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★
TECHNICAL MANUAL

FIELD MAINTENANCE

LAUNCH CONTROL CONSOLE

OA-2437(XAA-2)/GJQ-11

OA-2437(XAA-3)/GJQ-11

PART NO.

327N2110000-009

327P2110000-009

FSN MBAE 4935-819-3264

(MARTIN)

AF 04(645)-56

AF 04(694)-123

THIS PUBLICATION REPLACES T.O. 31X3-10-27-2 DATED 15 JULY 1961.

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INTRODUCTION

This manual is one of a series of field maintenance manuals covering the SM68 missile weapon system ground operating equipment and ground based components.

This manual contains all instructions needed to perform field level maintenance on the launch control console, including description and leading particulars, checkout and trouble analysis, and maintenance instructions.

This technical manual includes all changes, additions, and deletions made necessary by issuance of the following time compliance technical orders:

<u>T.O. Number</u>	<u>Date</u>
31X3-10-27-501	5 January 1962
31X3-10-27-502	16 March 1961
31X3-10-27-503	21 March 1961
31X3-10-27-504	14 February 1962
31X3-10-27-505	26 January 1962
31X3-10-27-508	16 February 1962

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SECTION I

DESCRIPTION AND LEADING PARTICULARS

1-1. PURPOSE OF MANUAL.

1-2. This manual comprises field maintenance instructions for the launch control consoles, Martin part numbers 327N2110000-009 and 327P2110000-009 located in the control center. This section gives the purpose of the manual and the purpose of the launch control console, describes the equipment, and tabulates the leading particulars.

1-3. PURPOSE OF LAUNCH CONTROL CONSOLE.

1-4. Instruments and controls on the launch control console control, monitor, and display the status of the launch sequence stages for three missiles and their associated facilities at the complex. A communications panel is connected to all pertinent facilities of the complex.

1-5. DESCRIPTION.

1-6. The launch control console (figure 1-1) is a desk-type structure that supports a vertically mounted front panel. The controls, indicators, and communications switchboard are mounted on the front panel within easy reach and observation of the operator. The communications dial is located on the console desk. The headset jacks are located in the console legs. Access doors in the console legs provide access to the terminal boards and the communications pigtail.

1-7. LEADING PARTICULARS.

1-8. Leading particulars of the launch control console are listed in figure 1-2. The locations and functions of the operating controls and indicators are listed in figure 1-3, and illustrated in figures 1-4 and 1-5.

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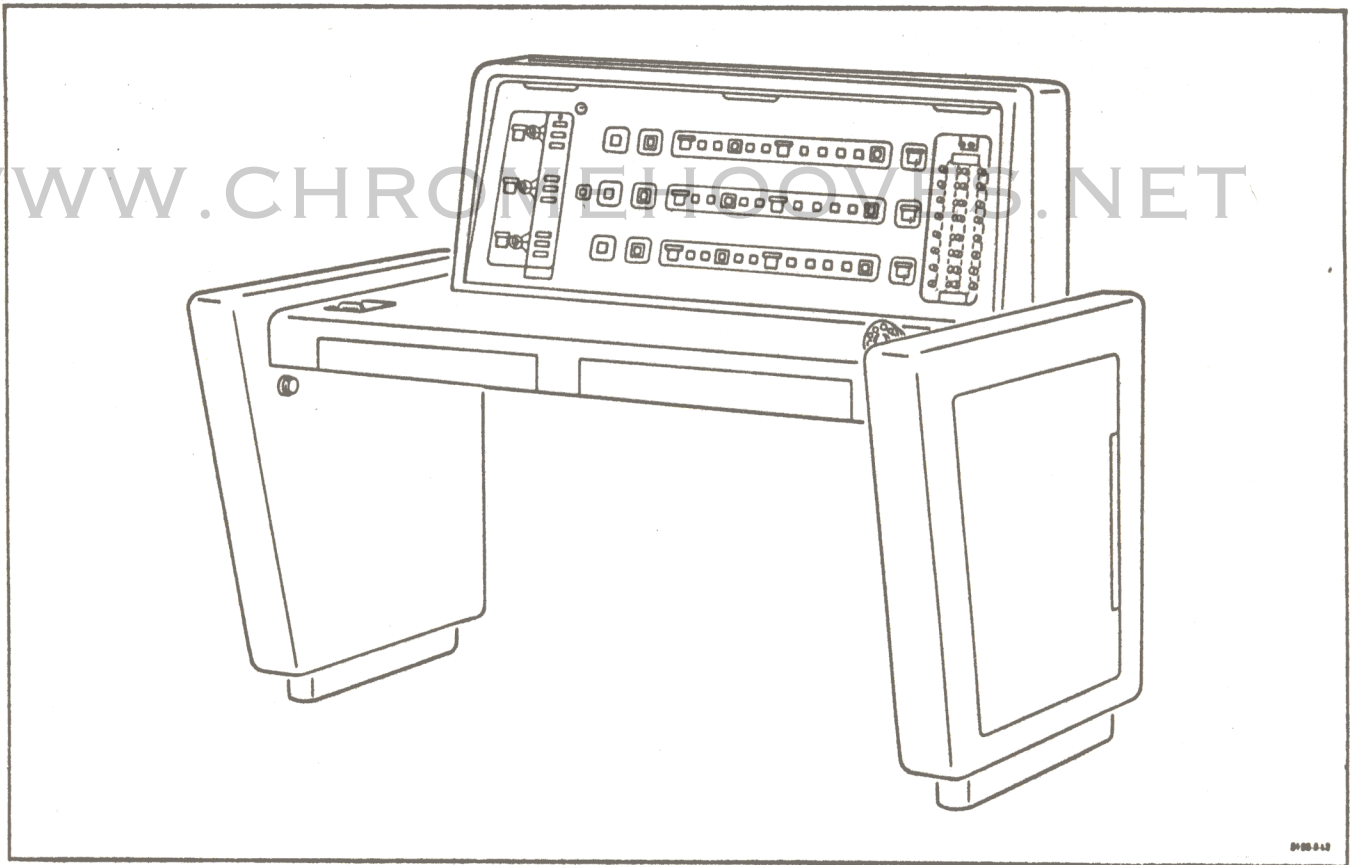


