 76	950			400~	
	1. POWER SUPPLY			70				
	2. SYNCHRONIZER ELEC.			46				
	3. CONV. ANALOG-DIG.			62.5				
	4. CONV. ANALOG-DIG.			64				

SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	POWER REQUIREMENTS												NORI COOLING	
			PRIME		REGULATED											
					NORMAL					EMERGENCY						
			POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING
			AVG	PEAK				AVG	PEAK				AVG	PEAK		
SYL 14045	28-1/4 x 29 x 76	960.			400~		120/ 208	432	432	400~		120/ 208	432	432	1470	FA
		70						432	432				432	432	735	
		49.5														
		53.5														
		52.5														
		52.5														
		66.7														
		64														
SYL /GFE 14014	28-1/4 x 29 x 76	1017			60~		120	620	1462	60~		120	620	1462	2108	FA
		50						20	22				20	22	68	
		5														
		5														
		157						340	440				340	440	1156	
		230						260	1000				260	1000	884	
SYL 14000	28-1/4 x 29 x 76	950			400~		120/ 208	240		400~		120/ 208	248		810	FA
		70						240					248		425	
		46						35					35		120	
		62.5						15					15		51	
		64						15					15		51	

Figure 2-2. LC

ME	POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
	REGULATED															
	NORMAL					EMERGENCY										
ER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
	400~		120/208	432	432	400~		120/208	432	432	1470	FA	55	67		30W to rack 6211. 10W to Console 6207
				432	432				432	432	735					& 10W to console 6203
	60~		120	620	1462	60~		120	620	1462	2108	FA	55	77		Cooling for standby load. Peak = 5 min every 6 hrs.
				20	22				20	22	68					
				340	440				340	440	1156					
				260	1000				260	1000	884					
	400~		120/208	240		400~		120/208	248		810	FA	55	67		10 watts from power supply to 6207 les panel
				240					248		425					
				35					35		120					
				15					15		51					
				15					15		51					

Figure 2-2. LCC Equipment List (Sheet 6 of 10)

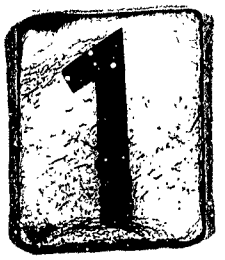
REF DES NO.	LCC EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	NORM AC	NORM DC	NORM VOL
	5. STATUS RECEIVER			46					
	6. MISSILE AWAY DETECTOR			46.5					
	7. TELE. REPEATER			64.7					
6219	STATUS AUTHENTICATION SYSTEM	SYL 14180	28-1/4 x 29 x 76	875			400~		120 208
	1. UNIDENTIFIED			17					
	2. UNIDENTIFIED			17					
	3. UNIDENTIFIED			17					
	4. SAU			68					
	5. SAU			68					
	6. SAU			68					
	7. POWER SUPPLY			70					
6215	SYSTEM 279L	GFE 14042	28-1/4 x 29 x 76	900			60~		120
6222	PAS	GFE 14044	28-1/4 x 29 x 76	885			60~		120
27	SHOCK ISOLATION SYS. CONTROL PANEL	AGE		900					
28	FIRE EXTINGUISHERS	GFE		100					
6202	SYSTEM 487L	GFE 14043	28-1/4 x 29 x 76	900			60~		120

SIZE X D X H NCHES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT				
		PRIME		REGULATED													
				NORMAL					EMERGENCY								
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O
		AVG	PEAK				AVG	PEAK				AVG	PEAK					
	46						15					15		51				
	46.5						20					20		68				
	64.7						10					10		34				
1/4 x x 76	875			400~		120/ 208	158		400~		120/ 208	158		540	FA	55	67	
	17																	
	17																	
	17																	
	68																	
	68																	
	68																	
	70						158	240				158	240	270				
-1/4 x x 76	900			60~		120	100	100	60~		120	100	100	340	FA	55		
-1/4 x x 76	885			60~		120	230	230	60~		120	230	230	780	FA	55		
	900																	
	100																	
-1/4 x x 76	900			60~		120	500	500	60~		120	500	500	1725	FA	55		

Figure 2-2. LCC Equipment List

ME	POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
	REGULATED															
	NORMAL					EMERGENCY										
ER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
				15					15		51					
				20					20		68					
				10					10		34					
	400~		120/208	158		400~		120/208	158		540	FA	55	67		
				158	240				158	240	270					50% Eff.
	60~		120	100	100	60~		120	100	100	340	FA	55			Tentative Power Budget
	60~		120	230	230	60~		120	230	230	780	FA	55			Tentative Power Budget
																Est'd wt of air compres-sor and panel.
																Est'd weight
	60~		120	500	500	60~		120	500	500	1725	FA	55			Tentative Power Budget

Figure 2-2. LCC Equipment List (Sheet 7 of 10)



REF DES NO	LCC EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W		NO		
					AVG	PEAK	AC	DC	V
32	OPERATORS SEATS			500					
	BATTERIES (32)	GFE	19-3/8 x 30-3/8 x 31	51,200					
6228 to 6257	160V SYSTEM	14105	19-3/8 x 30-3/8 x 31	48,000					
6226 & 6227	32 V SYSTEM	14104	19-3/8 x 30-3/8 x 31	3,200					
6225	160V BATTERY CHARGER & DISTRIBUTION SET	SYL 14102	28-1/4 x 29 x 76	1300	2.0K	6.5K			
6258	32V BATTERY CHARGER & DISTRIBUTION SET	SYL 14101	28-1/4 x 29 x 76	1300	800	5.5K			
6261	MONITOR CONTROL GRP	SYL 14150	28-1/4 x 29 x 76	900			400~		1 2
	CONTROL MONITOR			54					
	BUFFER STORAGE UNIT			54					
	CONTROL DECODER			46					
	ADDRESS COMPARATOR			53					
	POWER SUPPLY			77					
	CONTROL MAG. DRUM			42					
	MAG. DRUM DATA STOR.			77					

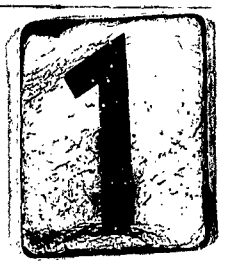
MP

O.	SIZE W X D X H (INCHES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREMEN			
			PRIME		REGULATED												
					NORMAL					EMERGENCY							
			POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OU} °F MAX
			AVG	PEAK				AVG	PEAK				AVG	PEAK				
		500																
	19-3/8 x 30-3/8 x 31	51,200													1020	CONV		
	19-3/8 x 30-3/8 x 31	48,000																
	19-3/8 x 30-3/8 x 31	3,200														CONV		
2	28-1/4 x 29 x 76	1300	2.0K	6.5K						0					4420	F.A.	55	77
1	28-1/4 x 29 x 76	1300	800	5.5K						0					3740	F.A.	55	77
0	28-1/4 x 29 x 76	900			400~		120/208	521	521				521	521	1771	FA	55	67
		54																
		54																
		46																
		53																
		77						521	521				521	521	764			
		42																
		77																

Figure 2-2. LCC Equipme

ME	POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
	REGULATED															
	NORMAL					EMERGENCY										
ER-W	AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
PEAK				AVG	PEAK				AVG	PEAK						
											1020	CONV				Total GES Wt. for 32 Batteries
																Wt. for 30 Batteries
												CONV				Wt. for 2 Batteries
6.5K						0					4420	F.A.	55	77		Cool for pk load at 80% eff.
5.5K						0					3740	F.A.	55	77		Cool for pk load at 80 % eff.
	400~		120/ 208	521	521				521	521	1771	FA	55	67		
				521	521				521	521	764					50% Eff.

Figure 2-2. LCC Equipment List (Sheet 8 of 10)



REF DES NO	LCC EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	NOR AC	NOR DC	NOR VO
6206	RADIO SET (SAC HF RACK)	GFE /SYL 14013	28-1/4 x 29 x 76	980			400~ 60~		120 208 120
	1. INTERCON. BOX			50			400~		120 208
	2. ANTENNA CONTROL			45			400~		120 208
	3. RADIO REC. TRANS.			55			400~		120 208
	4. TELE. REPEATER			67.5			60~		120
	5. TELE. REPEATER			67.5			60~		120
	6. AMP. RADIO FREQ. (DOUBLE DRAWER)			135			400~		120 208
	LIGHTING (NORMAL OP.)	RPIE			60~ 120V				
	EMERGENCY LIGHTING	RPIE					60~		12
	CONVENIENCE OUTLETS ELECTRICAL	RPIE							
	SURVIVAL LIGHTING	SYL 14107							
6319 to 6324	ESA MOUNTING ASSY	SYL 14003	40" x 7-5/16" x 12-1/4"						
	MCN JACK BOXES	SYL A1304							
	MF ESA	14129							
	AUDIO ESA	14004							
	HF ESA	14005							
	UHF ESA	14036							

E X H HES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT				
		PRIME		REGULATED													
				NORMAL					EMERGENCY								
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O
		AVG	PEAK				AVG	PEAK				AVG	PEAK					
4 x 6	980			400~ 60~		120/208 120	595 136	2645 136				595 136	2645 136	1278	FA	55	67	
	50			400~		120/208	100	100				100	100	340				
	45			400~		120/208	100	100				100	100	340				
	55			400~		120/208	40	45				40	45	153				
	67.5			60~		120	68	68				68	68	234				
	67.5			60~		120	68	68				68	68	234				
	135			400~		120/208	355	2400				355	2400	1200	CONV			
		60~ 120V													CONV			
				60~		120	500	500	60~		120	500	500	1700	CONV			
										•	32	20	30		—			
6" 1/4"																		

Figure 2-2. LCC Equipment List (Sh

ME	POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
	REGULATED															
	NORMAL					EMERGENCY										
ER-W	AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
PEAK				AVG	PEAK				AVG	PEAK						
	400~ 60~		120/208 120	595 136	2645 136				595 136	2645 136	1278	FA	55	67		Cooling for standby load peak = 5 min every 6 hrs
	400~		120/208	100	100				100	100	340					
	400~		120/208	100	100				100	100	340					
	400~		120/208	40	45				40	45	153					
	60~		120	68	68				68	68	234					2-1/2W from 6208
	60~		120	68	68				68	68	234					2-1/2W from 6208
	400~		120/208	355	2400				355	2400	1200	CONV				Room Ambient
V												CONV				
	60~		120	500	500	60~		120	500	500	1700	CONV				
							•	32	20	30		—				

3

Figure 2-2. LCC Equipment List (Sheet 9 of 10)

REF DES NO	LCC EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	NO AC	NO DC	P
6376	TIMER BUFFER	14150	28-1/4 x 29 x 76	800			400		
	1. UNIDENTIFIED			20					
	2. UNIDENTIFIED			20					
	3. UNIDENTIFIED			20					
	4. UNIDENTIFIED			20					
	5. COMM. NETWORK SYS. BUFFER			44					
	6. CYCLE TIMING DISTRIBUTION			55					
	7. POWER SUPPLY			77					

MPC

D.	SIZE W X D X H (INCHES)	WT (LBS)	POWER REQUIREMENTS												NORMAL COOLING REQUIREME			
			PRIME		REGULATED													
					NORMAL					EMERGENCY								
			POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX
			AVG	PEAK				AVG	PEAK				AVG	PEAK				
	28-1/4 x 29 x 76	800			400		120/ 208	500	500	400		120/ 208	500	500	1700	F. A.	55	67
		20																
		20																
		20																
		20																
		44													425			
		55													425			
		77						500	500						850			

Figure 2-2. LCC Equipmen

POWER REQUIREMENTS												NORMAL COOLING REQUIREMENT					REMARKS
PRIME		REGULATED															
		NORMAL					EMERGENCY										
POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOLING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
G	PEAK				AVG	PEAK				AVG	PEAK						
		400		120/208	500	500	400		120/208	500	500	1700	F.A.	55	67		
												425					
												425					
					500	500						850					50% Eff.

3

Figure 2-2. LCC Equipment List (Sheet 10 of 10)

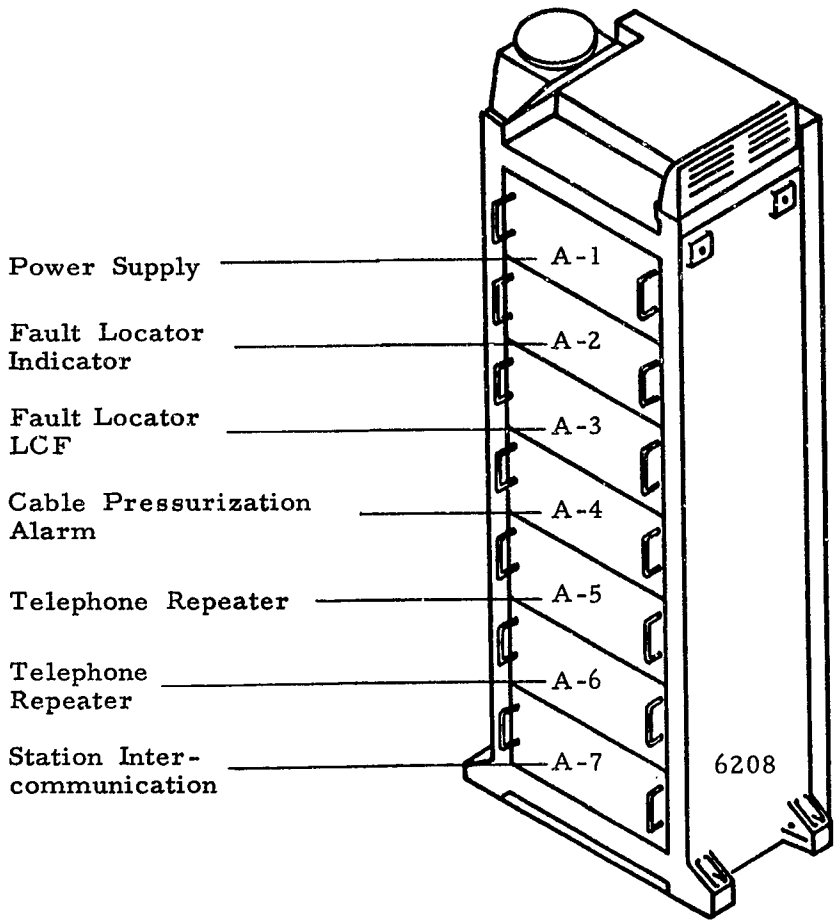


Figure 2-3. Alarm Monitor

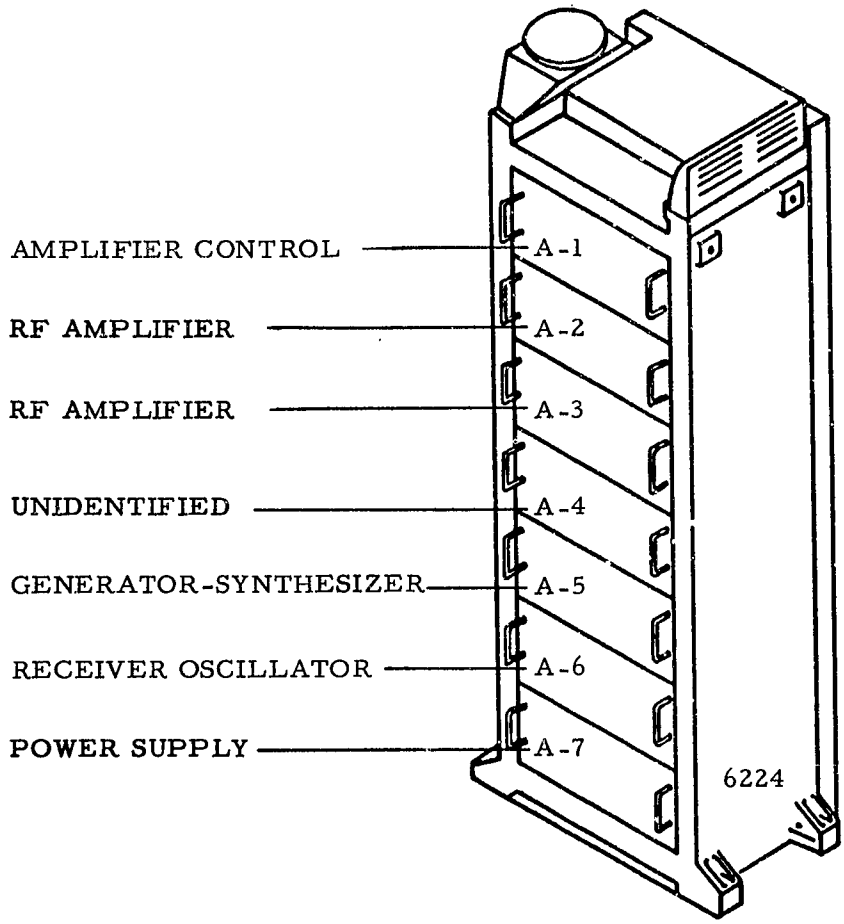


Figure 2-4. Radio Set (C&S)

Preliminary

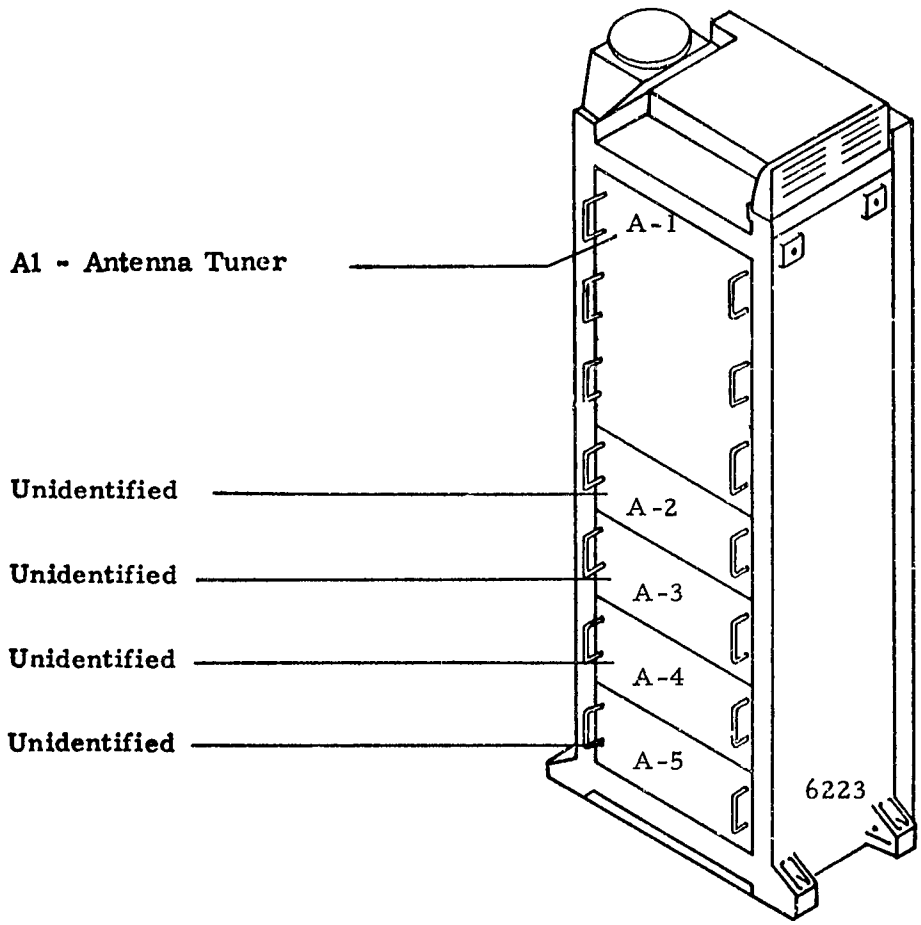


Figure 2-5. Antenna Tuner

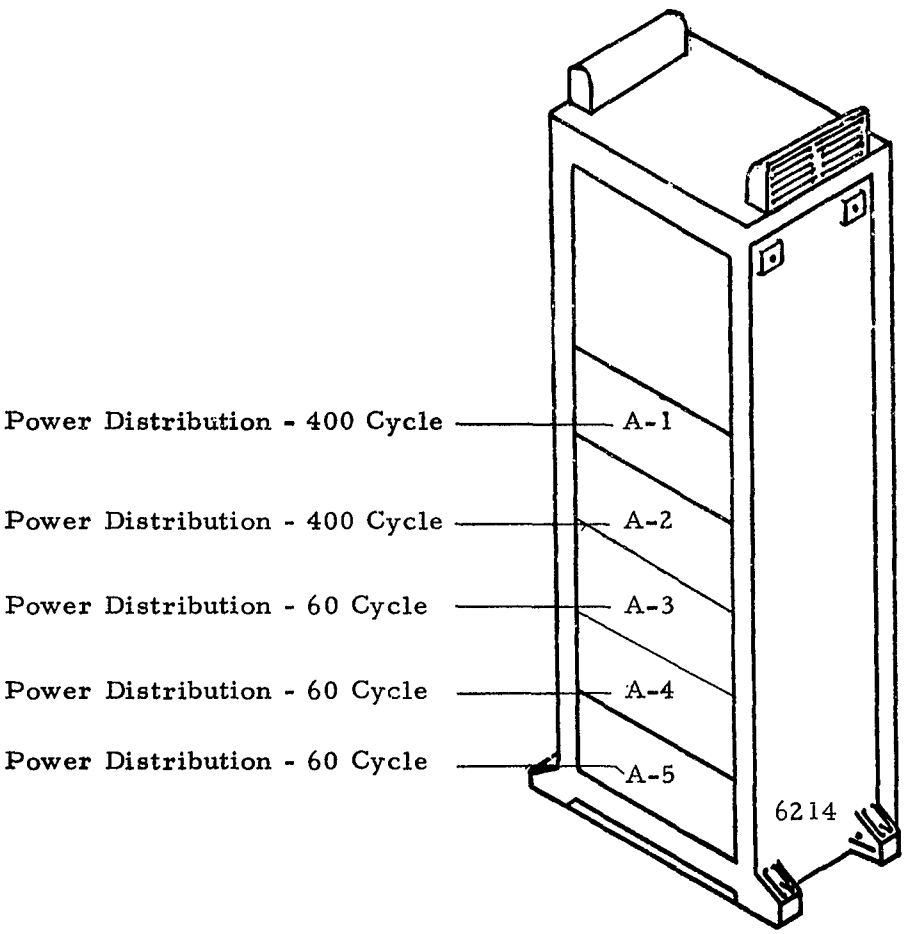


Figure 2-6. Power and Distribution

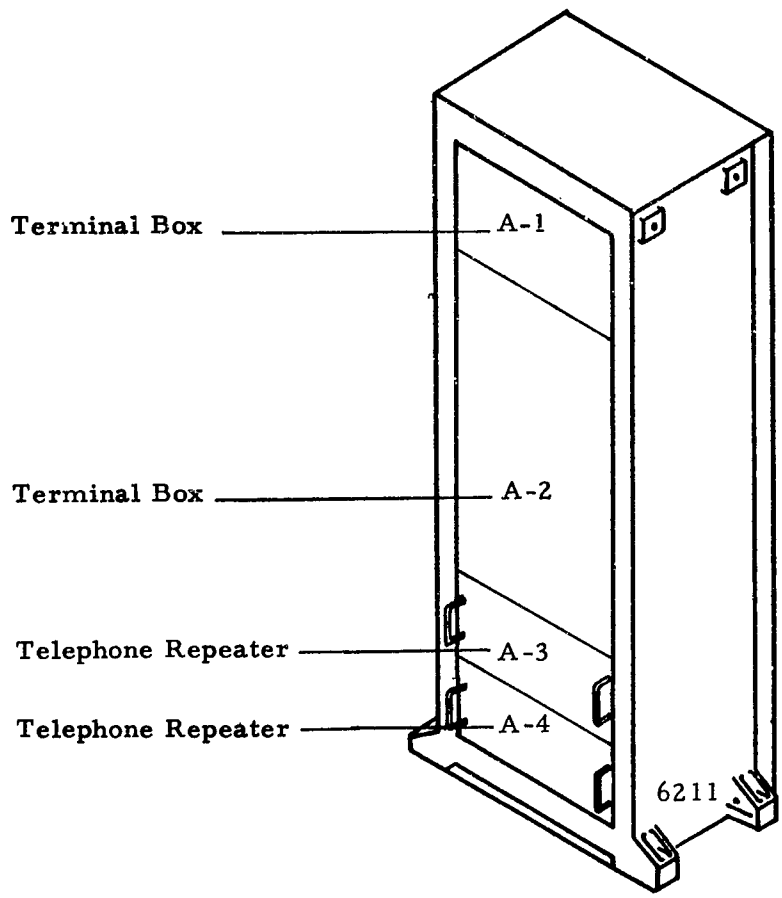


Figure 2-7. Junction Box Set

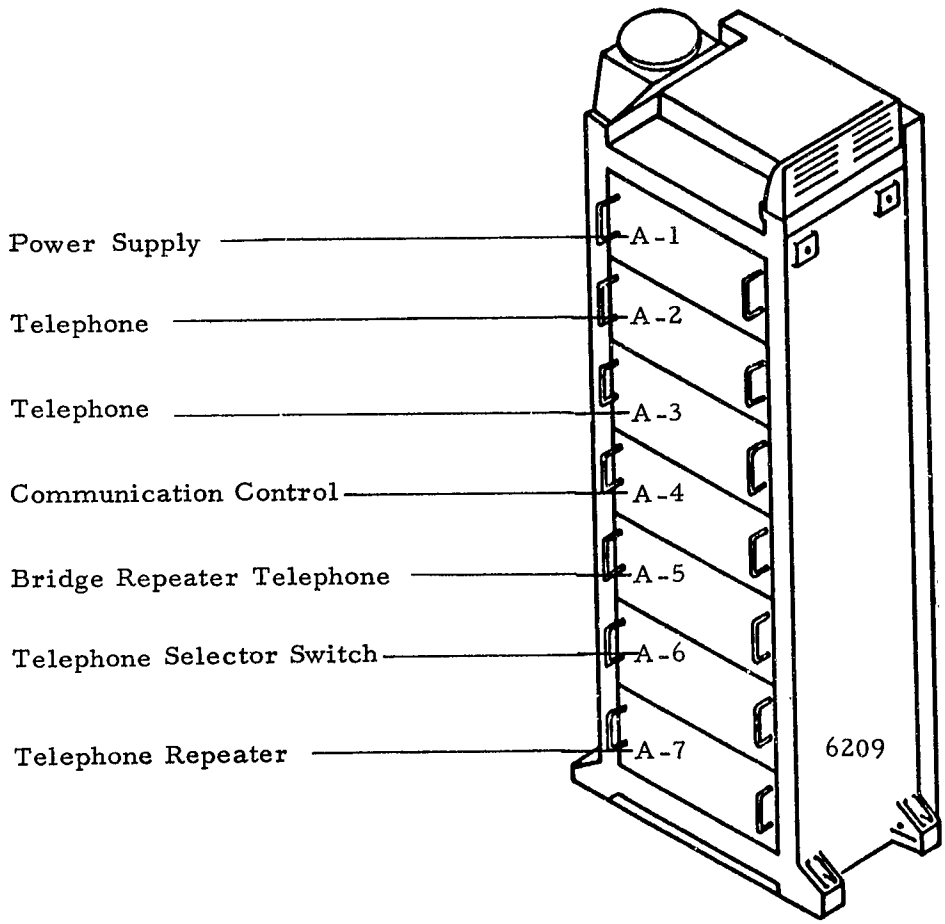


Figure 2-8. Telephone Terminal

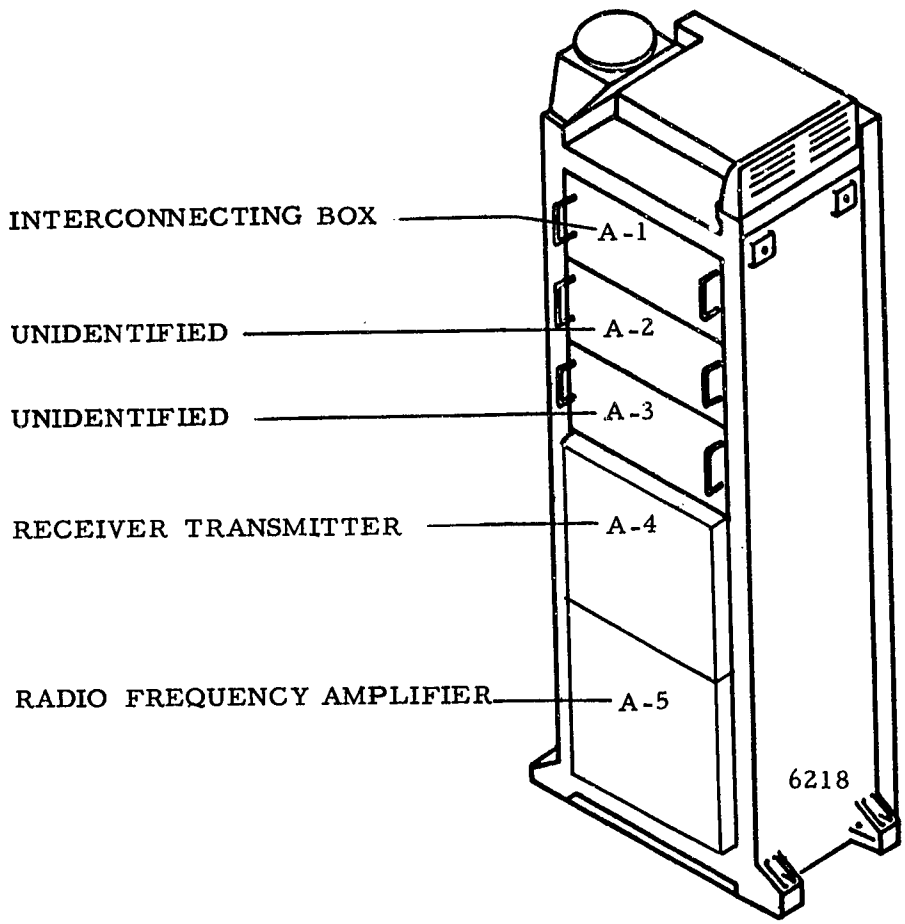


Figure 2-9. Radio Set (SAC UHF)

