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NA31/Charles W. Johnson

TRW

GROUND SOFTWARE MAINTENANCE FACILITY (GSMF) USER'S MANUAL

FINAL

26 FEBRUARY 1986

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28 February 1986

McDonnell Douglas Astronautics Co.
Huntsville Division
P.O. Box 1181
Huntsville, Alabama 35807

ATTENTION: MR. W. R. LOKKEN

SUBJECT: SUBCONTRACT 83916018, GSMF DELIVERABLES,

Dear Mr. Lokken,

Per Supplemental Agreement 04, paragraph 4.2 of the June 1984 revised Statement of Work, enclosed are the following final reports and baselined software:

Detailed Design Document (Final)
Users Manual (Final)
System Manual (Final)
GSMF Baselined Software
Acceptance Review Demonstration Package

If you should have any questions, please contact Mr. Garry Griffith at MSFC, Building 4708/B26A or telephone (205) 453-3910.

TRW Inc.
Defense Systems Group

V O'L Bain

V. O'L. Bain
Contracts Manager
System Development Division

Encl: As Stated

cc: V. O. Bain, N. L. Blanks, F. P. Herring, M. E. Hollowich, G. M. Lide, G. C. Hitt, TRW File (2), V. A. Wulff

Delivery Package Received by:

_____ _____

W. R. Lokken, Branch Chief — Date
Software and Ground Computer Systems
MDAC-HSV

1. SCOPE

1.1 IDENTIFICATION

~~This manual provides~~ instructions for the Ground Software Maintenance Facility (GSMF)-system user to operate the GSMF in all modes, ~~specifically;~~ is provided

- ~~Setup,~~
- ~~Standalone Simulation,~~
- ~~Integrated Simulation,~~ and
- ~~Test.~~

The GSMF system provides the resources for ATE computer program maintenance (GCOS and GOAL). automatic test equipments

Applicable reference documents are listed ~~in Section 2.~~ ~~Section 3 contains~~ an operational overview and major sections ~~(3.1, 3.2, ...)~~ that describe each mode noted above in terms of operator interfaces, options, equipment, material utilization, and operational procedures. Test restart procedures are described ~~in Section 4.~~ are contained.

~~Figure 1.1-1 shows~~ the GSMF documentation tree is shown which including the User's Manual. ~~The preliminary User's Manual was released at PDR, and a final version at sign-off.~~

software engineering
user manuals (computer programs)
program verification (computers)
file maintenance (computers)
data base management systems

display devices
simulation
real time operation
input/output routines
fault tolerance

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FINAL

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ILLUSTRATIONS (Continued)

ILLUSTRATIONS (Continued)

PREFACE

The GSMF User's Manual consists of a "Final" and "Final-Appendices". These two volumes are bound separately for the convenience of the reader.

1. SCOPE

1.1 IDENTIFICATION

This manual provides instructions for the Ground Software Maintenance Facility (GSMF)-system user to operate the GSMF in all modes. Specifically:

- Setup
- Standalone Simulation
- Integrated Simulation
- Test.

The GSMF system provides the resources for ATE computer program maintenance (GCOS and GOAL).

Applicable reference documents are listed in Section 2. Section 3 contains an operational overview and major sections (3.1, 3.2, ...) that describe each mode noted above in terms of operator interfaces, options, equipment, material utilization, and operational procedures. Test restart procedures are described in Section 4.

Figure 1.1-1 shows the GSMF documentation tree including the User's Manual. The preliminary User's Manual was released at PDR, and a final version at sign-off.

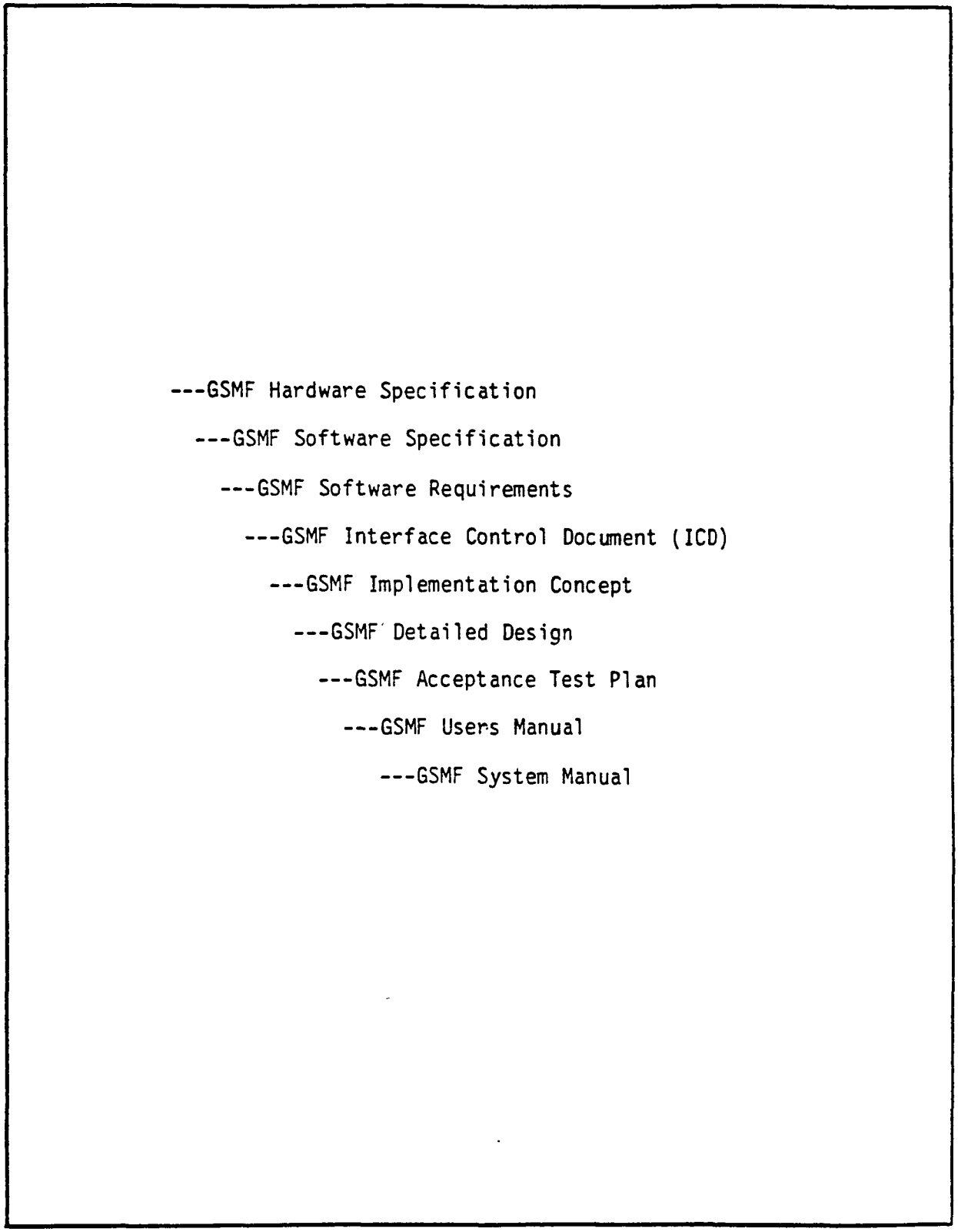

Figure 1.1-1. GSMF Specification Tree

2. APPLICABLE DOCUMENTS

2.1 GOVERNMENT DOCUMENTS

None.

2.2 NON-GOVERNMENT DOCUMENTS

Ground Software Maintenance Facility Hardware Requirements - 900472 - McDonnell Douglas Technical Services Company - May 3, 1984

Ground Software Maintenance Facility Software Requirements - 900471 - McDonnell Douglas Technical Services Company - May 3, 1984

Ground Software Maintenance Facility Interface Control Document - Acurex - July 16, 1984

Ground Software Maintenance Facility Detailed Design - TRW - February 18, 1986

Detailed Ground Software Maintenance Facility Software Requirements - TRW - March 13, 1985

GSMF System Manual - TRW - February 18, 1986

3. GSMF OPERATIONAL DESCRIPTION

This section describes the six operational modes.

The existing software for Display Control shall be utilized for GSMF operations. This program will allow a complete menu-driven execution for GSMF simulation and test modes. It controls all screen displays, user input (via function keys or compose fields), and data logging. This permits a user-friendly computer environment.

