SATURN V

Laboratory Maintenance Instruction for LTE

D R/A

Volume I

ACME, ADAPT, and ASTEC

IBM

Federal Systems Division
Owego, New York

VOLUME I OF V

Laboratory Maintenance Instructions

SATURN V
LAUNCH VEHICLE DIGITAL COMPUTER AND LAUNCH VEHICLE DATA ADAPTER TEST EQUIPMENT

(International Business Machines Corporation)

Contract NAS 8-11561

VOLUME I

Aerospace Computer Manual Exerciser (IBM Part No. 6900000)

Aerospace Data Adapter/Processor Tester (IBM Part No. 6900500)

Aerospace System Test And Evaluation Console (IBM Part No. 6940000)

23 OCTOBER 1964

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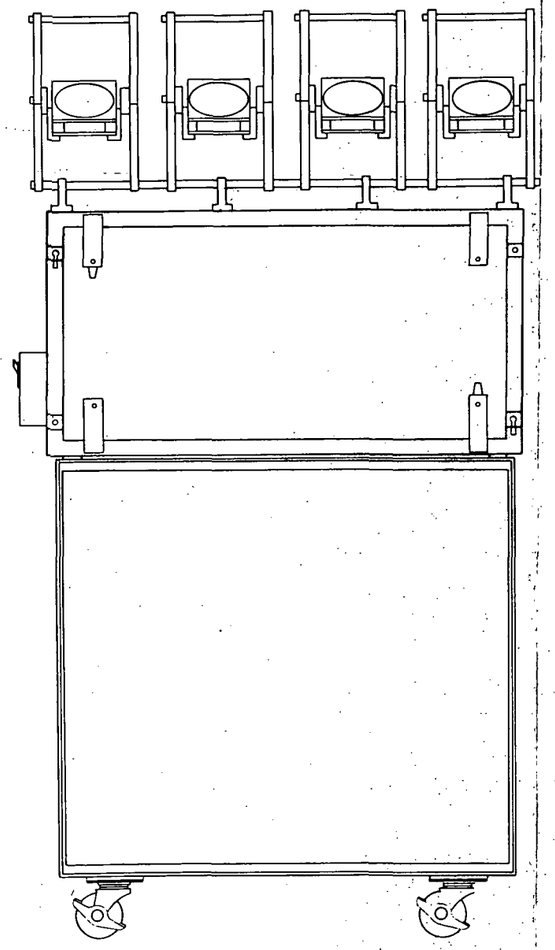
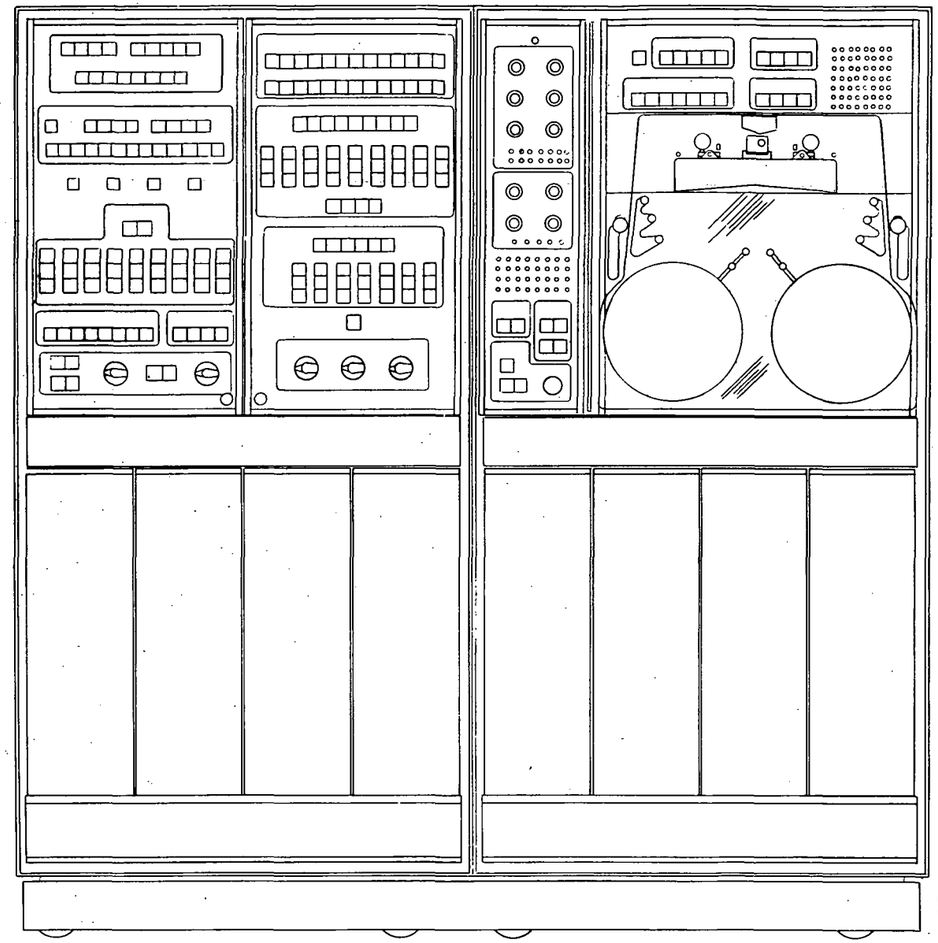
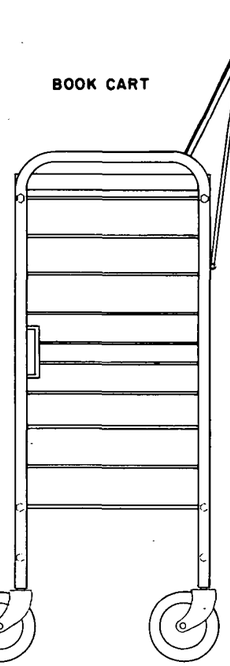
EQUIPMENT TEST STAND



