Report No. ARD-140-17-79

8/79

OPERATOR'S GUIDE

DABS/ARTS III SYSTEM

ADS AND TIV PROGRAM

James E. Wilson

August 1979

79-0637

DEVELOPMENT PROGRAMING BRANCH
ATC SYSTEMS DIVISION
SYSTEMS RESEARCH AND DEVELOPMENT SERVICE
FEDERAL AVIATION ADMINISTRATION

TABLE OF CONTENTS

Table of Contents	i - ii
List of Illustrations	iii
Section 1 - Introduction	
1.1 Purpose and Scope	1
Section 2 - Operational Environment	2
2.1 Equipment Requirements	2
2.2 Program Materials	4
Section 3 - TIV Computer Program Operator's Guide	
3.1 Pre-Operational Procedures	5
3.1.1 Equipment Set Up	5
1. MDBM	5
2. CMC Switch Settings	5
A. Simulation Mode	5
B. Sensor Mode	6
3. Display Switch Settings	6
4. IOMEC Disc	6
5. IOP (B) Switch Settings	7
3.1.2 TIV Data Reduction Program	7
3.2 Computer Program Set Up	7
3.2.1 TIV Program Set UP	7
A. At the IMT	7
B. At the IOMEC Disc	7
C. Loading NDRO	7-9
D. Copying Removable Disc to Fixed Disc	9
E. TIV Program Initialization	9
F. TIV Program Execution	10-11
3.3 TIV Data Reduction Program	11

Section 4 - ADS Computer Program Operator's Guide 12

4.1 ADS Pre-Operational Procedures 12
4.1.1 Equipment Set Up 12

1. MDBM 12
2. CMC Switch Settings 12
   A. Simulation Mode 12
   B. Sensor Mode 13
3. Display Switch Settings 13
4. IOMEC Disc 13
5. IOP (B) Switch Settings 13

4.1.2 ADS Data Reduction Program 14
4.2 Computer Program Set Up 14
4.2.1 ADS Program Set Up 14

A. At the IMT 14
B. At the IOMEC Disc 14
C. Loading NDRO 14-15
D. Copying Removable Disc to Fixed Disc 16
E. ADS Program Initialization 16
F. TIV Program Execution 17

4.3 ADS Data Reduction Program 18

List of Illustrations

System Block Diagram 3

IOP Maintenance Panel 19

CMC Switching Panel 20

CMC Patch Panel 21

Display Front Panel 22

Display Rear Panel 23

Back to Back Switches 24

INTRODUCTION

1.1 Purpose and Scope

This document provides the basic information required to operate the DABSEM/ARTS III Terminal Interface Verification Program (TIV) and the All Digital System Program (ADS) on the equipment presently installed at NAFEC in the Terminal Automated Test Facility (TATF).

Prior to running the TIV or the ADS program a knowledge of the equipment required is necessary. Section 2.0 describes the TATF requirements and configuration to run either program, TIV or ADS.

Section 3.0 describes system operational procedures for the TIV program from pre-operational steps to program initialization.

Section 4.0 describes system operational procedures for the ADS program from pre-operational steps to program initialization.

SECTION 2

OPERATIONAL ENVIRONMENT

2.1 Equipment Requirements

The DABS/ARTS software requires the following hardware:

- 2 Input/Output Processors, Type B (IOPB)
- 1 Control Memory Access Unit (CMA)
- 8 Memory Modules
- 1 Univac 9300
- 1 Univac VIC
- 2 Multiplexed Display Buffer Memory (MDBM)
- 6 Full Digital Data Entry and Display Subsystems (F/D DEDS)
- 1 Integral Magnetic Tape Unit (IMT)
- 1 ASR-37 (TTY)
- 1 IOMEC Disc
- 1 Communications Multiplexor Controller (CMC)
- 2 Radar Receiver Adapters (RRA)
- 1 CIDIN Receiver Adapter (CRA)
- 1 CIDIN Transmitter Adapter (CTA)
- 1 Surveillance Patch Panel
- 1 Communications Patch Panel
- 4 Modems

The configuration for this hardware is presented in Figure 2.1.