The SETUP mode shall be used to define a base software system for either the Standalone or Integrated Simulation modes. The SETUP mode shall be utilized to make mission-dependent changes in the GSMF database and simulation programs. One simulation system, as generated by the SETUP mode, may be used to verify many test cases for GCOS maintenance. The SETUP mode is addressed in Section 3.2.

The Standalone SIMULATION mode verifies real-time GCOS operation with run-time operator capabilities to control the simulation execution, values, and outputs. The Integrated SIMULATION mode provides the additional feature of executing GCOS in real-time with either SCOS or ECOS, or both. The SIMULATION modes, with software configurations defined by SETUP mode, will allow multiple verification tests without SETUP mode execution. Both SIMULATON modes are addressed in Section 3.3.

The TEST mode shall be run as a diagnostic and as part of the acceptance tests. The TEST mode is addressed in Section 3.4.

The POST-PROCESSING mode may be run for analysis of SIMULATION mode execution as recorded on a log tape. POST-PROCESSING Mode is addressed in Section 3.5. The PPI LOOPBACK section as described in Section 3.6 details the function of the loopback test which is a useful tool that is run prior to running the integrated mode.

The OFFLINE_FILE_BUILDER is a set of tasks that allows the user to create four files that will be used by SIMULATION Mode, create the GCID operating software disk files from tape, and read/create the eight disk files from the IBM-created SETUP tape. Section 3.7 details all files that will be created by OFFLINE_FILE_BUILDER.

3.1 DISPLAY_CONTROL

DISPLAY_CONTROL is a set of programs currently running on the P-E 3220. These programs control the display screens that were created via the display generation operation. All user inputs via function keys or compose fields shall be handled by display control and passed to the respective tasks via SVC6 intertask FORTRAN calls. The respective task then manipulates the data passed. Display control will bring up the display screen from the function key selected. Appendix A outlines the operating procedures for GSMF.

3.1.1 DISPLAY CONTROL Equipment Configuration

DISPLAY_CONTROL was developed to execute on the P-E 3220 or Interdata 8-32 series computers. It will will be modified as necessary to support the GSMF running on a PE-3250. The GSMF is configured currently to utilize five terminals: 1) users terminal (A17) 2) operators console simulation (A19), 3) SWID data display (A18), 4) performance analysis monitor (A16), and 5) system console (A1). For a successful simulation, these terminals must be support function keys and data entry as the PE-2300. The GSMF presently uses PE-1251 terminals. It is set up to utilize up to 16 function keys, which are available on these terminals. Appendix E details the PCU operating services that DISPLAY CONTROL obtained from the software for the GSMF display driver.

3.1.2 DISPLAY CONTROL Input Materials

3.1.2.1 Displays

All display screens will have been generated and resident on disk prior to executing GSMF simulation or test. Figure 3.1-1 is a sample screen created with display generation. The display generation software to be used will be the current version as identified by the TRW configuration management plan.

3.1.2.2 User Input

The GSMF user shall control the GSMF simulation via response to compose fields or function key activation.

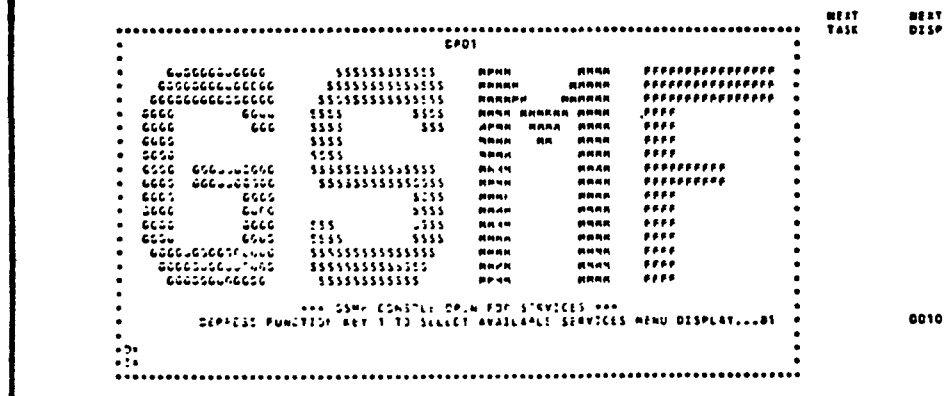

Figure 3.1-1. Display Generation Sample Screen

3.1.3 DISPLAY CONTROL Output Materials

All screens shall be read from resident disk files and displayed on the respective P-E terminals by DISPLAY_CONTROL. Currently, screens can be hardcopied to paper. All screens are discussed in detail in the remaining sections.

3.1.4 DISPLAY CONTROL Procedures

Figure 3.1-2 details the procedures that shall be used to initialize DISPLAY CONTROL and execute GSMF simulation through the User's Console. The execution of the GSMF simulation is menu-driven by DISPLAY CONTROL and tutorial in operation. Responses to the display screen are through compose field entries (entering the respective character, number, or string of characters/numbers) or depressing a function key.

The ATE Operator's Console simulation uses the same operator response as the operator's terminal. The terminal designation is A19. Terminal A18 displays the SWID Data Display in which the user enters the data file name that contains the SWID/SMIDs to be displayed.

3.2 SETUP MODE

SETUP Mode shall be performed to incorporate mission changes to Spacelab or EGSE (including GCOS) as they affect the GSMF system.

The GSMF sustaining staff shall review all ECRs for each mission to determine which changes must be reflected in the GSMF system. The changes are those that will be used by GCOS or GOAL such as:

- Reassignment of SWID end-items
- Changes to end-item functions
- Deletion/addition of end-items
- Changes to non-end-item equipment that GCOS interfaces
- Changes to SCOS or ECOS TMB allocations
- Changes to SCOS or ECOS functions which are simulated in the GSMF host.

New parameters or functions may be included to provide simulation of behavior for specific test cases such as error conditions or variable behavior

NOTES ON THE GSMF SYSTEM

1. Start system - "UP" or "GSMFUP"

2. Generate and establish display pages

   "DSKDSPLY DP____"

   "ESTDSPLY DP____"

3. Print display page

   "PRTDSPLY"

   > "0001-0001"

   > "END"

4. After new display pages have been created,

   "DELETE DFTEMP.LOG"

   before starting GSMF system.

Figure 3.1-2. Start Up Procedures for GSMF

necessary for software path verification tests. GOAL programmers shall also be able to add complex response behavior to the simulation (as needed) to model physical characteristics of the Spacelab/EGSE environment.

3.2.1 SETUP Mode Equipment Configuration

The SETUP mode functions shall be performed on three separate computer systems: MDTSCO IBM 4341, IBM 4381, and GSMF Host (P-E 3250).

Access to the IBM 4341 via a remote terminal shall be required for control and manual inputs, and outputs shall be on the printer, disk, and the tape unit.

The GSMF Host computer system shall be utilized to perform P-E specific tasks; specifically compiling, linking, and processing of the IBM SETUP mode output tape containing the GSMF data base and generation of the Host simulation software. Figure 3.2-1 shows the system configuration.

3.2.2 SETUP Mode Input Materials

3.2.2.1 SLDB

The Spacelab data base file that shall be used to identify a mission from MDTSCO document TBD. This file shall be on the IBM 4341 system.

3.2.2.2 DBGM Files

The DBGM files, as listed below, shall be identified for a mission from MDTSCO document TBD. These files shall be on the IBM 7387 system. These files shall identify the Specelab Data Base (SLDB) and the TMB offset, FIFO image, and Fetch commands for SCOS.

FMNSDK1B.MISALL.SLDB.V81SY001.ACDB
GSMF.FIFIO.SCOS(MS#)
GSMF.TELIMG.SCOS(MS#)
GSMF.FETCFIL.SCOS(MS#)

Where # is the mission number.