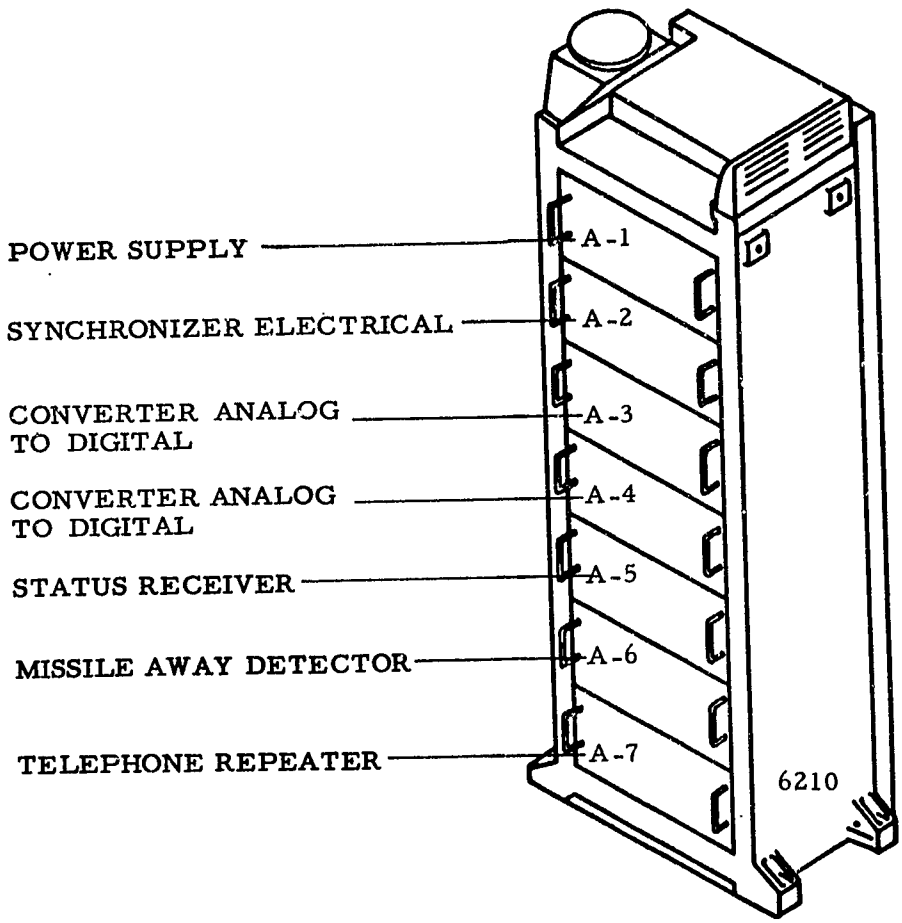


Figure 2-10. Terminal Digital

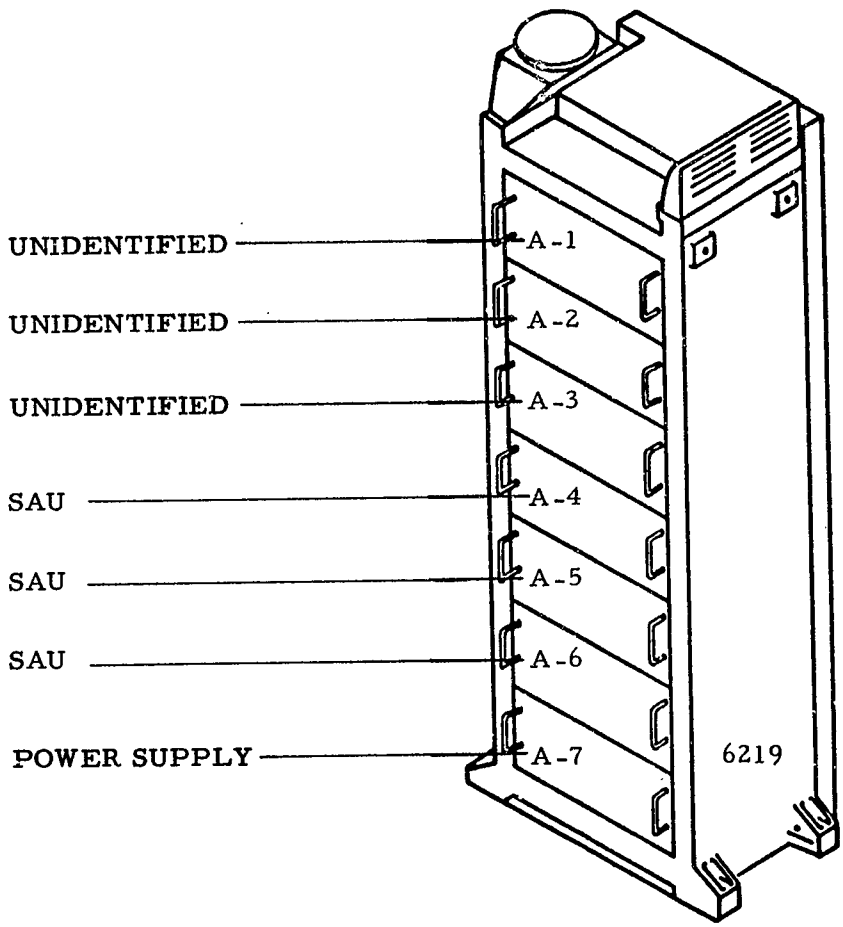


Figure 2-11. Status Authentication System

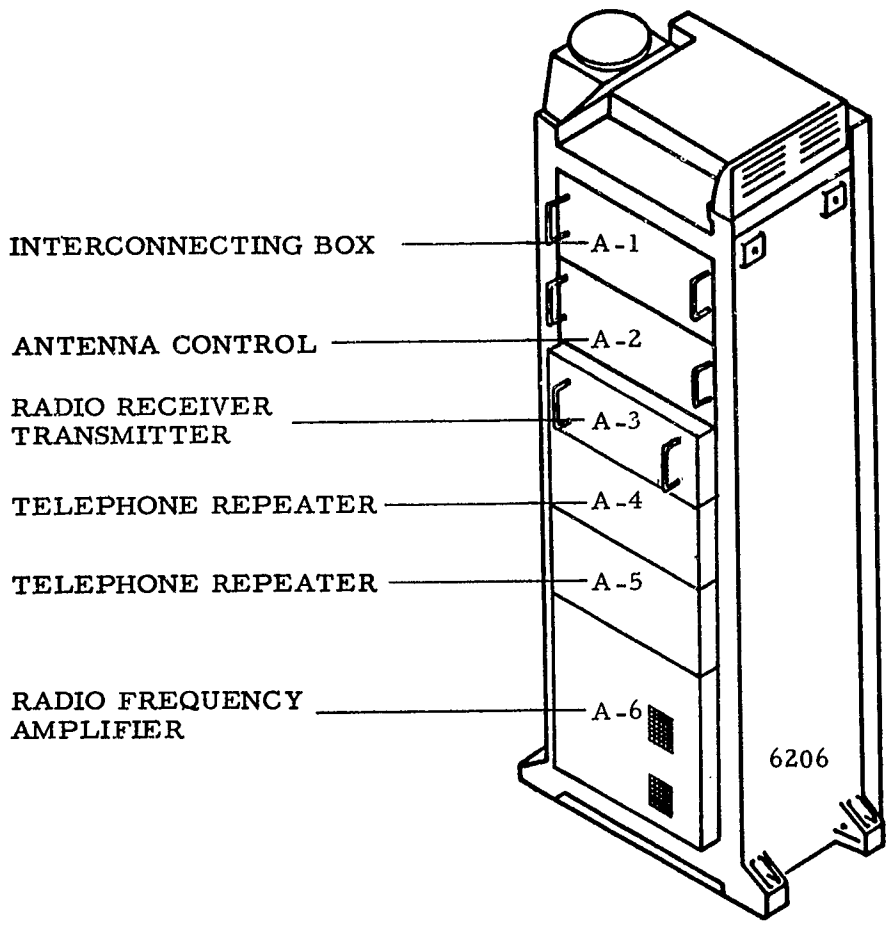


Figure 2-12. Radio Set (SAC HF)

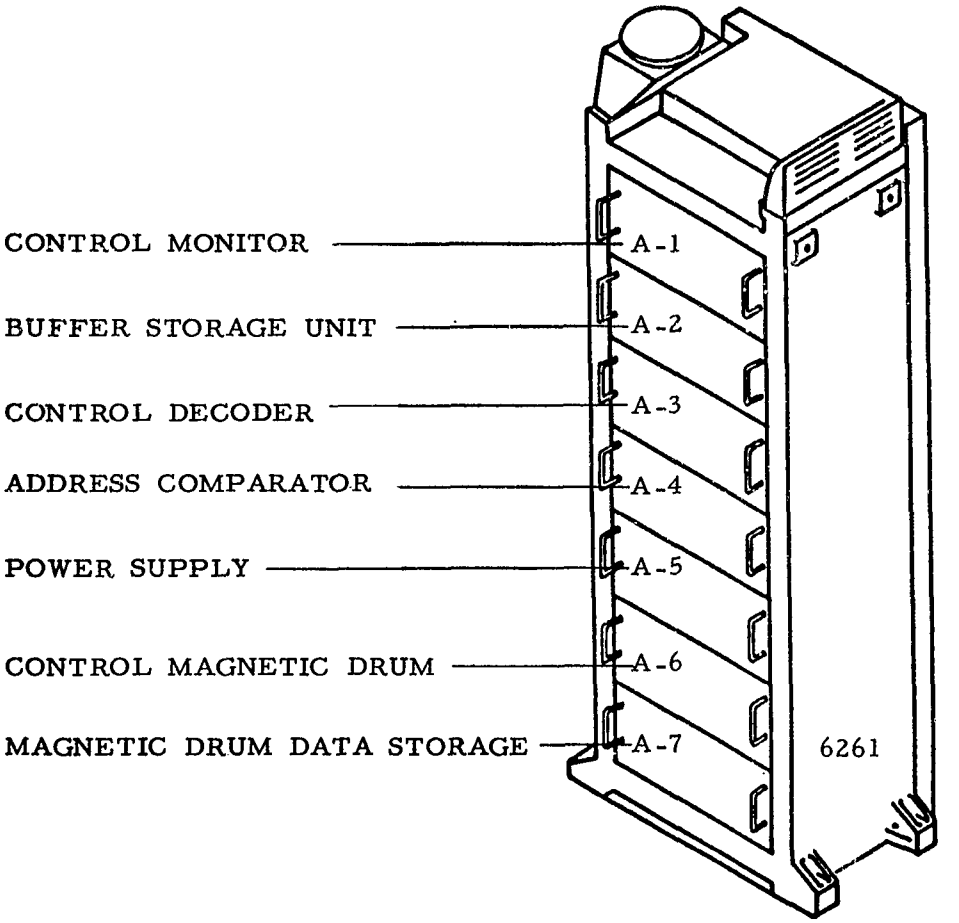


Figure 2-13. Monitor Control Group

EQUIPMENT CONFIGURATION
(STATUS CONSOLE)

1. EXTERNAL COMMUNICATIONS CONTROL
2. PAS
3. INDICATOR PANEL
4. PANEL STATUS CONTROL
5. COMMUNICATIONS CONTROL PANEL
6. INDICATOR CALL-UP PANEL
7. INDICATOR PANEL
8. CONNECTOR & AIR DUCT COOLING PANELS
9. RECORDER
10. PANEL CONTROL SWITCH
11. CONVERTER PROGRAMMER DIGITAL DATA
12. AMPLIFIER OSCILLATOR
13. BUFFER STORAGE UNIT
14. POWER SUPPLY

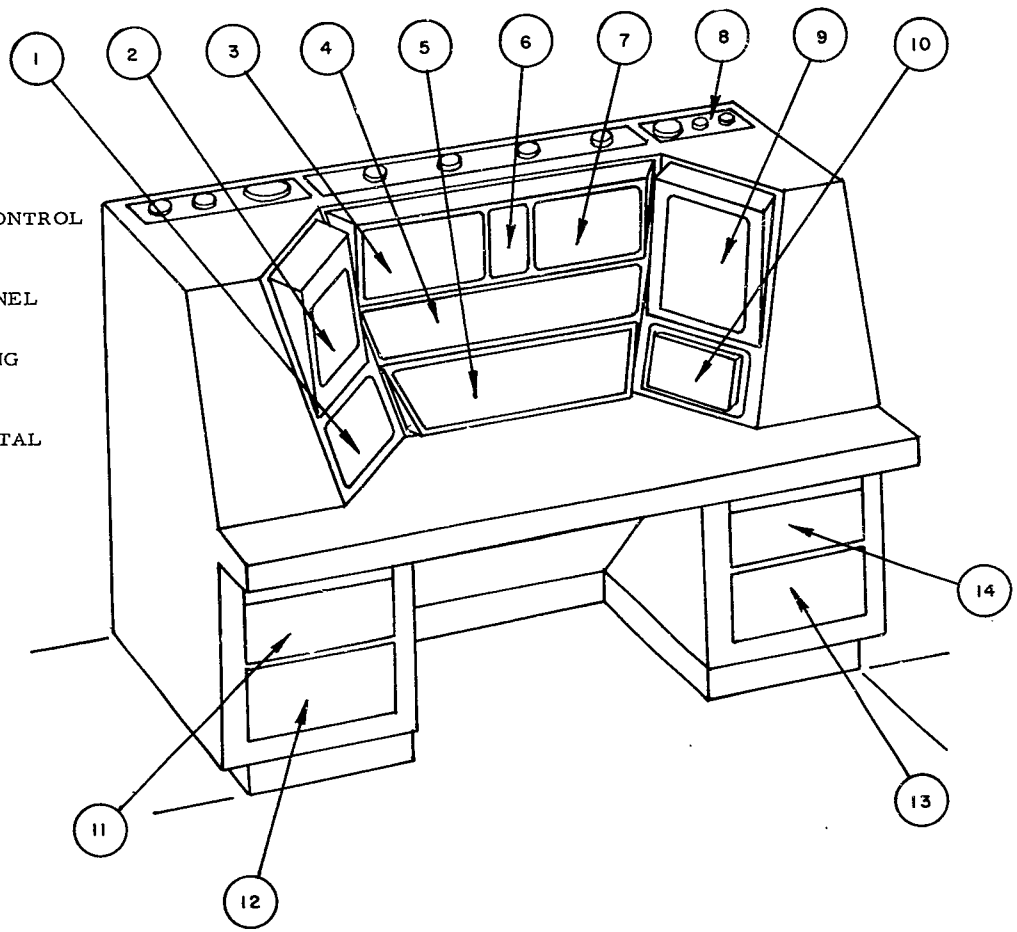


Figure 2-14. Launcher Control Console

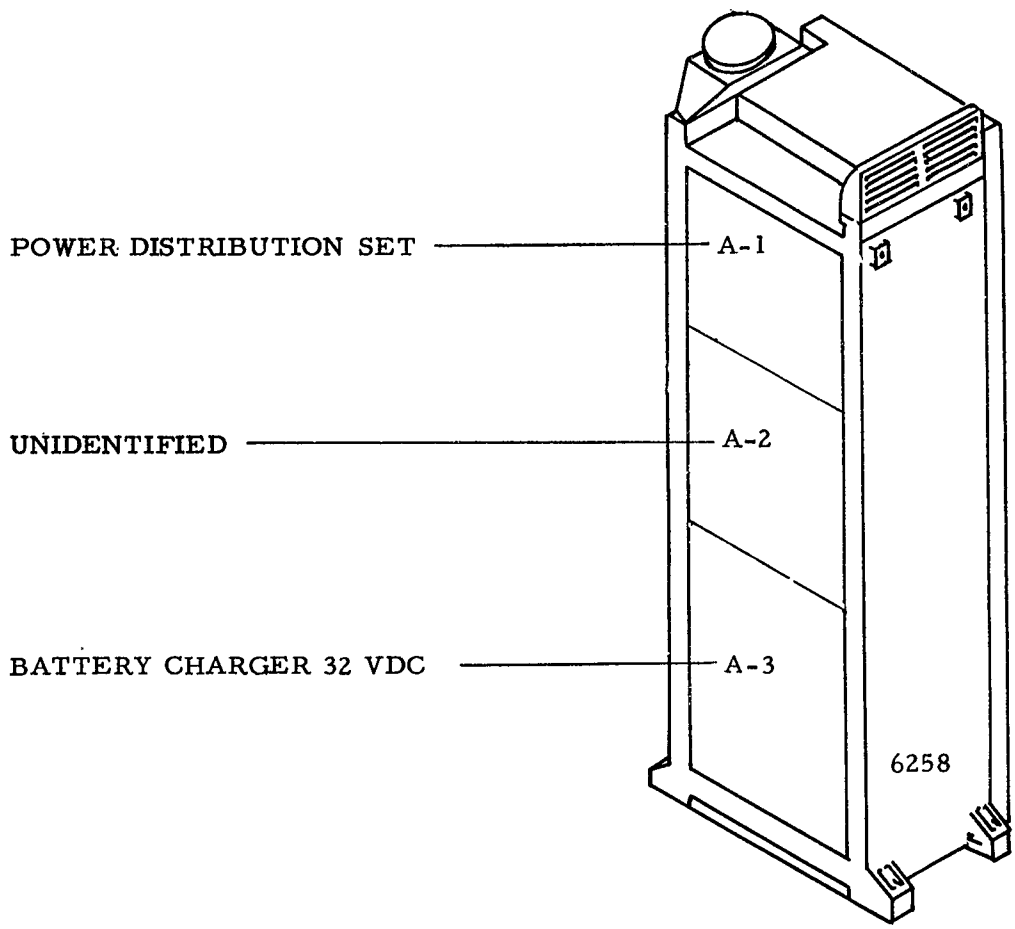


Figure 2-15. 32-Volt DC Battery Charger and Distribution Set

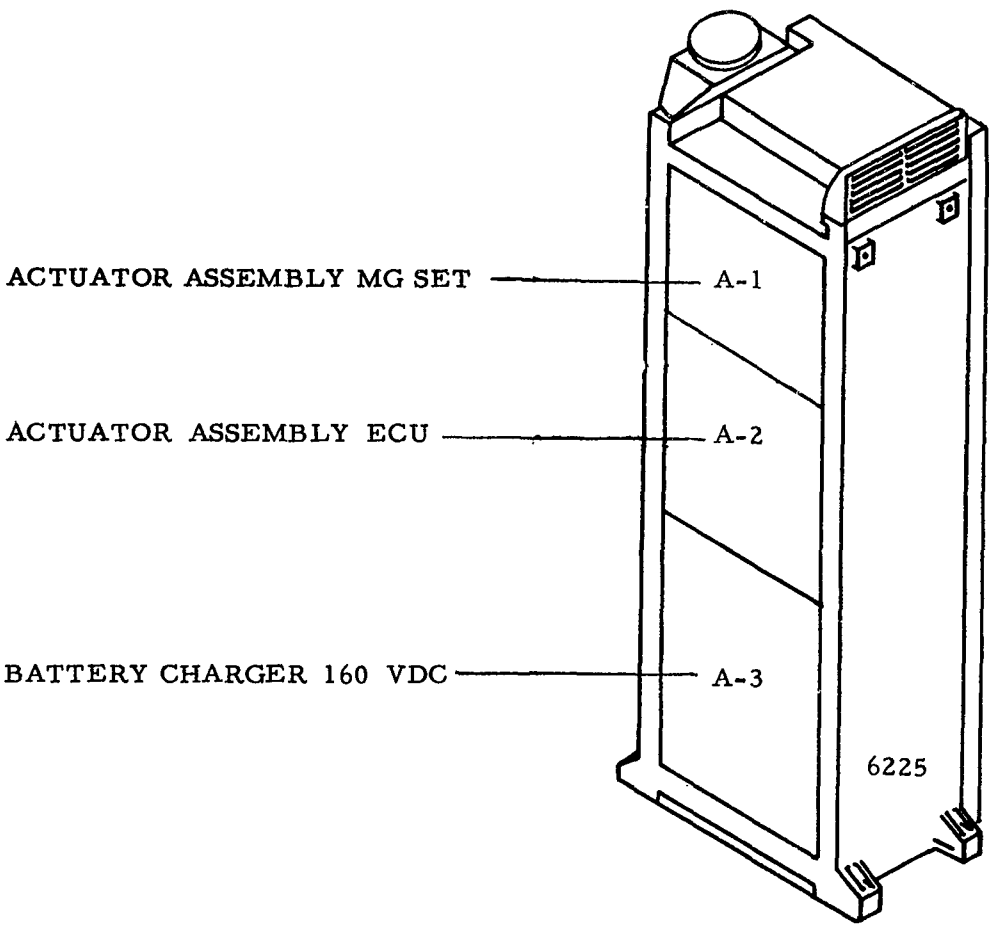


Figure 2-16. 160 VDC Battery Charger and Distribution Set

EQUIPMENT CONFIGURATION
(COMMAND CONSOLE)

1. PROGRAMMER
2. PAS MONITOR PANEL
3. LAUNCH CONTROL
4. PANEL SIGNAL DISTRIBUTION RADIO
5. MESSAGE MONITOR
6. COMMUNICATION CONTROL PANEL
7. CONTROL INDICATOR
8. CONNECTOR & AIR DUCT PANELS
9. 24-HOUR CLOCK
10. L.C.
11. LAUNCH CONTROL
12. COMMAND GENERATOR #1
13. COMMAND GENERATOR #2
14. POWER SUPPLY
15. CONSOLE LOGIC

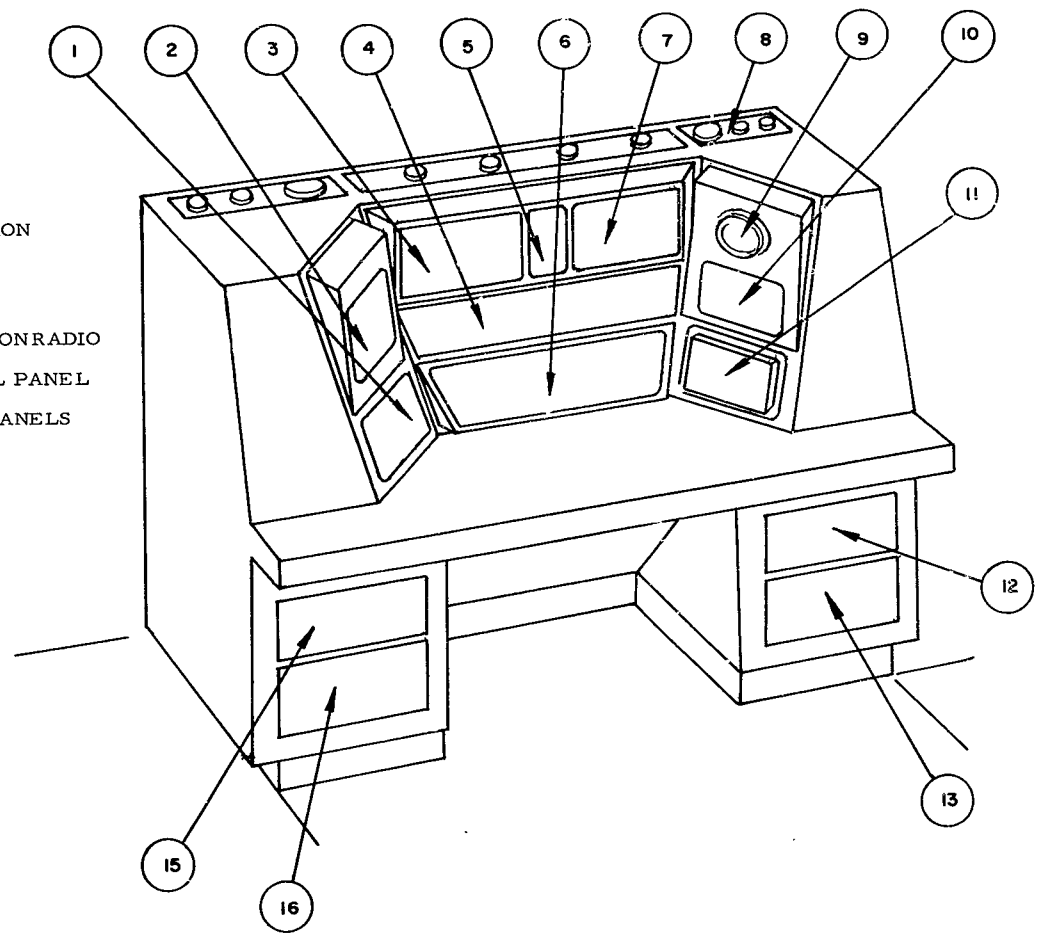


Figure 2-17. Console Control Launcher (6203)

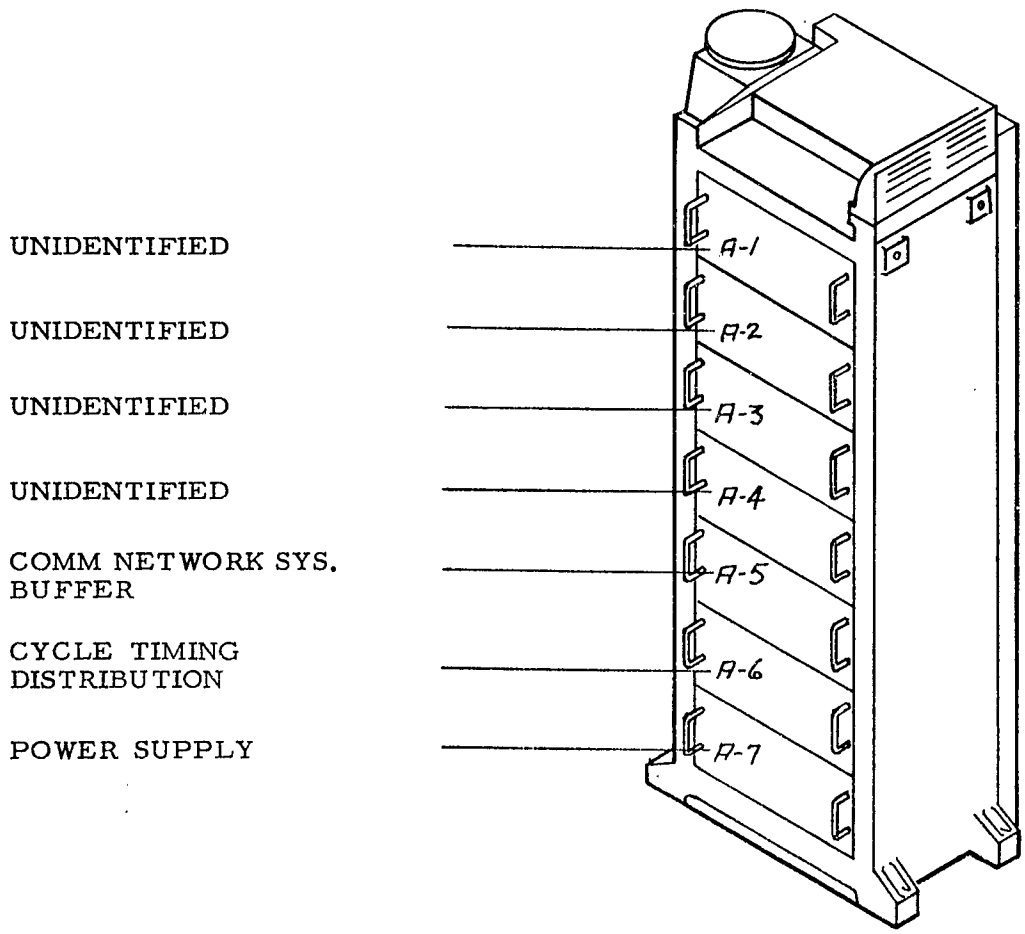


Figure 2-18. Timer Buffer

2.3 STRUCTURAL

Within the LCC there shall be provided by others an isolated equipment space capable of supporting the items described on the Sylvania LCC Equipment List which notes weights of both Sylvania and GFE items. Primary shock isolation devices for the LCC shall be provided by others.

The storage volume required to contain properties to be furnished by miscellaneous agencies are noted in paragraph 2.2.

Hold down devices, essential for secure fastening of contemplated units of equipment and subsystems to withstand weapons effects, shall be provided and installed by others. Minimum toe-to-toe clearance between racks adjacent to consoles shall be 97-1/2" for attachment of console handling casters.

Bolt hole location drawings will be supplied by Sylvania pertaining to all unique equipment to be placed within the LCC. Equipment identified as standard Minuteman racks have a bolt-down configuration as shown on ICD No. 25-38226 GES Equipment (LF and LCC Installation Envelope and Cooling).

Base details of Operator's Console are as shown on Interface Control Drawing No. 25-38250.

The MG set shall be located and mounted by others in accordance with details shown on ICD Drawing No. 25-38247. Lifting eyes shall be provided in the room structure for hoisting of the MG Set from its floor location.

ESA boxes and grou ding plate plus their hardware fasteners will be provided by Sylvania. The EMP wall shall be designed by others to withstand weapons effects and to accommodate the weight and number of ESA Boxes and the grounding plate required by Sylvania to accomplish the GES, EI isolation function. For EMP wall design purposes, six ESA boxes will normally be combined into a single module. Each ESA box will weigh

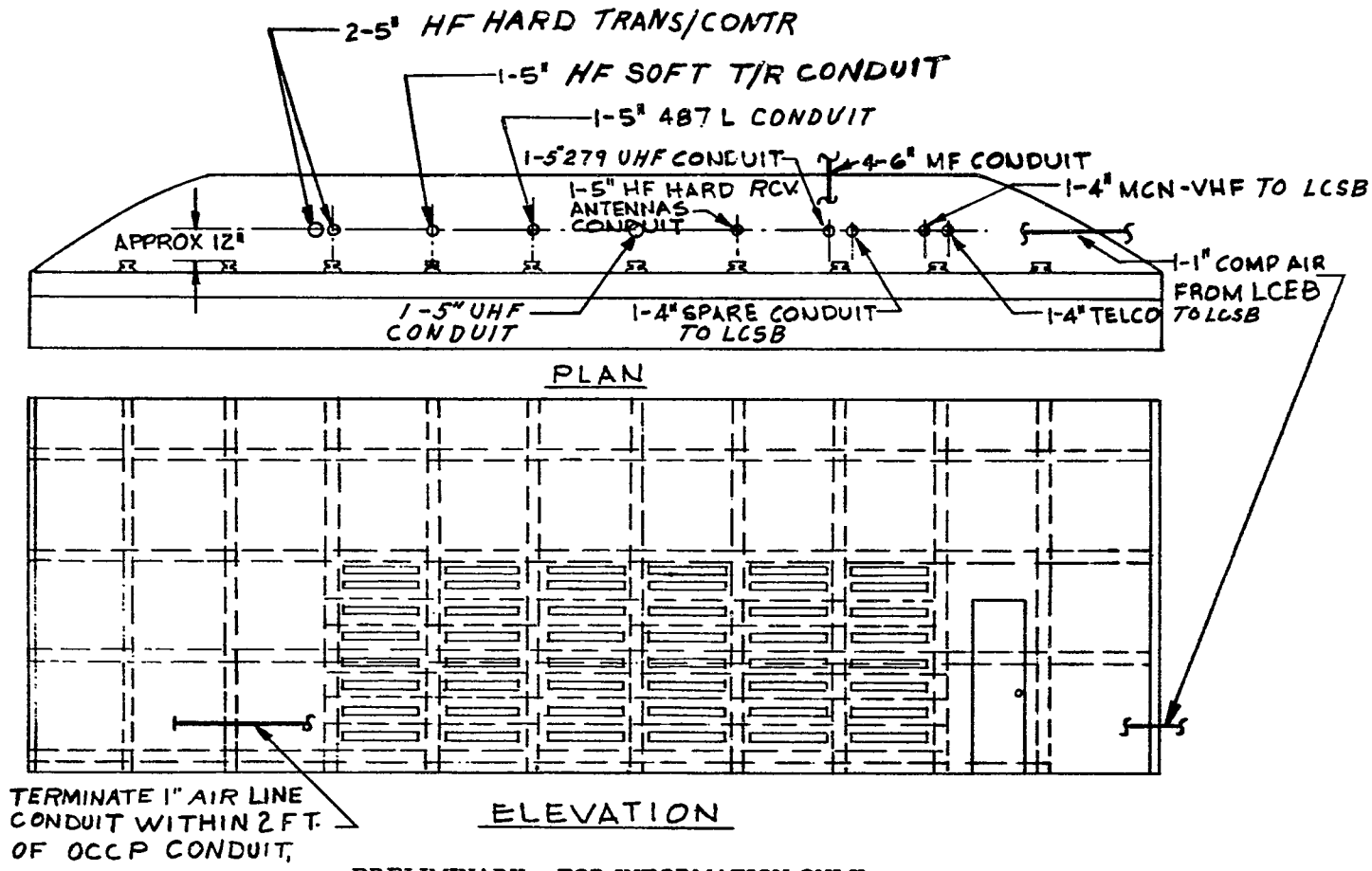
approximately 12 lbs (80% confidence). The module mounting arrangement will be supplied at a later date.

The EMP wall shall have penetrations to receive ESA Mounting Assemblies as shown in Figure 2-19a. Wall penetrations shall be arranged in vertical rows as shown on Figure 2-19a. ESA Mounting Assemblies will be furnished by Sylvania for installation by others in accordance with Sylvania installation instructions (See Figures 2-20a, 2-20b, and 2-20c).

The door to the EMP Room shall be a standard r.f. tight door as provided by a manufacturer of shielded enclosures. Door shall be capable of providing the following attenuation:

Type of Field	Frequency	Min. Attenuation
Low Impedance (H)	200 KC	70 DB
High Impedance (E)	200 KC	100 DB
Plane Wave	500 MC	100 DB
Plane Wave	1000 MC	100 DB

The Installation Contractor shall provide protection for the r.f. finger stock and/or gasket material used around the periphery of the door until the facility is accepted by the procuring agency.