Figure 1-1. Launch Control Console

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DIMENSIONS AND WEIGHT			
Width	60 inches	Height	46.5 inches
Depth	35 inches	Weight	350 pounds
ELECTRICAL DATA			
Operating voltage.....	27.5(±1.5) VDC		

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Figure 1-2. Table of Leading Particulars

CONTROL OR INDICATOR	REFERENCE DESIGNATION	DESCRIPTION	FUNCTION
GROUND GUIDANCE DISPLAY (SEE FIGURES 1-4 AND 1-5.)			
GROUND GUIDANCE	DS21 and DS22	Dual quadrant red, green, and white indicator lamps	Power input signals from the control center (CC) designate ground guidance status. Lamps lighted red denote no-go or not ready. Lamps lighted green denote go or ready. Lamps lighted white denote operation. A green and a white lamp lighted indicates LAMP VERIFY switch is ON.
LAUNCHER NO. 1 DISPLAY (SEE FIGURES 1-4 AND 1-5.)			
HANDOVER	S1 and DS1	Alternate acting pushbutton indicator with red and white lamps.	When switch is closed a signal is sent to Control Center Circuits (CCC) to enable handover of missile guidance system to another complex; white indicator lamps are lighted. When switch is open, there is no output signal. The white lamps go off and guidance capability remains within complex. When all quadrant red and white lamps are lighted, LAMP VERIFY switch is ON.
TARGET SELECTION A, B, or C	S2, DS2, DS3, and DS4	Pull-to-turn, three-position selector switch and three indicator lamp quadrants, each having white and green lamp pairs.	When selector switch is set to a specific target A, B, or C, a constant notification signal is sent to CCC. An acknowledgment signal returned from associated ground operating equipment (GOE) verifies proper target selection. The applicable green indicator lamps light. Status change signals from GOE extinguish the green lamps and light the white lamps to signify that designated target is locked in system.

Figure 1-3. Table of Operating Controls and Indicators (Sheet 1 of 8)