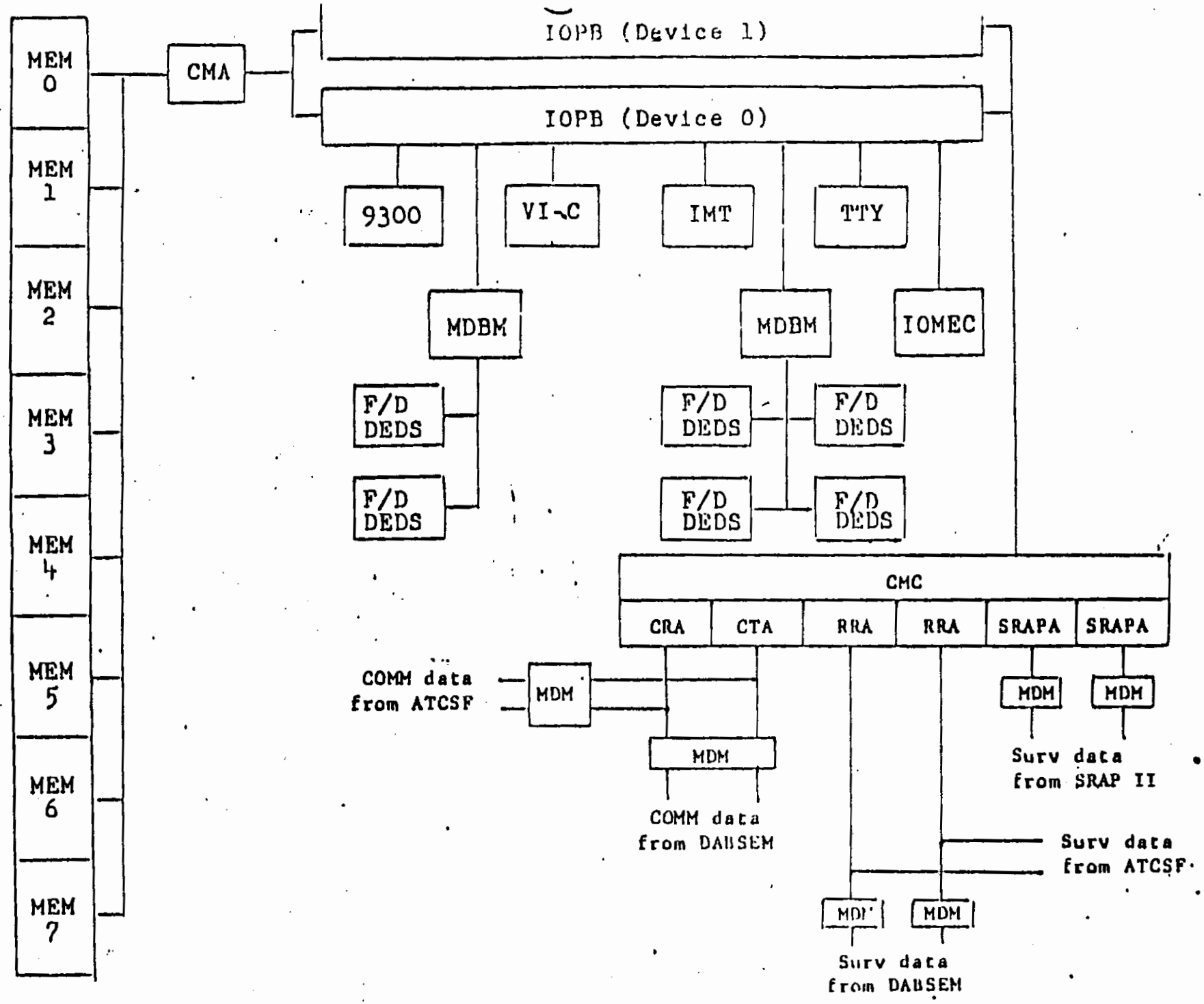


Figure 1.1. DABS/ARTS System Block Diagram (TATF SYSTEM 3)

2.2 Program Materials

The program materials discussed in this document are available at the TATF. Specifically:

- The DABS software resides on the DABS System Disc which is available in the TATF Tape Library.

- The DABS Data Reduction software resides on the DABS Data Reduction Disc which is available in the TATF Tape Library.

Section 3

TIV Computer Program Operator's Guide

3.1 Pre-Operational Procedures

3.1.1 Equipment Setup

The following hardware is required in order to run the Terminal Interface Verification Program (TIV):

1. MDBM - No special procedures are required for the MDBM as it is normally powered on; nevertheless, have the technicians check it.

2. CMC - Set switches at the switching panel to positions specified. (See page 20)

A. MODE: Simulation - from DSF/FR1800

Switch	Position
Surveillance #1	Simulation
Surveillance #2	Simulation
Communication	MODEM

At the Patch Panel (See page 21)

MODEM 1	patched to	NAFEC [Elwood] Surveillance 1
Surveillance 1 -	Send	Send
	Receive	Receive
MODEM 2	patched to	Surveillance 2
Surveillance 2 -	Send	Send
	Receive	Receive
MODEM 3	NOT patched	COMM
COMM -	Send - Removed	Send - plugged
	Receive - Removed	Receive - plugged

B. MODE: Sensor [NAFEC, Elwood, Clementon]

Set switches at the switching panel to positions specified.

Switch	Position
Surveillance # 1	MODEM
Surveillance # 2	MODEM
Communication	MODEM

At the Patch Panel

MODEM 1	patched to	NAFEC [Elwood, Clementon] Surveillance 1
Surveillance 1 - Send		Send
Receive		Receive
MODEM 2	patched to	Surveillance 2
Surveillance 2 - Send		Send
Receive		Receive
MODEM 3	patched to	COMM
COMM - Send		Send
Receive		Receive

3. F/D (See pages 22 & 23)
   DEDS - TIV uses displays V8 and V9. In order to be in the vector mode, the switch's labeled B on the displays front panels need to be in the down position and the three-position switch in the rear of both displays needs to be in the far right position (also labeled position B).

4. IOMEC
   DISC - No special procedures are required for the IOMEC disc as it is normally powered on; nevertheless, have the technicans check it.

5. IOP(B) - All back-to-back switches should be in the down position. The ESI switch on Device 0 needs to be in the on position. The scatter interrupt switches should be in the down position. All other switch and key requirements are discussed in the software setup subsections. (See page 24 for back to back switches)

3.1.2 TIV Data Reduction Program

Since the TIV Data Reduction runs under MCP control, its equipment setup requirements are the same as those of MCP.

3.2 Computer Program Setup

3.2.1 TIV Program

The following steps are required in order to set up and initiate the TIV program:

A. At the IMT

Step 1. Load scenario tape on IMT

Step 2. Load scratch tapes on TD0 and TD1

B. At the IOMEC Disc

Step 1. Install the DABS System Disc in the IOMEC Disc Drive

Step 2.	Protect switch	Protect
Step 3.	Power switch	On
Step 4.	Master clear	Depress

C. Loading the modified FS^2NDRO (See page 19)

Step 1. At both IOP Panels, Set the following switches to position specified.