PRELIMINARY - FOR INFORMATION ONLY

Figure 2-19A. Plan and Elevation of EMP Room at LCC

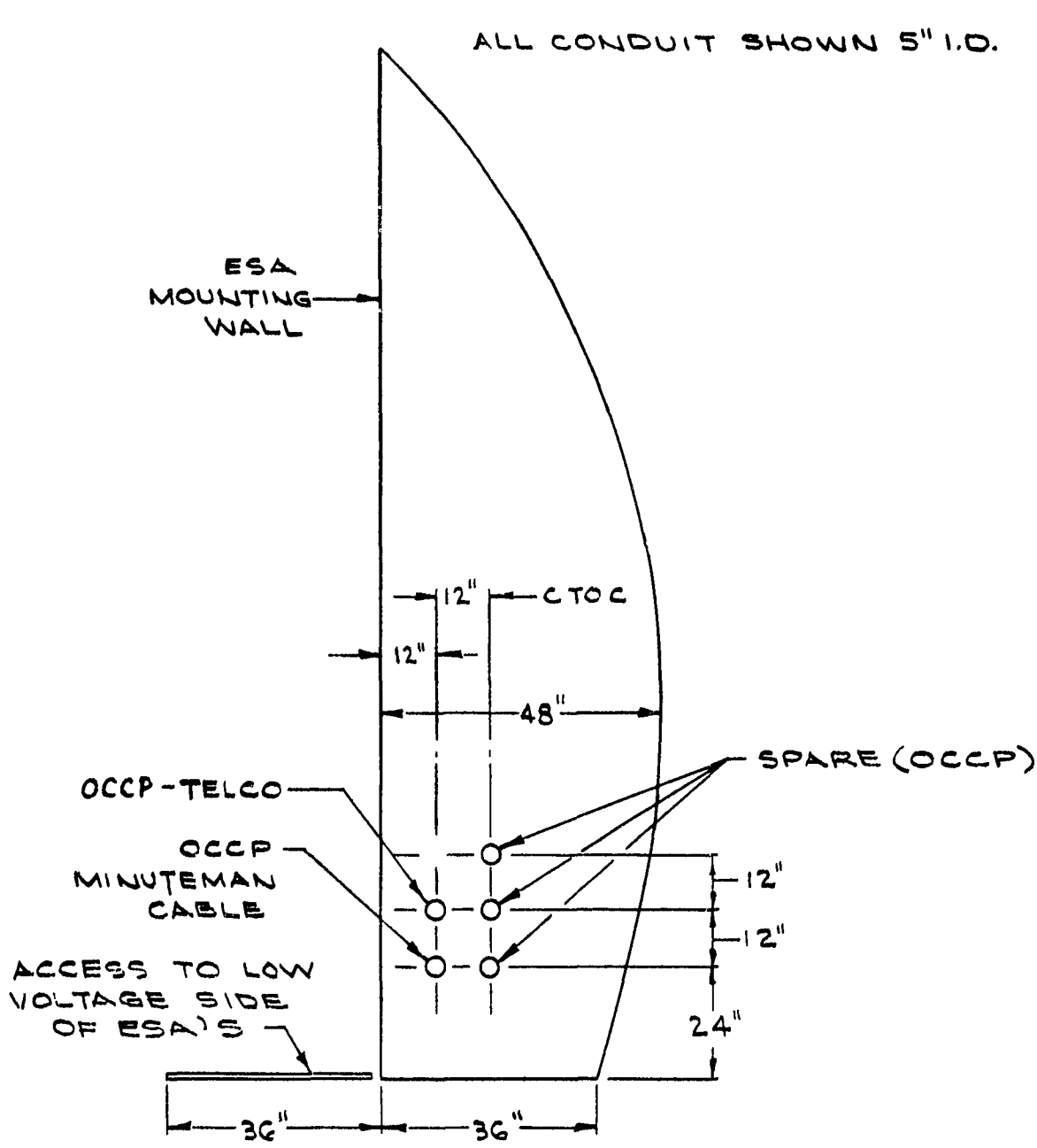


Figure 2-19B. LCC Conduit Penetrations-EMP Room Inside Elevation-Field End

Drawing to be Supplied at a Later Date

Figure 2-20A. ESA Interface at EMP Wall

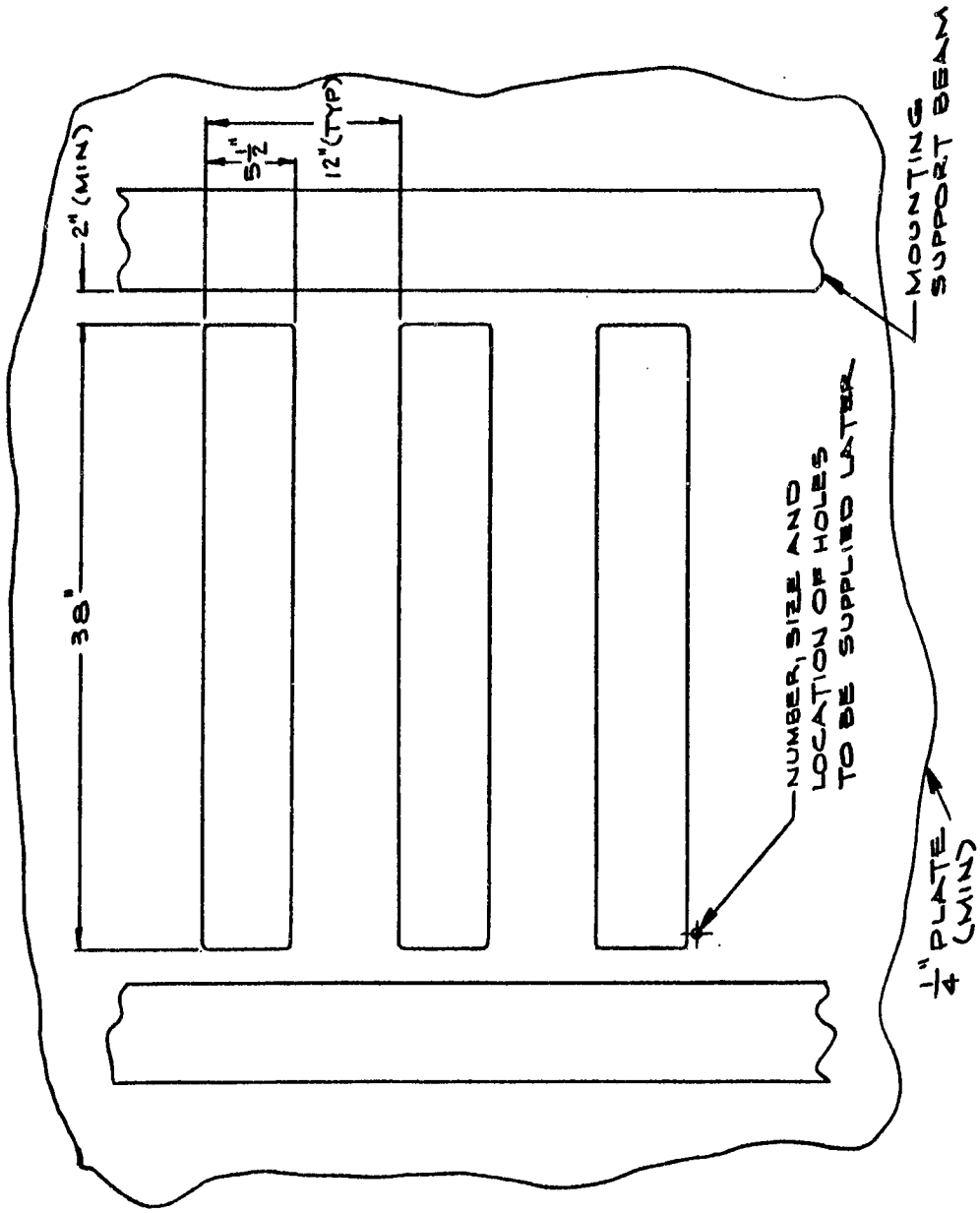


Figure 2-20B. View of Figure 2-20A with ESA Unit Removed

Drawing to be Supplied at a Later Date

Figure 2-20C. View of Figure 2-20A with Site Structure in Phantom Rotated 90°

2.4 MECHANICAL

Environmental control of LCC facilities shall be in accordance with the provisions of BSD Exhibit 62-51 for an occupied, temperature-controlled installation.

Within the temperature-controlled space, Sylvania GES and GFE electronic units of equipment shall be cooled by provision of conditioned air in accordance with BSD Exhibits 62-51 and 62-80. Equipment heat loads are enumerated on the Sylvania Equipment List applicable to the LCC (Figure 2-2).

Individual rack air quantities shall be determined in accordance with the provisions of BSD Exhibits 62-51 and 62-80 which prescribes an air temperature of 55°F ± 2°F inlet and a maximum outlet temperature of 67°F. During the emergency period forced cooling air may not exceed a temperature of 90°F leaving the racks. The emergency environmental control system must be capable of maintaining temperatures of the cooling air below the 90°F for the required period. Personnel engineering requirements recommend that the ambient does not exceed 85°F as stated in BSD Exhibit 62-79.

A round flexible duct, damper and holding clamp, provided by others and capable of withstanding weapons effects, shall interface with the inlet transition duct, the Boeing Company No. BACD40F3, a part of BACC-60B03-C1F02 (Minuteman Rack) provided by Sylvania. See Figure 2-1 for guidance as to locations of units of equipment.

The Environmental Control System serving the LCC shall be detail designed and provided by others in accordance with BSD Exhibit 62-80 to supply the gross air quantity and temperature control as indicated on the Equipment List, Figure 2-2, for cooling the equipment within the LCC and maintaining the ambient within limits prescribed in BSD Exhibit 62-79.

Air for cooling must be provided continuously including periods of battery operation.

Distribution duct work, including a flexible make-on to a six-inch diameter inlet transition duct on all racks shown on ICD No. 25-38226 within the LCC shall be provided by others. Means shall be provided in all air supply ducts for manual modulation of air flow to the individual rack level in accordance with BSD Exhibit 62-84. Air distribution shall be developed to accomodate approximately 1.5 inches water gage pressure drop through the forced air cooled racks. Exhausts from the racks will pass through a Sylvania provided louvered discharge assembly to the room from which the environmental control unit draws air by indirect return.

The environmental control system reserve cooling capability within the LCC shall provide limited-duration operation of the GES complex in the battery powered mode. The environmental control system shall be capable of rack cooling during the emergency period. Air exhausted from units of equipment is not to exceed 90°F in accordance with BSD Exhibit 62-80.

Beyond Sylvania's designation of locations for plumbing and sanitary services within the LCC, all considerations of plumbing service shall be provided by others.

2.5 ELECTRICAL

2.5.1 Power - Sylvania has determined the primary power inputs essential to operate the motor-generator set and battery chargers from commercial or Deisel generator source. These quantities are shown on Figure 2-2, LCC Equipment List.

Alternating current power shall be provided by others in accordance with BSD Exhibits 62-4 and 62-77. Power input shall be sufficient to fulfill the GES equipment requirements established on the Sylvania

Equipment List of Figure 2-2. Additional AC loads for performance of functions within the LCC, not associated with the GES and Sylvania integrated GFE, shall remain the responsibility of others.

Power distribution within the Launch Control Center occurring as an output of the motor generator set, will be a Sylvania responsibility.

2.5.2 Distribution. - All GES conduit entering the structure of the LCC shall be provided by others as specified by Sylvania. Conduit associated with RPIE items shall be identified by others. Preliminary analysis of cable tray requirements indicates the use of double tier tray installation, with trays having a load-carrying capacity of 50 pounds per linear foot for each tier. The routing and centerline location of the cable trays are shown in Figures 2-1b and 2-1c. The size of the power cable tray shall be 12" wide. The wide sections of the signal tray where cable concentration is heavy, shall be 18" wide, and for the narrow sections shall be 12" wide. The cable tray shall be of the ladder type with a cable drop out for each rack. Each cable drop-out shall be so positioned or otherwise extended such that the free length of any cable shall not exceed 24" as measured in a plan view. The mounting height of the signal tray should be 7'-5" and for the power tray 8'-1". The tolerance in locating the cable trays shall be $\pm$ 2 inches for all plan view dimensions and $\pm$ 1/2 inch for installation heights.

2.5.3 Lighting - All lighting requirements shall be in accordance with BSD 62-79.

2.5.3.1 Normal Operation - Lighting for normal operation within the LCC shall be provided by others.

Lighting capability in the EMP room is required only during periods of normal operation. It shall be provided by others. Penetrations of the EMP wall for power wiring from the interior of the LCC shall be through an electrical surge arresting device or may be run in a metallic conduit bonded electrically to the LCCGP.

2.5.3.2 Survival Lighting - Sylvania will provide cables, fixtures and lamps for connections from the GES protection and distribution rack. Installation of fixtures shall be by others.

2.5.3.3 Emergency Lighting - For emergency lighting, Sylvania will provide a power connection device on the protection and distribution rack and cable to a facilities interface panel, ceiling mounted above the rack. Emergency lighting circuit shall consist of the RPIE lighting fixtures serving the Operators' Consoles, powered at all times from the GES 120 volt, 60 cycle regulated power source.

2.5.4 Grounding, Shielding and Electro-Interference

LCF Grounds - Each Launch Control Facility shall be provided with the following ground systems to provide static grounding for circuits and equipment: an electronic equipment reference system, a structure grounding system, a lightning ground system, and a vehicle grounding system.

Each Launch Control Facility shall have two named grounding points as follows:

1. The LCFGP (Launch Control Facility Ground Point) which is the point at which an earth ground connection is made.

2. The LCCGP (Launch Control Center Ground Point) which is a common ground point for all items in the LCC. This shall be located on the inside wall of the capsule.

The lightning ground system shall provide for the connection of all necessary items to earth ground, and shall provide the primary means for conducting to earth ground surge currents induced in the system by lightning.

The water-well casing shall be used as the primary ground means. Provision shall be made to eliminate electrolytic action at the connection point of the grounding wires to the LCFGP. The LCCGP, the LCFGP, and the interconnecting conductors shall survive weapons effects as specified in AFBSD 62-83.

All signal and power cables and leads shall enter the LCC at or near the LCCGP. All shields and conduits shall be grounded at this point.

All such leads shall enter the LCC directly into a shielded enclosure which houses the necessary filters, isolating transformers, surge voltage protection devices, cable pressurization, and sealing means.

2.5.5 Conduits - All conduit and pull wires shall be provided by others. The steel penetrations of the concrete at the LCC into the EMP Room shall be welded with a continuous weld to the wall liner for grounding purposes. During installation of all conduits, the outer end shall be capped and marked above ground with a monument.

Eleven antenna conduits are required from the LCC EMP Room to the Antenna Farm. See Figures 2-21 and 2-22. These shall be 5-inch I.D. steel, with the exception of the four conduit to the MF Antenna which shall be 6-inch I.D. non-ferrous (plastic). MF Antenna conduit shall provide straight-line routing as further described in Section 8 of this document. Minimum bending radius for conduit housing the UHF transmission line shall be six feet. This figure shall become twenty feet if plastic conduit is substituted on the UHF line.

Five conduits, 5-inch I.D. steel (see Figure 2-19), are required for the OCCP installation from the penetration of the LCC EMP Room to within four feet of the surface of the ground. These conduits shall extend twenty-five (25) feet beyond the fence of the security enclosure and shall rise at an angle with the horizon not greater than 45°. Long sweep bends shall be employed for the OCCP conduit, having a radius 36 times the conduit diameter.

Three conduits, four inches inside diameter steel, are required from the LCSB to the LCC EMP Room, one each for VHF/MCN and TELCO and one spare. As the communication facilities in the Support Building are "soft", these conduits will not be required to withstand weapons effects. There are no critical bending radii for these conduits.

A one inch conduit shall be provided between the compressor-dryer location in the LCEB and the LCC for the pressure lines terminating in the EMP Enclosure. Suitable means (one-inch exposed conduit) shall be provided within the EMP enclosure to convey the pressurizing hose across the EMP room to within two feet of the OCCP cable entry.

All of the above designated conduits must enter the EMP Room, as shown on Figures 2-21 and 2-22.

A conduit, four inches I.D. shall be provided for the pressurization system monitor, alarm and MCN circuits from the LCEB to the LCC. The conduit for the monitor and alarm circuits and MCN shall not enter the EMP Enclosure. There is no critical bending radius for this conduit.

2.6 COMMUNICATIONS

2.6.1 Inside Cable Communications Plant - Communications is a function of the GES and shall be accomplished by Sylvania. It is the function of the Inside Cable Communications Plant of the GES to interface with the Outside Cable Communications Plant, and to provide the voice and data communications, which will be transmitted by the Outside Cable Communications Plant, between the LCF's and LF's. Sylvania shall be responsible for utilization within the LCC of the display circuits from the LCEB to the LCC relative to "high air pressure", "low air pressure", and "power on" to compressor dryer breakers. Placement of MCN devices and cable routing thereto, together with mounting plate requirements are shown on Sylvania Figures 2-24 and 9-3.

2.7 INTERFACES

Within the LCC, interfaces between Sylvania and others are as listed herein.

2.7.1 Architectural - Data inputs are shown on Sylvania drawings.

2.7.2 Structural - Sylvania will provide rack and console hold down descriptions consisting of bed plate or footing detail drawings. Anchor bolts, vibration elimination devices, shock isolators and mounting pads, rails, or pedestals shall be provided by others, incorporating Sylvania requirements.

2.7.3 Mechanical - To cool electronic equipment, a round flexible duct, damper and holding clamp capable of withstanding weapons effects shall

be provided by others. It shall interface with the Minuteman rack (BACC-60-B03C1F02) provided by Sylvania. (See ICD No. 25-38226).

Sylvania will take no cognizance of plumbing interface within the LCC beyond a statement of location for devices.

2.7.4 Electrical - Primary power described in paragraph 2.5 shall be routed to the RPIE Power Panel LCDB by others. Cables from the load side of GFE circuit breakers on the RPIE Power Panel to battery chargers and the MG set will be provided by Sylvania, in conduit or wireways provided by others.

The Sylvania interface is at the load side of the GFE circuit breakers in the RPIE Power Panel. At the load side of the GFE circuit breakers, commercial or stand-by power shall be as specified in AFBSD Exhibit 62-77.

Power service provided by others is required from the LCC to the HF Hard Transmit Pop-Up Antenna as stated in Sylvania Equipment List, Figure No. 8-3.

Sylvania interface with Environmental Control Unit for provision of emergency battery power shall be at the junction box of the Environmental Control Unit.

2.7.5 Communications - Three conduits shall be provided from the LCSB to the LCC for communication cables that interface with soft communications in the LCSB.

Eleven conduits shall be provided from the LCC to the antenna farm, as specified in paragraph 2.5.5 of this document.

Two conduits shall be provided between the LCC and the LCEB. One conduit will carry the cabling for the maintenance communications network, and monitor and alarm pairs. The other is for the cable pressurizing air line.

The power conduit shall be specified by others for prime power input to the LCC.

Five conduits shall be provided from the LCC to a point 25 feet beyond the security fence surrounding the LCF for the cable connection to the LF, and for hardened TELCO cables. Pulling iron shall be provided in conjunction with the OCCP conduit to permit application of a 1200-pound pulling stress for placement of OCCP cable in the LCC.

In the above conduit items, the structural penetrations shall be provided by others. Conduit terminations for GES shall be provided by Sylvania for installation by others. (Figures 2-21 and 2-23.) All conduits shall have pull wires placed when the conduit is installed.

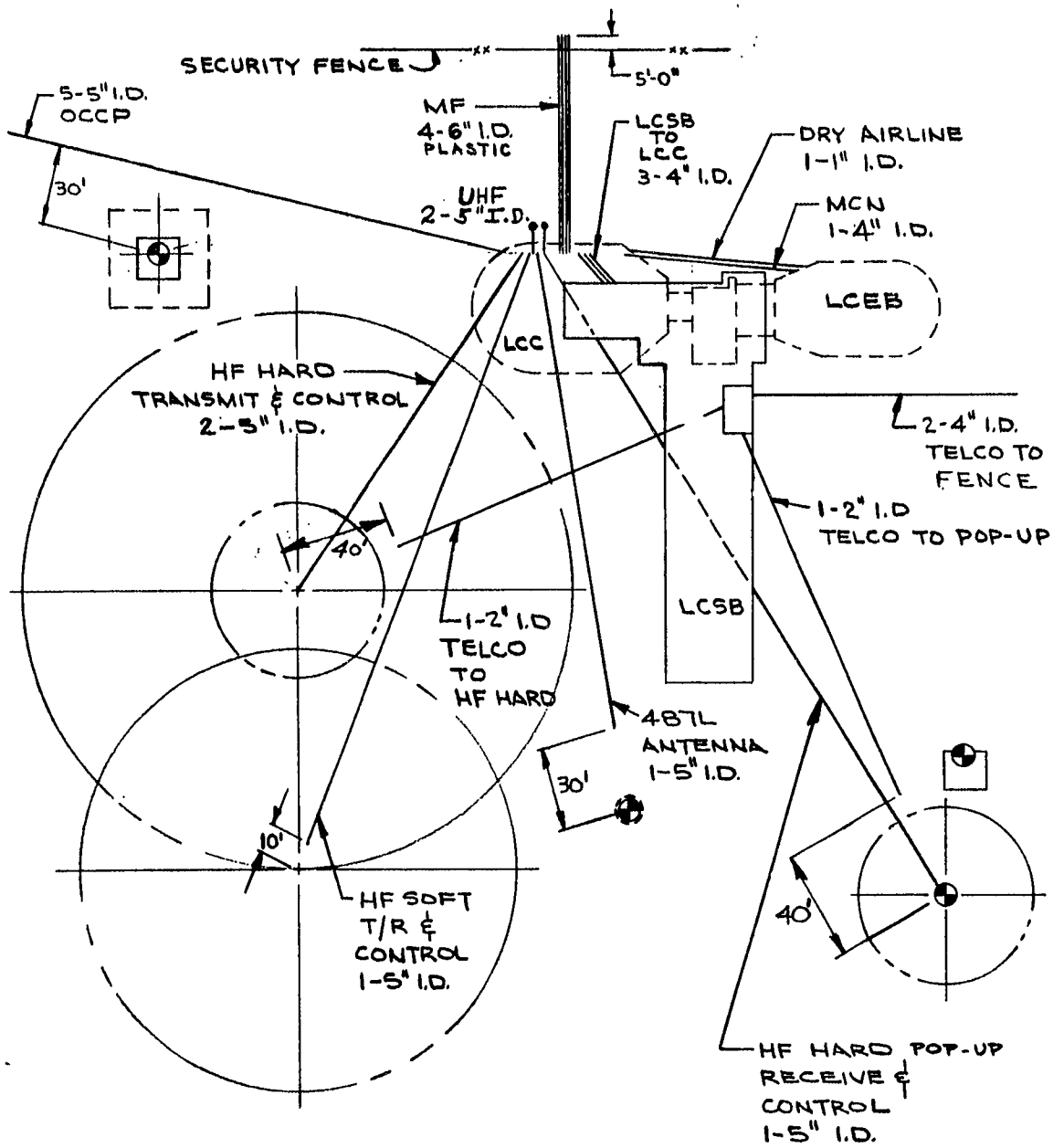
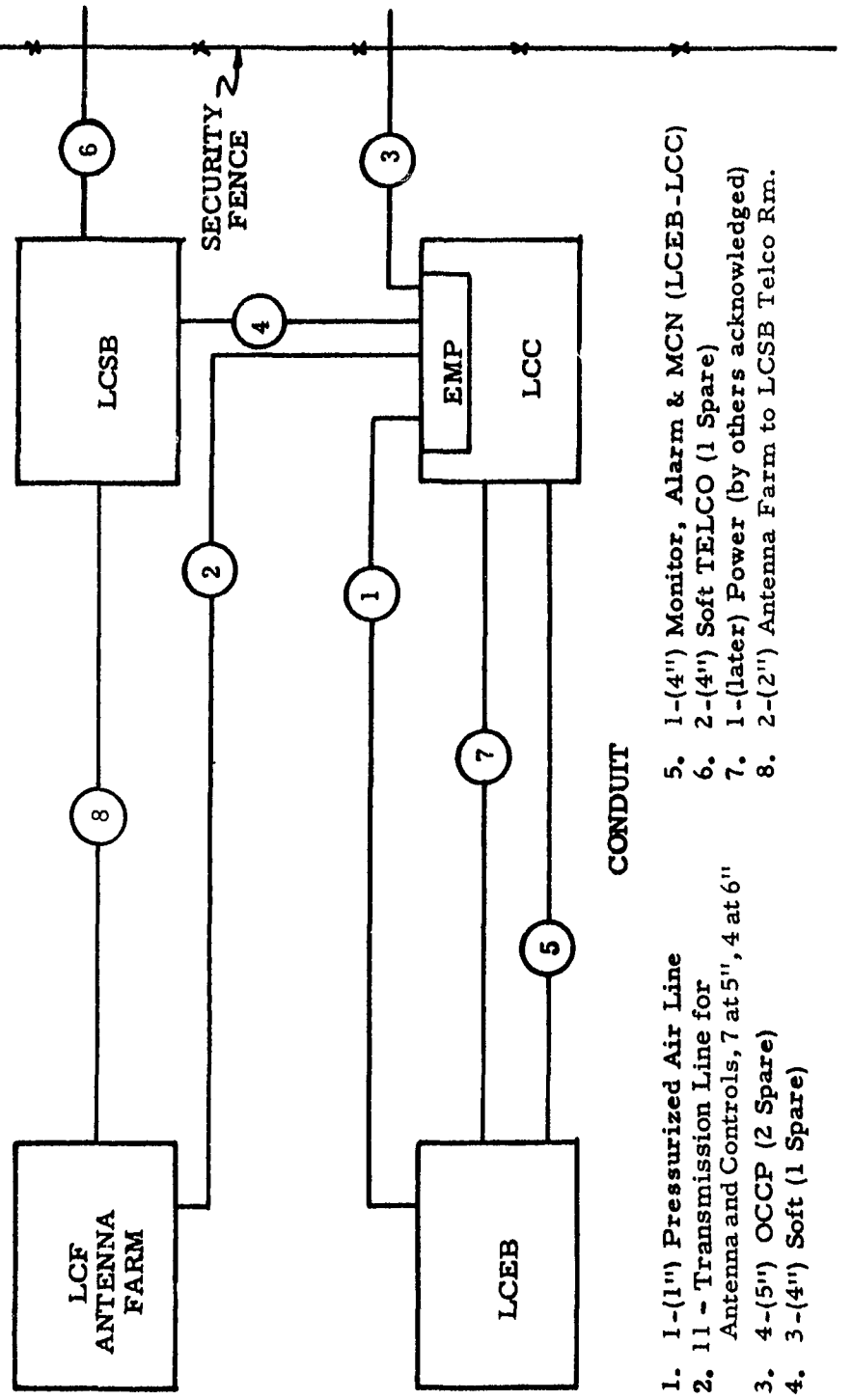


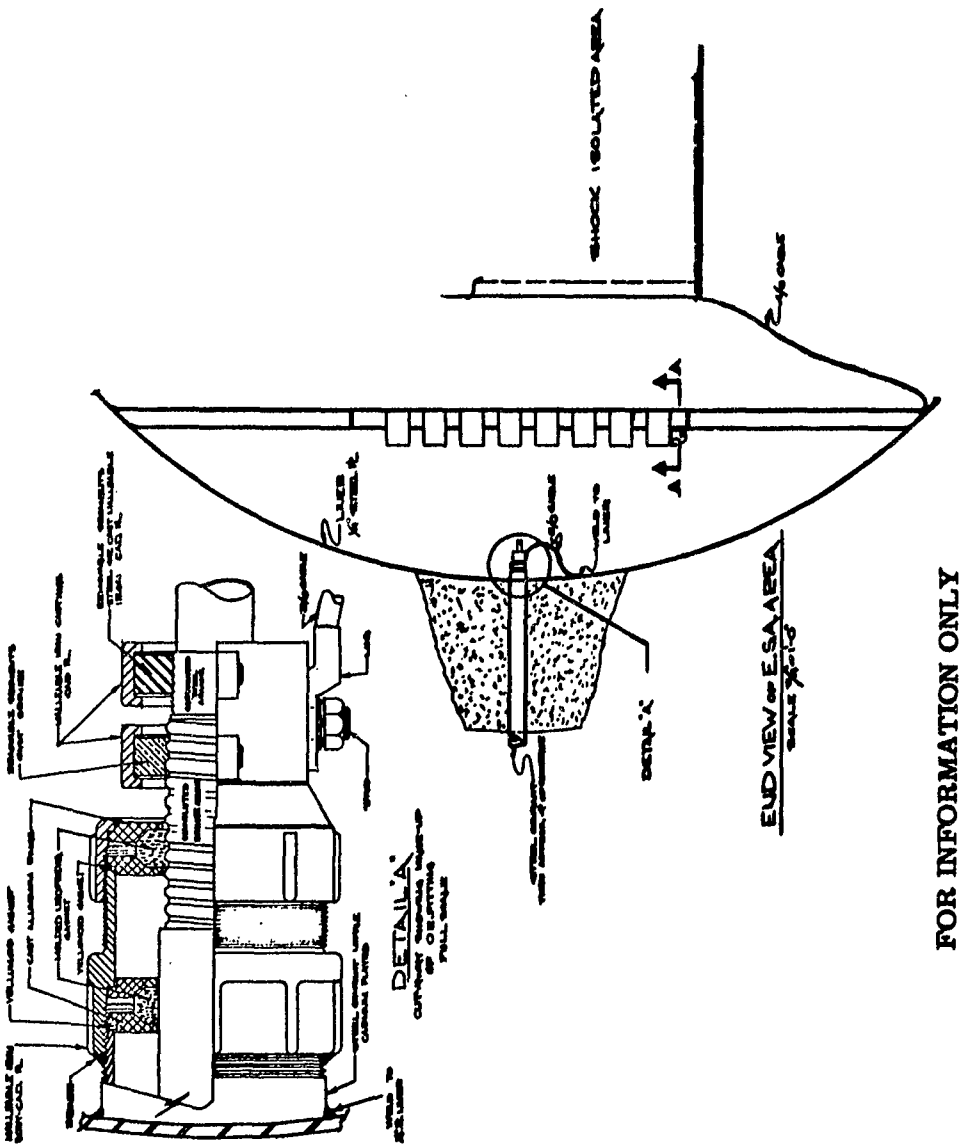
Figure 2-21. Conduit Emplacement Plan at LCF



CONDUIT

1. 1-(1") Pressurized Air Line
2. 11 - Transmission Line for Antenna and Controls, 7 at 5", 4 at 6"
3. 4-(5") OCCP (2 Spare)
4. 3-(4") Soft (1 Spare)
5. 1-(4") Monitor, Alarm & MCN (LCEB-LCC)
6. 2-(4") Soft TELCO (1 Spare)
7. 1-(later) Power (by others acknowledged)
8. 2-(2") Antenna Farm to LCSB Telco Rm.