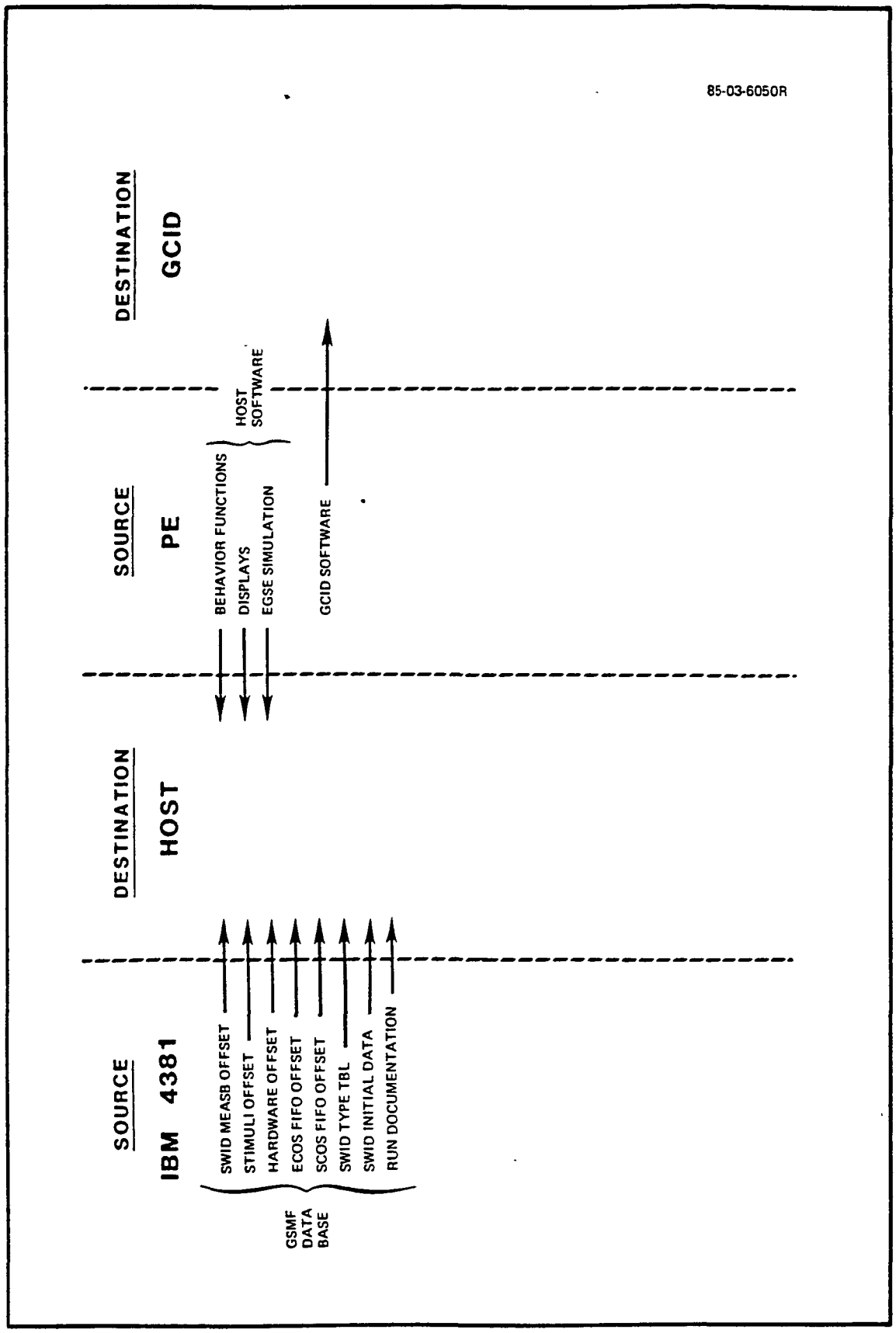

Figure 3.2-1. Set Up Mode Equipment

3.2.2.3 CASS Files

The CASS-generated files listed below, on the IBM system, shall be identified from the MDTSCO Configuration Management document. These files shall identify the TMB offsets, FIFO image, and Fetch commands for ECOS.

GSMF.FIFO.ECOS(MS#)
GSMF.FETCFIL.ECOS(MS#)
GSMF.TBIMG.ECOS(MS#)

where # is the mission number.

3.2.2.4 SWID Relations File

The SWID Relations File (also referred to as the STIMULI/MEASUREMENT SWID pairs file) shall be updated via the CMS editor on the IBM 4341 system from information contained in the forms "SWID Relation Change Form" for a mission as defined by Configuration Management document TBD.

The SWID Relation Change Forms shall be created for a mission to reflect the following changes:

a) Reassignment of SWID

b) End-item functional changes

c) New end-items

d) Changes to EGSE equipment configuration.

They shall be defined by review of all ECRs for a mission as received from Configuration Management.

The procedure to generate the SWID Relations File is presented in Appendix C.

3.2.2.5 SMID

Simulation Identifiers (SMID) shall be used to process simulation data or parameter values that are not Spacelab end-items. These definitions must be input to SETUP mode so they will be defined during SIMULATION. An example of SMID is a parameter that controls the type of SIMULATION: standalone, integrated that are: a) connected to SCOS and ECOS, b) connected to SCOS-SDF only, or c) connected to ECOS-SDF only.

3.2.2.6 Initial Value File

This file shall be built by editing the baseline initial value file located on the IBM 4341. It shall contain initial values to be assigned for measurement SWIDs and for SMIDs. The SWID values are those which GCOS or GOAL programs expect to read prior to any action that would set a value for them. The SMID values are for simulation control variables initial states such as defaults for logging and mode control (standalone/integrated).

The baseline initial value file was created from several sources of information concerning EGSE/SL equipment:

a) Engineering analysis/judgement

b) Personal knowledge

c) GCOS source code

d) Monitor table

e) SLDB

f) Spacelab documentation.

Updates shall be made to this file as information becomes available. The initial value file for a mission shall be created to reflect peculiar values for the mission or tests. These are IBM 4341 files and shall be identified as GSMF.SWDINIT.DATA(MS#) where # is the mission number. The initial values shall be included in the GSMF data base.

3.2.3 SETUP Mode Output

3.2.3.1 GSMF Database Listing

The listing file shall be generated with the information as shown in the Figure 3.2-2 example. Each data base file shall be listed including contents. This listing may be printed from the IBM 4341 for access during the SIMULATION mode.

SWID MEASB OFFSET FILE

SMID/ SWID	MSE/ SCCD	MEASB OFFSET	P_1 P_2 P_3	DISCRETE CODES 0	1	GROUP DISCRETE BIT LENGTH		EU	SHORT SNI	CALIBRATION COEFFICIENTS A_0 ------ A_5	TYPE	DECALIBRATION COEFFICIENTS A_0 A_1
3963	0/1	265	135	ON	OFF				ST3 NDAK		0	
3964	0/1	233	126			3	16		MCA STATUS		1	
3965	0/1	222	346					V	VOLTAGE 1	A_0 ------ A_5	2	A_0 A_1
.	.	.	.	.	.	.						
.	.	.	.	.	.	.						
.	.	.	.	.	.	.						
.	.	.	.	.	.	.						

SCOS FIFO OFFSET FILE

SWID	OFFSET1	OFFSET2	.	.	.	.	.	OFFSET 20
3622	23	-1						
3624	26	96	-1					
3633	60	90	130	.	160	-1		
3665	20	50	80	.	.	.	.	180

ECOS FIFO OFFSET FILE

SWID	OFFSET1	OFFSET2	.	.	.	.	.	OFFSET 20
4430	23	-1						
4422	52	120	-1					
.	.	.						.
.	.	.						.

SWID TYPE TABLE

SWID	TYPE	OFFSET1	OFFSET2
3963	1	235	---
3722	2	25	120
3666	3	50	---
4443	4	20	---
.	.	.	.
.	.	.	.

Figure 3.2-2. GSMF Data Base Listing Example

STIMULI OFFSET TABLE

SWID	MEASB OFFSET	COUNT	BEHAVIOR
3500	20	1	T3500
3501	50	2	T3501
3501	60	2	T3501
.	.	.	.
.	.	.	.

HARDWARE OFFSET

P_1 P_2 P_3	STIMULI OFFSET
165	20
325	10
.	.
.	.

SWID INITIAL DATA

SWID	DATA
3463	0
3264	1
3520	7.00
.	.
.	.
.	.

Figure 3.2-2. GSMF Data Base Listing Example (Continued)

3.2.3.2 SWID Relations Listing

The SWID Relations listing file shall be generated with the information as shown in the Figure 3.2-3 example. There will be one entry for each SWID, and the file may be printed from the IBM 4341 for reference during SIMULATION mode.