LVDCME



BOOK CART



ACME

Figure 1-1. Saturn V Laboratory Test Equipment

SECTION I

INTRODUCTION AND DESCRIPTION

1-1. INTRODUCTION.

1-2. PURPOSE OF MANUAL.

1-3. This manual provides laboratory maintenance instructions for the Saturn V Aerospace Computer Manual Exerciser (ACME), NASA part number (Not Available), IBM part number 6900000 M1; the Aerospace Data Adapter/Processor Tester (ADAPT), NASA part number (Not Available), IBM part number 6900500; and the Aerospace System Test and Evaluation Console (ASTEC), NASA part number (Not Available), IBM part number 6940000 (see figure 1-1). This test equipment is manufactured by the International Business Machines Corporation, Federal Systems Division, Rockville, Maryland.

1-4. This manual consists of five volumes. Each volume (except Volume I) contains the maintenance instructions for the individual assemblies that make-up the three test sets mentioned in paragraph 1-3. This volume (Volume I) contains information necessary to identify and interconnect the individual assemblies into each of the three test set configurations. Also contained in this volume are the procedures required for preparing the test sets for use, storage and shipment and for turning-on or off power to the test sets. The following list identifies the assembly or assemblies contained in each of the remaining volumes:

Volume	Assembly
II	Equipment Test Stand (two configurations) and Temperature Modulator
III	Launch Vehicle Digital Computer Manual Exerciser (LVDCME)
IV	Launch Vehicle Data Adapter Manual Exerciser (LVDAME)
V	Programmable Test Controller (PTC)

1-5. The following list identifies the volumes of the manual required to obtain the complete maintenance instructions for each individual test set:

Test Set	Volumes
ACME	I, II, and III
ADAPT	I, II, IV, and V
ASTEC	I, II, III, IV, and V

1-6. Maintenance instructions for those test set assemblies not built or modified by the Federal Systems Division are not included in this manual, but are supplied separately. (Refer to the list of related manuals.)

1-7. PURPOSE OF EQUIPMENT.

1-8. The following list describes the purpose of each test set:

Test Set	Purpose
ACME	To evaluate the launch Vehicle Digital Computer (LVDC), hereinafter referred to as the computer.
ADAPT	To evaluate the launch Vehicle Data Adapter (LVDA), hereinafter referred to as the data adapter.
ASTEC	To evaluate both the computer and data adapter separately or to evaluate the computer/data adapter marriage.