Figure 2-22. Preliminary LCF Conduits



FOR INFORMATION ONLY

Figure 2-23. Conduit/Outside Cable/ESA Grounding

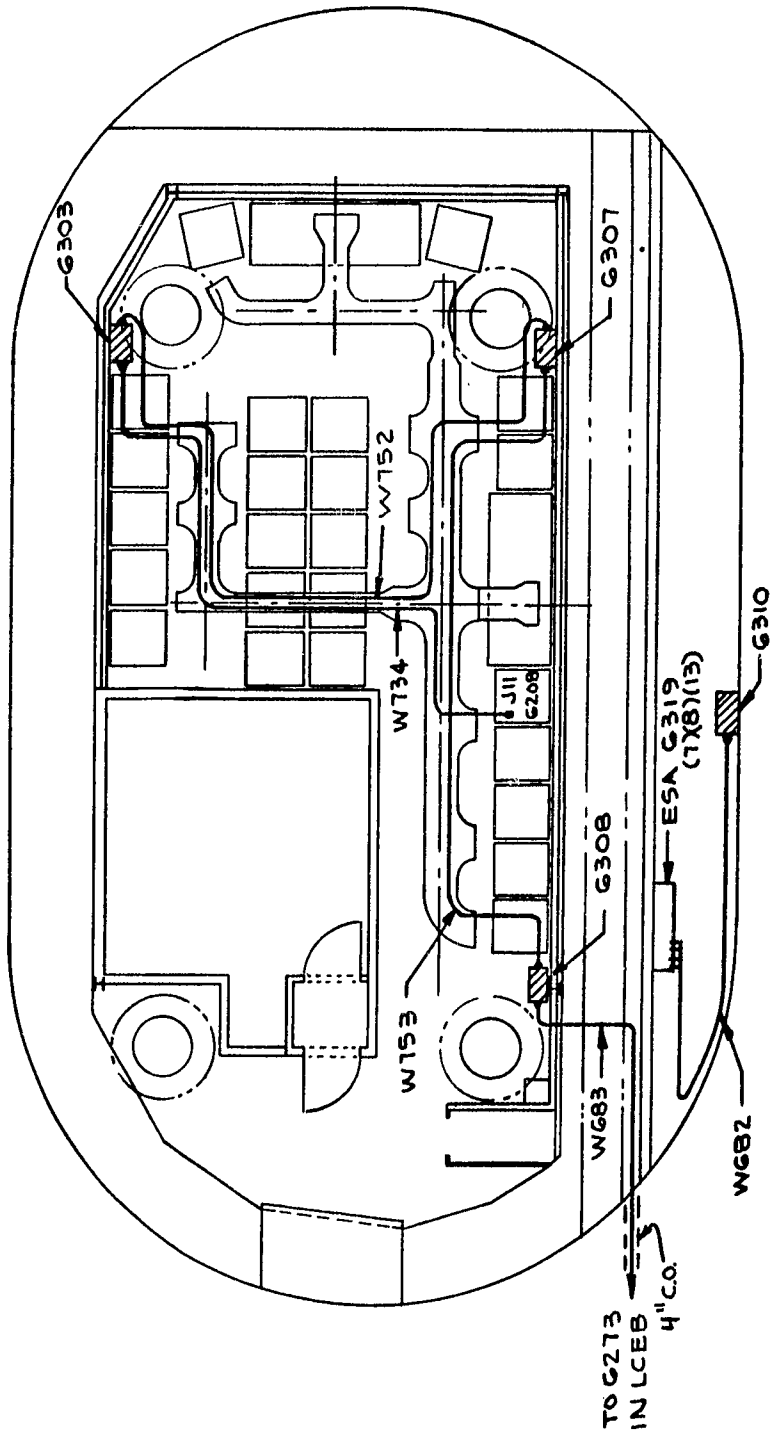


Figure 2-24. Location & Cabling of FLCF Jack Boxes

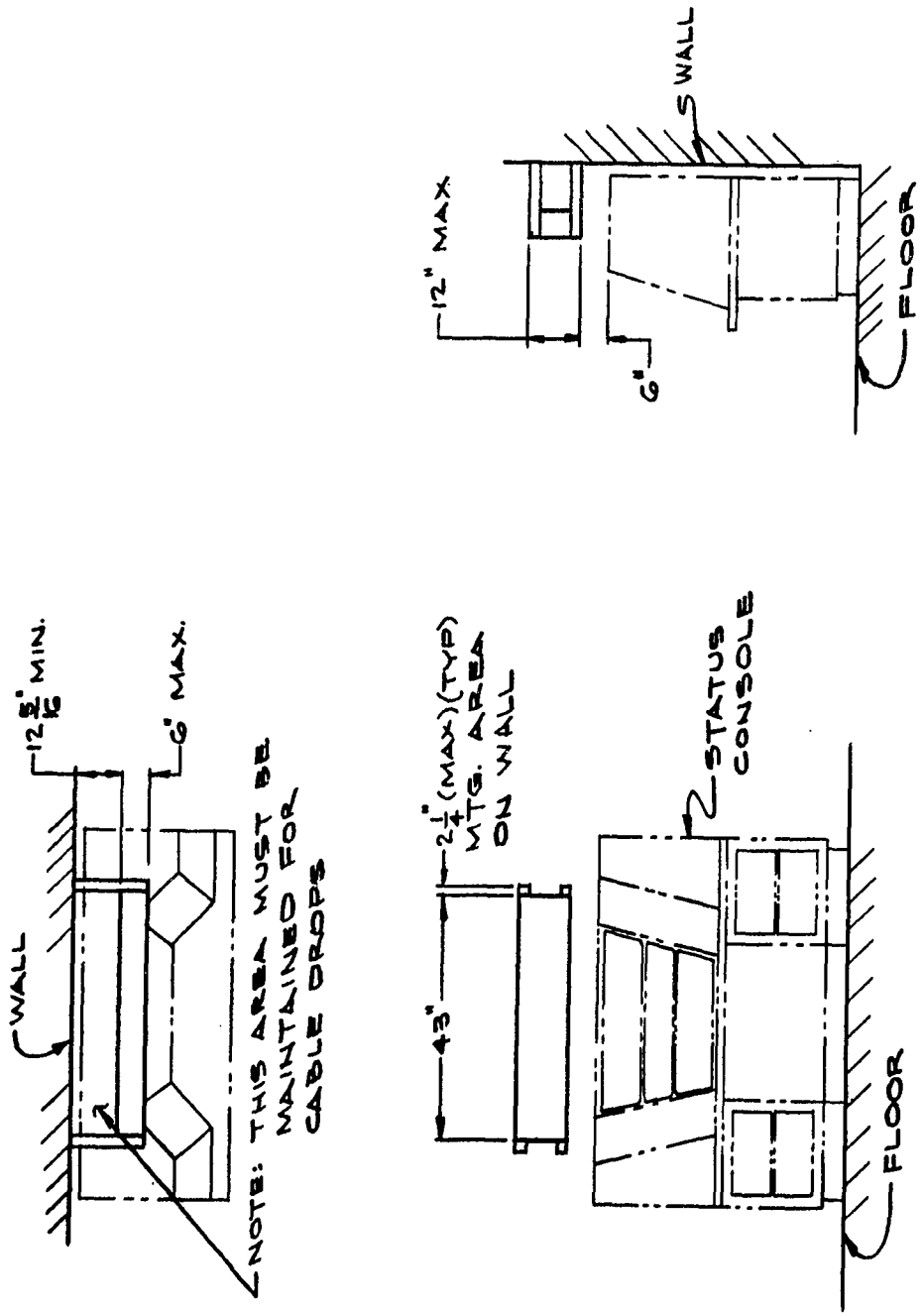


Figure 2-25. Available Space for RPIE Annunciator Panel

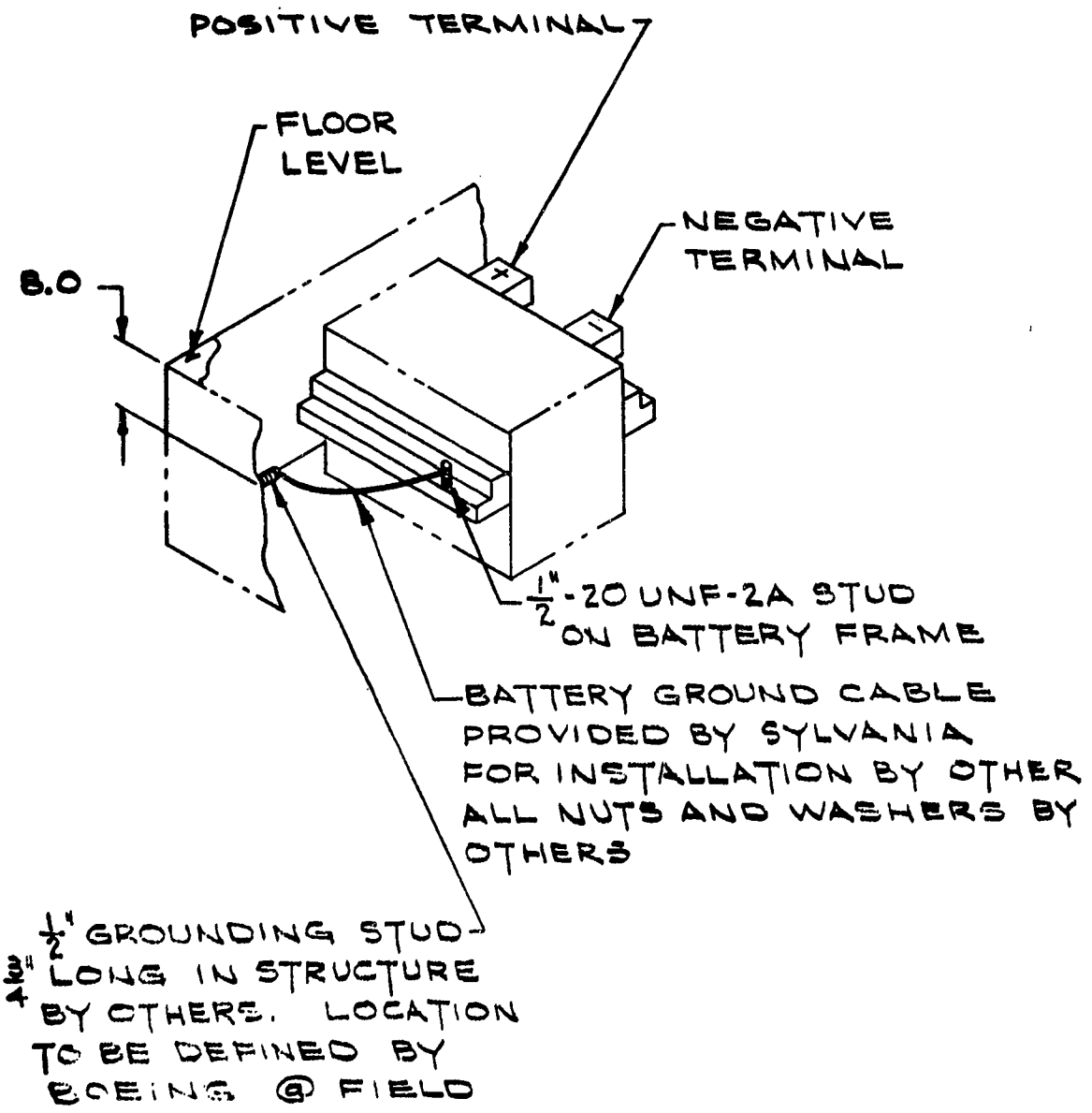
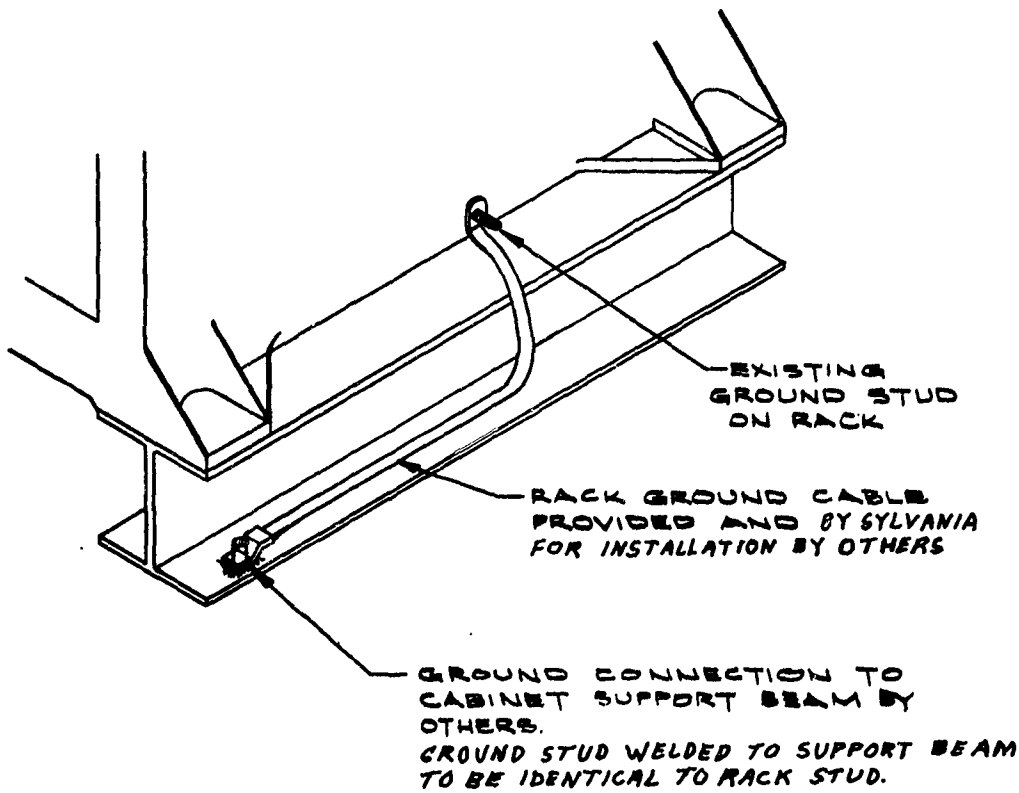


Figure 2-26. **Battery Ground-LCC**



NOTE:
NUTS AND WASHERS AT RACK AND ALL MOUNTING HARDWARE AT RAIL SHALL BE PROVIDED BY OTHERS.

Figure 2-27. Rack Grounding in LCC

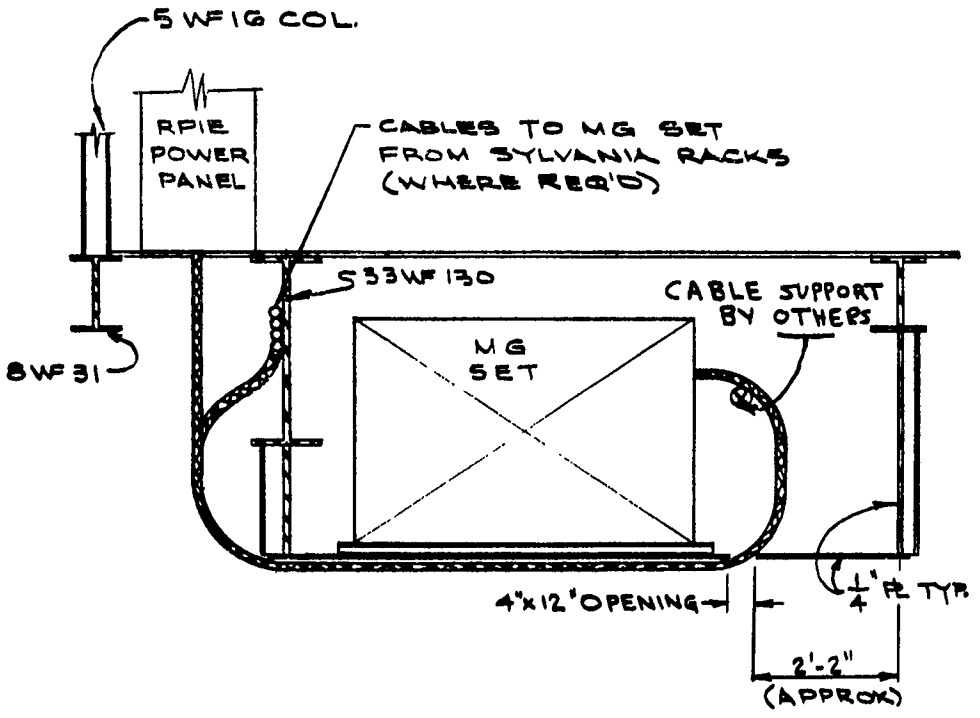


Figure 2-28. Power Cable Routing to MG Set

SECTION 3

LAUNCH CONTROL EQUIPMENT BUILDING (LCEB)

3.1 FUNCTION

The LCEB is the utilities and environmental control center for sustaining long duration activity within the adjacent LCC. It shall be considered an unattended facility with respect to Sylvania-implemented GES Equipment. Within this structure, Sylvania requires space allocation for placement of a cable pressurization system (as shown on the LCEB Equipment List, Figure 3-1). Except for Maintenance Communication Network (MCN) circuits, no additional Sylvania-provided, or Sylvania-integrated devices are contemplated for location within the LCEB. This facility shall also serve as a power generation source, housing the GFE auxiliary generator and the transfer switch equipment to control the gross power input to the adjacent LCC.

3.2 ARCHITECTURAL

Space availability and access shall be provided within all LCEB's for pressurization equipment of the size and weight shown on the applicable Sylvania Equipment List (Figure 3-1). Preference for the location of the compressor-dryer within an LCEB is not an architectural constraint, except that access to the entire cabinet shall be provided for maintenance purposes (Figure 3-1). It is further required that additional clear space of four inches at sides and rear be provided for air circulation and bracket attachment.

A refrigerator-type dryer-compressor is contemplated for this installation; however, there is no requirement for a drain to remove the water condensed from the intake air since this is accomplished by re-evaporation into the room.

Routine maintenance imposes a requirement that the cabinet be accessible for accomplishment of such tasks as lubrication, belt adjustments, cleaning or changing strainers and filters, and replacement of chemical canisters.

3.3 STRUCTURAL

Provision shall be made by others for secure fastening of the pressurization system within the LCEB. Equipment is designed to be fastened to the wall, and is provided complete with detachable brackets which bolt to the cabinet. The means of securing these brackets to the equipment room structure shall be provided by others. For dimensional drawing pertaining to the placement of wall mounting brackets for the compressor-dryer, refer to ICD 25-38272. A mounting panel shall be provided by others for the placement of the pressurization system and for the MCN jack box and alarm set, for installation by others. Jack box mounting height centerline shall be approximately 5 feet above the work platform. See Sylvania supplementary illustrations for fastening pattern of jack box and alarm set.

3.4 MECHANICAL

Sylvania will furnish a cable pressurization system complete with self-contained compressor, receivers, distribution manifold and primary control devices for installation in all LCEB's. The assembly shall have characteristics as defined on the Sylvania Equipment List (Figure 3-1). Between the LCEB and the LCC a plastic pressure line and connecting clamps will be provided by Sylvania for installation by others.

In addition to the above requirement, the LCEB shall be considered the physical source of environmental (temperature and humidity) control for the adjacent LCC in accordance with the requirements of BSD Exhibit 62-80. In determining the load summations for these services, consult Sylvania Equipment Lists in which certain equipment heat loads are defined.

All sumps and drains shall be provided by others.

REF DES NO	LCEB EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	N AC	N DC
6318	AIR COMPRESSOR DRYER UNIT	SYL 14028	19" x 12" x 43"	175	115v 60 1 kw			
	RECHARGEABLE EMERGENCY LIGHTING	RPIE		40 Est'd	115v 100w			
	MCN JACK BOX AND ALARM	SYL 14034						

SIZE (W X D X H INCHES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT			
		PRIME		REGULATED												
				NORMAL					EMERGENCY							
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOLING	T_{IN} °F	T_{OUT} °F MAX
		AVG	PEAK				AVG	PEAK				AVG	PEAK				
9" x 12" x 43"	175	115v 60 1 kw												3400	CONV		
	40 Est'd	115v 100w													CONV		

2

Figure 3-1. L

POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT					REMARKS
	REGULATED															
	NORMAL					EMERGENCY										
W EAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
											3400	CONV				Model 600 Provides 15-amp circuit
												CONV				

3

Figure 3-1. LCEB Equipment List

3.5 ELECTRICAL

A power output from the LCEB to the adjacent LCC consisting of the following shall be provided by others:

1. Major input to Sylvania motor-generator set per Sylvania Equipment List.
2. Input to battery chargers, per Sylvania Equipment List.
3. Miscellaneous power inputs for operation of non-critical equipments in the LCC. This portion covers those inclusions by others within the LCC for which Sylvania has no governing requirements under the cognizant GES Equipment.

There shall be provided by others such disconnect devices and conduits within the LCEB as required to make on for the operation of the Sylvania-furnished pressurizing system.

The compressor-dehydrator requires power as defined in the Sylvania Equipment List. More stringent regulation than in normally delivered commercial power is not required. This equipment operates continuously; however there is no requirement to operate it during the battery mode of operation.

Conduit provisions from the LCEB to the LCC shall be as follows:

1. A single hardened conduit for prime power input to the LCC from commercial or a Diesel generator source. Size to be determined by others.
2. A single 4-inch hardened conduit provided and installed by others to contain the pressurization system monitor and alarms and MCN circuit cables provided by Sylvania for installation by others.
3. A single one-inch hardened conduit for carrying cable pressurization tubes to be provided by Sylvania for installation by others.

Pressurization of the Minuteman hardened cable is accomplished by connection of the air line within the adjacent LCC. Monitoring circuits located at the compressor-dryer device are high pressure, low pressure and high humidity sensors. Power provided by others is re-

3.6 COMMUNICATIONS

Sylvania will provide for installation by others, cables associated with pressurization system monitors and MCN circuits from the LCEB to the LCC. Sylvania will also provide a telephone jack box and alarm for use in the MCN network for installation by others. Mounting height shall be approximately 5 feet above the working platform level for ease of utilization.

The LCEB is not normally manned. Maintenance personnel will carry telephone headsets to plug into jacks. These headsets will be compatible with a hard hat and will not require the use of hands for operation once a connection has been established. Communications pairs will be carried in the same conduit as the pressurization system monitor and alarm circuits to the LCC, as stated in Section 2 of this document. Monitor-alarm pairs from status check points of equipments provided by others and located within the LCEB shall not be conveyed in the Sylvania-provided cables to the LCC.

3.7 INTERFACES

The following interfaces are recognized as being associated with Sylvania GES items located in the LCEB:

3.7.1 Architectural - Minimum space requirements must be provided for the pressurization equipment as shown on the Sylvania Equipment List, Figure 3-1. Attachment to the wall of mounting devices for the pressure dehydrator system shall be provided by others.

3.7.2 Structural - The weight and package size of the pressurization equipment is shown in the Sylvania Equipment List (Figure 3-1). Anchor bolts, vibration elimination devices, and shock isolation devices shall be provided by others and shall be compatible with dimensions on the Sylvania provided equipment.

3.7.3 Mechanical - Sylvania shall provide as a package all valves, regulators, switches, manifold and gages pertinent to the pressure

system located within the LCEB. This shall include a flexible non-metallic line between the compressor-dryer on the shock-isolated platform and fixed structural envelope of the LCEB. Any penetration of the fixed envelope to permit passage of the pressurizing hose to the LCC shall be provided by others.

3.7.4 Electrical - Electric service connection to the GES compressor shall be provided by others. Power requirements are detailed on the Sylvania Equipment List (Figure 3-1). This service is not considered part of the critical load, but is part of the essential load, to the extent previously noted in paragraph 3.5. A terminal strip exists in the compressor cabinet for attachment of status monitor lines which form a part of the MCN network. Power service to the compressor shall be provided by others. The compressor is provided with a Cornish Wire Co. cord and plug set CP-01335-7 having 3-conductor twist lock plug and 9-foot service cord.

The conduit from LCEB to LCC containing the compressed air line, status indicating conductors, and voice communication pairs shall be provided by others with grounding in accordance with BSD Exhibit 62-75 or as otherwise specified by Sylvania.

3.7.4.1 Commercial Power

Power - Sylvania has no mechanical or electrical interfaces with the commercial power connections. Wires are required to provide power from the commercial source to continually trickle-charge the Diesel starting battery. The mechanical interface is located outside of Sylvania's responsibility.

Control - Sylvania has no mechanical or electrical control interfaces with the commercial power company.

Monitoring - The RPIE monitor and alarm panels shall monitor the commercial power. This panel must be provided a signal which

indicates the loss of commercial power. Circuitry to generate this signal shall be provided by others.

An electrical signal from a commercial power monitor to the standby power source should be provided in order to supply an out of tolerance commercial power signal to start the Diesel engine. Circuitry to generate this signal will be provided by others.

3.7.4.2 Standby Power

Power - Sylvania has no mechanical or electrical interfaces with the power connections.

3.7.5 Control, Mechanical and Electrical - Sylvania has no mechanical or electrical control interfaces with the standby power unit.

The RPIE monitor and alarms panel shall monitor the standby power. A signal will be provided to indicate the loss of standby power. Circuitry to generate this signal shall be provided by others.

3.7.6 Communications – Telephone jack boxes and alarms will be installed as part of the MCN. Sylvania will provide the jack boxes and alarms for installation by others. Routing of MCN conductor and pressurizing hose within the LCEB shall be along the structural edge of the work platform.

Conduit, provided by others, shall contain a pull wire. Pulling stress for MCN cable is forty (40) pounds.

Positioning of conduits for the MCN Cable and Pressurization Line leaving the LCEB enclosure shall be structurally constrained only to the following extent:

1. The MCN cable when entering the adjacent LCC shall run on the sway space side of the EMP room structural wall and at a level 8 feet above the walkway level. It shall not terminate within the EMP enclosure.

2. The Pressurization Line may be introduced into the EMP enclosure at any selected level within the EMP enclosure above the walkway level, but shall not interfere with access to the EMP enclosure via its RF shielded door.

SECTION 4

ACCESS FACILITY

4.1 FUNCTION

This section pertains to those access conveyance plants and facilities lying between the LCC and LCEB, and including entrance provisions thereto via the LCSB. The primary function with respect to Sylvania GES shall be to provide access for personnel and handling of equipments from above ground LCSB to the LCC and LCEB.

An additional function shall be to provide routing of utilities service to the LCC in the form of primary power, water, sanitary and LCC environmental source control.

4.2 ARCHITECTURAL

Architectural provisions shall consist of access facilities from the LCSB for personnel and equipment. Equipment sizes and weights are as enumerated on Sylvania Equipment Lists (Figures 2-1 and 3-1) applicable to the adjacent LCC and LCEB.

All doorways, aisle space, hatches, and handling facilities shall be provided and installed by others and will have the size and capability for handling the largest equipment envelope and weight described on the above equipment list. Any placement within the access facilities of equipments provided by others shall in no way impede the handling, installation, maintenance or removal of Sylvania devices within the LCF complex.

Sylvania will employ a maximum equipment envelope size (with shipping containers removed) compatible with existing WS-133A system constraints. The principal constraints are imposed by the elevator and the LCC blast door, and dictate that the envelope size will not exceed 36" x 62" x 96".

Personnel access and safety control within this region shall be provided by others.

4.3 STRUCTURAL

Structural provisions of the interconnecting facilities at the LCF shall be commensurate with the weight and size requirements of Sylvania modules as described in the Sylvania equipment list (Figures 2-1 and 3-1).

All conduits between the LCEB and LCC shall be placed in the structure of the access facility to assure survival of weapons effects.

These conduits will be used for passage of power, instrumentation, ventilation air distribution, cable pressurization line, and communication capability. Conduit sizes are identified in Section 2.5.

All conduit, air duct and power feeders within this passageway structure shall be provided by others.

Equipment hoisting capability, to the extent implied by equipment weights given on the Sylvania Equipment List (Figures 2-1 and 3-1), shall be provided by others as herein defined.

Hoisting and handling capability in the Access Facility shall be provided at the blast door entry to the LCC. This shall be in the form of lifting eyes or a demountable crane rail suitably sized and spaced to permit handling of the Operators' Consoles and MG Set.

It is essential to hoist these modules when installing, and to block up or crib up to the threshold level of the blast door in order to permit passage of these devices into the LCC. Suitable 2000 pound hoists are available from WS-133A systems to perform the lifting functions.

Special attachable wheel dollies will be provided by Sylvania for the consoles and will permit their handling once the units are blocked up to proper rolling height of the blast door mounting sill.

The MG Set will be handled on an existing WS-133A systems wheel dollie. However, the lifting for horizontal plane alignment with the door sill requires that hoisting provisions be considered in the Access Facility.

Suggested spacing of lifting eyes is eight feet to accommodate the consoles and five feet for the MG Set. Any lifting eye located near the blast door jamb shall be positioned to give the nearest approach to the end vertical wall and still permit blast door operation and hanging of any demountable hoists.

4.4 MECHANICAL

Sylvania imposes no unique mechanical constraints upon the confines of the Access Facility. Sylvania assumes the existence of an environment of 40°F to 115°F within the interconnecting corridor between LCEB and LCC.

4.5 ELECTRICAL

The electrical function associated with the Access Facility shall be to provide an assured conveyance of signal and commercial or Diesel power between the LCEB and the LCC. Cables and conduits to accomplish this shall be provided and installed by others within the structural confines of the interconnecting corridor facility.

Size of feeders and conduits shall be determined by others from load requirements established on Sylvania Equipment Lists (Figures 2-1 and 3-1) as a minimum requirement. All penetrations, flexible transitions and terminations of power and signal cables and conduits in this vicinity shall be provided and installed by others.

Signal capability shall be considered to include such items as pressurization system status lines, lines to phone jacks connecting the LCC and LCEB, access door operating circuits, and security devices as yet undefined.

4.6 COMMUNICATIONS

Not applicable.

4.7 INTERFACES

Interfaces within the Access Facility are principally architectural in nature, as already defined above.

SECTION 5

LAUNCH CONTROL SUPPORT BUILDING (LCSB)

5.1 FUNCTION

The primary function of the LCSB is to support the LCC under normal operating conditions and to provide controlled entry to the Access Facility for personnel and equipment. As such, it provides convenience services to the LCC. It should be noted that all interest in the total LCF area is directed toward sustaining the activity within the LCC as the focal point of the Ground Electronics System complex.

5.2 ARCHITECTURAL

The commercial telephone company servicing the area in which the LCF is located will require a closed 10' x 10' area with a ceiling clearance of 9' (minimum) in the LCSB. Within this closed area, the TELCO will place certain equipment as shown on Figure 5-1, the LCSB Equipment List. In the design of this closed area attention shall be given to the height of these racks, for access to the room, and placing the TELCO equipment. Certain GFE to be integrated by Sylvania shall be installed by others in a separate area immediately adjacent to the TELCO area. GES equipment in the LCSB is also listed on the LCSB Equipment List, Figure 5-1.

Principal access to the LCC and LCEB is through the LCSB. It is a Sylvania requirement that the design of the LCSB be such that no impediment be placed on handling of equipment destined for passage through the LCSB. Sizes and weights of these Sylvania equipments are shown in Figures 2-1 and 3-1.

5.3 STRUCTURAL

Within the Launch Control Support Building, as a minimum, the TELCO Area floor shall be capable of bearing a static load of two hundred pounds per square foot.

5.4 MECHANICAL

VHF radio utilizes room ambient air for cooling and does not require connection to the central facility cooling devices.

5.5 ELECTRICAL

Two 4-inch conduits are required from the TELCO Area in the LCSB to a point 25 feet beyond the security fence. These conduits shall be installed to a depth of three feet. The ends shall be capped and a suitable marker placed to indicate where the conduit is located. Pulling wire shall be left in the conduits.

A single four-inch conduit shall be placed from the TELCO area through the exterior wall at the roof of the LCSB. This conduit shall be capped and a pulling wire installed. Another single two-inch conduit shall be placed from the GES area of the LCSB to the roof of the LCSB for passage of the VHF antenna lead.

A single two-inch interior conduit shall be installed from the security area to the GES-TELCO area. This conduit shall be for VHF control, signaling and communication.

Three conduits, four inches inside diameter, are required from the LCSB to the LCC EMP room for utilization as indicated in Section 2.5.

Two 2-inch conduits are required from the TELCO room to LCF Antenna Plot to contain monitoring lines from H. F. pop-up antennas. Refer to LCF Conduit Plan, Figure 2-23 for general routing.

5.6 COMMUNICATIONS

Communications between the LCSB and the LCC will be provided by Sylvania as part of the MCN cable function. Communications between the LCSB and the SMSB shall be provided by TELCO.

REF DES #	LCSB EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	AC	DC
	VHF RADIO	GFE 14046	23" x 21" x 69"	250	500 60 115v			
	TELCO RACKS		24" x 24" x 108"	Total 3200				
	MCN JACK BOXES (5)	SYL A1304						
	HANDS-FREE PHONE	SYL 14030						
	DESK PHONE	SYL A1341						
	TERMINATION EQUIP.	SYL 14051			0			

).	SIZE W X D X H (INCHES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREM			
			PRIME		REGULATED												
					NORMAL					EMERGENCY							
			POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{C} M
			AVG	PEAK				AVG	PEAK				AVG	PEAK				
	23" x 21" x 69"	250	500 60 115v														
	24" x 24" x 108"	Total 3200															
			0														

2

Figure 5-1

POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
REGULATED															
NORMAL					EMERGENCY										
AK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
																Security Room
																TELCO Room
																Four located per Para. 5.6
																Security Room
																Security Room
																In TELCO Room

3

Figure 5-1. LCSB Equipment List

Sylvania will provide five (5) MCN jack boxes for placement by others as shown on the LCSB MCN Placement Figure. Per direction from BSD four jack boxes are located as follows:

(1) heating equipment room
(2) water treatment room
(3) garage
(4) environmental systems equipment room.

The fifth jack box is located in TELCO room.

MCN jack boxes shall be mounted 42 to 48 inches off the floor for ease of utilization.

There are no conduit requirements associated with these jack boxes. There is likewise no requirement to utilize the grounding studs on the boxes placed in the LCSB.

5.7 INTERFACES

Within the LCSB, interfaces between GES and others are listed below.

5.7.1 Architectural – Space for TELCO and other GES equipment is noted in Sections 5.2 and 5.3.

5.7.2 Structural – Sylvania shall specify mounting details for GES equipment within the LCSB. Mounting devices shall be provided and installed by others. There is no requirement for equipment installed in the LCSB to withstand weapons effects.

5.7.3 Electrical – Convenience outlets and lighting shall be sufficient to support the TELCO Equipment and GES equipment housed in the LCSB and to support maintenance equipment.

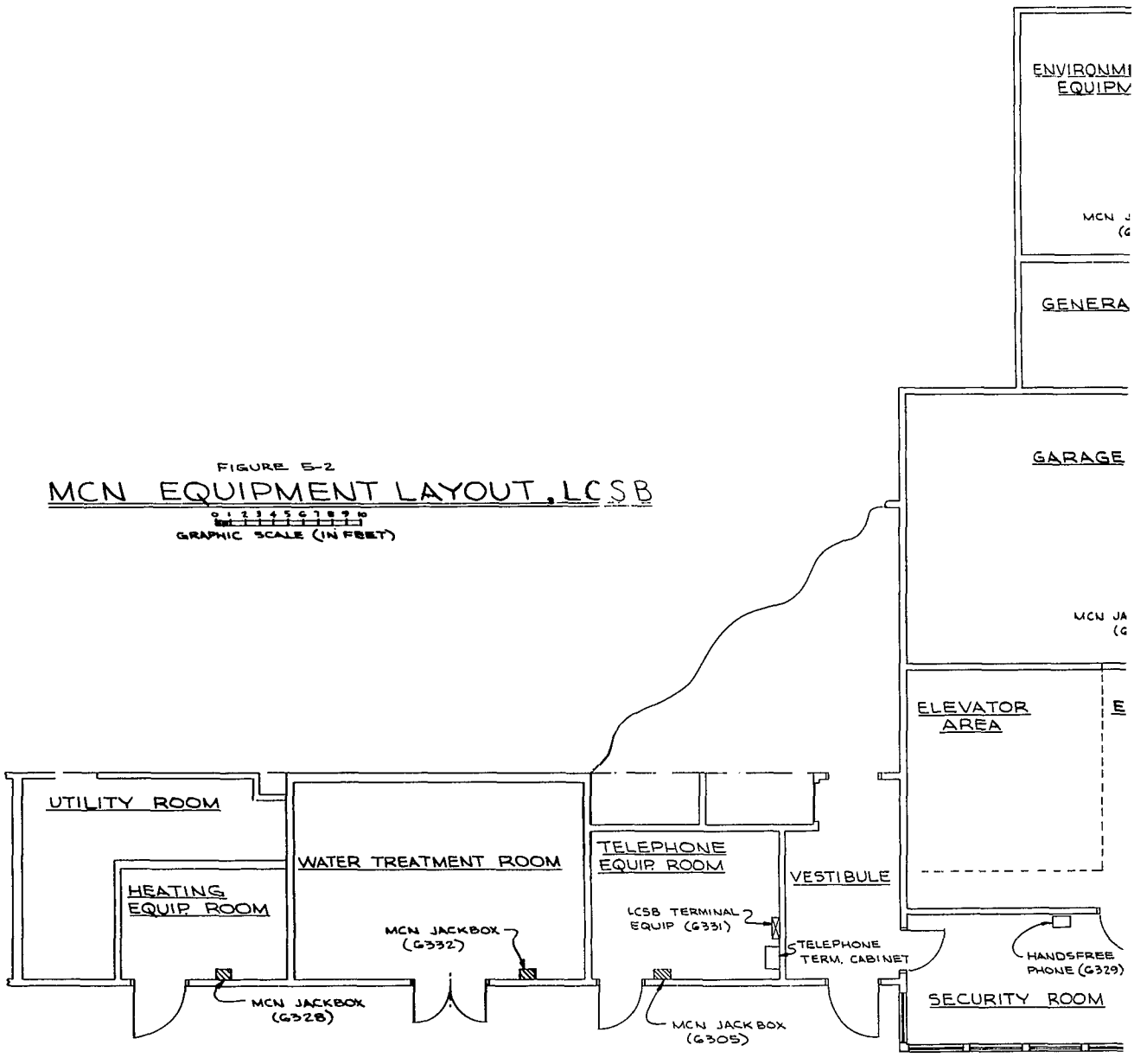
5.7.4 Communications – Sylvania will interface with TELCO and will integrate other GES equipment in the LCSB via conduits described under the electrical requirements of this section.