3.2.3.3 Run Documentation

The SETUP mode shall list to a file the names of all files used or generated during execution on the Host system and provide a hard-copy reference of file usage for Configuration Management and operator verification. Figure 3.2-4 shows a sample printout.

3.2.4 SETUP Mode Procedures

3.2.4.1 Pre-SETUP Events

3.2.4.1.1 IBM 4381

Prior to executing the SETUP mode on the IBM 4381 system, several events must be performed and verified.

1) Identify mission for which GCOS software to be tested was built. This is the mission of interest.

2) Complete all modifications to SWID Relation File via CMS EDITOR and new identification by Configuration Management.

3) Receive from Configuration Management the identifier for SLDB for mission of interest.

4) Receive identifiers for DBGM files for mission from Configuration Management. These files are the ones created for SCOS and ECOS in preparation for the mission.

5) Create SCOS/ECOS Fetch command tape which will be loaded on the Mitra (see Appendix G) to support GSMF SCOS/ECOS Telemetry Buffer processing.

6) Load GNC data on Mitra (see Appendix G) to support GNC uplink process to SCOS and ECOS in integrated mode.

When these steps are accomplished, the SETUP mode on the IBM 4381 will be ready to run.

```
GSMF REQUIREMENTS FOR SWID 9101    OF SUBTABLE  /DORM

SYMBOLIC NAME:     SS-INV PWR OFF              SSINV OFF

MML-ID:            S01K0103Y          HW ADDR P1:  1
SOURCE:            1.3.16             HW ADDR P2:  3
DESTINATION:       P011 SS-INV        HW ADDR P3: 16

REMARKS:



RELATED SWIDs SUBJECT TO CHANGE:


GSMF DATA BASE REQUIREMENTS:


GCOS UTILIZATION:


BEHAVIOR FUNCTION REQUIREMENTS:


SCOS/ECOS MODELING REQUIRED:


GCID/BUFFER REQUIREMENTS:


SWID     RELATIONSHIP DESCRIPTION
```

Figure 3.2-3. SWID Relations Listing Example

RUN DOCUMENTATION

Name	Mission	Date	Level
SWID MEASB OFFSET	3	2/21/85	0.0
SCOS FIFO OFFSET	3	2/21/85	0.0
ECOS FIFO OFFSET	3	2/21/85	0.0
STIMULI OFFSET	3	2/21/85	0.0
SWID TYPE FILE	3	2/21/85	0.0
HARDWARE OFFSET	3	2/21/85	0.0
SWID INITIAL DATA	3	2/21/85	0.0
SPACELAB DATA BASE	3	2/19/85	CDTV1302

Figure 3.2-4. Sample SETUP Printout

3.2.4.1.2 Host System

Prior to executing the SETUP mode on the Host system, several events shall be performed and verified.

1) Host System software will have been "up and running". See Appendix A for bringing up the GSMF Host from a cold start.

2) The IBM 4381 SETUP mode output tape shall be prepared for mission of interest.

3) All Behavior Function Tasks shall be compiled, linked, and appropriate as Tasks.

When these events are accomplished, SETUP mode will be ready to be run on the Host system.

3.2.4.2 SETUP Mode Operation

The SETUP mode operation shall be performed on two computer systems: the IBM 4381 and the GSMF Host.

The IBM 4381 system with its VM/CMS feature will allow the user to interactively generate the GSMF data base tape. (See Appendix F.) Outputs will be GSMF data base files, defined in Section 3.2.3.3, and a tape containing these files for transporting them to the GSMF Host system.

READ_SETUP_TAPE shall read the IBM-created tape into predefined disk files that will be resident on the GSMF host computer. This task is run off-line prior to simulation. The GCID operating software will be loaded from the Intergraph-provided tape into disk files on the GSMF host system. This procedure is discussed in Section 3.7.

The GSMF Host system SETUP mode operation shall consist of verifying the success of all previous required events and executing the task to build the output disk files containing the inputs for SIMULATION mode.

3.2.4.2.1 SETUP Mode Normal Completion

Normal completion shall be indicated to the operator by displaying the message: "Successful completion of READ_SETUP_TAPE."

3.2.4.2.2 SETUP Mode Error Conditions

Error conditions shall be indicated to the operator by messages on the display.

3.2.4.3 SETUP Mode Termination

No special procedures are needed to terminate the SETUP mode.

3.3 SIMULATION MODE

The SIMULATION mode shall be run to test GCOS and GOAL software in real-time. The SIMULATION system will have been previously configured for mission consistency with the GCOS or GOAL software to be tested. The GSMF operator shall control the simulation execution via a display terminal by commanding value changes and special test Behavior Function execution, and by selecting display options to aid the GCOS system user (the GCOS or GOAL programmer). Documentation of test results may be output to a log tape (for data reduction/analysis), also under operator control.

The SIMULATION mode shall provide models of the SCOS and ECOS systems (as they effect GCOS or GOAL programs) in the standalone GSMF configuration. In the integrated and standalone GSMF configurations, the SIMULATION mode shall provide models of all other Spacelab and EGSE functions that affect GCOS or GOAL programs. The Integrated SCOS and/or ECOS functions shall be provided by the SSC and/or EXC SDF systems.

3.3.1 SIMULATION Mode Equipment Configuration

The SIMULATION mode will be performed utilizing the basic Standalone and the Integrated configurations.

The Standalone configuration will be used in the majority of the tests. Figure 3.3-1 depicts the Standalone configuration including the Host system, the GCID, and the GCOS system.

The Integrated configuration is an extended test configuration that will validate configuration of, and communications between, GCOS and SCOS/ECOS. Figure 3.3-2 depicts the Integrated configuration including the Standalone system and one or both of the SDF systems (including SSC and EXC).

3.3.2 SIMULATION Mode Input Materials

3.3.2.1 SETUP Files

The output tape from the SETUP mode will contain the necessary data files to run the SIMULATION mode. These files are in Figure 3.2-4. Section 3.7