	Switch	Position
a.	Auto start	up
b.	I/O ACK long	down
c.	RTC enable	up
d.	Parity stop	down
e.	Fault stop	down
f.	Buffer step enable	down
g.	FS^2/ARTS III	FS^2
h.	Load	I
i.	Debug/Stop	Debug

Step 2. On IOP Device 0

Set the following switches to position specified

	Switch	Position
a.	Master clear	Depress
b.	Switch 7	Up
c.	Set Q to	00001 00005
d.	Enable load	Depress
e.	Start	Depress

IOP will come to a 7-stop

Step 3. On both IOP's

Set the following switches to position specified.

	Switch	Position
a.	Master clear	Depress
b.	Set P to	14000
c.	Switch 4 and 5	Up
d.	Switch 6 and 7	Middle
e.	Switch 1, 2 and 3	Down
f.	Start switch	Depress

IOP will come to a 4-stop

g.	Enable NDRO switch	Down
h.	Start switch	Depress

IOP will come to a 4-stop

i.	Load switch	II
j.	Start switch	Depress
	IOP will come to a 4-stop	
k.	Load switch	III
l.	Start switch	Depress
	IOP will come to a 5-stop	
m.	Load switch	I
n.	Enable NDRO switch	Up
o.	Master clear switch	Depress

D. (Optional)

Copying the DABS System Disc to the fixed disc

Step 1. On IOP device 0

a. Set Q to 00001 00003, depress ENABLE LOAD, and depress START. "NEXT?" will be typed on the TTY.

b. Type "BUP (carriage return)" on the TTY. "BUP-DISC VERSION BUP?" will be typed on the TTY.

c. Set the PROTECT SWITCH on the disc unit up and type "CPF (carriage return)" on the TTY (copy removable disc to fixed disc). After the contents of the removable disc have been copied on the fixed disc, "BUP?" will by typed on the TTY.

d. Depress STOP on the IOP.

e. Set the PROTECT SWITCH on the disc unit down.

E. Initializing the DABS TIV Program:

Step 1. On both IOP's

Set the following switches to the position specified

Switch	Position
a. Master clear	Depress
b. Switch 4, 5 and 6	Down
c. Switch 2 and 7	Up
d. Set MLO registers for 8 banks of memory	

Step 2. On IOP Device 0

Set the following switches to the position specified

Switch	Position
a. FS^2/ARTS III	ARTS III

b. Make the following core changes using the INSPECT AND CHANGE feature:

P= 1400 - 00000 00003 (contents of Z)
00000 00001 (when using one IOP)
1401 - 00000 00377
1402 through 1410 - 00000 00000

c. FS^2/ARTS III — FS^2

F. Executing the DABS TIV Program

Step 1. On both IOP's

a. Depress STOP and MASTER CLEAR.
b. Set the DEBUG/START SWITCH to the DEBUG position.

Step 2. On IOP Device 0

a. Set Q = 00000 00013 (or to 00001 00013 if steps under B omitted), (15 disc was not copied down) depress ENABLE LOAD, and depress START. IOP will come to a 7-STOP.

Step 3. On IOP Device 1

a. Set bit 6 in the STATUS REGISTER, set p to 10000, and depress START
b. Run Light will be illuminated.

Step 4. On IOP Device 0

a. Depress START. The TTY will type "DEBUG REQUESTS".
b. If no patches are to be read into core, type "IN NO (control EOT)" on the TTY. TTY will type "READY".
c. If patches are to be read into core, proceed as in the ADS program. F. Step 4. If no patches than go to Step d.
d. Type "IN XQT (control EOT)" on the TTY.
e. If target generator is desired type "TK IA TG (control EOT)" on the TTY.
TTY will type "OK 001".

Note: the System should now be cycling.

When Q is depressed it should be lit along with the bottom lights of the display register.

f. In the event of system abort, go to F. Step 1 and Repeat the sequence through Step 4.

3.3 TIV Data Reduction Program

In order to run the TIV Data Reduction Software, follow the MCP loading and Initializing Instructions.

4.1 Pre-Operational Procedures

4.1.1 Equipment Setup

The following hardware is required to be set up in order to run the All Digital System Program (ADS).

1. MDBM - No special setup procedures are required for the MDBM as it is normally powered on; nevertheless have the technicians check it.

2. CMC - Set Switches at the switching panel to positions specified. (See page 20)

A. MODE: Simulation from DSF/FR180

Switch	Position
Surveillance #1	Simulation
Surveillance #2	Simulation
Communication	MODEM

At the Patch Panel (See page 21)

MODEM 1	patched to	NAFEC [Elwood] Surveillance 1
Surveillance 1 -	Send	Send
	Receive	Receive
MODEM 2	patched to	Surveillance 2
Surveillance 2 -	Send	Send
	Receive	Receive
MODEM 3	Not patched	COMM
COMM -	Send - Removed	Send - plugged
	Receive - Removed	Receive - plugged

B. MODE: Sensor [NAFEC, Elwood, Clementon] Set switches at the switching panel to positions specified.

Switch	Position
Surveillance #1	MODEM
Surveillance #2	MODEM
Communication	MODEM

At the Patch Panel

MODEM 1	patched to	NAFEC [Elwood, Clementon] Surveillance 1
Surveillance 2 - Send		Send
Receive		Receive
MODEM 3	patched to	COMM
COMM - Send		Send
Receive		Receive

3. F/D (See pages 22 & 23)
   DEDS - ADS uses displays V7, V8, V9, H2 and H4. In order to be in the vector mode, the switch labeled B on the displays front panels needs to be in the down position. The three-position switch in the rear of the displays need to be in the far right position (also labeled position B).

4. IOMEC
   DISC - No special procedures are required for the IOMEC disc as it is normally powered on; nevertheless have the technician check it.