FIGURE 5-2

MCN EQUIPMENT LAYOUT, LCSB

0 1 2 3 4 5 6 7 8 9 10

GRAPHIC SCALE (IN FEET)



1

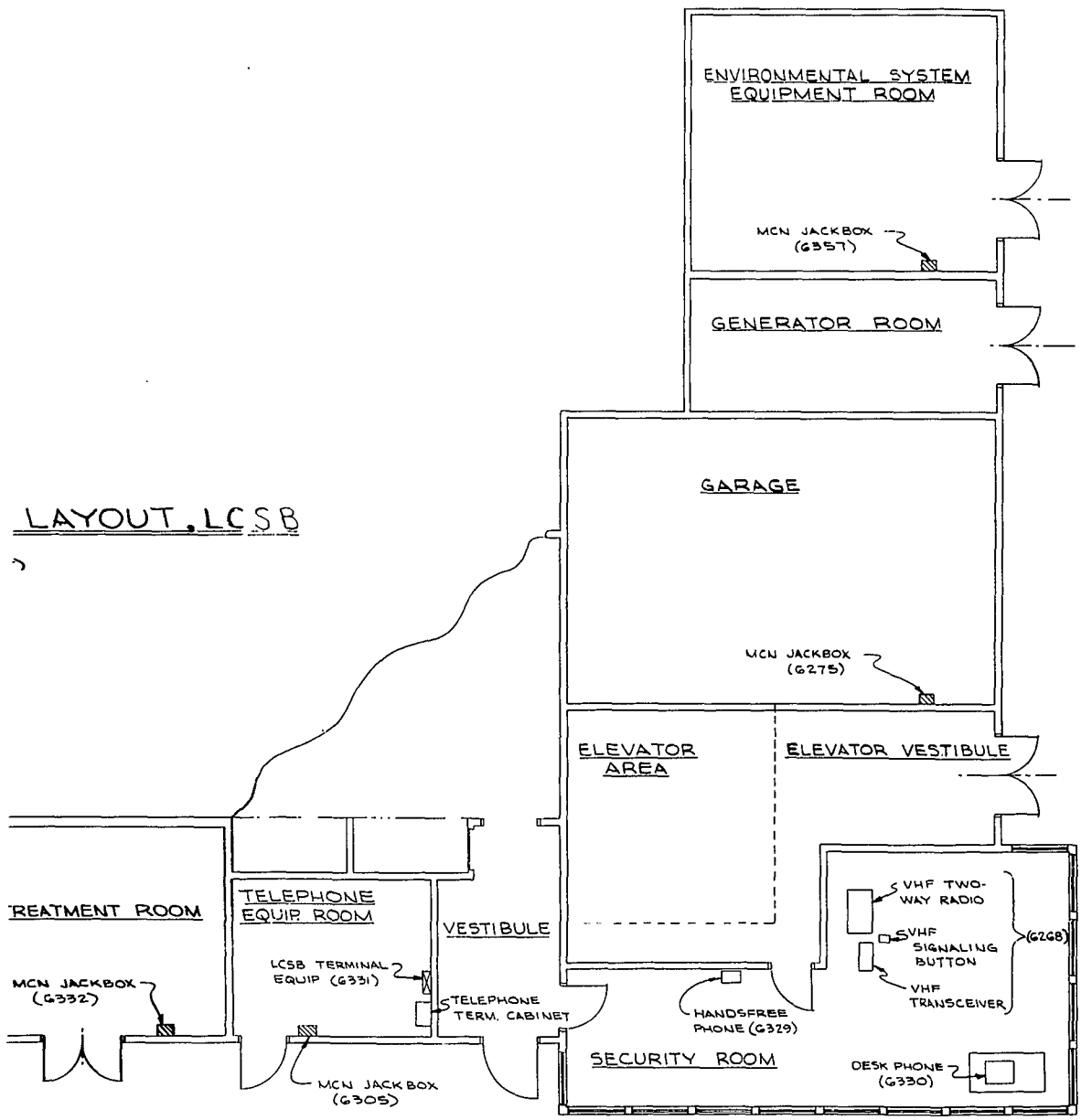


Figure 5-2. Equipment Layout MCN, LCSB

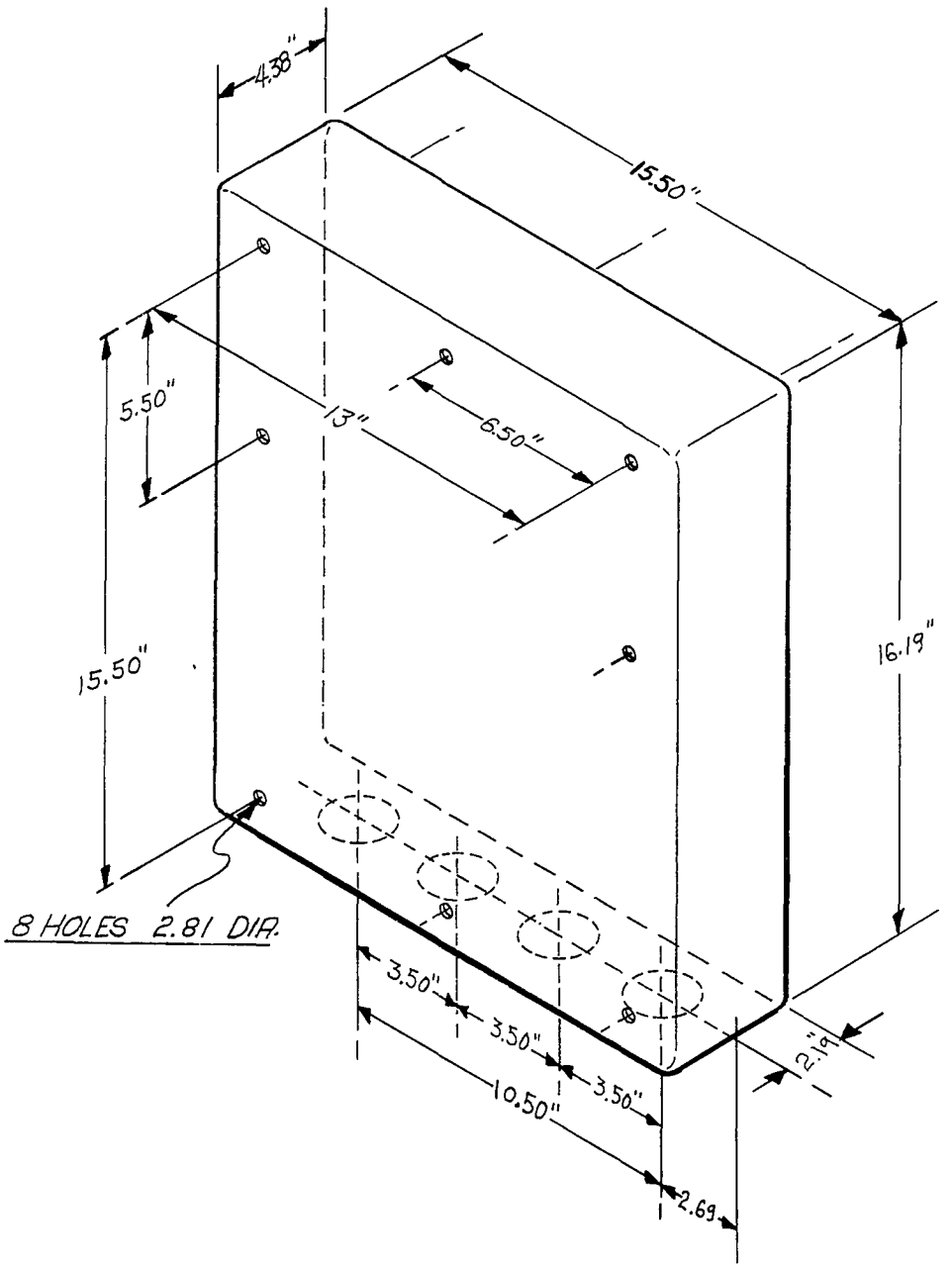
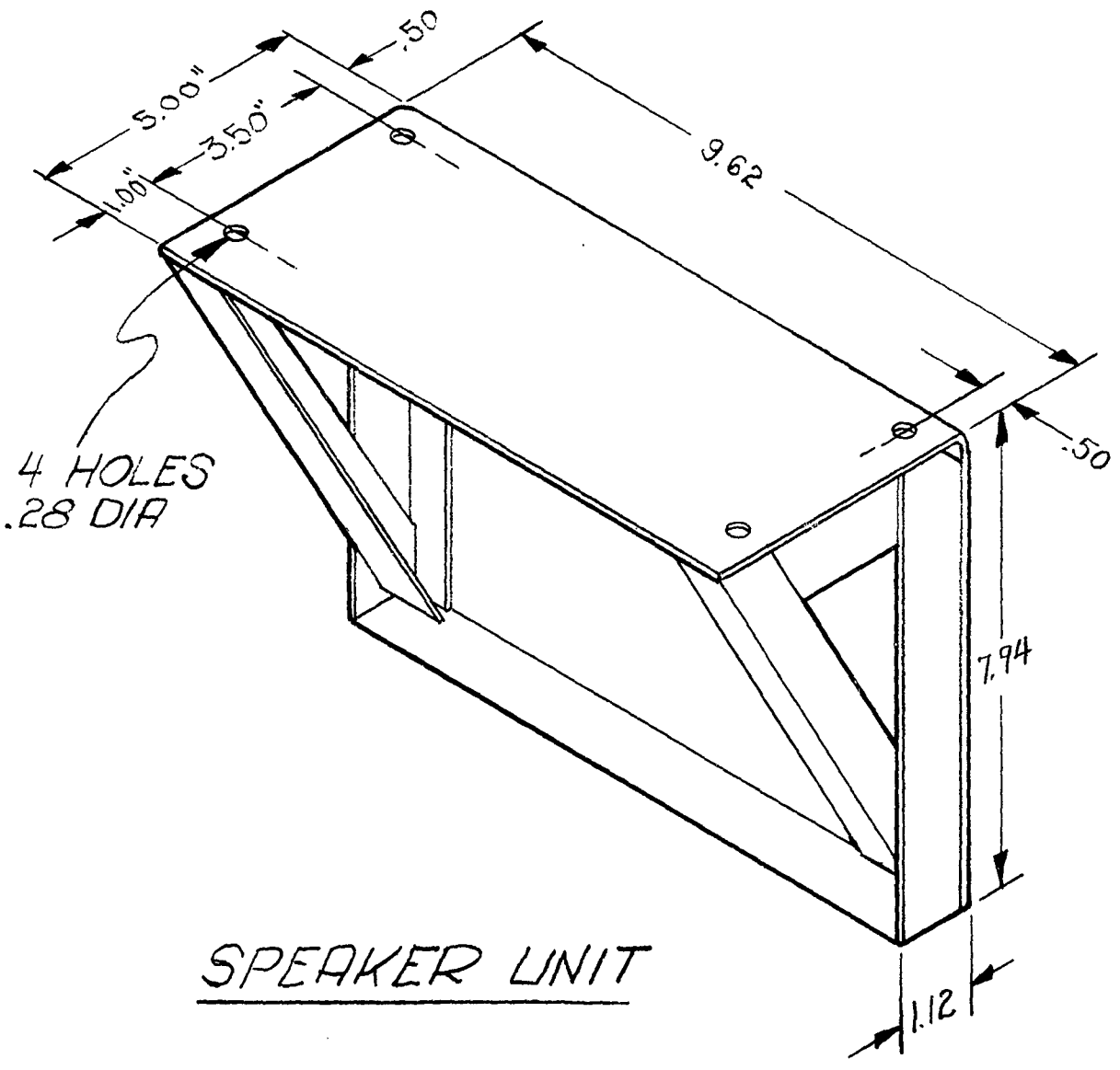
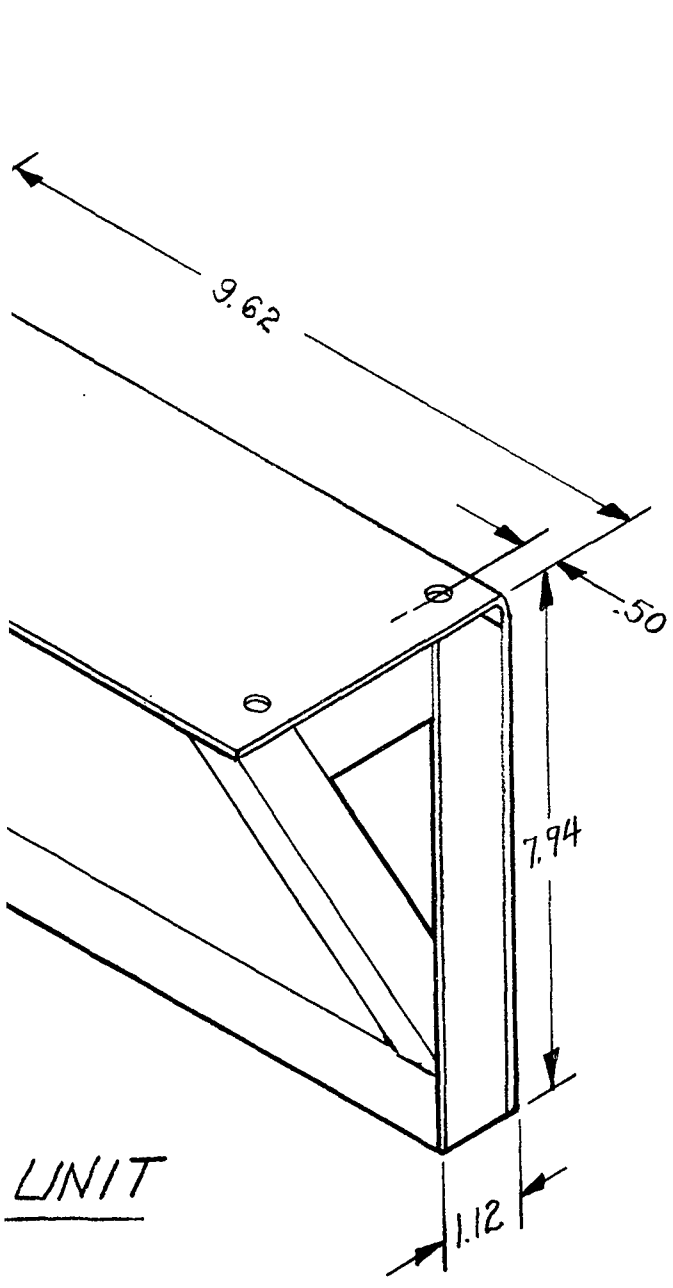


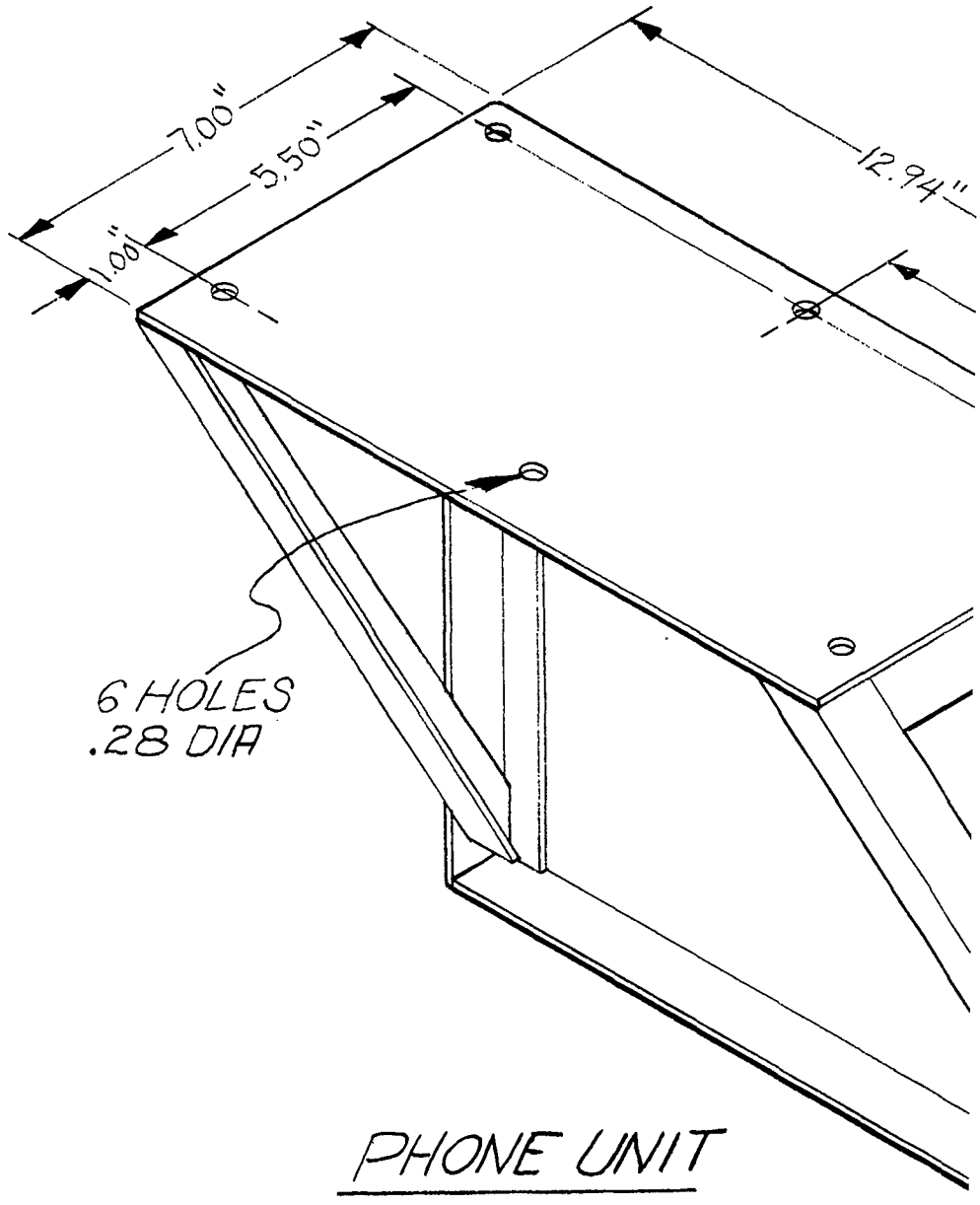
Figure 5-3. LCSB Terminal Box



SPEAKER UNIT

1





2

Figure 5-4. Brac
Hands-Fre

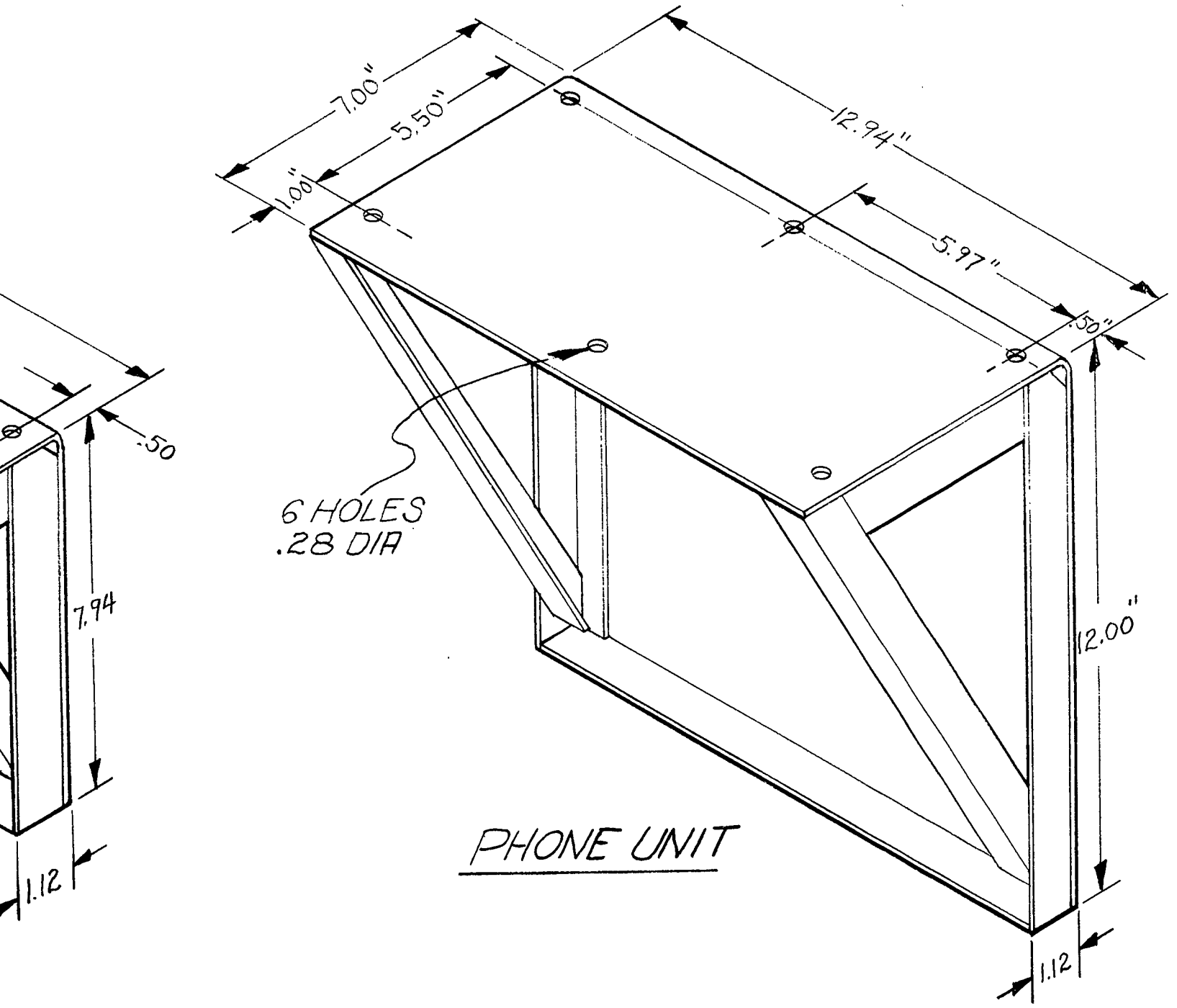


Figure 5-4. Bracket Dimensions of Hands-Free Telephone

SECTION 6

LAUNCHER EQUIPMENT ROOM (LER)

6.1 FUNCTION

The LER (Figures 6-1, 6-2, and 6-3) shall house certain essential-to-launch equipment associated with the WS-133B configuration, including the GES racks (Figures 6-4, 6-5, 6-6, and 6-7) described in this section. Within this structure, Sylvania will require a space allocation for those equipments detailed on the Sylvania Equipment List applicable to the LER as shown in Figure 6-8.

6.2 ARCHITECTURAL

Space availability and access shall be provided within the LER for placement of equipment of the size and weight shown in the Sylvania Equipment List applicable to the LER, Figure 6-8. The preferable location of the GES equipment is in close proximity to the Autonetics Signal Converter rack within the LER. BSD Exhibit 62-71 provisions shall apply with respect to aisle space for accessibility to drawers within racks.

6.3 STRUCTURAL

Provision shall be made by others for the secure fastening of Sylvania GES equipment in the LER as specified by Sylvania, suitable to withstand weapons effects. Electrical service control devices, conduit, piping, power cabling and cable-carrying devices shall be provided and suitably fastened by others, as specified by Sylvania, to structural members in consonance with BSD Exhibits 62-51 and 62-83, to withstand weapons effects.