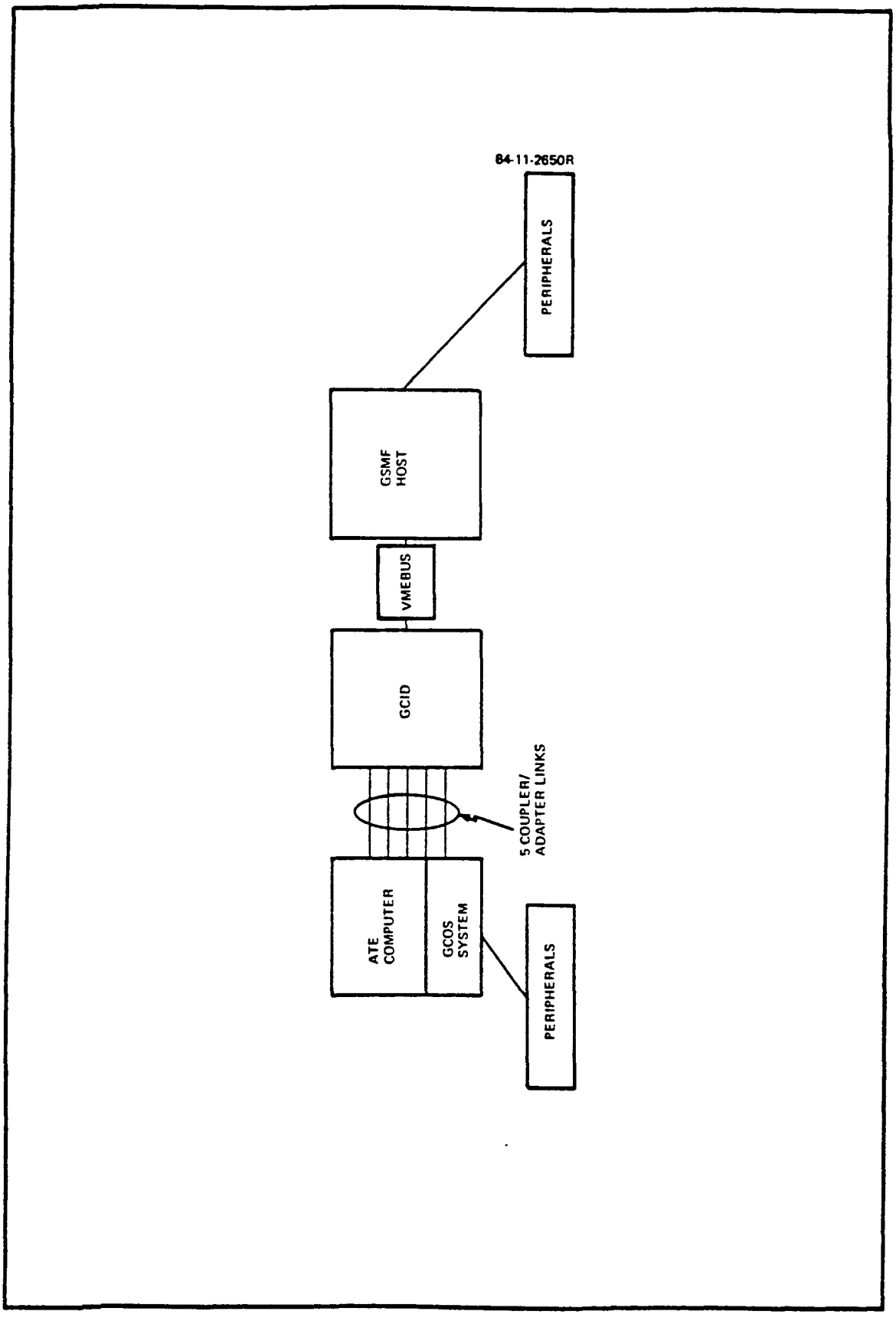

Figure 3.3-1. GSMF Standalone Configuration

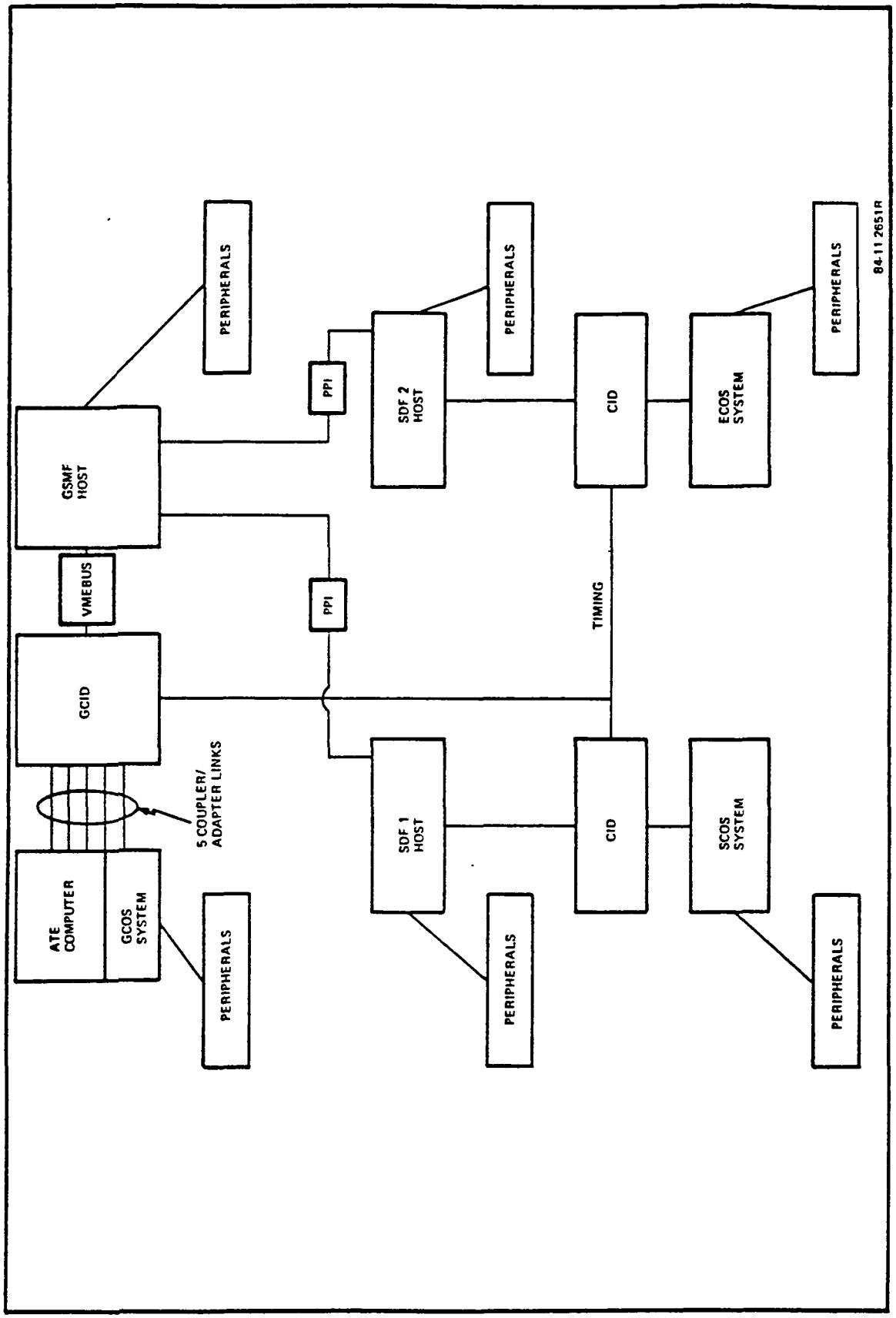

Figure 3.3-2. GSMF Integrated Configuration

Section 3.7, OFFLINE_FILE_BUILDER, describes in detail the remaining files that can be created for SIMULATION mode execution.

3.3.2.2 Operator

Figure 3.3-3 is an overview of the relationship of the SIMULATION menus. The display number, e.g., DP#0010, with the respective function key numbers are detailed.

The execution of the SIMULATION mode path of events, as described in Appendix A, for "start-up" will end with the GSMF MODE SELECTION Menu DP#0010 as depicted in Figure 3.3-4. Section 3.3.2.2.1 describes the operation of this main control menu, and similarly one section is devoted to each display of the SIMULATION mode. All operator action shall be initiated via these menus. During the execution of the GSMF simulation the user will constantly have to enter data or make selections from the displayed menus. The menu selections will be via a function key. For the GSMF hardware configuration, the P-E 1251 CRT is the terminal that is used. It has 16 function keys which are located across the top row of keys and vertically to the extreme right of the keyboard. No other entry is made after depressing the function key. When a display has compose fields, the user will "TAB" to the appropriate field, enter data, and depress the "SEND" key for transmission after all entries are made. On all displays, the ampersand (@) preceding the number indicates a function key entry. The 16 function keys can be "SHIFTED" which will give a total of 32 function keys. The symbols "<>" enclosing a key number (i.e., <16>) indicates that it is a "SHIFT" Function Key 16 entry.

3.3.2.2.1 GSMF MODE SELECTION Display

The GSMF MODE SELECTION menu DP#0010 (Figure 3.3-4), the first accessed in the SIMULATION Mode provides the capability to run SIMULATION MODE, TEST MODE, POST-PROCESSING, PPI LOOPBACK, or EXIT the SIMULATION.

The selection of TEST mode shall enter the display sequences described in Section 3.4. Only one terminal shall be active when the TEST mode is entered. To stop the SIMULATION from this main level, Function key 5 shall be depressed. Figure 3.3-5, DP#0002, displays the simulation shutdown instructions.