5. IOP(B)- All back-to-back switches should be in the down position. The ESI switch on Device 0 needs to be in the on position. The scatter interrupt switches should be in the down position. All other switch and key requirements are discussed in the software setup subsections. (See page 24 for back to back switches)

4.1.2 ADS Data Reduction Program

Since the ADS Data Reduction runs under MCP control, its equipment setup requirements are the same as those of MCP.

4.2 Computer Program Setup

4.2.1 ADS Program

The following steps are required in order to set up and initiate the ADS program:

A. At the IMT

Step 1. Load scenario tape on IMT

Step 2. Load scratch tapes on TD0 and TD1

B. At the IOMEC Disc

Step 1. Install the DABS System Disc in the IOMEC Disc Drive

Step 2.	Protect switch	Protect
Step 3.	Power switch	On
Step 4.	Master clear	Depress

C. Loading the modified FS^2NDRO

Step 1. At both IOP Panels, Set the following switches to position specified.

	Switch	Position
a.	Auto start	up
b.	I/O ACK long	down
c.	RTC enable	up
d.	Parity stop	down
e.	Fault stop	down
f.	Buffer step enable	down
g.	FS^2/ARTS III	FS^2
h.	Load	I
i.	Debug/Stop	Debug

Step 2. On IOP Device 0

Set the following switches to position specified

	Switch	Position
a.	Master clear	Depress
b.	Switch 7	Up
c.	Set Q TO	00001 00005
d.	Enable load	Depress
e.	Start	Depress

IOP will come to a 7-stop

Step 3. On both IOP's

Set the following switches to position specified.

	Switch	Position
a.	Master clear	Depress
b.	Set P to	14000
c.	Switch 4 and 5	Up
d.	Switch 6 and 7	Middle
e.	Switch 1, 2 and 3	Down
f.	Start switch	Depress

IOP will come to a 4-stop

g.	Enable NDRO switch	Down
h.	Start switch	Depress

IOP will come to a 4-stop

i.	Load switch	II
j.	Start switch	Depress

IOP will come to a 4-stop

k.	Load switch	III
l.	Start switch	Depress

IOP will come to a 5-stop

m.	Load switch	I
n.	Enable NDRO switch	Up
o.	Master clear switch	Depress

D. (Optional)

Copying the DABS System Disc to the fixed disc.

Step 1. On IOP Device 0

a. Set Q to 00001 00003, depress ENABLE LOAD, and depress START. "NEXT?" will be typed on the TTY.
b. Type "BUP (carriage return)" on the TTY. "BUP-DISC VERSION BUP?" will be typed on the TTY.
c. Set the PROTECT SWITCH on the disc unit up and type "CRF (carriage return)" on the TTY. After the contents of the removable disc have been copied on the fixed dis, "BUP?" will be typed on the TTY.
d. Depress STOP on the IOP.
e. Set the PROTECT SWITCH on the disc unit down.

E. Initializing the DABS ADS Program:

Step 1. On both IOP's

Set the following switches to the position specified

	Switch	Position
a.	Master clear	Depress
b.	Switch 4, 5 and 6	Down
c.	Switch 2 and 7	Up
d.	Set MLO registers for 8 banks of memory	

Step 2. On one IOP

Set the following switches to the position specified

	Switch	Position
a.	FS^2/ARTS III	ARTS III

b. Make the following core changes using the INSPECT AND CHANGE feature:

P= 1400 - 00000 00003 (contents of Z)
00000 00001 (if only one IOP is being used)
1401 - 00000 00377
1402 through 1410 - 00000 00000

c. FS^2/ARTS III FS^2

F. Executing the DABS ADS Program

Step 1. On both IOP's

a. Depress STOP and MASTER CLEAR.
b. Set the DEBUG/START SWITCH to the DEBUG position.

Step 2. On IOP Device 0

a. Set Q = 00000 00014 (or to 00001 00014 if steps under D omitted), (Disc was not copied). Depress ENABLE LOAD, and depress START. IOP will come to a 7-STOP.

Step 3. On IOP Device 1

a. Set bit 6 in the STATUS REGISTER, set p to 10000, and depress START.