SYL EQUIPMENT LIST

ANTENNA TUNER RACK 6408
RADIO SET (C&S) 6407
STATUS AUTHENTICATION SYS. 6405
TERMINAL, DIGITAL DATA 6406

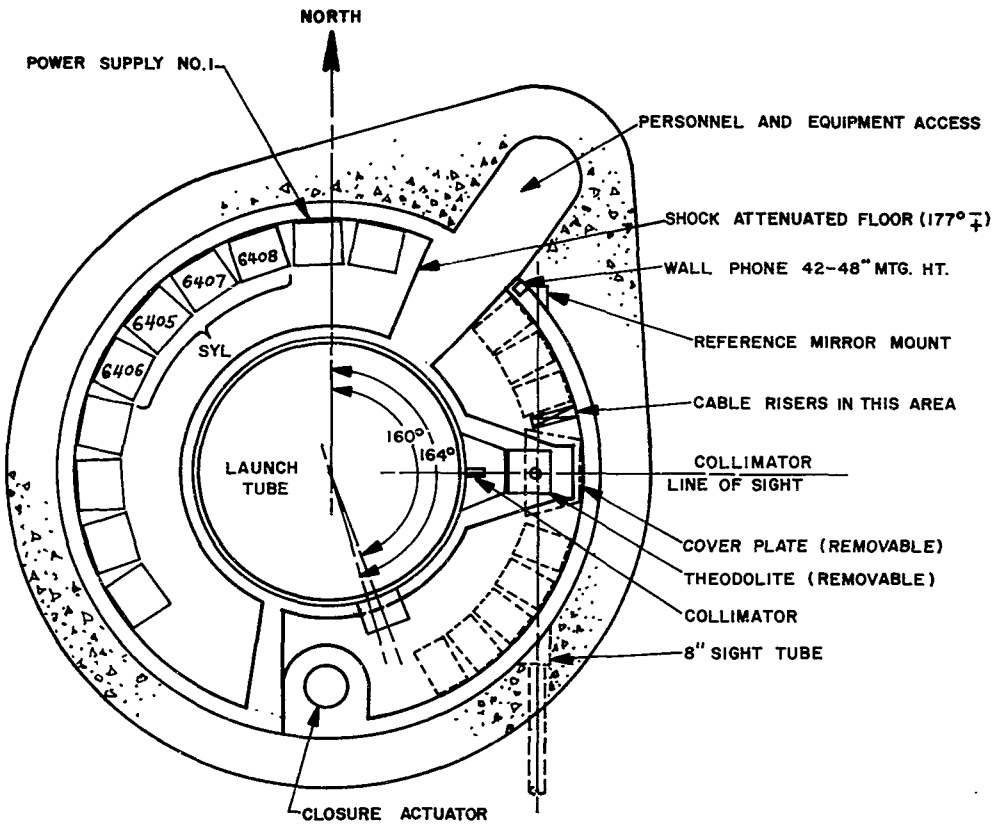


Figure 6-1. LF/LER First Level Floor Plan

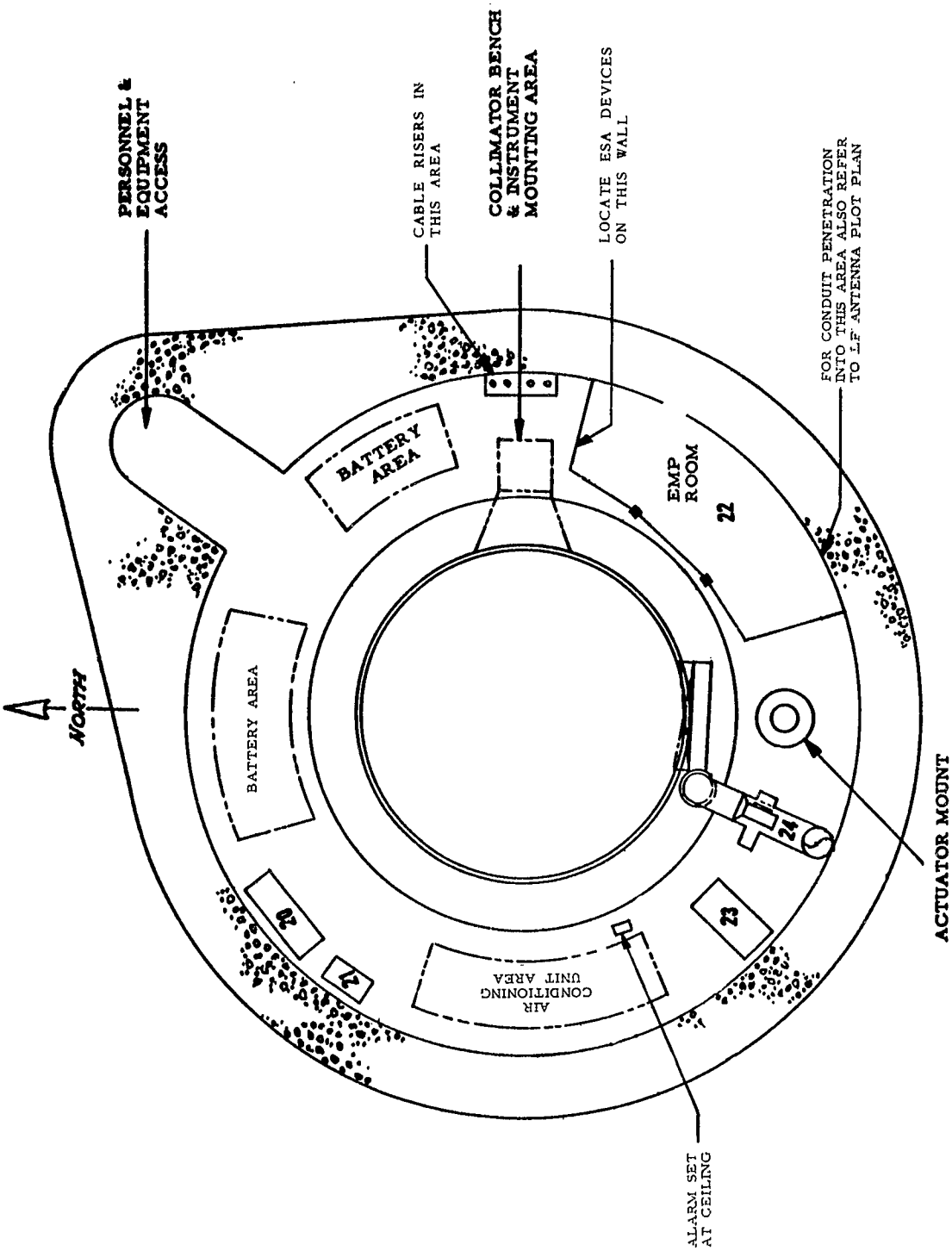


Figure 6-2. LF/LER Second Level Floor Plan

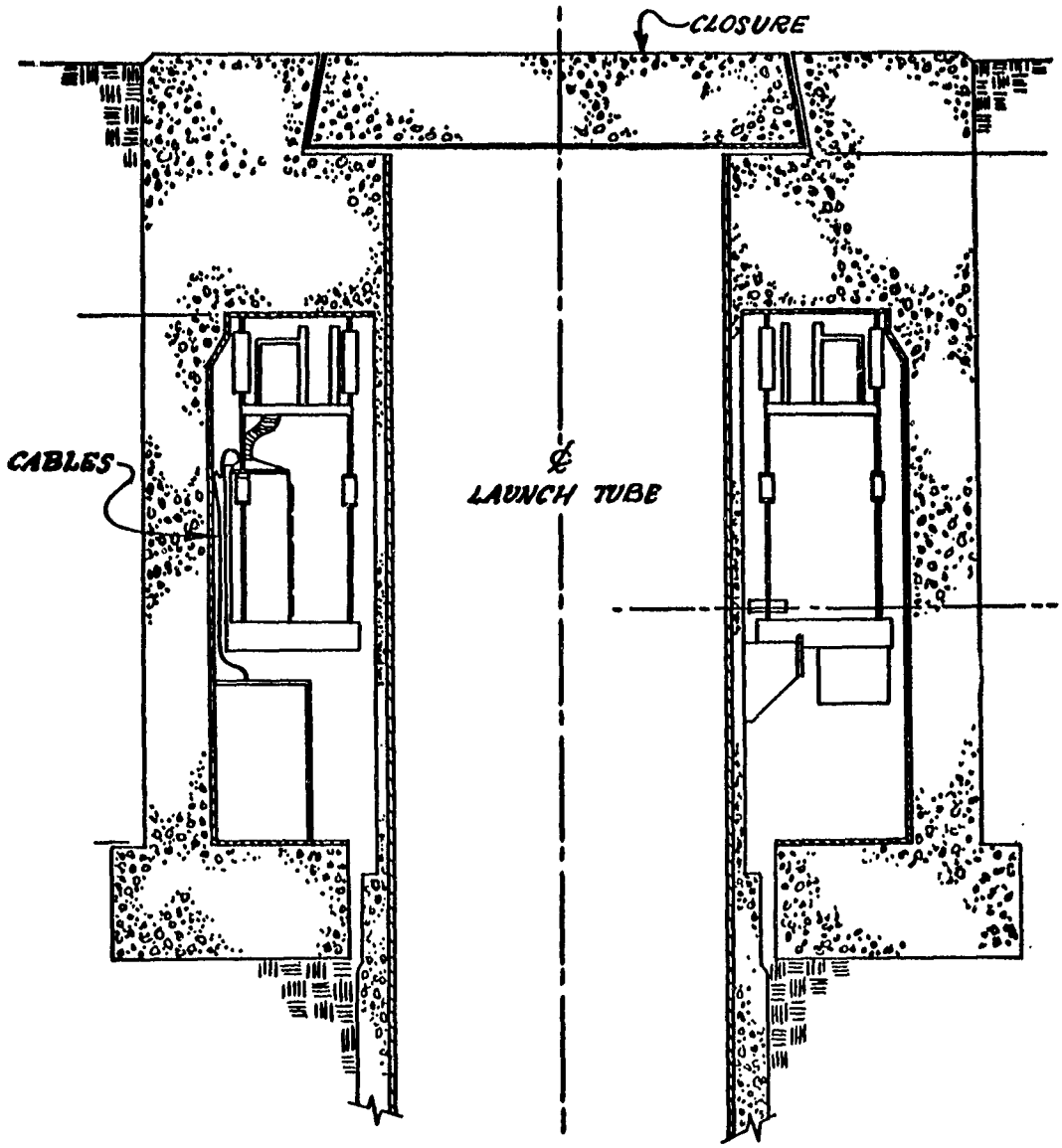


Figure 6-3. LF Launcher Equipment Room Sectional View

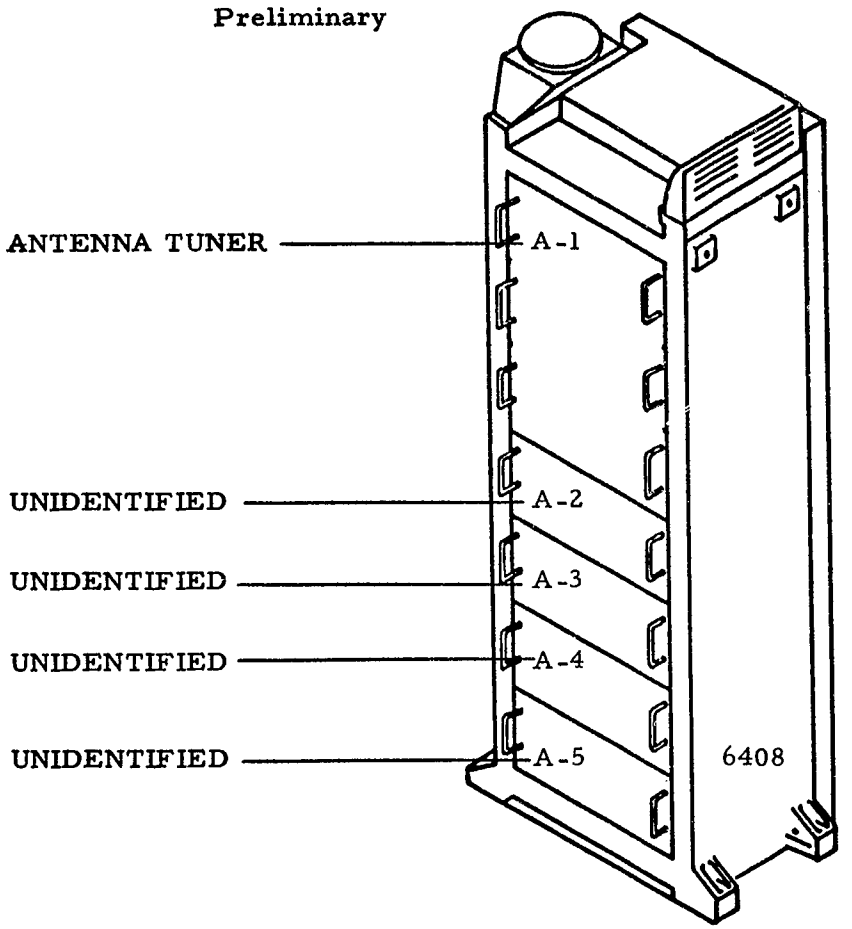


Figure 6-4. LF Antenna Tuner Set

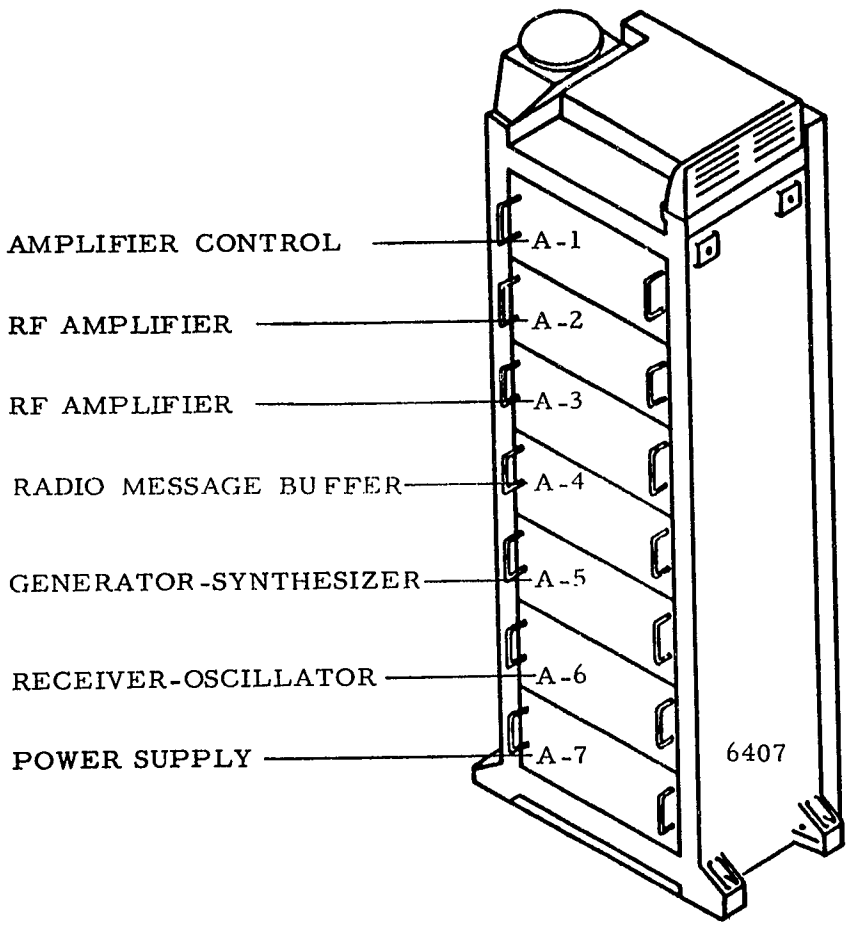


Figure 6-5. Radio Set (C&S)

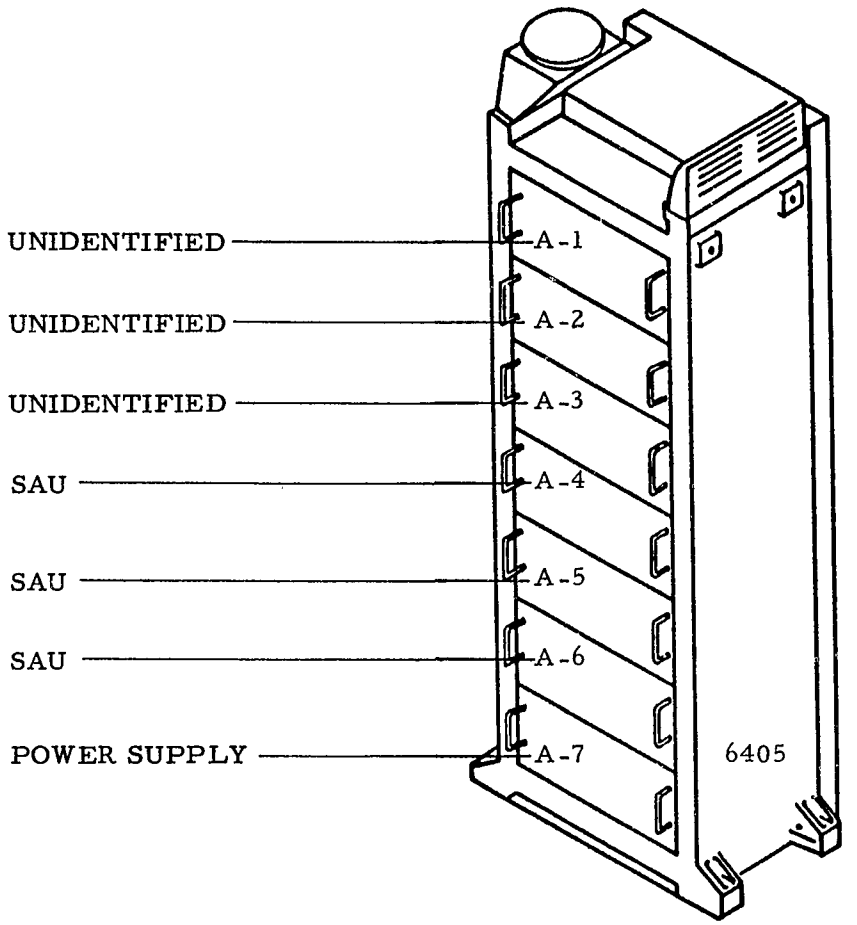


Figure 6-6. Status Authentication System

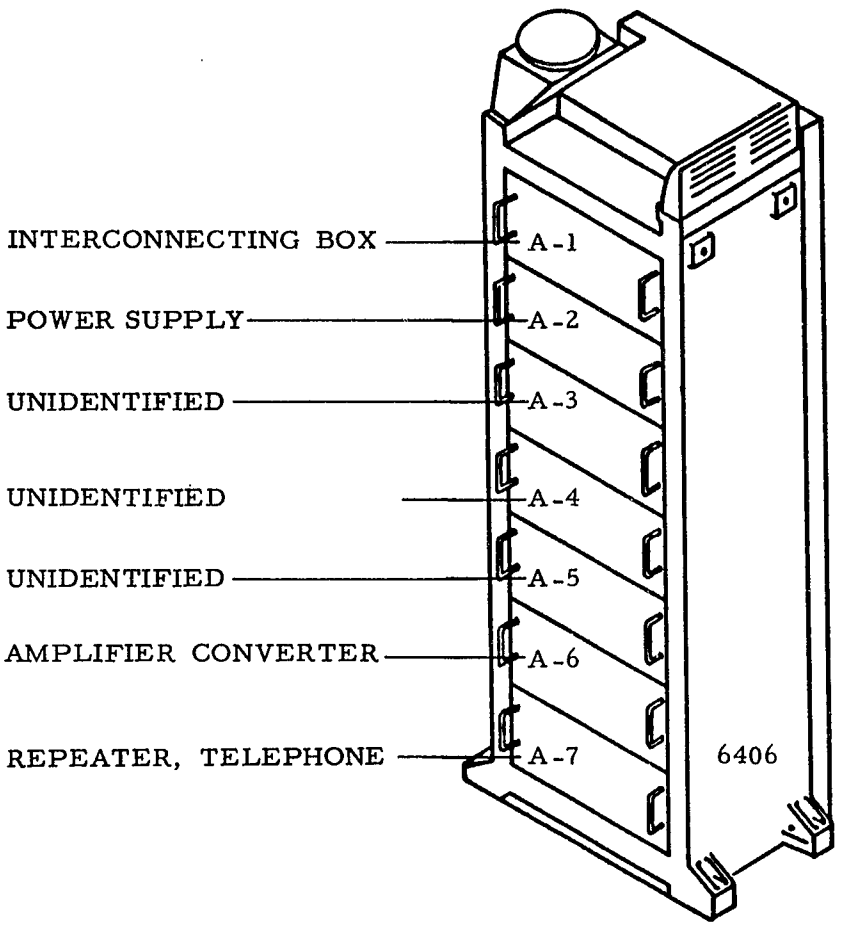


Figure 6-7. Terminal, Digital Data

REF DES NO.	LER EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	NO AC	NO DC	NO VC
6408	ANTENNA TUNER	SYL A14130	28 1/4 x 29 x 76	750					
	1. ANTENNA TUNER (TRIPLE DRAWER)			100					
	2. UNIDENTIFIED			20					
	3. UNIDENTIFIED			20					
	4. UNIDENTIFIED			20					
	5. UNIDENTIFIED			20					
6407	RADIO SET (C&S)	SYLA14125	28 1/4 x 29 x 76	958				•	
	1. AMPLIFIER CNTRL L			50					
	2. RF AMPLIFIER			75					
	3. RF AMPLIFIER			75					
	4. RADIO MESSAGE BUFFER			45					
	5. GENERATOR SYNTHESIZER			45					
	6. RECEIVER OSCILLATOR			39					
	7. POWER SUPPLY			75					
6492	INSIDE ALARM SET	SYL 14053							
	WORK CAGE JACK BOX	SYL A1361							
	HEADSET	SYL A4144							
	MF ESA	SYL 14129							

SIZE X D X H NCHES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT					
		PRIME		REGULATED														
				NORMAL					EMERGENCY									
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O
		AVG	PEAK				AVG	PEAK				AVG	PEAK					
1/4 x 29 6	750													1025	FA	55	67	
	100																	
	20																	
	20																	
	20																	
	20																	
1/4 x 29 '6	958				•	32	3585	6785		•	32	3585	6785	5670	FA	55	67	1.5"
	50						140	140				140	140	480				
	75						1600	3200				1600	3200	2180				
	75						1600	3200				1600	3200	2180				
	45						50	50				50	50	170				
	45						30	30				30	30	102				
	39						30	30				30	30	102				
	75						385	385				385	385	460				

Figure 6-8. LER Equipment Lis

POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
REGULATED															
NORMAL					EMERGENCY										
AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	HT LOSS BTU/HR	TYPE COOLING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
										1025	FA	55	67		300 W RF Peak Heat Dissipation for reflected RF Power
	•	32	3585	6785		•	32	3585	6785	5670	FA	55	67	1.5"	60% efficiency 50% duty cycle 36V input
			140	140				140	140	480					
			1600	3200				1600	3200	2180					183 AMPS
			1600	3200				1600	3200	2180					
			50	50				50	50	170					RCVR power separate
			30	30				30	30	102					Input at
			30	30				30	30	102					8.5 AMPS.
			385	385				385	385	460					65% Eff. P.S.

Figure 6-8. LER Equipment List (Sheet 1 of 2)

REF DES NO.	LER EQUIPMENT LIST	SOURCE & FIG. A. No.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	NOR AC	NOR DC	NOR VO
6405	STATUS AUTHENTICATION SYSTEM	SYL 14181	28-1/4 x 29 x 76	875				•	3
	1. UNIDENTIFIED			17					
	2. UNIDENTIFIED			17					
	3. UNIDENTIFIED			17					
	4. SAU			68					
	5. SAU			68					
	6. SAU			68					
	7. POWER SUPPLY			70					
	AUDIO ESA	SYL 14004							
6406	TERMINAL, DIGITAL DATA	SYL 14152	28-1/4 x 29 x 76	832				•	3
	1. INTERCONNECTING BOX			25					
	2. POWER SUPPLY			70					
	3. UNIDENTIFIED			17					
	4. UNIDENTIFIED			55					
	5. UNIDENTIFIED			17					
	6. AMPLIFIER CONVERTER			51					
	7. TELEPHONE REPEATER			47					
6494	WALL PHONE	SYL A1306							
6411	ESA MOUNTING ASSEMBLY	SYL 14003	40" x 7-5/16" x 12-1/4"						
	MCN JACK BOXES (7)	SYL 14034							
6433 6446	WEATHER PROOF ALARM & JACK BOX	SYL 14024							

SIZE (X D X H INCHES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT				
		PRIME		REGULATED													
				NORMAL					EMERGENCY								
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O
		AVG	PEAK				AVG	PEAK				AVG	PEAK					
-1/4 x 29 6	875				●	32	276	276		●	32	276	276	970	FA	55	67	
	17																	
	17																	
	17																	
	68						46	46				46	46	157				
	68						46	46				46	46	157				
	68						46	46				46	46	157				
	70						276	276				276	276	435				5
-1/4 x x 76	832				●	32	180	180		●	32	180	180	612	FA	55	67	
	25						-	-				-	-					
	70						180	180				180	180	306				E
	17																	
	55																	
	17																	
	51						23	23				23	23	78				
	47						14	14				14	14	48				
)" x -5/16" 12-1/4"																		

Figure 6-8. LER Equipment List (S

RIME		POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
		REGULATED															
		NORMAL					EMERGENCY										
WER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
;	PEAK				AVG	PEAK				AVG	PEAK						
			●	32	276	276		●	32	276	276	970	FA	55	67		
					46	46				46	46	157					
					46	46				46	46	157					
					46	46				46	46	157					
					276	276				276	276	435					50% Eff.
			●	32	180	180		●	32	180	180	612	FA	55	67		
					-	-				-	-						
					180	180				180	180	306					50% Eff.
					23	23				23	23	78					
					14	14				14	14	48					

Figure 6-8. LER Equipment List (Sheet 2 of 2)

The Sylvania GES equipment is mounted in standard Minuteman Equipment Racks for which a bolt-down pattern is shown in ICD. Drawing No. 25-33226, entitled GES Equipment LF and LCC Installation Envelope and Cooling.

6.4 MECHANICAL

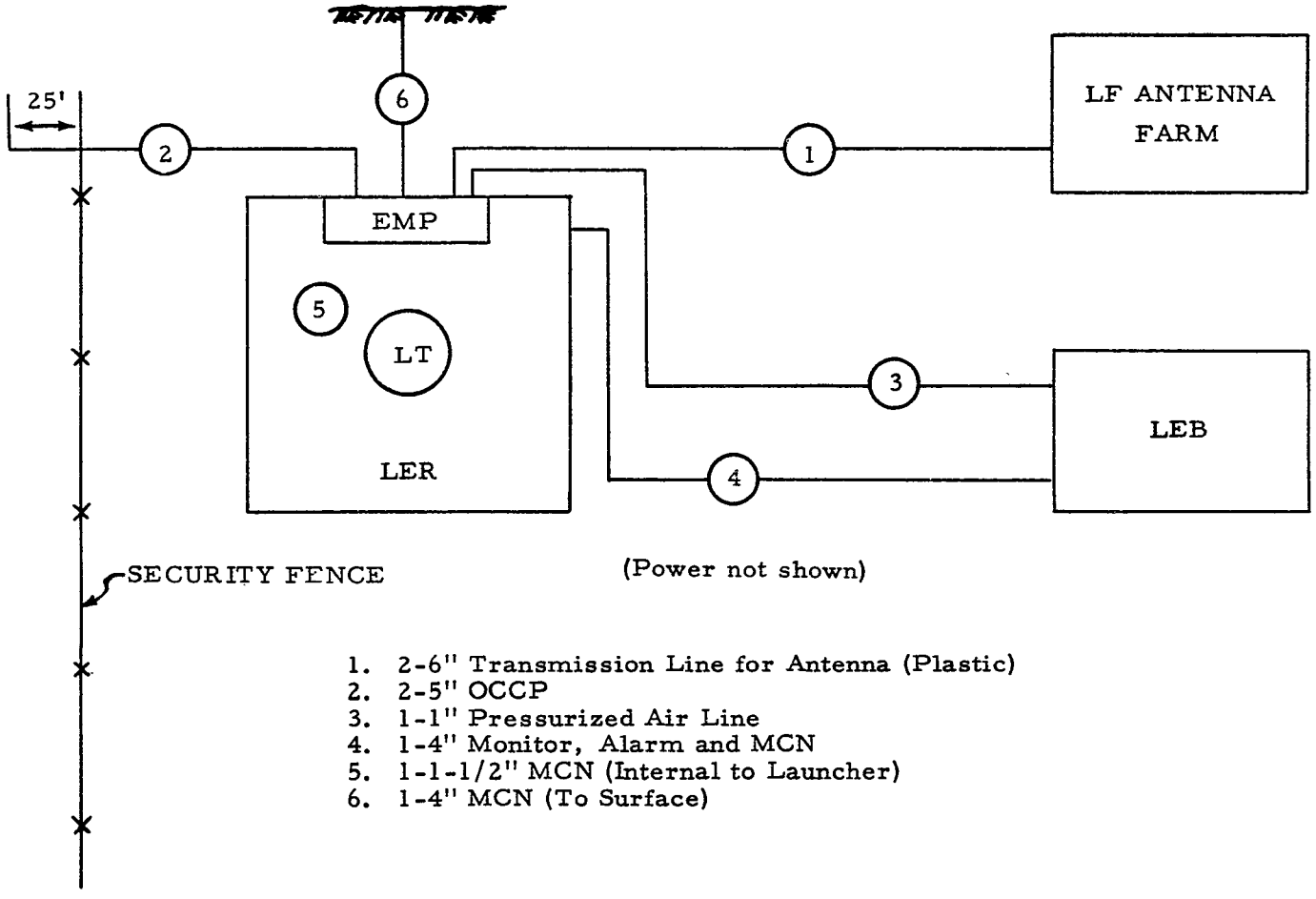
Cooling requirements for Sylvania GES racks are delineated in Figure 6-8, the Sylvania Equipment List applicable to the LER. Cooling shall be provided by others in consonance with BSD Exhibit 62-80.

6.5 ELECTRICAL

Power required for Sylvania GES equipment to be located within the LER is delineated on the Sylvania Equipment List (Figure 6-8). All of this equipment must remain operative during pre- and post-attack periods. Power supplied by others shall conform to BSD Exhibits 62-4 and 62-77.

Two conduits, each five inches inside diameter, for voice and data communication cable shall be provided by others from the LER EMP Enclosure to a point 25 feet outside the fence surrounding the LF (see Figure 6-9). This conduit shall provide protection for the cable to survive weapons effects. The position of the conduit end shall be marked by a stake to facilitate locating when the cable is placed. The end of the conduit shall be suitably plugged for protection during the construction phase. The minimum conduit bend radius shall be 36 times the diameter of the installed conduit. The cable to be placed in this conduit will be provided by Sylvania. The conduit utilization outlined above is for one active and one spare duct. A pull wire will be left in each conduit when the conduit is placed. Depth of bury at field end where staked shall be four feet.

At all LER's a single one-inch conduit shall be provided by others from the LER to the adjacent LEB for passage of the plastic pressurizing line from the compressor located in the LEB. The size of the cable pressurizing line is determined to be 1/4-inch I. D. Its conduit bend radius is considered non-critical. Sylvania will select



1. 2-6" Transmission Line for Antenna (Plastic)
2. 2-5" OCCP
3. 1-1" Pressurized Air Line
4. 1-4" Monitor, Alarm and MCN
5. 1-1-1/2" MCN (Internal to Launcher)
6. 1-4" MCN (To Surface)

Figure 6-9. I-F Conduits

specific LEB's from this general arrangement in which to house compressor-dryers. This conduit shall terminate within the EMP enclosure.

A pull wire will be left in this conduit when the conduit is placed.

A single 4-inch hardened conduit shall be provided by others from the LEB to the LER for the passage of the MCN cable and the pressurization monitor and alarm cable. (The size of the monitoring signal cable will be determined by Sylvania.) Its bend radius is considered non-critical. A pull wire will be left in this conduit when the conduit is placed. This conduit shall not enter the EMP Enclosure of the LER, but shall terminate along the east end wall of the EMP enclosure. See Figure 6-13.

Two 6-inch plastic conduit shall be provided by others from the LER to the adjacent LF antenna area for passage of the Sylvania antenna feed cables. This conduit is required to be a straight-line routing device and shall enter the EMP enclosure at a height of six and one-half feet above the floor in that area. A pull wire shall be left in these conduit when the conduit is placed. Lateral displacement shall be two feet east of the south end wall of the EMP enclosure (see Figure 6-2).

A telephone conduit network for MCN shall be provided by others. It shall consist of the following:

(1) one 4-inch conduit from the EMP room to the surface for weather proof jack box and alarm set, which shall be mounted on left-hand wing wall of closure structure.

(2) one and one-half inch conduit around the launch tube serving seven jack boxes, with conduit stopping one foot each side of jack boxes. Jack box mounting heights shall be 42 to 48 inches above floors.

(3) access box at base of launch tube to accept jack box located near sump pump.

See supplementary sketches elsewhere in this section for additional conduit information.

All above noted conduits shall be provided by others as specified by Sylvania.

Cable trays in the vicinity of Sylvania GES racks within the LER shall be provided by others to satisfy an intra-rack cabling configuration to be determined by Sylvania.

6.6 COMMUNICATIONS

Telephone jacks will be provided by Sylvania in the LER to permit voice communications for the MCN. The LER is normally not manned. Maintenance personnel will carry plug-equipped head-set telephones.

6.7 INTERFACES

The following interfaces are recognized in conjunction with Sylvania GES in the LER.

6.7.1 Architectural – Minimum space requirements must be provided for equipment as shown on the Sylvania Equipment List (Figure 6-8) and as specified elsewhere by Sylvania.

6.7.2 Structural – The weight of Sylvania GES modules is shown on the Sylvania Equipment List (Figure 6-8). Sylvania equipment to be placed within the LER shall be securely fastened by others in accordance with Sylvania footing detail, and mounting plates suitable to withstand weapons effects.

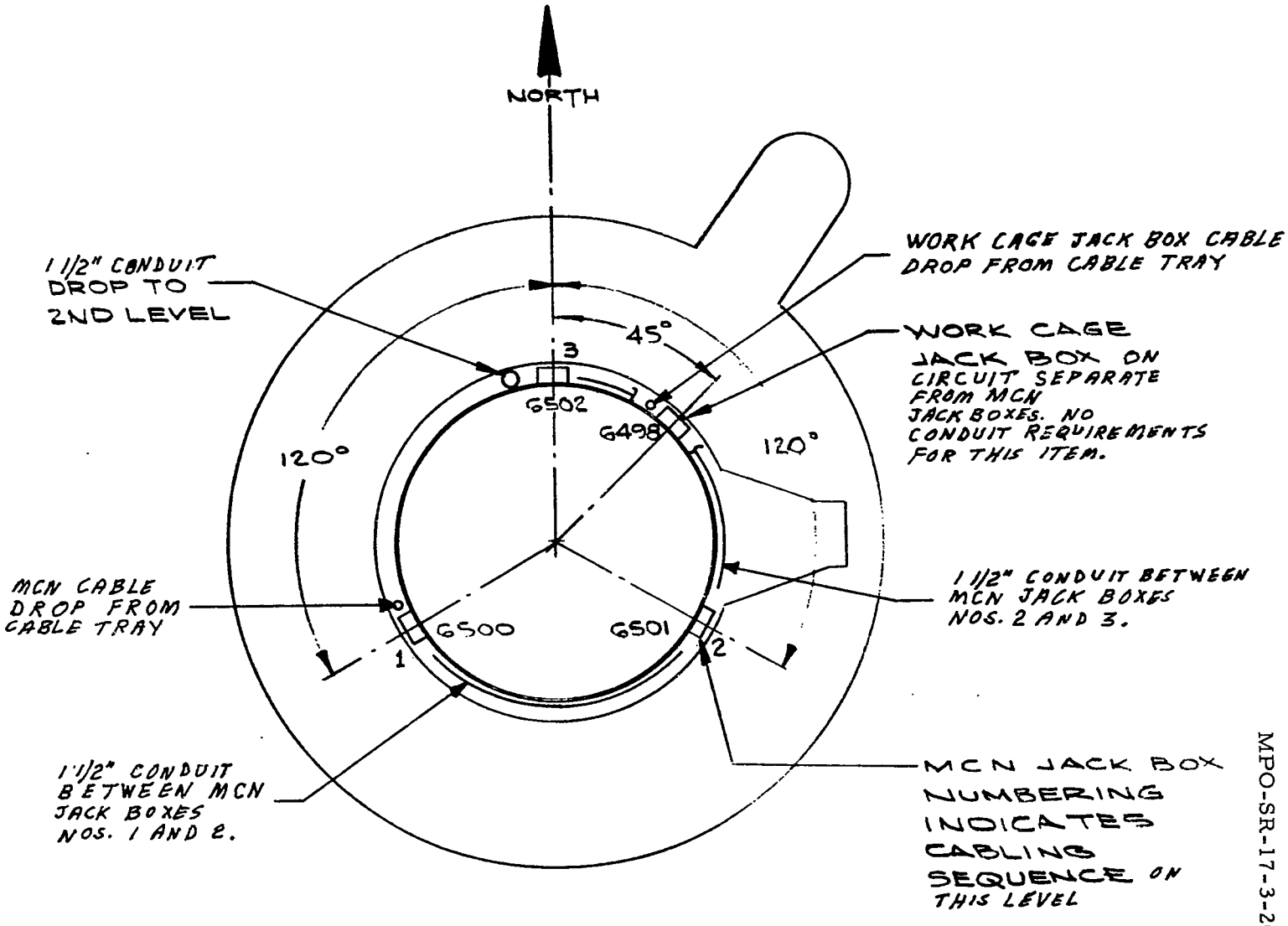
6.7.3 Mechanical – A round flexible duct, damper and holding clamp, provided by others, capable of withstanding weapons effects, shall interface with the inlet transition duct, Boeing number BACD40F3, which is a part of BACC60B03C1F02 (Minuteman Rack) provided by Sylvania. See the Sylvania equipment layout drawing, Figure 6-1, for guidance as to locations of units of equipment. Inlet transition duct is shown on ICD No. 28-38226.

6.7.4 Electrical – Electrical service connections to GES equipment within the LER shall be provided by others, as specified by Sylvania. Grounding of GES shall be provided by others in accordance with BSD Exhibit 62-75 and as otherwise specified in Figure 6-15. Provisions for the installation

of three ESA Mounting Assemblies shall be made at the cable entrance of the launch tube. Mounting details will be identical with those at the LCC. For further details relative to mounting of ESA devices, see Figures 2-19 and 2-20a, b, and c, in Section 2 of this document.

6.7.5 Communications — Telephone jack boxes and alarm devices will be supplied by Sylvania for installation by others. Locations within the LER are as shown on Sylvania drawings in this section. Weather proof jack box and alarm shall be mounted on left-hand wing wall at closure structure.

6.7.6 Antenna Farm — Interfaces at the LF antenna farm pertaining to the conduit requirements at the Sylvania MF antenna are detailed in Section 8, Antenna Farms, of this document.