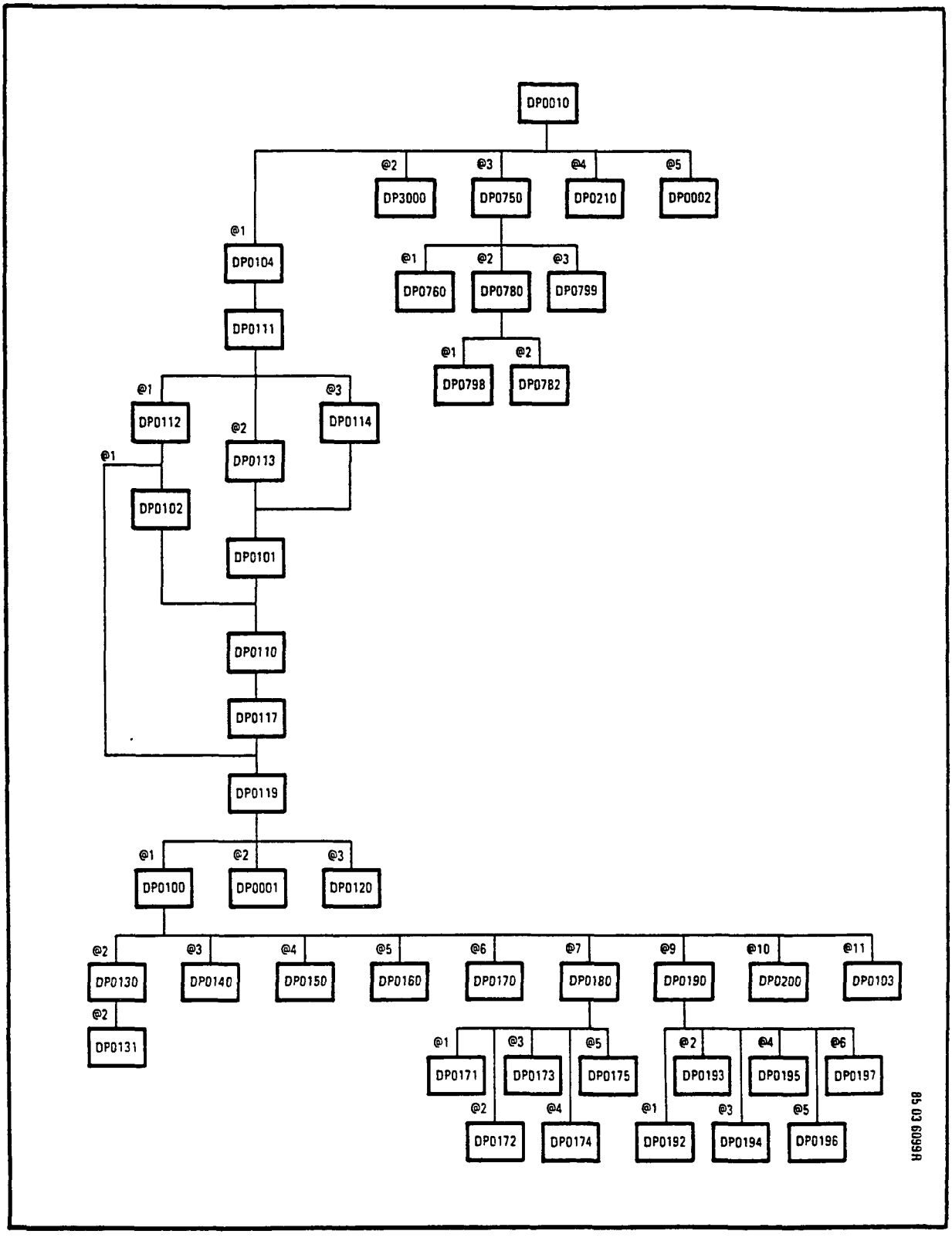

Figure 3.3-3. Simulation Menu Hierarchy

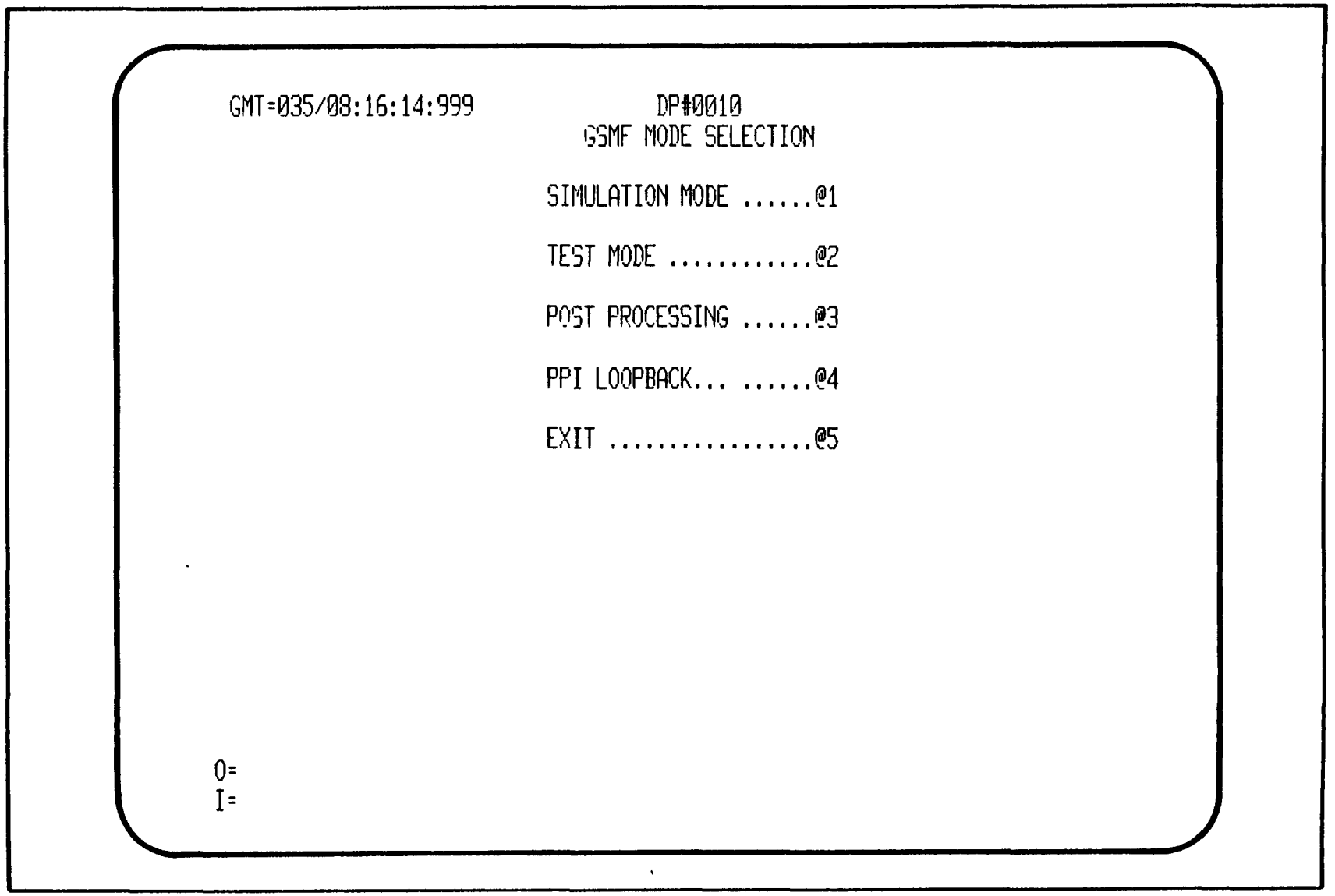

Figure 3.3-4. GSMF Mode Selection Menu

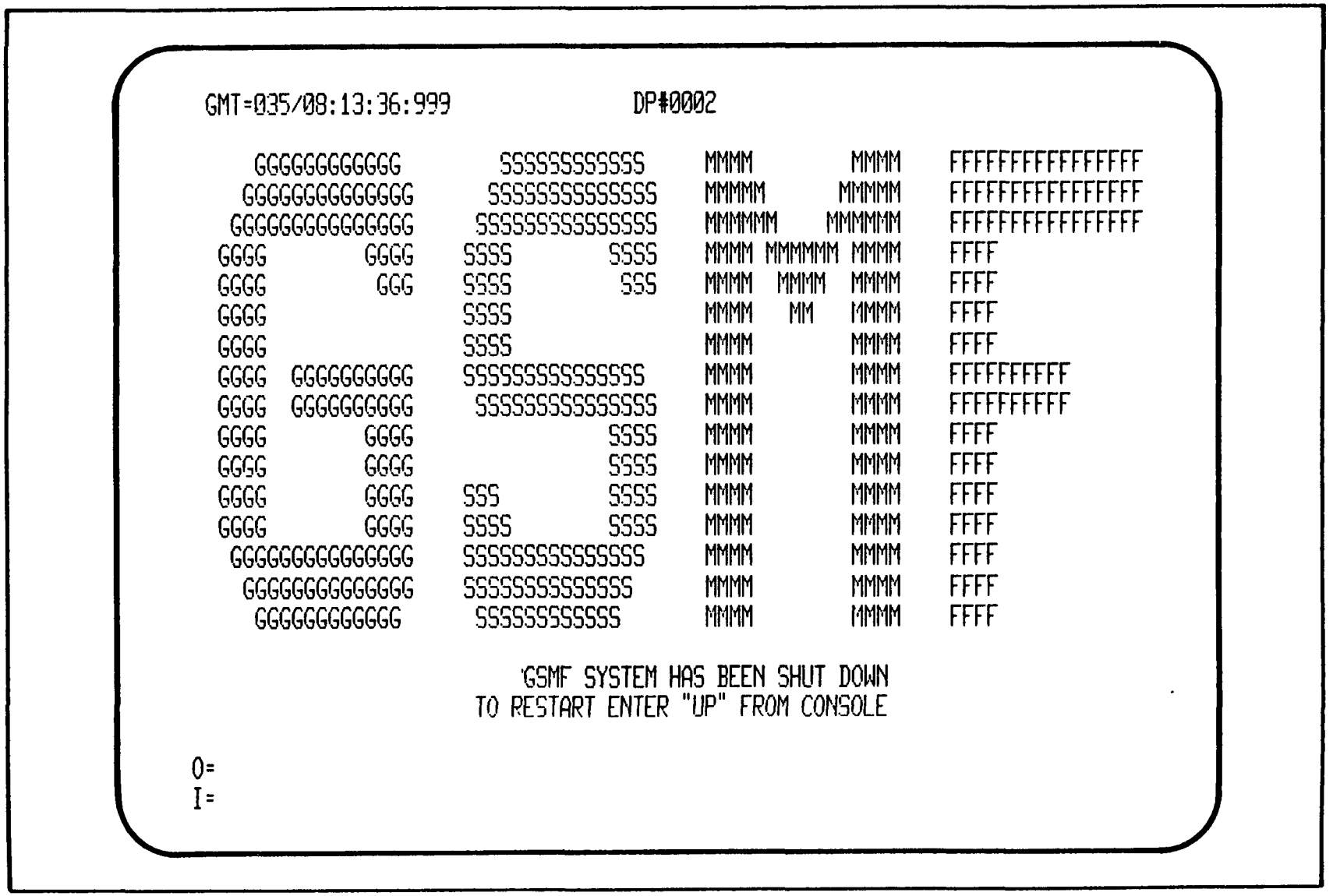

Figure 3.3-5. GSMF Shutdown Screen Logo

3.3.2.2.2 SIMULATION MODE Options

Before the SIMULATION MODE Options Menu DP#0100 is displayed, the user will be guided through a series of menus that allow for basic "housekeeping" prior to running the simulation. After pressing function key @1 of the GSMF MODE SELECTION menu (Figure 3.3-4) initialization for the simulation shall be started. Display DP#0104, "SYNCHRONIZING GMT TO GCID" (Figure 3.3-6), shall be displayed. During initialization, the GMT between the Host and the GCID is synchronized, and the message is displayed on the users console (A17); afterwhich, the SELECT SCOS MODE menu, DP#0111 (Figure 3.3-7) will be displayed. If STANDALONE (@1) is selected from DP #0111, menu DP#0112 (Figure 3.3-8) SELECT ECOS MODE will be displayed. If the user again selects STANDALONE (@1) from DP #0112, DP#0119 SYSTEM STATUS (Figure 3.3-9), is displayed. If function key @2 or @3, INTEGRATED PPI-1 and INTEGRATED PPI-2 is selected, then DP#0102 (Figure 3.3-10) is displayed before DP#0110 (Figure 3.3-11), INITIALIZATION IN PROCESS is displayed. If INTEGRATED PPI-1 (@2) is selected, then DP#0113 (Figure 