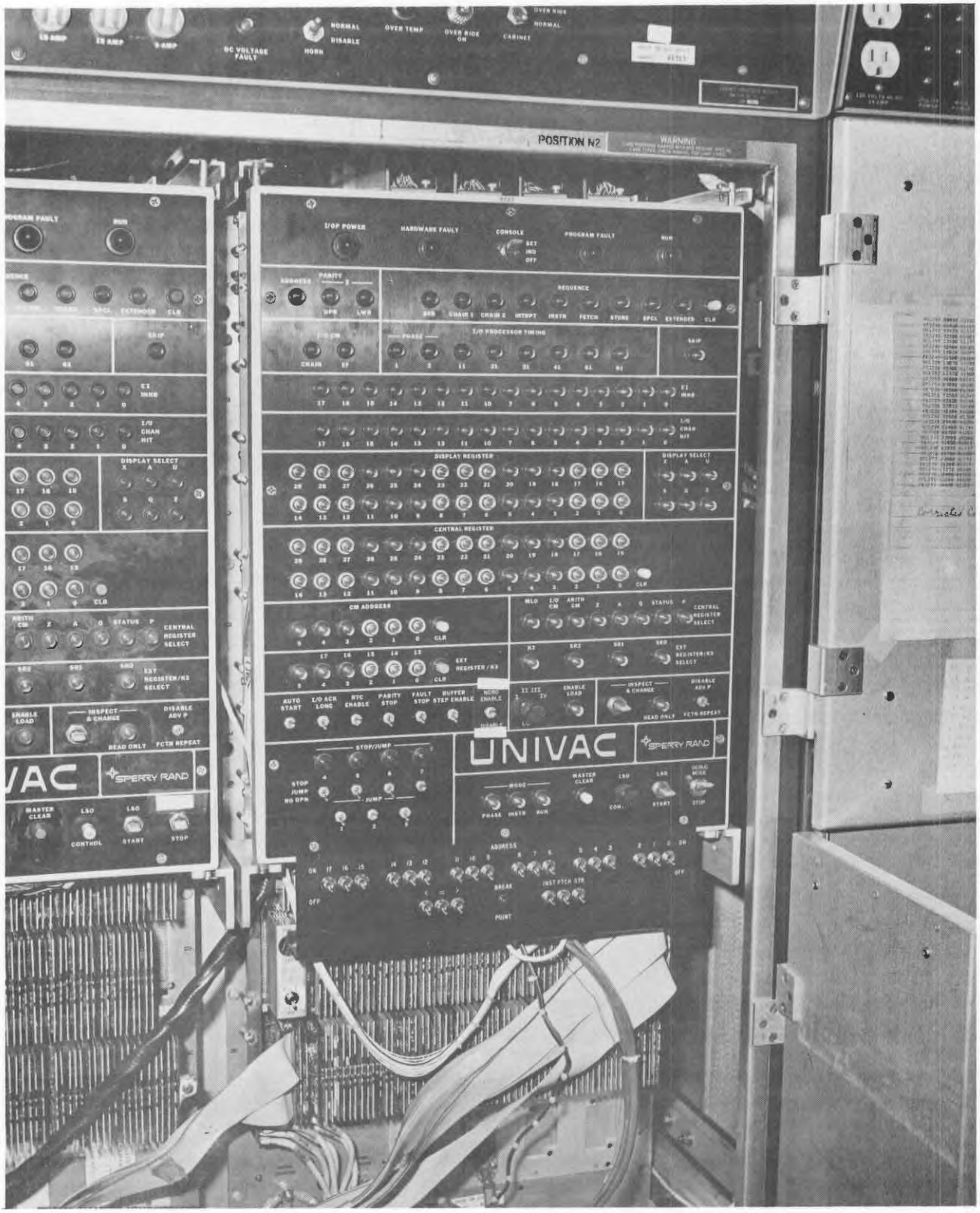
Step 4. On IOP Device 0

a. Depress START. The TTY will type "DEBUG REQUESTS."
b. If no patches are to be read into core, type "IN NO (control EOT)" on the TTY. TTY will type "READY". If a patch deck is to be read into core, place this deck in the 9300 Card Reader, read one card, and type "DB CR (control EOT)" on the TTY. The patch deck will be read into core. After the read is completed, type "IN NO (control EOT)" on the TTY. TTY will type "READY".
c. Type in "IN XQT (control EOT)" on the TTY.
d. If target generator is desired; type in "TK IA TG (control EOT)" on the TTY. TTY will type "OK 001".

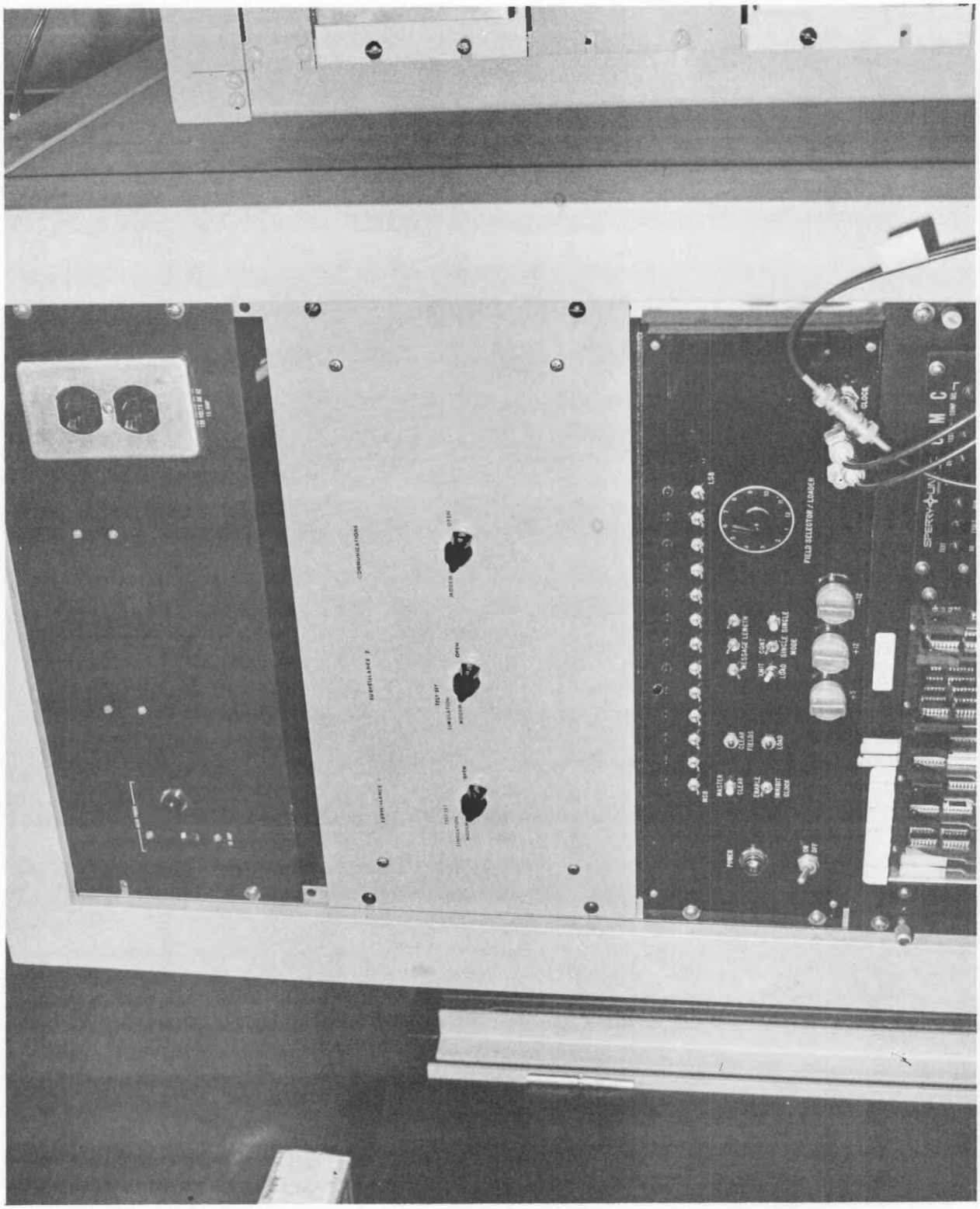
   Note: the system should now be cycling. When Q is depressed it should be lit along with the bottom lights of the display register.
e. In the event of system abort, go to F. Step 1 and repeat all steps through Step 4.