CONTROL OR INDICATOR	REFERENCE DESIGNATION	DESCRIPTION	FUNCTION
STATUS MISSILE AND FACILITY	DS5	Red and green indicator lamps.	Input signals from CCC indicate readiness status of active missile and associated facilities. Lamps lighted red indicate no-go or missile facility not ready. Lamps lighted green indicate go or ready. During spare lamp circuitry checkout, lamps lighted green signify LAMP VERIFY switch is ON.
SHUTDOWN 1	S3 and DS6	Momentary-type pushbutton indicator with red and white lamps.	When pushbutton is momentarily pressed, a signal is sent to CCC to initiate shutdown of designated missile and facility. A compliance signal is returned from CCC to light the red indicator lamps. Lamps lighted white indicate LAMP VERIFY switch is ON.
LOAD PROPELLANTS	S4 and DS7	Momentary-type pushbutton indicator with white and red lamps.	When pushbutton is momentarily pressed, a signal is sent to CCC to initiate start of missile launch sequence. A compliance signal is returned from CCC to light the white indicator lamps. Lamps lighted red indicate LAMP VERIFY switch is ON.
LOX LOADING	DS8	White and red indicator lamps	The white lamps are lighted by a signal from CCC denoting liquid oxygen loading of missile tanks is in progress. Lamps lighted red indicate LAMP VERIFY switch is ON.
LOX LOADED	DS9	White and red indicator lamps	The white lamps are lighted by a signal from CCC denoting missile liquid oxygen tanks are full. Lamps lighted red indicate LAMP VERIFY switch is ON.

Figure 1-3. Table of Operating Controls and Indicators (Sheet 2 of 8)

CONTROL OR INDICATOR	REFERENCE DESIGNATION	DESCRIPTION	FUNCTION
RAISE LAUNCHER	S5 and DS10	Momentary-type pushbutton indicator with green and white lamps	When a ready or go status for raising launcher exists during launch sequence, CCC sends a notification signal which lights the green lamps. When pushbutton is momentarily pressed with green lamps lighted, a signal is sent to CCC to initiate raise launcher sequence. When signal is received by CCC, the raise launcher sequence is initiated to lock out raising capabilities of the other two launchers within complex. A compliance signal is returned from CCC to extinguish green lamps and light white lamps.
FUEL VALVES OPEN	DS11	White and red indicator lamps	The white lamps are lighted by a notification signal from CCC denoting that fuel valves have been opened. Lamps lighted red indicate LAMP VERIFY switch is ON.
MISSILE TANKS PRESS'D	DS12	White and red indicator lamps	The white lamps are lighted by a notification signal from CCC denoting that missile tanks have been pressurized. Lamps lighted red indicate LAMP VERIFY switch is ON.
LAUNCH	S6 and DS13	Momentary-type pushbutton indicator with green and white lamps	When a ready or go status for launch of missile exists, CCC sends a notification signal which lights the green lamps. When pushbutton is momentarily pressed with green lamps lighted, a signal is sent to CCC to initiate LAUNCH. When signal is received by CCC, launch procedure is initiated. A compliance signal is returned from CCC to extinguish the green lamps and light the white lamps, signifying launch in progress.

Figure 1-3. Table of Operating Controls and Indicators (Sheet 3 of 8)

CONTROL OR INDICATOR	REFERENCE DESIGNATION	DESCRIPTION	FUNCTION
POWER TRANSFERRED	DS14	White and red indicator lamps	The white lamps are lighted by a notification signal from CCC, denoting transfer from ground power to missile power has been accomplished. Lamps lighted red indicate LAMP VERIFY switch is ON.
GUIDANCE LOCKED ON	DS15	White and red indicator lamps	The white lamps are lighted by a notification signal from CCC denoting that ground guidance station has guidance control of missile. Lamps lighted red indicate LAMP VERIFY switch is ON.
LOOP CHECK COMPL	DS16	White and red indicator lamps	The white lamps are lighted by a notification signal from CCC denoting that loop check of the missile has been completed. Lamps lighted red indicate LAMP VERIFY switch is ON.
LIFT OFF	DS17	White and red indicator lamps	The white lamps are lighted by a notification signal from CCC denoting that liftoff sequence has been initiated. Lamps lighted red indicate LAMP VERIFY switch is ON.
LOWER LAUNCHER	S7 and DS18	Momentary-type pushbutton indicator with green and white lamps	When a ready or go status for lowering launcher exists, CCC sends a notification signal which lights the green lamps. When the pushbutton is momentarily pressed with green lamps lighted, a signal is sent to CCC to initiate launcher lowering. When signal is received by CCC, lowering of launcher is initiated to lock out lowering capabilities of the other two launchers and extinguish their LOWER LAUNCHER or RAISE LAUNCHER green lamps if lighted. A compliance signal is returned from CCC to LOWER LAUNCHER lamp, extinguishing

Figure 1-3. Table of Operating Controls and Indicators (Sheet 4 of 8)