1-9. DESCRIPTION.

1-10. TEST SET CONFIGURATIONS.

1-11. The test sets shown in figure 1-1 consist of separate cabinets (or consoles) that are utilized to make up the complete test set. These separate cabinets (except Test Stand 6940100) are used in two of the test set configurations. The individual cabinets are interchangeable between the test sets in which they are used. Figure 1-2 lists the test sets, the assemblies (cabinets) that make up the test sets, the assembly part number and the volume of this manual that contains the maintenance instructions for each assembly.

1-12. PHYSICAL DESCRIPTION.

1-13. Figure 1-3 lists the over-all dimensions, weight and floor space requirements for each test set. Refer to Volumes II through V for the dimensions and weights of the individual assemblies.

1-14. Volumes II through V describe the physical construction of each of the assemblies. Section II of this volume describes the placement of the assemblies and the interconnection between assemblies in the test set installation configuration.

1-15. POWER REQUIREMENTS.

1-16. Figure 1-4 lists the power requirements for each test set. The power requirements for the individual assemblies are contained in Volumes II through V.

Test Set	Assemblies	IBM Part No.	Maintenance Instructions Volume No.
ACME	Equipment Test Stand	6940100	II
	LVDCME	6902000 M1	III
	Book Cart	6900039	(None Required)
ADAPT	Equipment Test Stand	6943000	II
	Temperature Modulator	6903900	II
	LVDAME	6942000	IV
	Programmable Test Controller	6900900	V
	Input/Output Printer (IBM Type 735)		*
	Book Carts		(None Required)
ASTEC	Equipment Test Stand	6943000	II
	Temperature Modulator	6903900	II
	LVDCME	6902000 M1	III
	LVDAME	6942000	IV
	Programmable Test Controller	6900900	V
	IBM 1443 MOD 1 Printer	6941000	*
	Book Carts		(None Required)

*Refer to the list of related manuals.

Figure 1-2. Test Sets Configurations

Test Set	Length	Depth	Height	Weight	Floor Space
ACME	8 FT	34 IN.	69 IN.	2100 LB	154 SQ FT
ADAPT	19 FT	34 IN.	71 IN.	5400 LB	275 SQ FT
ASTEC	28 FT	34 IN.	71 IN.	8100 LB	400 SQ FT

Figure 1-3. Physical Description

Test Set	Phase	Frequency	Voltage	Current
ACME	3 phase, 5 wire, wye connected, phase sequence-ABC	60 ± 5 CPS	115.0 ± 11.5 VAC line-to-neutral	208 VAC line-to-line (MIN), 20 AMP (MIN), 30 AMP (MAX) per phase
ADAPT	3 phase, 5 wire, wye connected, phase sequence-ABC	60 ± 5 CPS	115.0 ± 11.5 VAC line-to-neutral	208 VAC line-to-line (MIN), 60 AMP (MIN), 80 AMP (MAX) per phase
ASTEC	3 phase, 5 wire, wye connected, phase sequence-ABC	60 ± 5 CPS	115.0 ± 11.5 VAC line-to-neutral	208 VAC line-to-line (MIN), 70 AMP (MIN), 110 AMP (MAX) per phase

Figure 1-4. Power Requirements

SECTION II

PREPARATION FOR USE, STORAGE AND SHIPMENT

2-1. PREPARATION FOR USE (ACME).

2-2. ASSEMBLY.

2-3. There are no assembly procedures for the ACME. The LVDCME and the Test Stand are not electrically or physically connected together. The only connections that exist between the test stand and the LVDCME are the cable connections between the computer and the LVDCME after the computer is mounted on the test stand. Lift Handles, IBM part number D-656101, shall be used for lifting the computer when installing it on the test stand. See figure 2-1 for the computer and LVDCME cable connections.

WARNING

As soon as the external power cables are connected to the ACME, a chassis ground check through the cables must be made as a safety measure. A short circuit must be measured (use ohmmeter) between cable connector case nearest the power source and the ACME frame.

2-4. INSTALLATION.