4.3 ADS Data Reduction Program

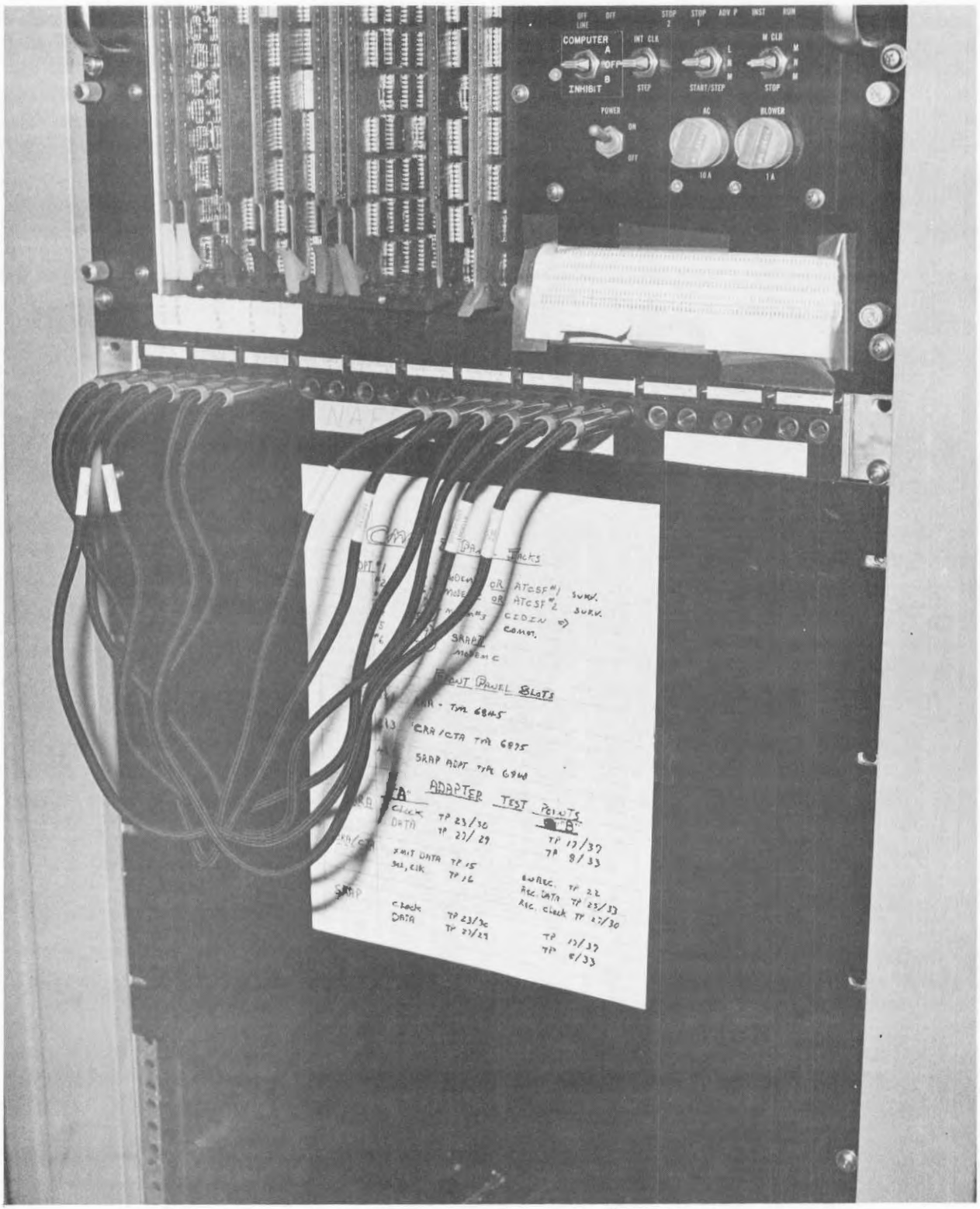
In order to run the ADS Data Reduction Software, follow the MCP Loading and Initializing Instructions.