3.3-12) SELECT ECOS MODE will be displayed. If INTEGRATED PPI-2 (@3) is selected, then DP#0114 (Figure 3.3-13) shall be displayed for user response. From DP#0114, if function key 1 is selected, the next screen displayed is DP#0110 (Figure 3.3-11). If function key 2 is selected, then DP#0101, "STARTING SCOS SDF" message is displayed before DP#0110, INITIALIZATION IN PROCESS (Figure 3.3-11) is displayed on the CRT. Figure 3.3-14, STARTING SCOS SDF, DP#0110 message is displayed, afterwhich DP#0110 will be displayed.

Display DP#0119 (Figure 3.3-9), shows the user the status of the I/O devices, PPIs, and GCID microprocessors. From the displayed SYSTEM STATUS, the user can elect to GO/NOGO with the simulation. If function key 1 is depressed, GO, DP#0100 (Figure 3.3-15), SIMULATION MODE OPTIONS menu is displayed. If NOGO, function key 2, is selected, then DP#0001, GSMF MODE SELECTION (Figure 3.3-4), is displayed. Function key 3, EXECUTE SDF TIME DIAGNOSTIC, DP#0120 (Figure 3.3-16), is displayed. From this menu the user can STOP GMT (function key 1), enter desired GMT, START GMT (function key 2), or EXIT (function key 3).

The "SIMULATION MODE OPTIONS" menu, the first menu accessed in the SIMULATION mode (Figure 3.3-15) will provide the capability to Start Simulation Models (@1), to Specify Logging Options (@2), to Read/ Write SWID Value (@3),