MPO-SR-17-3-205

Figure 6-10. LF/LER First Level Jack Boxes

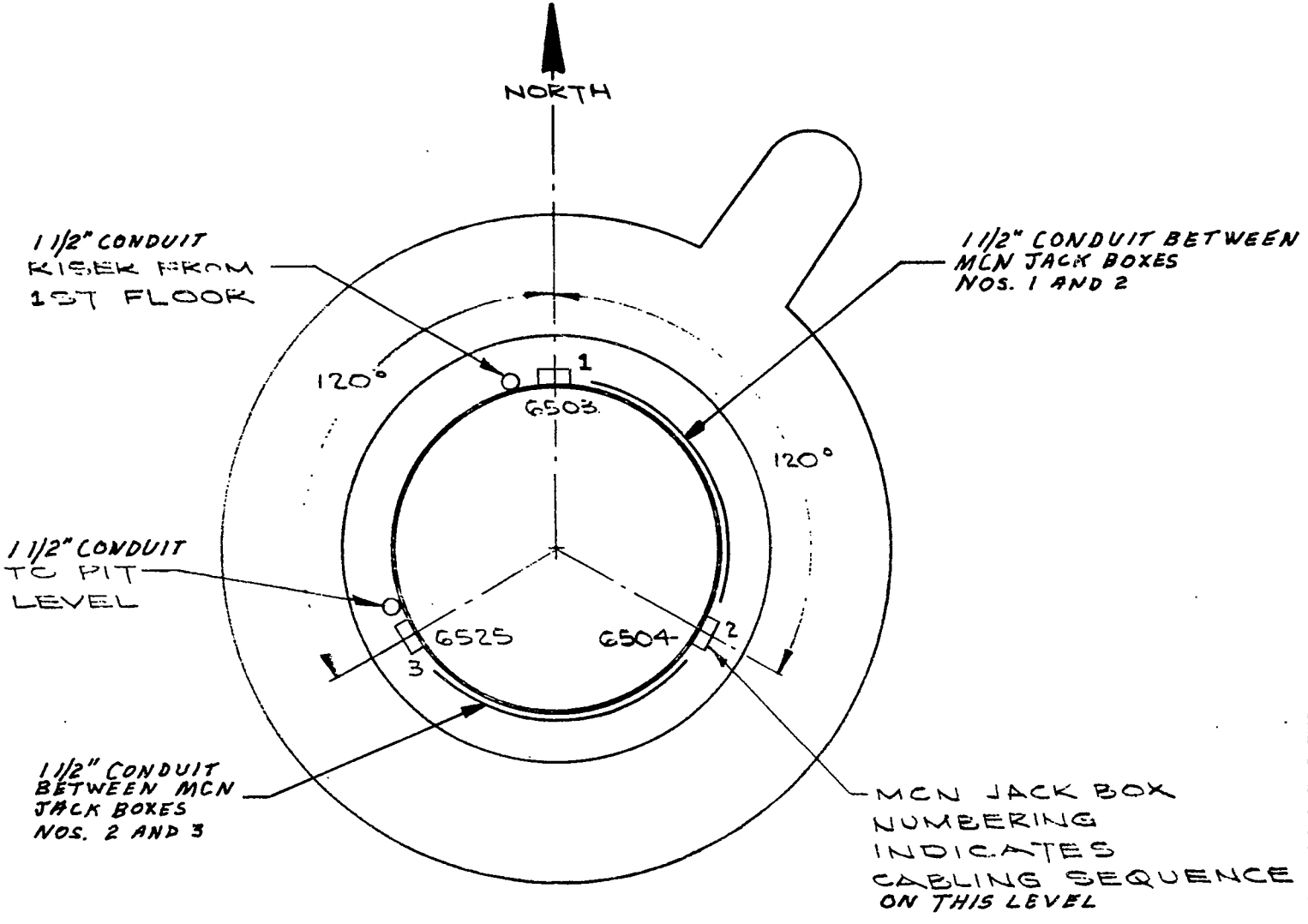


Figure 6-11. LF/LER Second Level Jack Boxes

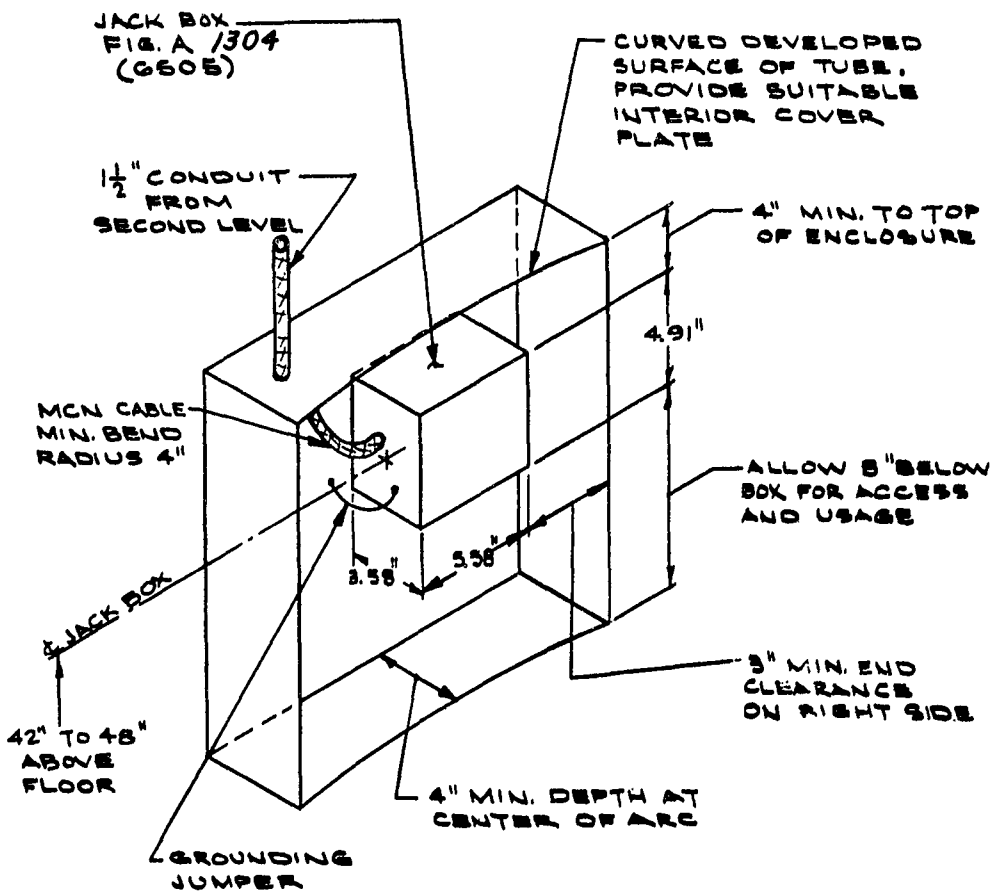


Figure 6-12. Mounting Detail LF Sump Pit Jack Box

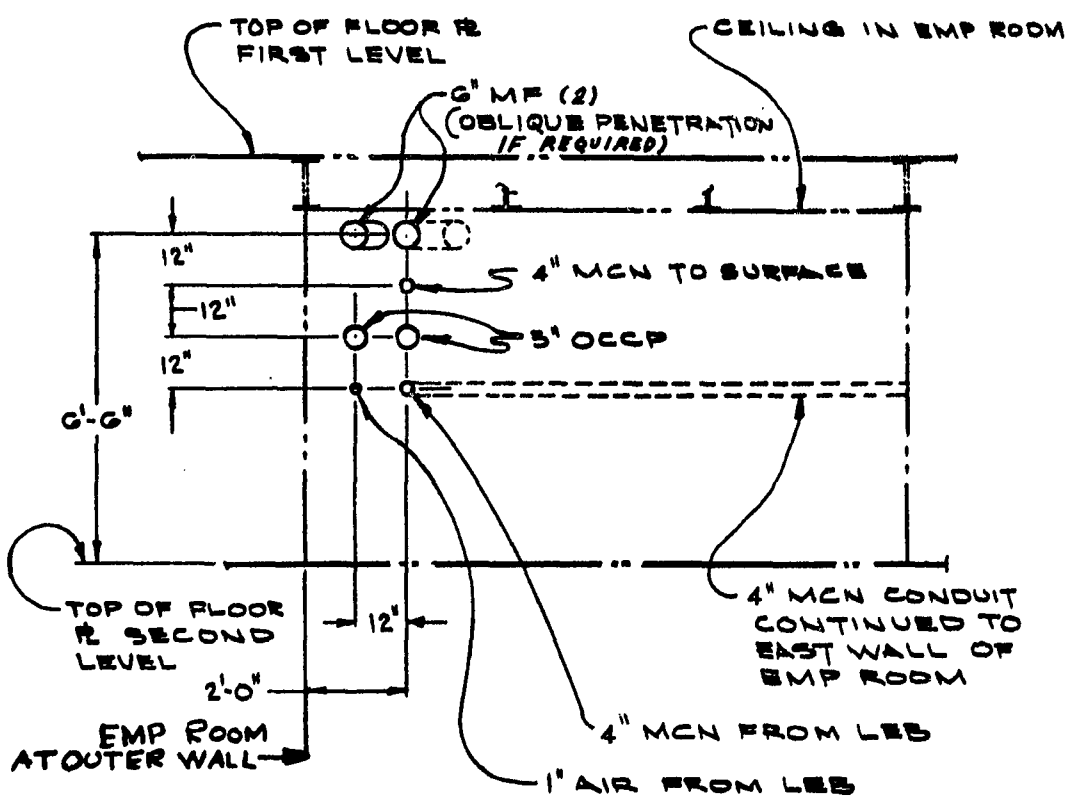


Figure 6-13. Conduit Penetration into LF/LER

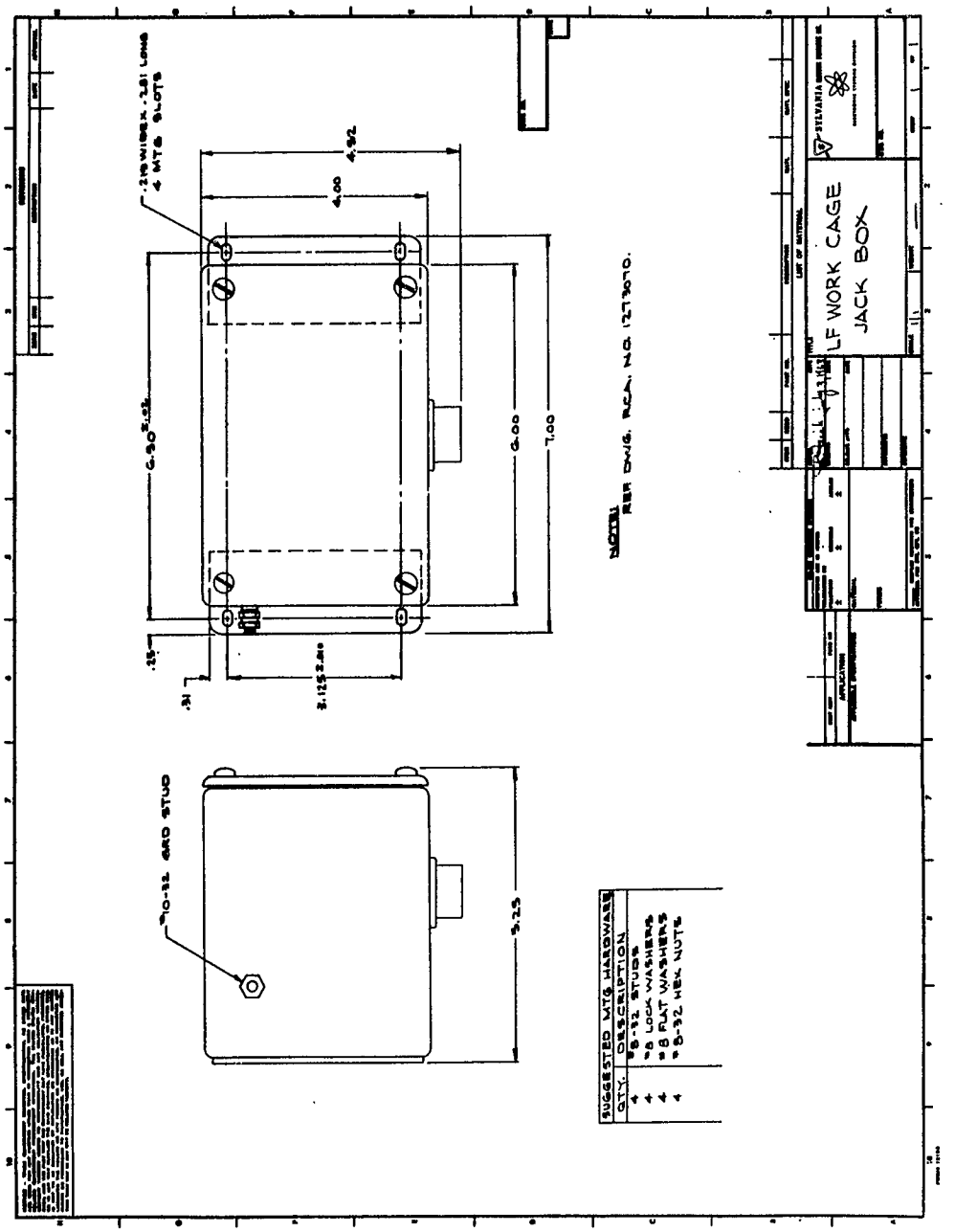


Figure 6-14. LF Work Cage Jack Box

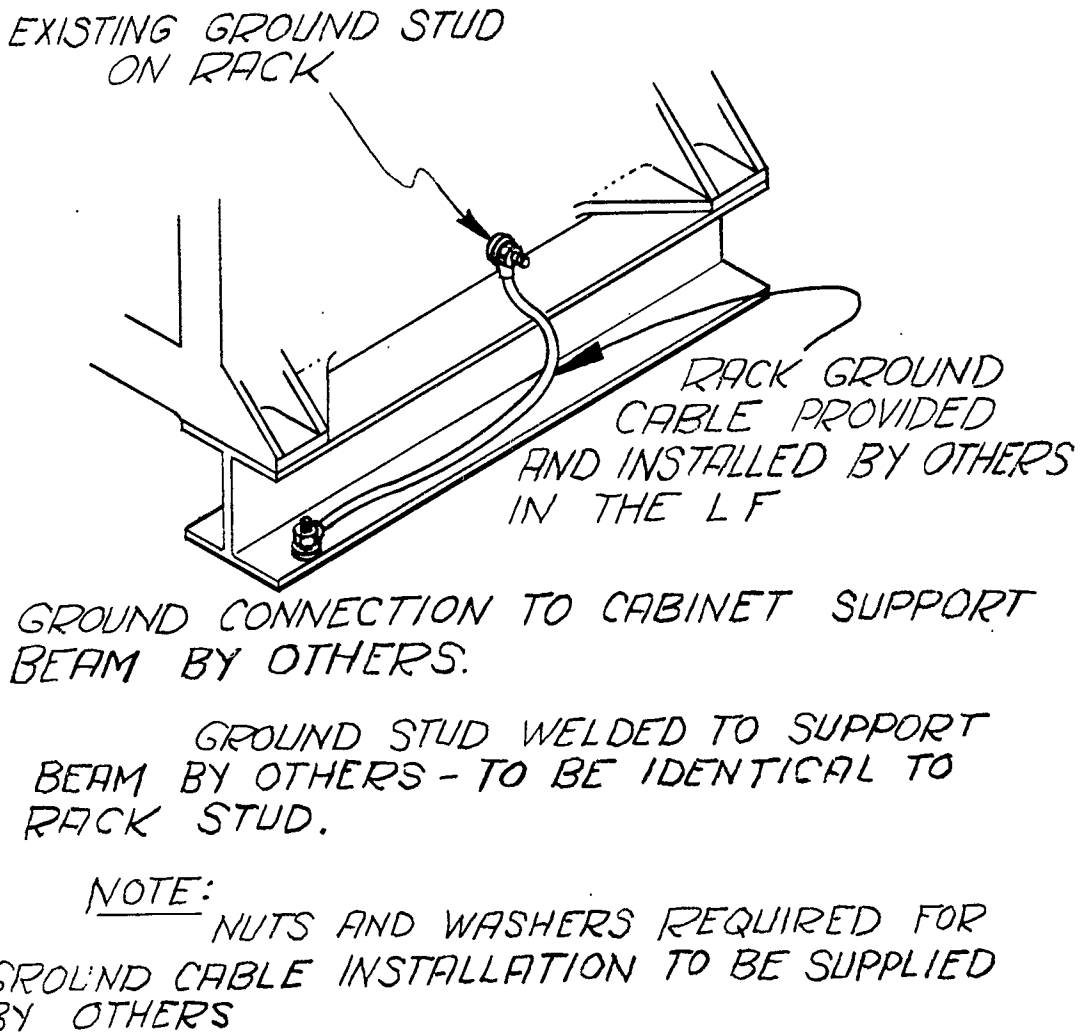


Figure 6-15. Rack Grounding in LF

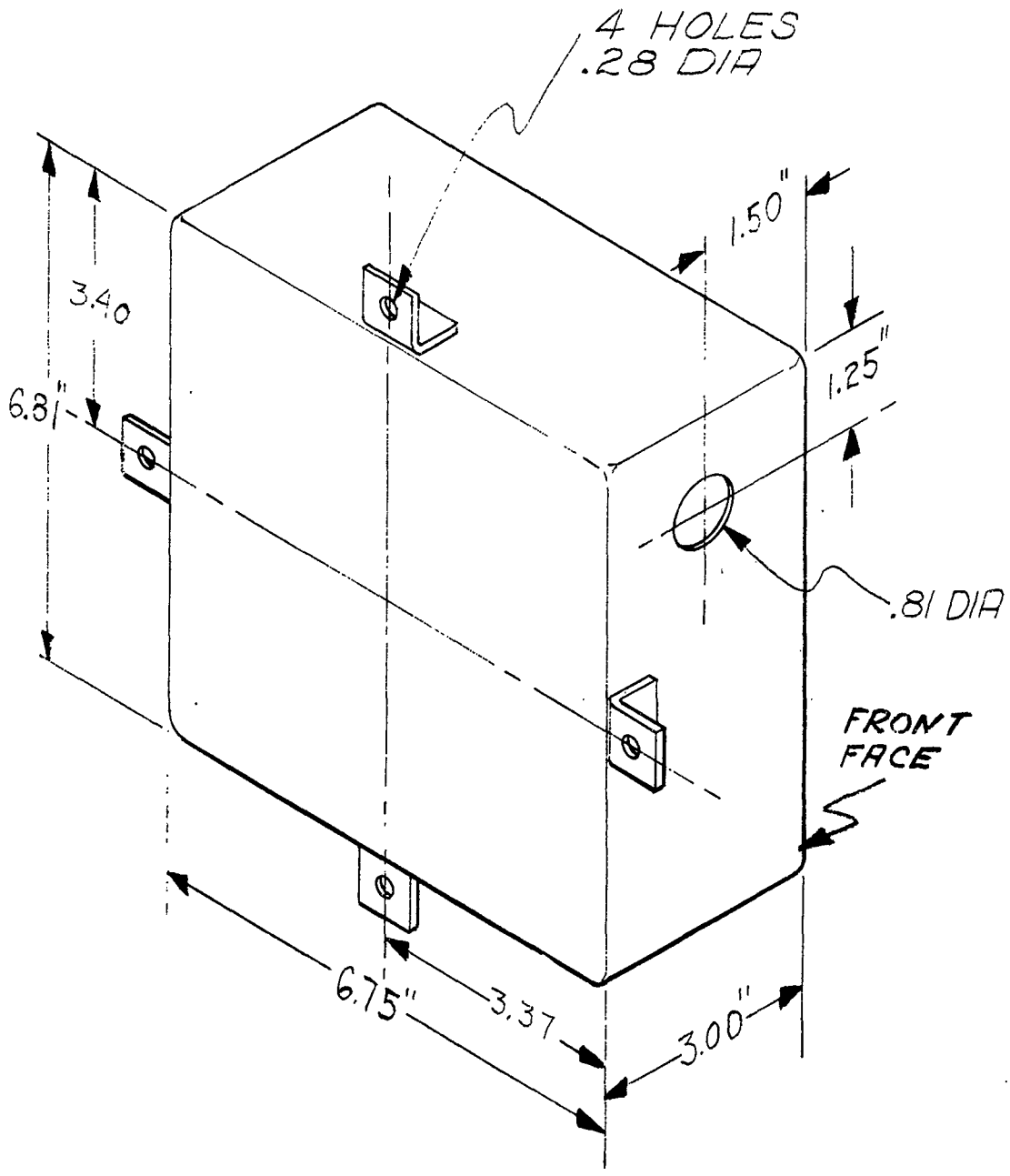


Figure 6-16. Outline Dimensions of Alarm & Driver Assembly

SECTION 7

LAUNCHER EQUIPMENT BUILDING (LEB)

7.1 FUNCTION

The LEB shall be the center for all air breathing apparatus that supports the associated launcher. Within this structure, Sylvania requires a space allocation for the placement of a cable pressurization system and communications jack box and alarm.

7.2 ARCHITECTURAL

Space availability and access shall be provided within all LEB's for placement, at a location to be determined later, of pressurization equipment of the size and weight shown on the applicable Sylvania Equipment List (Figure 7-1). Preference for the location of the compressor-dehydrator within an LEB is not an architectural constraint, except that access to the entire cabinet shall be provided for maintenance purposes. It is further required that an additional clear space of four inches at sides and rear be provided for air circulation and bracket attachment.

A refrigerant-type, dryer-compressor is contemplated for this installation. There is no requirement for a drain to remove the water condensed from the intake air since this is accomplished by re-evaporation into the room.

Routine maintenance imposes a cabinet accessibility requirement to accomplish such tasks as lubrication, belt adjustments, cleaning or changing strainers and filters, and replacing chemical canisters.

7.3 STRUCTURAL

Provision shall be made by others for secure fastening of the pressurization system within the LEB. The equipment is designed to be fastened to the wall, and is provided complete with detachable brackets which bolt to the cabinet. The method of securing these brackets to

this equipment room structure shall be provided by others. For dimensional drawing of the placement of wall mounting brackets for the compressor-dryer, refer to ICD 25-38272. A mounting panel shall be provided by others for the placement of the pressurization system and for the MCN jack box and alarm set, for installation by others. Jack box mounting height centerline shall be approximately 5 feet above the work platform. See Sylvania supplementary illustrations for fastening pattern of jack box and alarm set.

7.4 MECHANICAL

Sylvania will furnish a cable pressurization system complete with self-contained compressor, receivers, distribution manifold and primary control devices for installation of the selected LEB. The assembly shall have characteristics as defined on the Sylvania Equipment List (Figure 7-1). Between the LEB and the LER a plastic pressure line and connecting clamps will be provided by Sylvania for installation by others.

7.5 ELECTRICAL

The compressor-dehydrator requires power as defined in the Sylvania Equipment List. Normally regulated commercial power will meet the requirements for this device. This equipment operates continuously; however there is no requirement to operate it during battery mode.

At each LEB a four-inch conduit shall be provided to carry a cable containing the MCN circuits and monitor alarm pairs to the adjacent LER as stated in Section 6. In addition to this specified conduit, a one-inch conduit shall be provided at all LEB's to carry the pressure line from the compressor-dehydrator to the pressurized communications cable in the adjacent LER. Pressurization of the Minuteman hardened cable is accomplished by a connection of the air line within the adjacent LER. Actual utilization of the pressurization line conduit will occur only at selected LER's dependent upon actual field conditions governing placement of cable and lengths of cable runs. Monitoring circuits located at the compressor-dryer device are high pressure, low pressure and high humidity sensors.

REF DES NO	LEB EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	AC	DC
6483	AIR COMPRESSOR DRYER UNIT	SYL A14028	19" x 12" x 43"	175	115v 60v 1 kw			
	MCN JACK BOX AND ALARM	SYL A14053						

ZE D X H HES)	WT (LBS)	POWER REQUIREMENTS												NORMAL COOLING REQUIREMENT				
		PRIME		REGULATED														
				NORMAL					EMERGENCY									
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H,
		AVG	PEAK				AVG	PEAK				AVG	PEAK					
x 12"	175	115v 60v 1 kw												3400	CONV			

2

Figure 7-1. LEB

K	POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
	REGULATED															
	NORMAL					EMERGENCY										
	AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
				AVG	PEAK				AVG	PEAK						
											3400	CONV				Model 600 provide 15-amp circuit

3

Figure 7-1. LEB Equipment List

7.6 COMMUNICATIONS

Sylvania will provide cables associated with pressurization system monitors and MCN circuits from the LEB to the LER, for installation by others. Sylvania will also provide a telephone jack box and alarm set for use in the MCN network for installation by others.

The LEB is not normally manned. Maintenance personnel will carry telephone headsets to plug into jacks. (These headsets will be compatible with a hard hat and will not require the use of hands for operation once a connection has been established.) Communications pairs will be carried in the same conduit as the pressurization system monitor and alarm circuits to the LER as stated in Section 6 of this document. Monitor-alarm pairs from status check points of equipments provided by others and located within the LEB shall not be conveyed in the Sylvania-provided cables to the LER.

7.7 INTERFACES

The following interfaces are recognized as associated with Sylvania GES items located in the LEB.

7.7.1 Architectural - Minimum space requirements must be provided for the pressurization equipment as shown on the Sylvania Equipment List (Figure 7-1). Attachment to the facilities wall of the mounting devices for the pressure dehydrator system and MCN devices shall be provided by others.

7.7.2 Structural - The weight and package size of the pressurization equipment is shown on the Sylvania Equipment List (Figure 7-1). Anchor bolts, vibration elimination devices, and shock isolation devices, shall be provided by others and shall be compatible with dimension of the Sylvania-provided equipment.

7.7.3 Mechanical - Sylvania shall provide as a package all valves, regulators, switches, manifold and gages pertinent to the pressure system located within the LEB. This shall include a flexible non-metallic

line between the compressor-dehydrator on the shock-isolated platform and fixed structural envelope of the LEB. Any penetration of the fixed envelope to permit passage of the pressurizing hose to the LER shall be provided by others.

7.7.4 Electrical - Electric service connection to the GES compressor shall be provided by others. Power requirements are detailed on the Sylvania Equipment List (Figure 7-1). This service is not considered part of the critical load, but is part of the essential load, to the extent previously noted in Section 7.5. Power receptacle shall be provided for the compressor dryer to be compatible with Cornish Wire Co. CP-01335-7 Cord and Plug set having 3 conductor twist lock plug and 9-foot service cord.

The conduit from the LEB to the LER containing the compressed air line, pressurization status indicating conductors, and voice communication pairs shall be provided by others, with grounding in accordance with BSD Exhibit 62-75 or as otherwise specified by Sylvania.

These conduits shall be located in the LEB structure to permit their being routed into the LER in accordance with the penetration conditions defined in Para. 6.5 of this document. Beyond these stated requirements, Sylvania has no additional design requirement for the routing of these conduits between the LEB and the LER. Conduit bending radii are considered non-critical. MCN cable and pressurizing hose shall be routed along the edge of the work platform within the LEB.

7.7.5 Communications - Telephone jack boxes will be provided by Sylvania for installation by others as part of the MCN network. Conduit, provided by others, shall contain a pull wire. Pulling stress for MCN cable is forty pounds.

SECTION 8

LCF AND LF ANTENNA FARMS

8.1 LCF ANTENNA FARM

8.1.1 Function - The function of the LCF Antenna Farm is to provide a physical location for soft and hardened antennas furnished as Government Equipment or as designed by Sylvania. These antennas will permit radio communications with SAC Headquarters, Numbered Air Force Headquarters, adjacent LCF's, LF's and the Airborne Command Post.

8.1.2 Architectural - The preliminary layout of the LCF Plot Plan and the Antenna Farm layout is shown in Figure 8-1. Data applicable to each individual antenna at the LCF is indicated on the LCF Antenna Equipment List, Figure 8-2.

8.1.3 Structural - For the Sylvania MF antenna at the LCF, the following limitations are imposed:

1. No security fence within 30 feet of the array.
2. No shallowly buried metallic objects within 15 feet of the array.
3. If a cattle fence of strung barbed wire is used to enclose the array, it should not be closer than 10 feet to the array and must be:
   a) No higher than 5 feet
   b) Electrically broken every 100 feet
   c) Be non-electrified
4. No roads within 15 feet of the array.
5. Acceptable median slope of antenna installation area 15%.

Footings, casings and/or attachments for other antennas shall be provided by others. Details will be supplied by Sylvania as the GES integrating contractor through information derived from individual antenna suppliers.

8.1.4 Mechanical - Not applicable.

8.1.5 Electrical - Conduits to the LCF Antenna Farm are delineated in Section 2. The four 6-inch conduit for the Sylvania MF Antenna shall be installed by others. They shall be capped and staked for identification, 5 feet outside of the established fence perimeter of the antenna location and 8 feet below the finished grade line. These conduit shall provide a straight-line entry at the MF Antenna lead into the LCC EMP enclosure. All other antenna conduit shall terminate at the antenna locations at 4 feet below grade.

8.1.6 Communications - Communications for the Antenna Farm will be above ground and provided as part of the MCN from the LCSB by use of a headset and a long cable.

8.1.7 Interfaces - Within the LCF Antenna Farm, interfaces between Sylvania and others are as follows:

8.1.7.1 Architectural - Figures 8-1 and 2-21 are the LCF Plot Plan and the LCF Antenna Farm conduit layout, respectively. Until the layout is final, fence locations, drainage provisions, parking areas and roadways cannot be fully defined.

8.1.7.2 Structural - Drawings will be supplied by Sylvania showing structural interfaces.

8.1.7.3 Mechanical - Not applicable.

8.1.7.4 Electrical - Each antenna in the LCF Antenna Farm will require hardened conduit for its transmission and control lines. These conduits are depicted in Figure 2-21, Section 2.

8.1.7.5 Communications - Not applicable.

8.2 LF ANTENNA FARM

8.2.1 Function - The function of the LF Antenna Farm is to provide a physical location for the Sylvania MF antenna.

8.2.2 Architectural - The preliminary layout of the Sylvania antenna at the LF is shown in Figure 8-3. Physical size of the antenna is as shown on the LF Antenna Farm Equipment List, Figure 8-4.

8.2.3 Structural -

1. No security fence within 30 feet of the array.
2. No shallowly buried metallic objects within 15 feet of the array.
3. If a cattle fence of strung barbed wire is used to enclose the array, it should not be closer than 10 feet to the array and must be:
   a) No higher than 5 feet
   b) Electrically broken every 100 feet
   c) Be non-electrified.
4. No roads within 15 feet of the array.
5. Acceptable median slope of antenna installation area 15%.

8.2.4 Mechanical - Not applicable.

8.2.5 Electrical - The conduit to the Sylvania MF antenna shall be two 6-inch I. D. plastic, installed by others. They shall be capped and staked for identification, terminating 5 feet outside the established fence perimeter of the antenna location and 8 feet below the finished grade line at its outer extremity. These conduit shall provide a straight-line entry of the MF antenna leads into the LF EMP enclosure.

8.2.6 Communications - Any communications necessary for maintenance in the vicinity of the MF antenna will be provided by using the MCN jack box (Sylvania Figure A14024) at ground level with Sylvania Figure A14035 headset.

8.2.7 Interfaces - Within the LF Antenna Farm, interfaces are as follows.

8.2.7.1 Architectural - Figure 8-4 shows the Sylvania antenna placement as required.

8.2.7.2 Structural - Detailed drawings will be provided by Sylvania showing structural interfaces.

8.2.7.3 Mechanical - Not applicable.

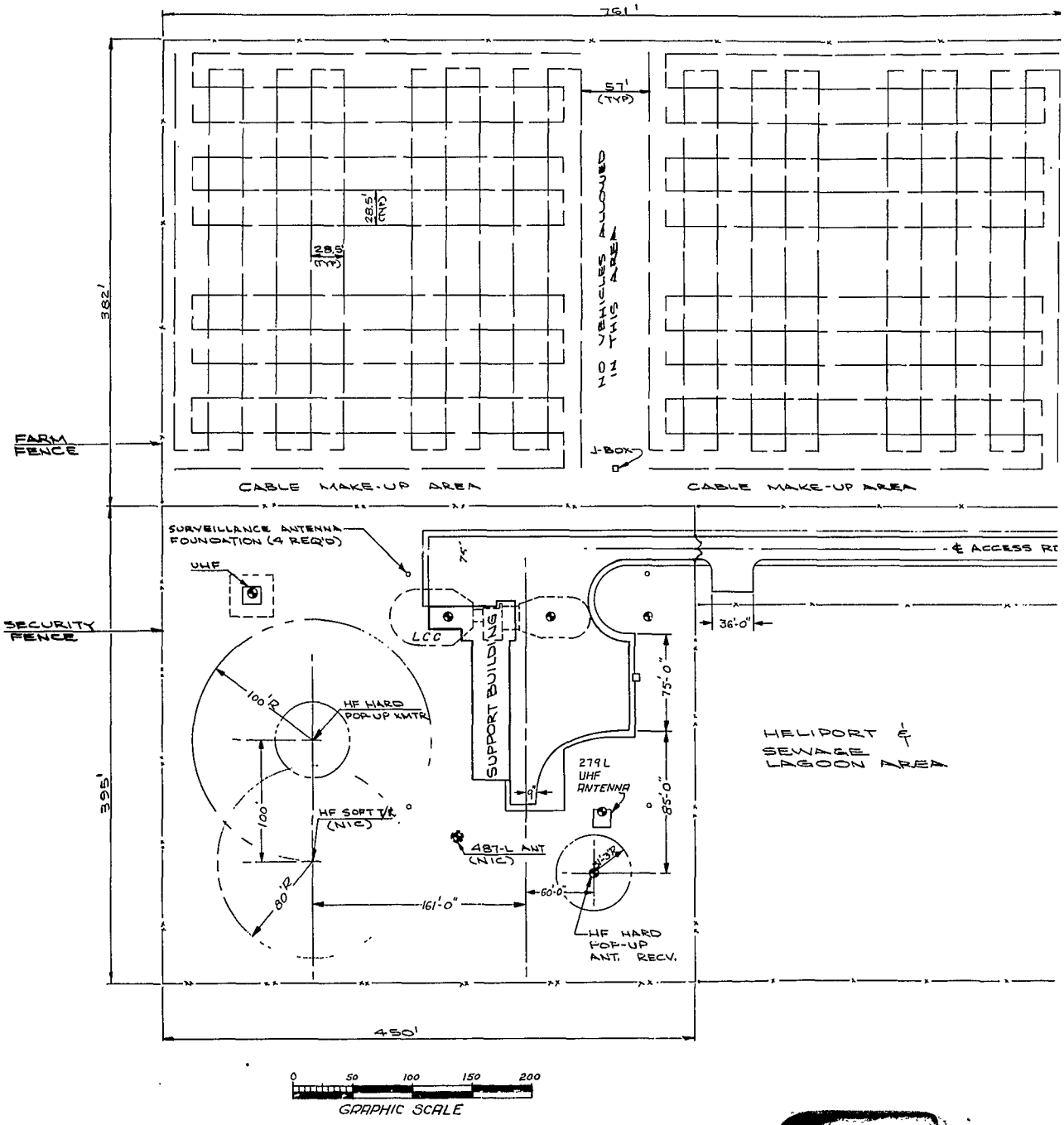
8.2.7.4 Electrical - Conduit interface is indicated in Section 6 of this document.