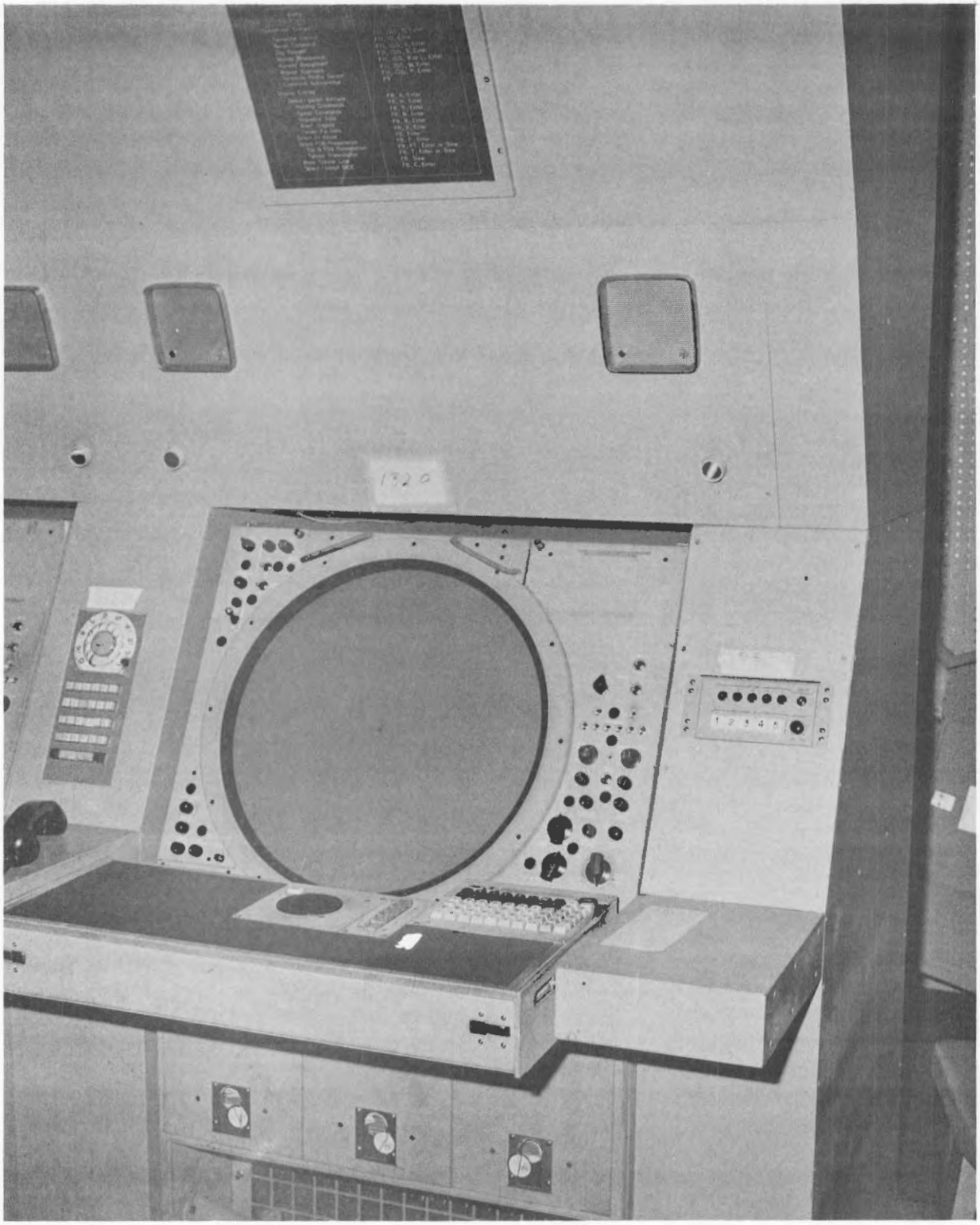
IOP MAINTENANCE PANEL



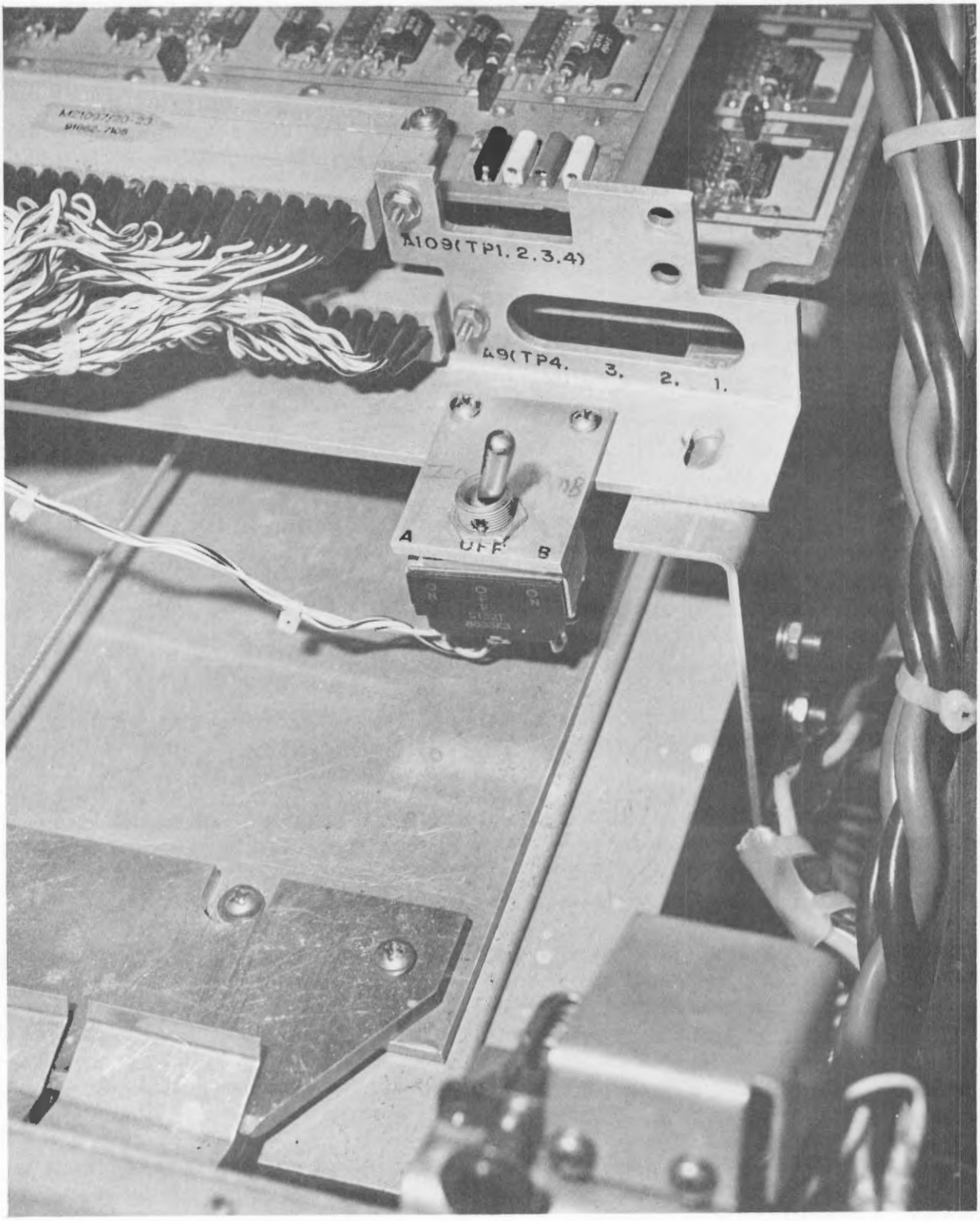
CMC SWITCHING PANEL