CONTROL OR INDICATOR	REFERENCE DESIGNATION	DESCRIPTION	FUNCTION
EXERCISE 1	S8, S9, DS19, and DS20	Alternate acting pushbutton type indicators with red, white, and green lamps	<p>the green lamps and lighting the white lamps. Lamps lighted white indicate that launcher lowering is in progress. When launcher is down, the white lamps are extinguished by the CCC, and the extinguished green LOWER LAUNCHER or RAISE LAUNCHER lamps of the other launchers within the complex are lighted.</p> <p>When pushbutton is pressed to close, a signal is sent to CCC to prepare missile for exercise mode. A compliance signal is returned from CCC, lighting green lamps. By momentarily pressing LOAD PROPELLANTS switch while exercise indicator is green, exercise countdown sequence is initiated. A compliance signal is returned from CCC to extinguish green lamps and light white lamps, indicating exercise is in progress. When pushbutton is pressed to open, the white lamps go off. Unsuccessful missile or facility compliance during launch exercise sequence causes CCC to extinguish the white lamps and light the red lamps. A green and a white lamp lighted indicates LAMP VERIFY switch is ON. S9 is a spare switch and is not used.</p>
LAUNCHER NO. 2 DISPLAY (SEE FIGURES 1-4 AND 1-5.)			
HANDOVER TARGET SELECTION A, B, or C	S10 and DS23 S11, DS24, DS25, and DS26	Same as launcher NO. 1 Same as launcher NO. 1	

Figure 1-3. Table of Operating Controls and Indicators (Sheet 5 of 8)

CONTROL OR INDICATOR	REFERENCE DESIGNATION	DESCRIPTION	FUNCTION
STATUS MISSILE AND FACILITY	DS27	Same as launcher NO. 1	
SHUTDOWN 2	S12 and DS28	Same as launcher NO. 1	
LOAD PROPELLANTS	S13 and DS29	Same as launcher NO. 1	
LOX LOADING	DS30	Same as launcher NO. 1	
LOX LOADED	DS31	Same as launcher NO. 1	
RAISE LAUNCHER	S14 and DS32	Same as launcher NO. 1	
FUEL VALVES OPEN	DS33	Same as launcher NO. 1	
MISSILE TANKS PRESS'D	DS34	Same as launcher NO. 1	
LAUNCH	S15 and DS35	Same as launcher NO. 1	
POWER TRANSFERRED	DS36	Same as launcher NO. 1	
GUIDANCE LOCKED ON	DS37	Same as launcher NO. 1	
LOOP CHECK COMPL	DS38	Same as launcher NO. 1	
LIFT OFF	DS39	Same as launcher NO. 1	
LOWER LAUNCHER	S16 and DS40	Same as launcher NO. 1	
EXERCISE 2	S17, S18, DS41, and DS42	Same as launcher NO. 1 with the exception that S18 is a spare switch and is not used.	
LAUNCHER NO. 3 DISPLAY (SEE FIGURES 1-4 AND 1-5.)			
HANDOVER	S20 and DS43	Same as launcher NO. 1	
TARGET SELECTION A, B, or C	S21, DS44, DS45, and DS46	Same as launcher NO. 1	

Figure 1-3. Table of Operating Controls and Indicators (Sheet 6 of 8)

CONTROL OR INDICATOR	REFERENCE DESIGNATION	DESCRIPTION	FUNCTION
STATUS MISSILE AND FACILITY	DS47	Same as launcher NO. 1	
SHUTDOWN 3	S22 and DS48	Same as launcher NO. 1	
LOAD PROPELLANTS	S23 and DS49	Same as launcher NO. 1	
LOX LOADING	DS50	Same as launcher NO. 1	
LOX LOADED	DS51	Same as launcher NO. 1	
RAISE LAUNCHER	S24 and DS52	Same as launcher NO. 1	
FUEL VALVES OPEN	DS53	Same as launcher NO. 1	
MISSILE TANKS PRESS'D	DS54	Same as launcher NO. 1	
LAUNCH	S25 and DS55	Same as launcher NO. 1	
POWER TRANSFERRED	DS56	Same as launcher NO. 1	
GUIDANCE LOCKED ON	DS57	Same as launcher NO. 1	
LOOP CHECK COMPL	DS58	Same as launcher NO. 1	
LIFT OFF	DS59	Same as launcher NO. 1	
LOWER LAUNCHER	S26 and DS60	Same as launcher NO. 1	
EXERCISE 3	S27, S28, DS61, and DS62	Same as launcher NO. 1 with the exception that S28 is a spare switch and is not used.	
BACK PANEL, LAUNCH CONTROL CONSOLE (SEE FIGURE 1-5.)			
LAMP VERIFY	S19	Two-position, momentary on toggle switch	When switch is set to ON, checkout power from CC is supplied to spare lamp

Figure 1-3. Table of Operating Controls and Indicators (Sheet 7 of 8)

CONTROL OR INDICATOR	REFERENCE DESIGNATION	DESCRIPTION	FUNCTION
			quadrants of all panel indicator lamps. When switch is set to OFF, all power is removed.