2-5. When installing the ACME, the test stand shall be placed to the left side of the LVDCME so that the computer and LVDCME may be interconnected. The book cart shall be located near the ACME so that the drawings and manuals are accessible. Figure 1-3 lists the floor space required for the ACME. Approximately three feet of open area should be left around the ACME for work space.

2-6. TESTS.

2-7. To determine operability of the ACME perform the tests described in Volume II, Section V (test stand) and Volume III, Section V (LVDCME).

2-8. PREPARATION FOR USE (ADAPT and ASTEC). (These procedures will be supplied with the equipment delivery.)

2-9. PREPARATION FOR STORAGE (ACME).

2-10. Prior to preparing the ACME for storage, disconnect the computer from the LVDCME, remove the computer from the test stand, and disconnect the test stand and LVDCME from facility power. Prepare the test stand and LVDCME for storage as described in Volume II, Section V and Volume III, Section V, respectively.

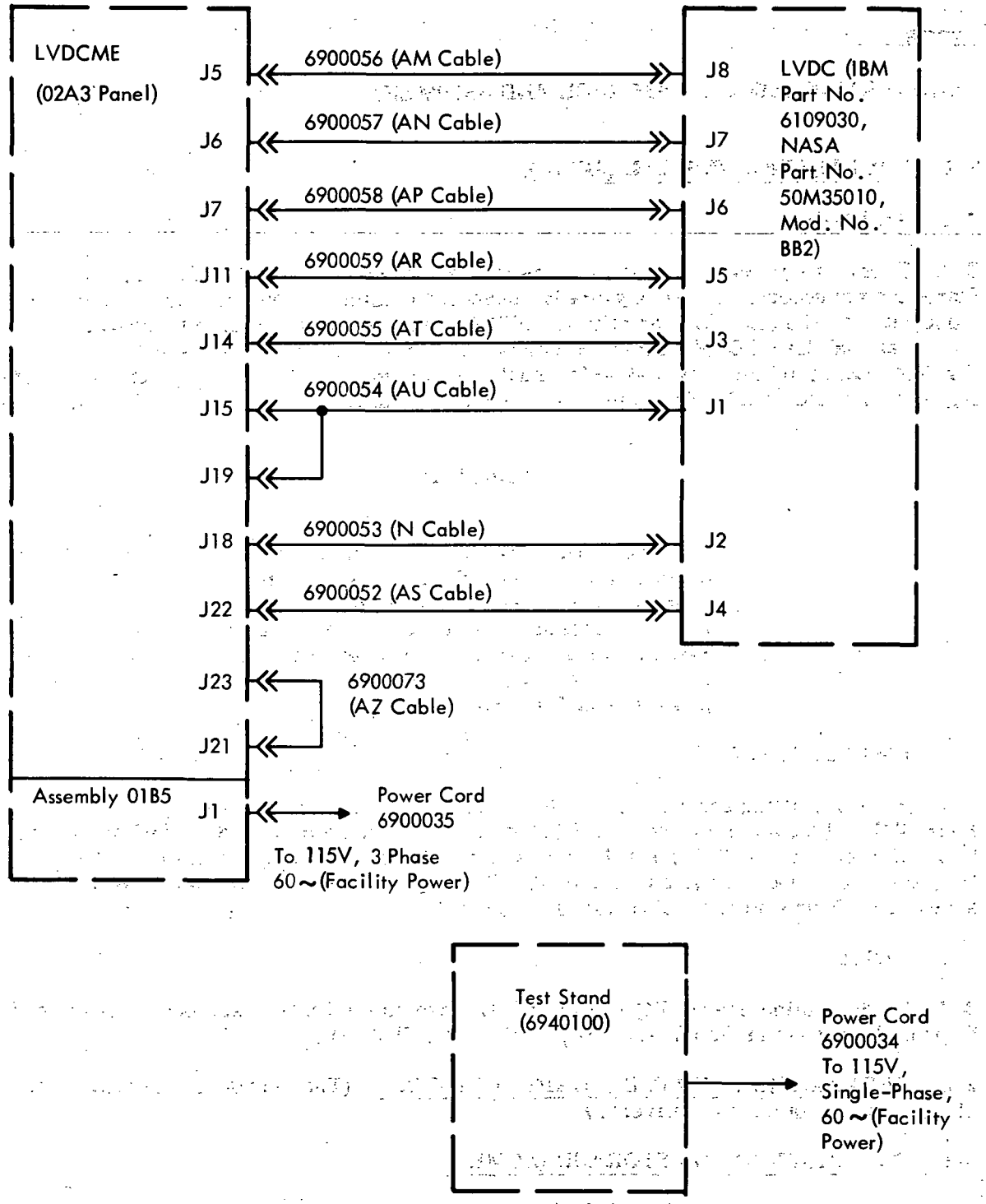


Figure 2-1. ACME Interconnection Diagram Showing LVDC Connections

2-11. PREPARATION FOR STORAGE (ADAPT and ASTEC). (These procedures will be supplied with the equipment delivery.)

2-12. PREPARATION FOR SHIPMENT (ACME).

2-13. Prior to preparing the ACME for shipment, disconnect the computer from the LVDCME, remove the computer from the test stand and disconnect the test stand and LVDCME from facility power. Prepare the test stand and LVDCME for shipment as described in Volume II, Section V and Volume III, Section V, respectively.

2-14. PREPARATION FOR SHIPMENT (ADAPT and ASTEC). (These procedures will be supplied with the equipment delivery.)

SECTION III

POWER CONTROL PROCEDURES

3-1. GENERAL.

3-2. This section describes the turn-on and turn-off procedures for each complete test set. Volumes II through V contain turn-on and turn-off procedures for the individual consoles.

3-3. TURN-ON (ACME).

3-4. After the ACME has been connected to facility power and the computer has been installed on the ACME as described in Section II of this volume, turn-on power as follows:

a. Observe that MAIN POWER, POWER OFF lamp (POWER CONTROL panel) is lit.