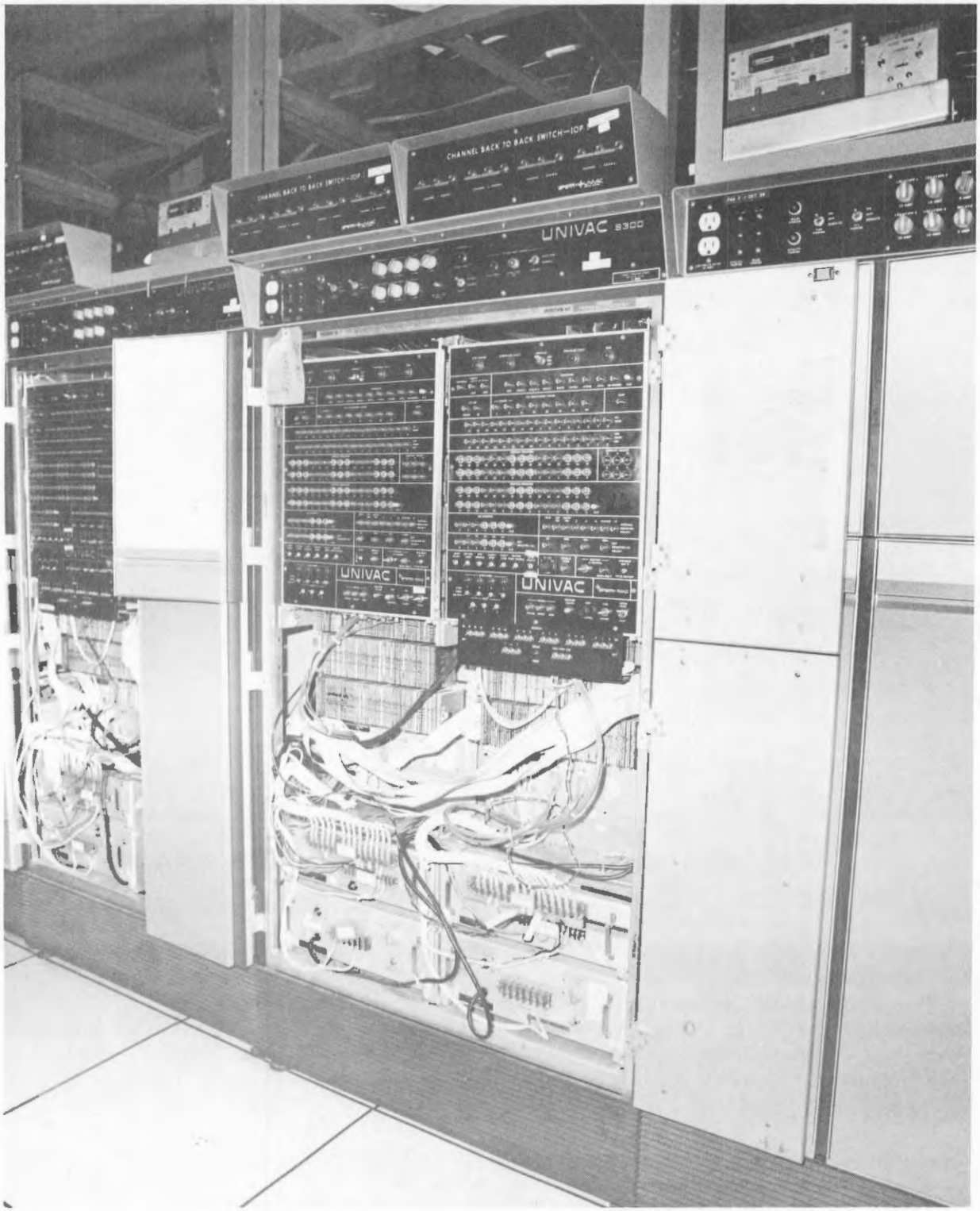
CMC PATCH PANEL



DISPLAY FRONT PANEL



DISPLAY BACK PANEL



BACK-TO-BACK SWITCHES