Figure 1-3. Table of Operating Controls and Indicators (Sheet 8 of 8)

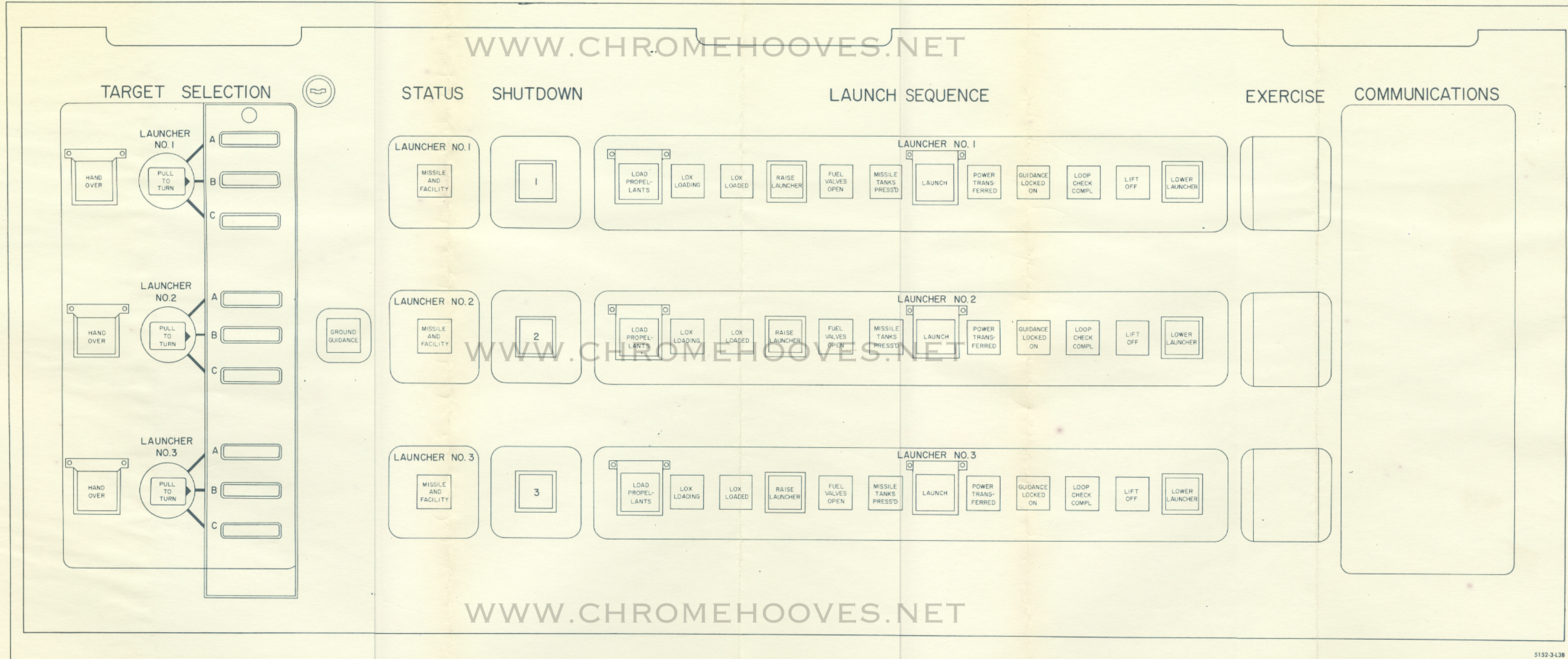


Figure 1-4. Front Panel Controls and Indicators

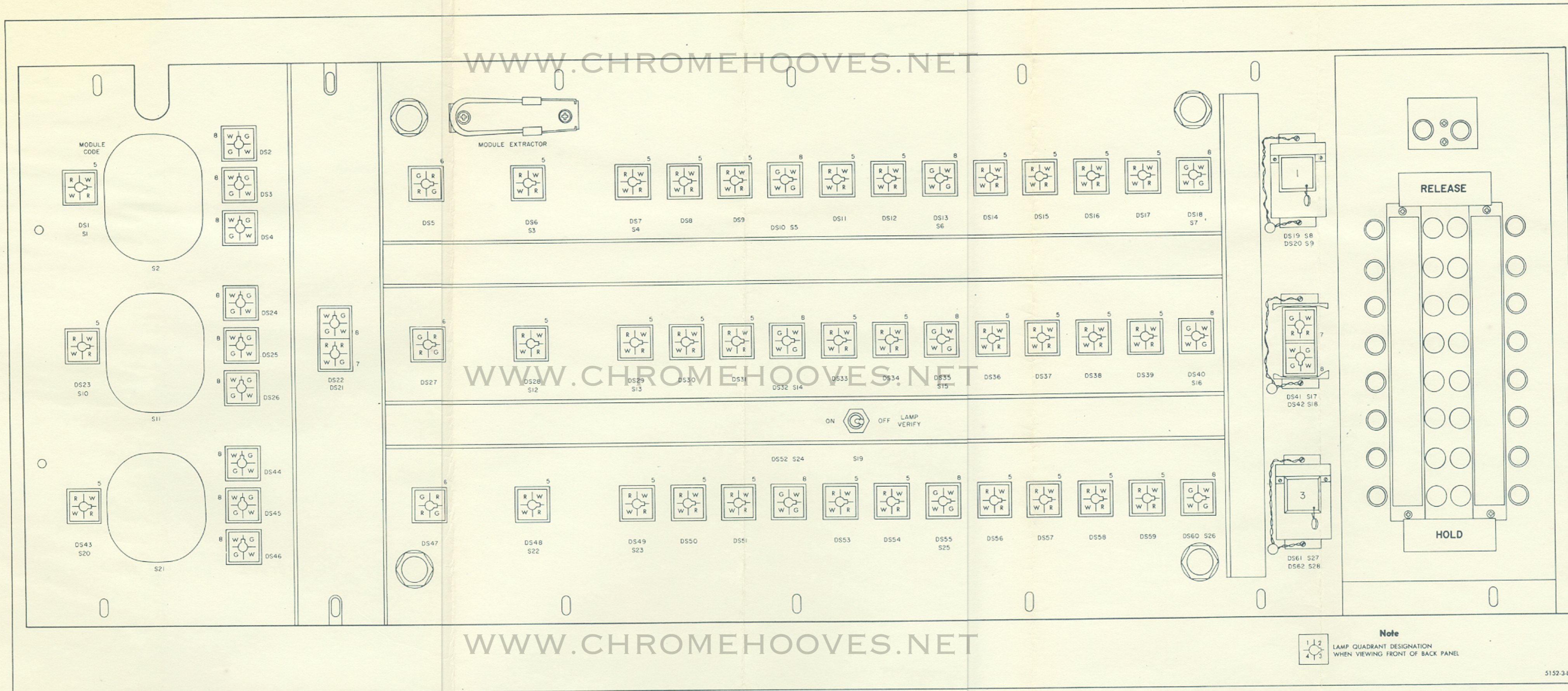


Figure 1-5. Back Panel Operating Controls and Indicators

SECTION II

PREPARATION FOR USE AND RESHIPMENT

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SECTION III

TEST EQUIPMENT AND SPECIAL TOOLS

3-1. This section contains information on test equipment and special tools required to perform maintenance of the equipment described in Section VII of this manual.

3-2. TEST EQUIPMENT.

3-3. Test equipment required for field maintenance of the launch control console is listed in figure 3-1.

3-4. SPECIAL TOOLS.

3-5. The module extractor (Martin-Denver Standard Part NO. 60D1-1) is the only special tool required for the launch control console. This tool is illustrated in figure 7-7.

FIG. AND INDEX NO.	NAME	AN TYPE DESIGNATION	ALTERNATE	USE AND APPLICATION
	Multimeter	AN/PSM-6	Or equivalent	To measure voltage
	Power supply	Hewlett-Packard model 712B	Or equivalent	To generate DC voltage

Figure 3-1. Table of Test Equipment

SECTION IV

THEORY OF OPERATION

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SECTION V

DESCRIPTION OF SYSTEM TIE-IN OF EQUIPMENT AND ACCESSORIES

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SECTION VI

CHECK-OUT OR ANALYSIS

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