NOTE

If the MAIN POWER, POWER OFF lamp is not lit, check that all interlock switches are closed, the EMERGENCY PULL switch is reset (pushed-in), and that all circuit breakers located in end panel 01B11 are ON.

b. Ascertain that all AC ON and ON switches on the power supplies located at the rear of the LVDCME are at ON position.

c. Press and release MAIN POWER, POWER ON pushbutton lamp (POWER CONTROL panel) and allow 15 minutes minimum for power supply warm-up. Note that MAIN POWER, POWER ON lamp lights; ϕA, ϕB, ϕC, and FAN lamps light; MAIN POWER, POWER OFF lamp goes out; COMP POWER, SEQ OFF lamp lights; and ACME POWER, SEQ OFF lamp lights.

d. Press, hold (five seconds) and release ACME POWER, SEQ ON pushbutton/lamp. Note that ACME POWER, SEQ OFF lamp goes out and ACME POWER, SEQ ON lamp lights after noticeable delay.

e. Press and release COMP POWER, SEQ ON pushbutton/lamp. Note that COMP POWER, SEQ OFF lamp goes out and COMP POWER, SEQ ON lamp lights after approximately 3 seconds delay.

f. Operate power switch on test stand to on (up) position. Note that cooling fans on test stand are operating.

3-5. EMERGENCY-OFF PROCEDURE (ACME).

3-6. To remove power from the LVDCME in case of an emergency, pull-out EMERGENCY PULL switch on the POWER CONTROL panel. Note that POWER OFF lamp goes out.

3-7. TURN-OFF (ACME).

3-8. Turn-off power as follows:

a. Press and release COMP POWER, SEQ OFF pushbutton/lamp. Note that COMP POWER, SEQ ON lamp goes out and COMP POWER, SEQ OFF lamp lights.

b. Press and release ACME POWER, SEQ OFF pushbutton/lamp. Note that ACME POWER, SEQ ON lamp goes out and ACME POWER, SEQ OFF lamp lights.

c. Press and release MAIN POWER, POWER OFF pushbutton lamp. Note that MAIN POWER, POWER OFF lamp lights and all other lamps go out.

d. Operate power switch on test stand to off (down) position. Note that cooling fans on test stand stop operating.

3-9. TURN-ON (ADAPT and ASTEC). (These procedures will be supplied with the equipment delivery.)

3-10. TURN-OFF (ADAPT and ASTEC). (These procedures will be supplied with the equipment delivery.)

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