8.2.7.5 Communications - Not applicable.

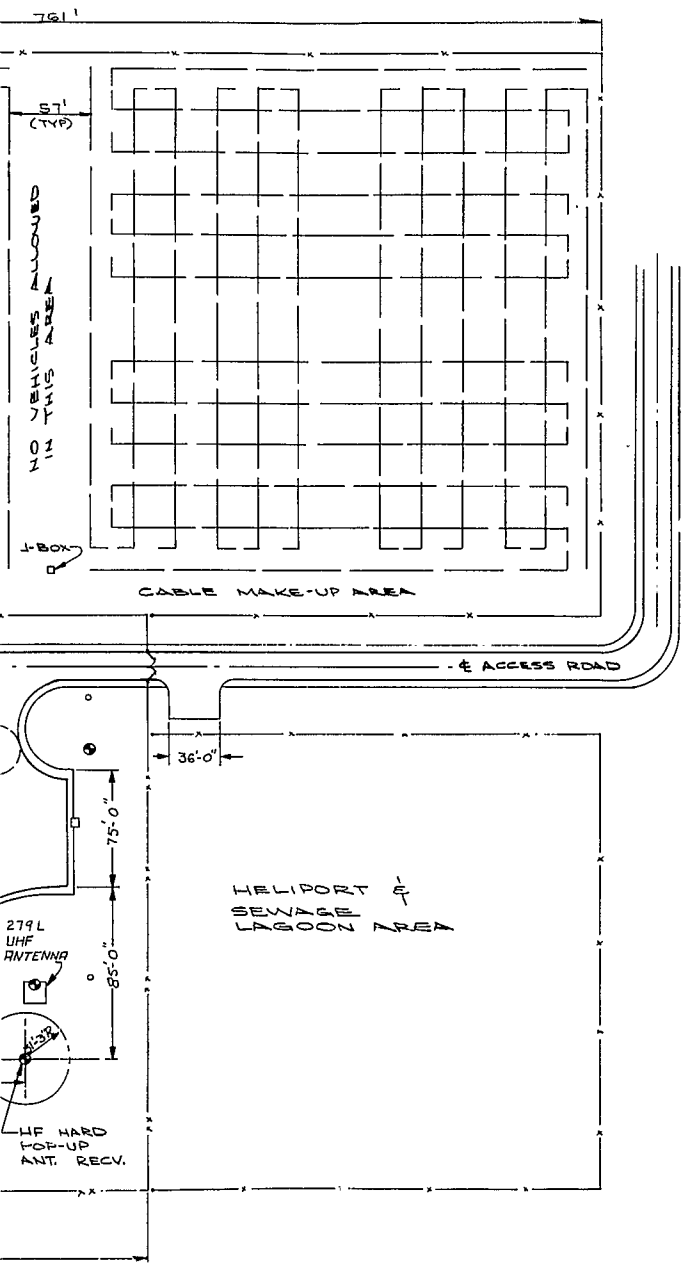
8.3 ILLUSTRATIONS

The following is a list of illustrations which will be provided in subsequent revisions to this report:

1. HF Soft Antenna Transmit and Receive Antenna Installation (Boeing Figure A 1425).
2. HF Hard Antenna, Transmit only, Pop-Up Antenna Installation.
3. HF Antennas, Receive Only, Pop-Up Antenna Installation.
4. UHF Hard Antenna, Transmit and Receive, Antenna Installation (Boeing Figure A 1424).


761'
382'
395'
450'
57' (TYP)
28.5' (TYP)
28.5' (TYP)
VEHICLES ALLOWED IN THIS AREA
J-BOX
CABLE MAKE-UP AREA
CABLE MAKE-UP AREA
FARM FENCE
SECURITY FENCE
SURVEILLANCE ANTENNA FOUNDATION (4 REQ'D)
UHF
LCC
SUPPORT BUILDING
36'-0"
75'-0"
85'-0"
HF HARD POP-UP XMTR
100' R
100'
80' R
HF SOPT T/R (NIC)
279L UHF ANTENNA
487-L ANT (NIC)
161'-0"
60'-0"
HF HARD POP-UP ANT. RECV.
HELIPORT & SEWAGE LAGOON AREA
0 50 100 150 200
GRAPHIC SCALE

1



NOTES:
1. 28.5' IS THE LARGEST ARRAY.
2. UHF ANTENNAS TO BE SITED IN FIELD AFTER CONSTRUCTION OF FACILITIES TO OBTAIN OPTIMUM PERFORMANCE

Figure 8-1. Antenna Farm Layout (LCF)

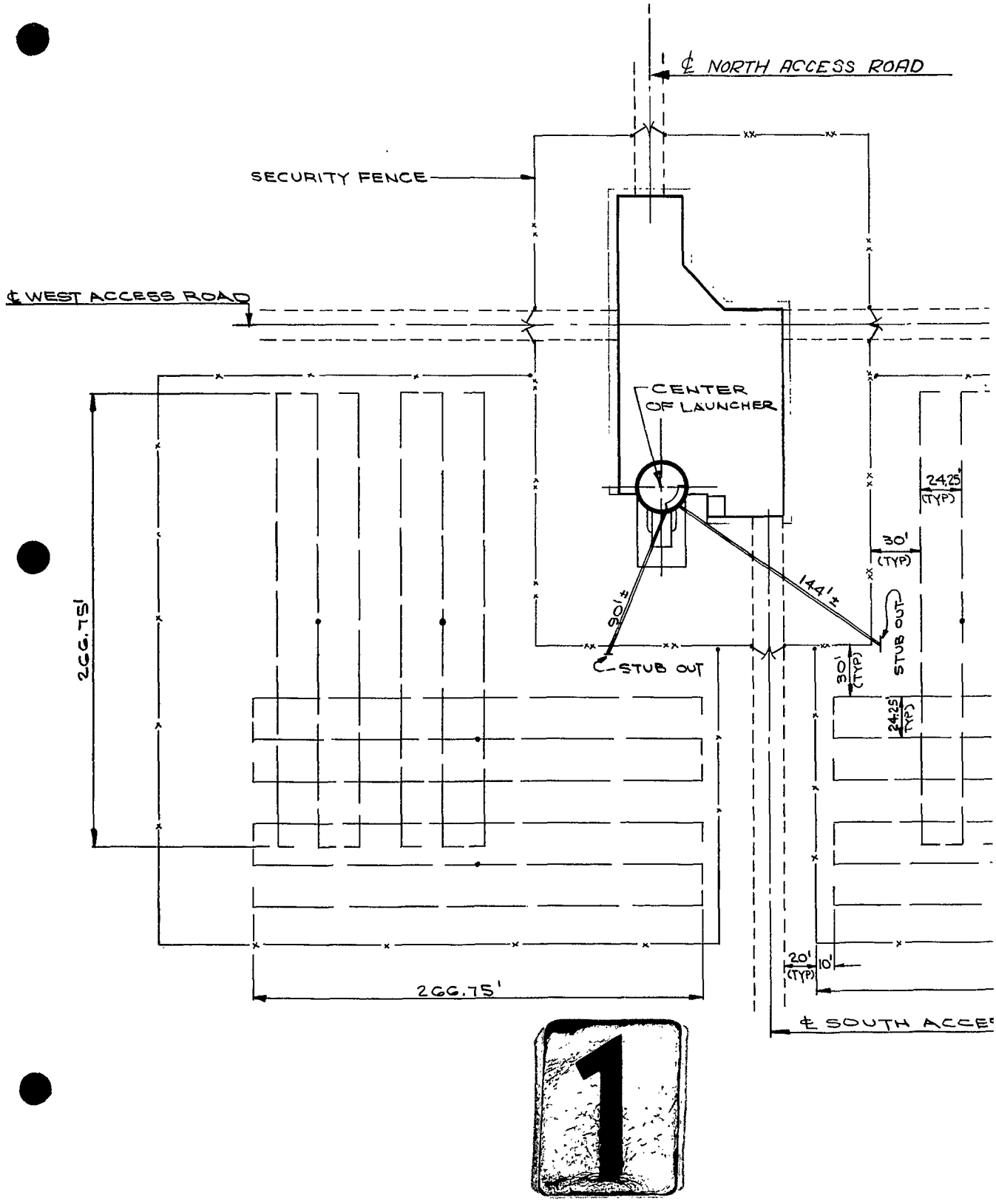
REF DES NO.	LCF ANTENNA FARM EQUIPMENT LIST	SOURCE & FIG. A. NO.	SIZE W X D X H (INCHES)	WT (LBS)	PO				
					PRIME		NORMA		
					POWER-W				
					AVG	PEAK	AC	DC	VOLT
6289	HF SOFT ANTENNA TRANSMIT AND RECEIVE	GFE 1425	160 FT DIA						
6288	HF HARD ANTENNA TRANSMIT POP-UP	GFE 1426	200 FT DIA		4.0 KW 60~, 3 ϕ 120/208V 4 WIRE				
6280 to 6284	HF ANTENNA RECEIVE POP-UP HARD	GFE	SEE REMARKS						
6285	UHF HARD ANTENNA TRANSMIT AND RECEIVE	GFE 1424							
6286	UHF HARD ANTENNA TRANSMIT AND RECEIVE (279 SYS.)	GFE							
6287	LF ANTENNA (487L SYSTEM)	GFE							
6290	MF HARD ANTENNA TRANSMIT AND RECEIVE	SYL A14128	SEE FIG. 8-1						

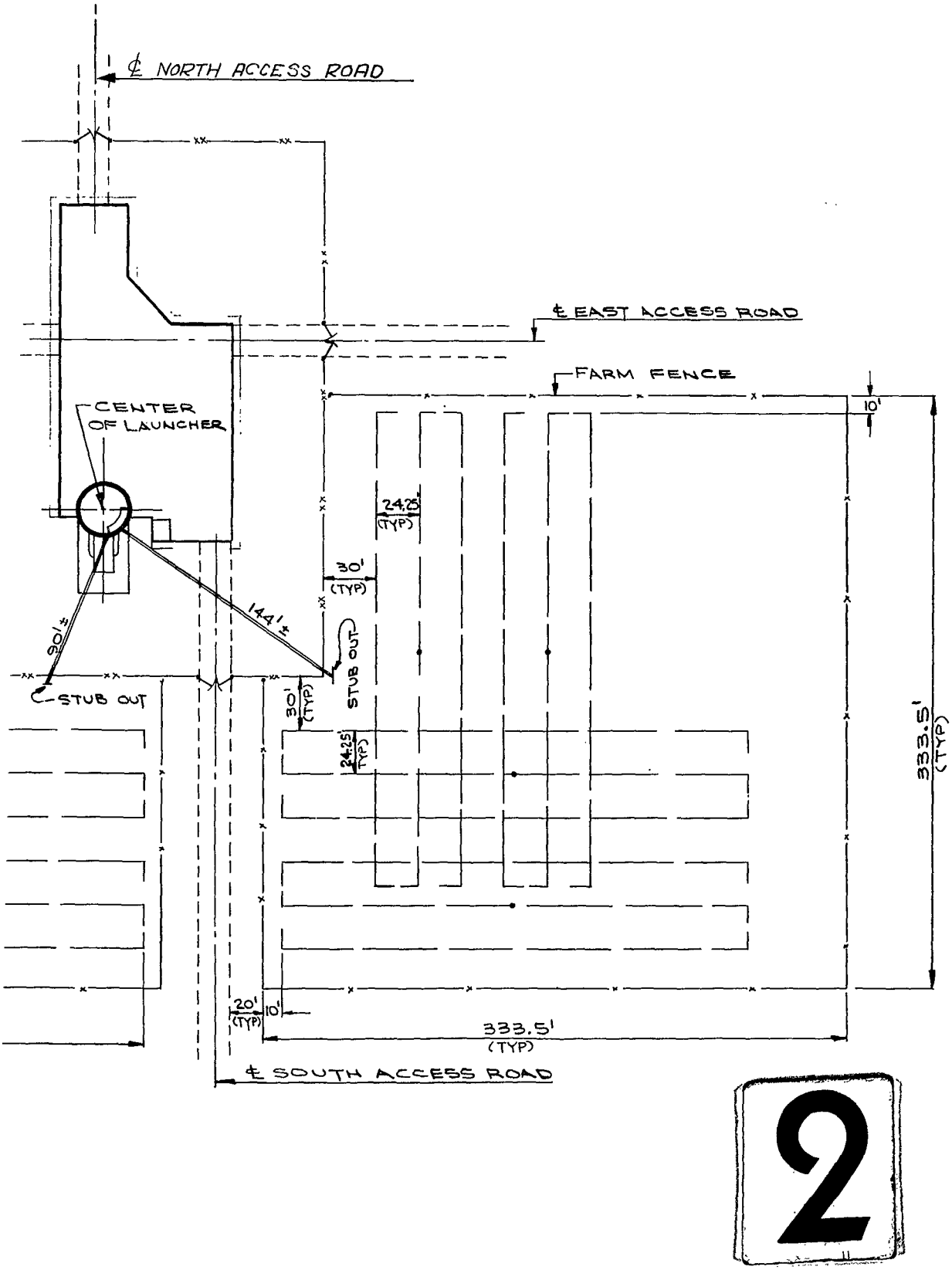
ZE D X H HES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT					R
		PRIME		REGULATED														
				NORMAL					EMERGENCY									
		POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
		AVG	PEAK				AVG	PEAK				AVG	PEAK						
T DIA																			Des be s a la
T DIA		4.0 KW 60~, 3 ϕ 120/208V 4 WIRE																	Pc fr LC
E ARKS																			'5' an a clu Grou dia r
																			Ref Boe Fig
																			FU
																			FU
E 8-1																			

Figure 8-2. LCF Antenna Farm Equip

POWER REQUIREMENTS											NORMAL COOLING REQUIREMENT					REMARKS
PRIME		REGULATED														
		NORMAL					EMERGENCY									
WER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	
G	PEAK				AVG	PEAK				AVG	PEAK						
																	Description to be supplied at a later date
KW 3 ø 208V IRE																	Power from LCC
																	'5' antennae in a cluster. Ground plane 50 dia ref Fig. 8-1
																	Reference Boeing Fig. 'A' 1424
																	FUTURE
																	FUTURE

Figure 8-2. LCF Antenna Farm Equipment List


℄ NORTH ACCESS ROAD
SECURITY FENCE
℄ WEST ACCESS ROAD
CENTER OF LAUNCHER
90'±
144'±
C-STUB OUT
STUB OUT
266.75'
266.75'
24.25' (TYP)
30' (TYP)
30' (TYP)
24.25' (TYP)
20' (TYP)
10'
℄ SOUTH ACCE
1



NOTES:

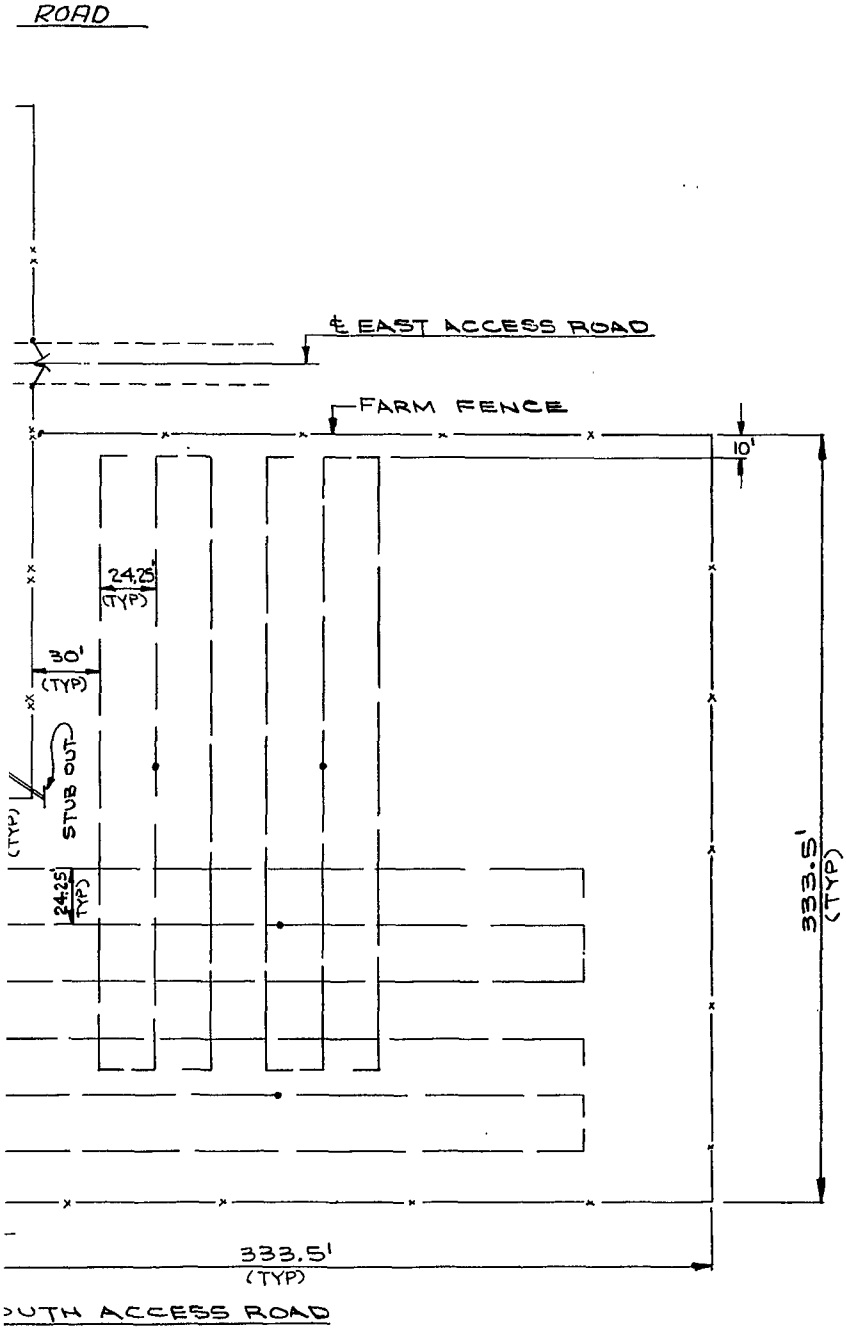
1. ARRAYS SH
   SMALLEST
2. LAND ARE
   THE LARGI
3. THE MF A
   IN TWO Q
   DESIGN E
   ACTUAL IN
   BE LIMITEC
   QUADRAN

0 50

GR

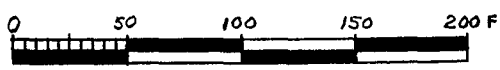
2

Figure 8-3. Antenna Fa



NOTES:

1. ARRAYS SHOWN ARE THE SMALLEST ARRAYS (24.25').
2. LAND AREA SHOWN IS FOR THE LARGEST ARRAY (28.5)
3. THE MF ANTENNA IS SHOWN IN TWO QUADRANTS FOR DESIGN EVALUATION ONLY. ACTUAL INSTALLATION SHALL BE LIMITED TO A SINGLE QUADRANT.



GRAPHIC SCALE

3

Figure 8-3. Antenna Farm Layout (LF)

REF DES NO.	LF ANTENNA FARM EQUIPMENT LIST	SOURCE & FIG. A. No.	SIZE W X D X H (INCHES)	WT (LBS)	PRIME POWER-W AVG	PRIME POWER-W PEAK	AC	DC
6468	MF HARD ANTENNA TRANSMIT AND RECEIVE	SYL A14127	SEE FIG. 8-3					

	SIZE W X D X H (INCHES)	WT (LBS)	POWER REQUIREMENTS											NORMAL COOLING REQUIREME			
			PRIME		REGULATED												
					NORMAL					EMERGENCY							
			POWER-W		AC	DC	VOLT	POWER-W		AC	DC	VOLT	POWER-W		HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_O ° M
			AVG	PEAK				AVG	PEAK				AVG	PEAK				
7	SEE FIG. 8-3																	

2

Figure 8-4. LF
List

ıE	POWER REQUIREMENTS										NORMAL COOLING REQUIREMENT					REMARKS
	REGULATED															
	NORMAL					EMERGENCY										
?-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	AC	DC	VOLT	POWER-W AVG	POWER-W PEAK	HT LOSS BTU/HR	TYPE COOL-ING	T_{IN} °F	T_{OUT} °F MAX	ΔP IN H_2O	

3

Figure 8-4. LF Antenna Farm Equipment List

SECTION 9

MISCELLANEOUS COVERAGE

9.1 GENERAL

This section will contain those miscellaneous details which are not uniquely associated with any particular area or location. Such items will include the weather-proof jack box and weather-proof alarm set, MCN jack box, hands-free phone and wall mounted telephone.

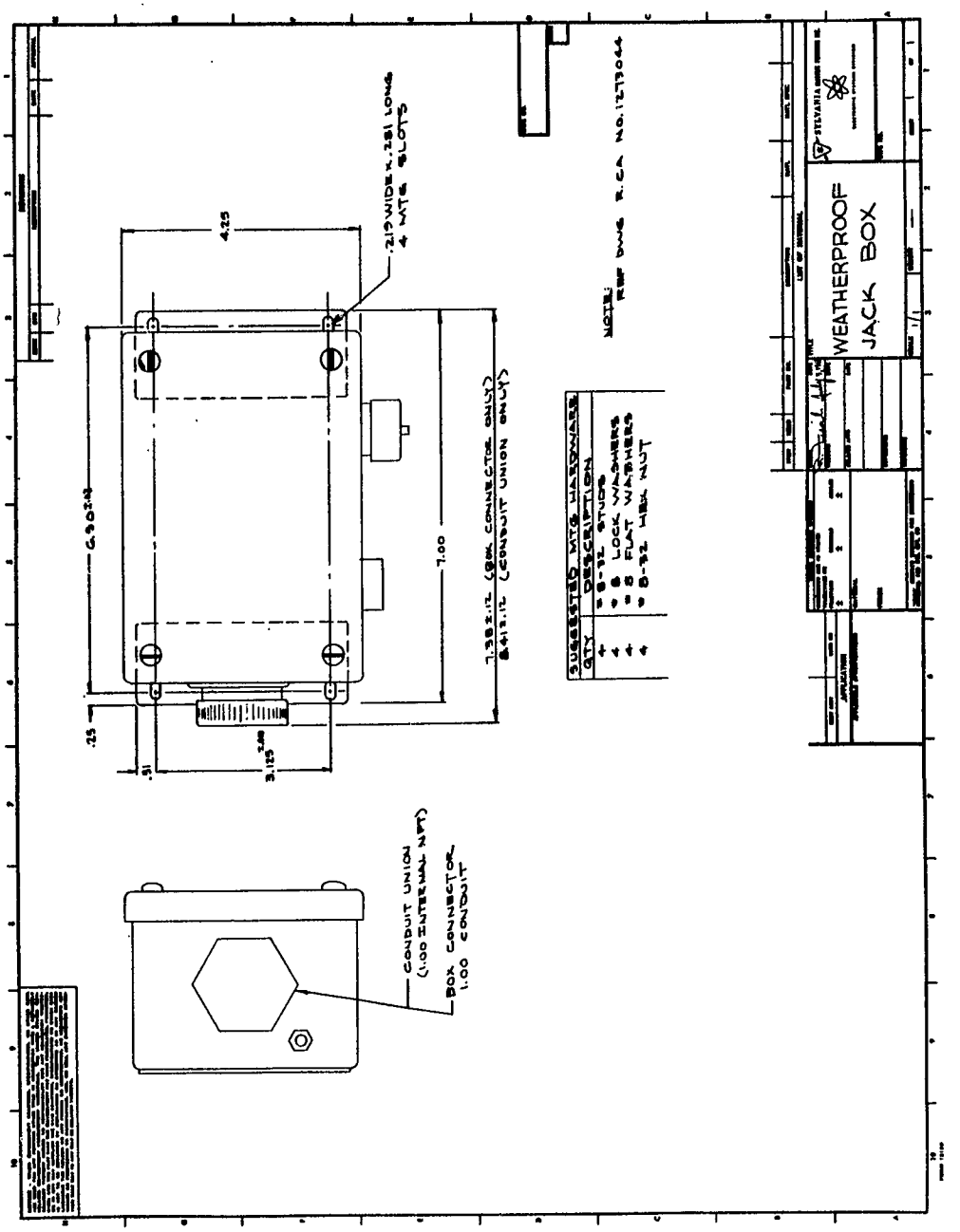


Figure 9-1. Weatherproof Jack Box

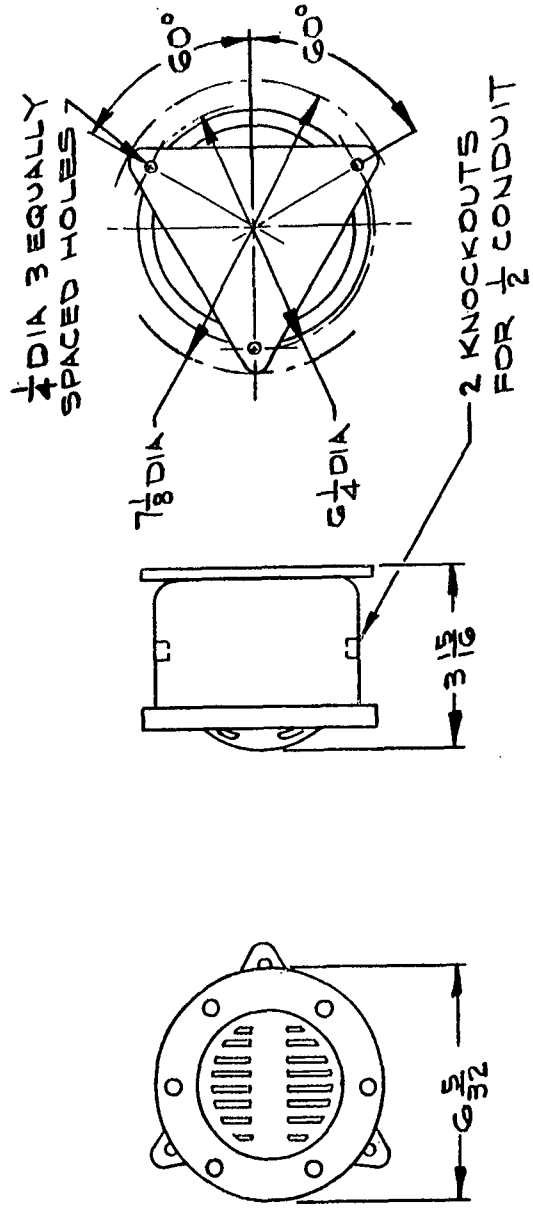


Figure 9-2. Weatherproof Alarm Set

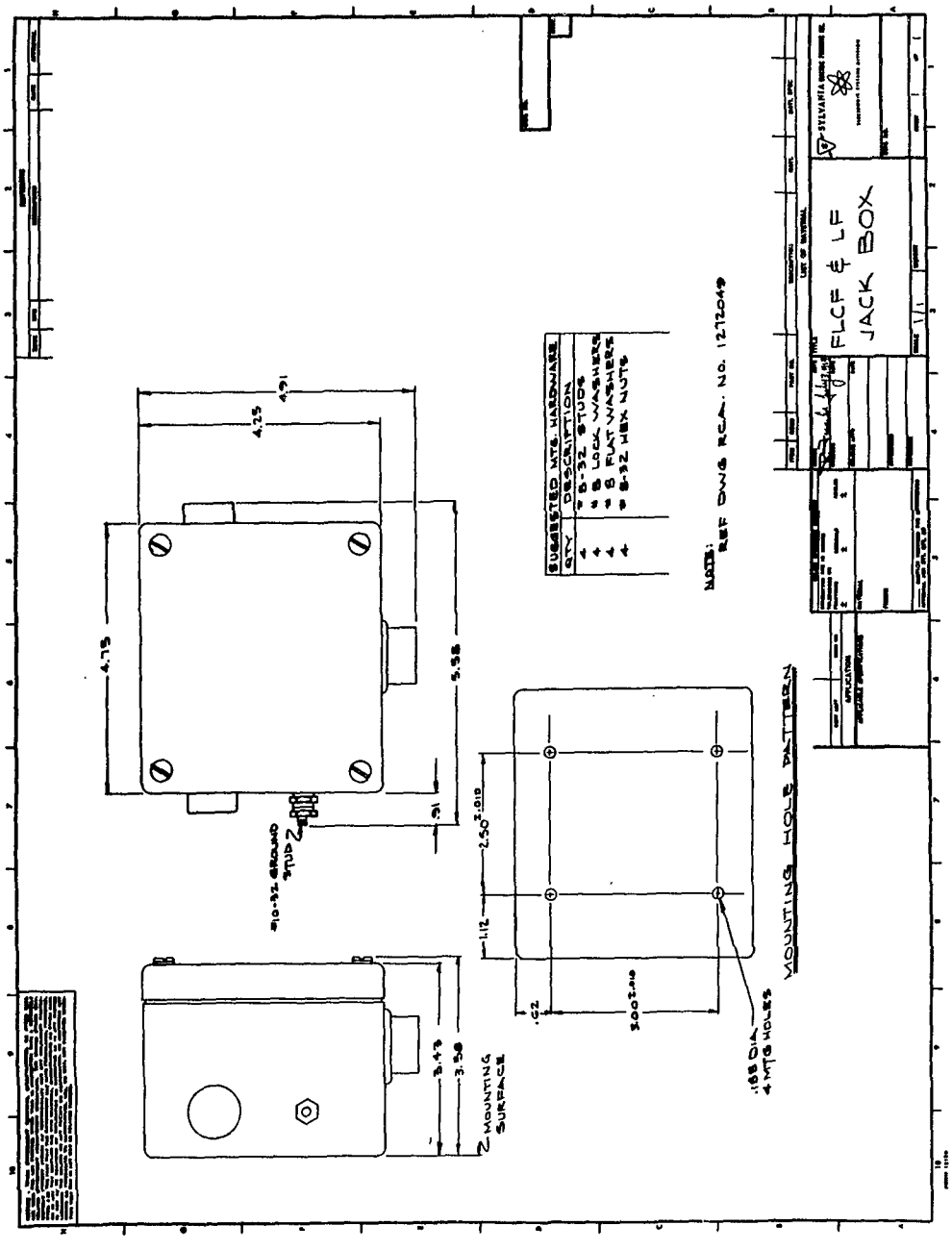


Figure 9-3. FLCF & LF Jack Box

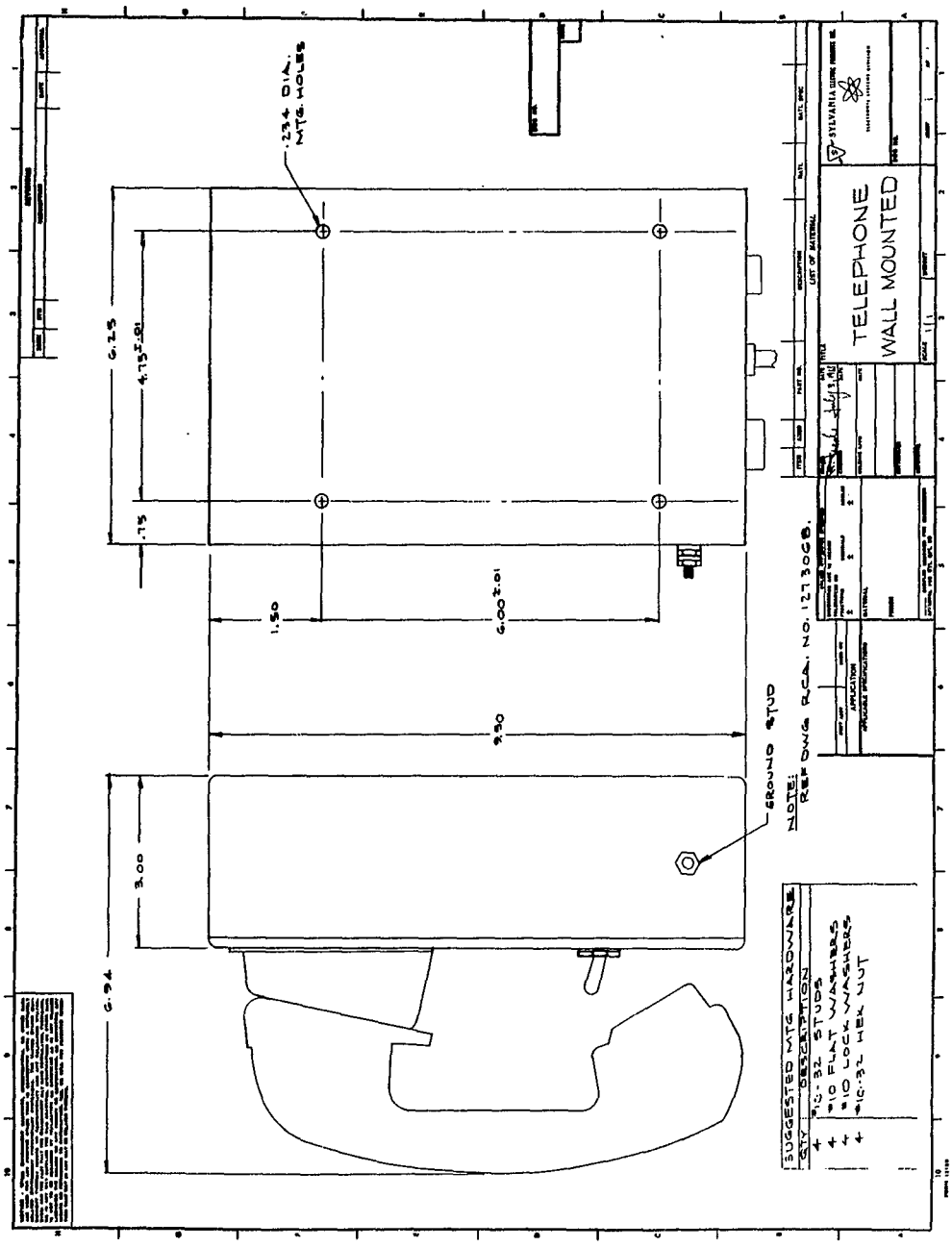


Figure 9-4. Wall Mounted Telephone