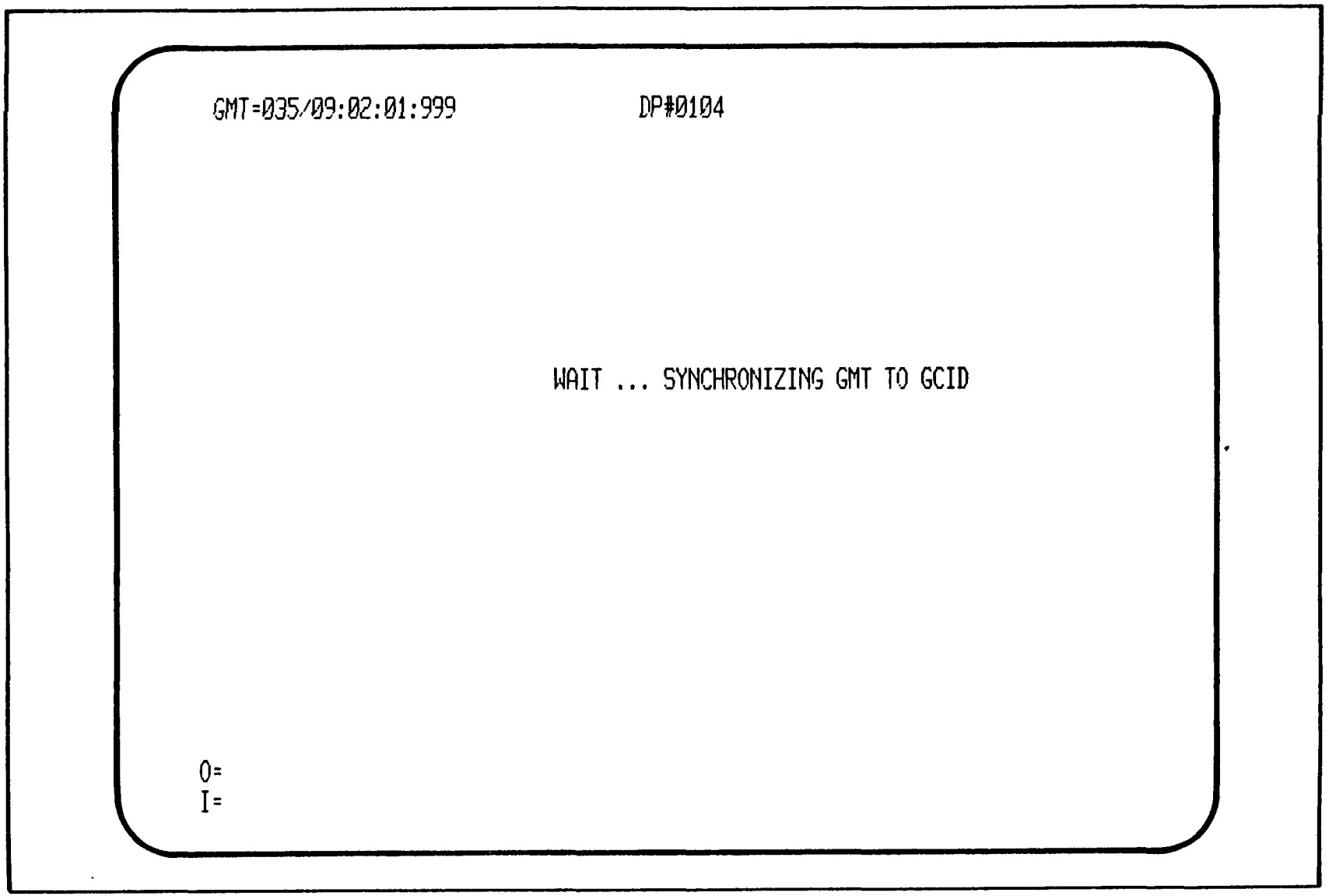

Figure 3.3-6. GMT-GCID Synchronizing Display

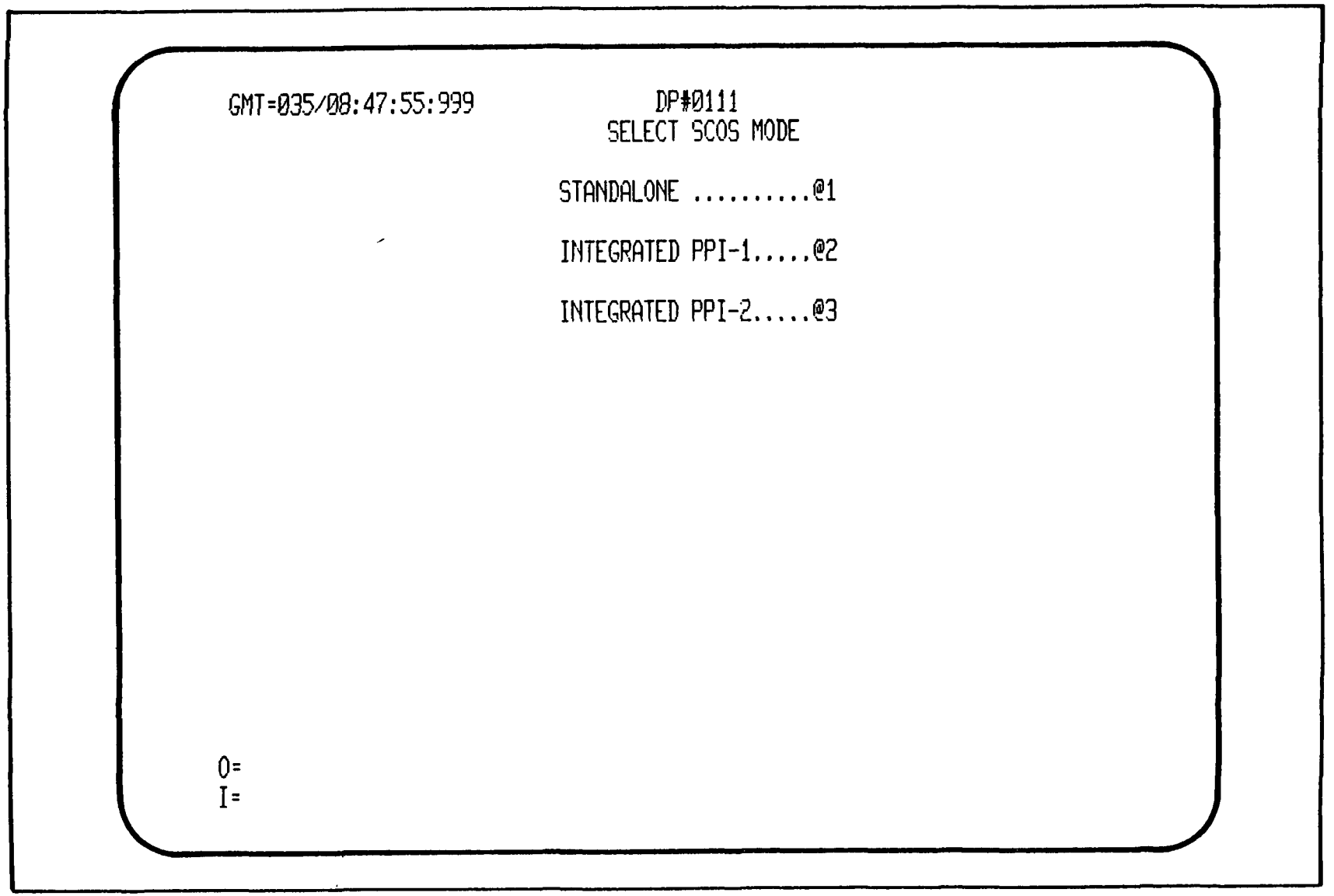

Figure 3.3-7. Select SCOS Mode Display Menu

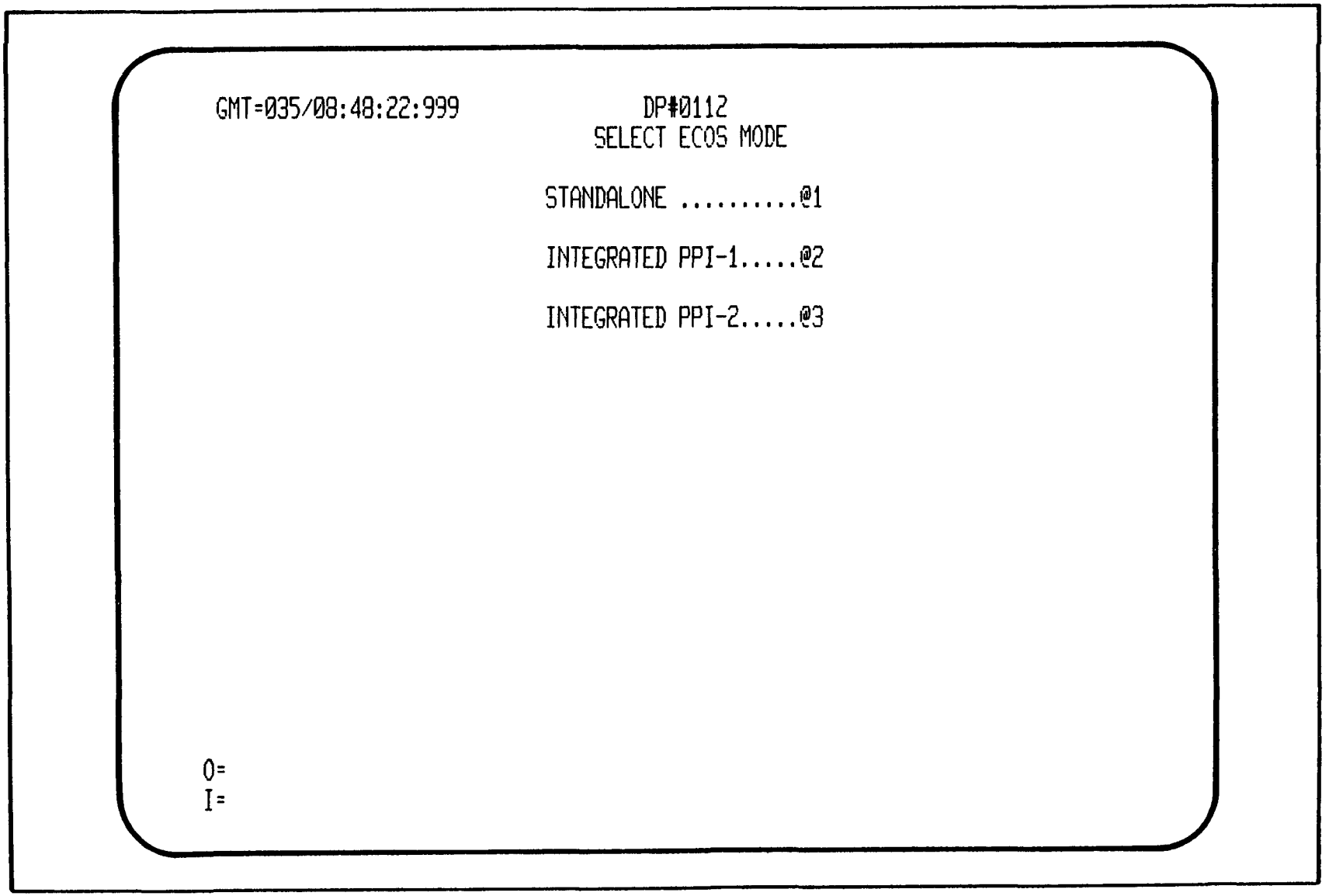

Figure 3.3-8. Select ECOS Mode Menu

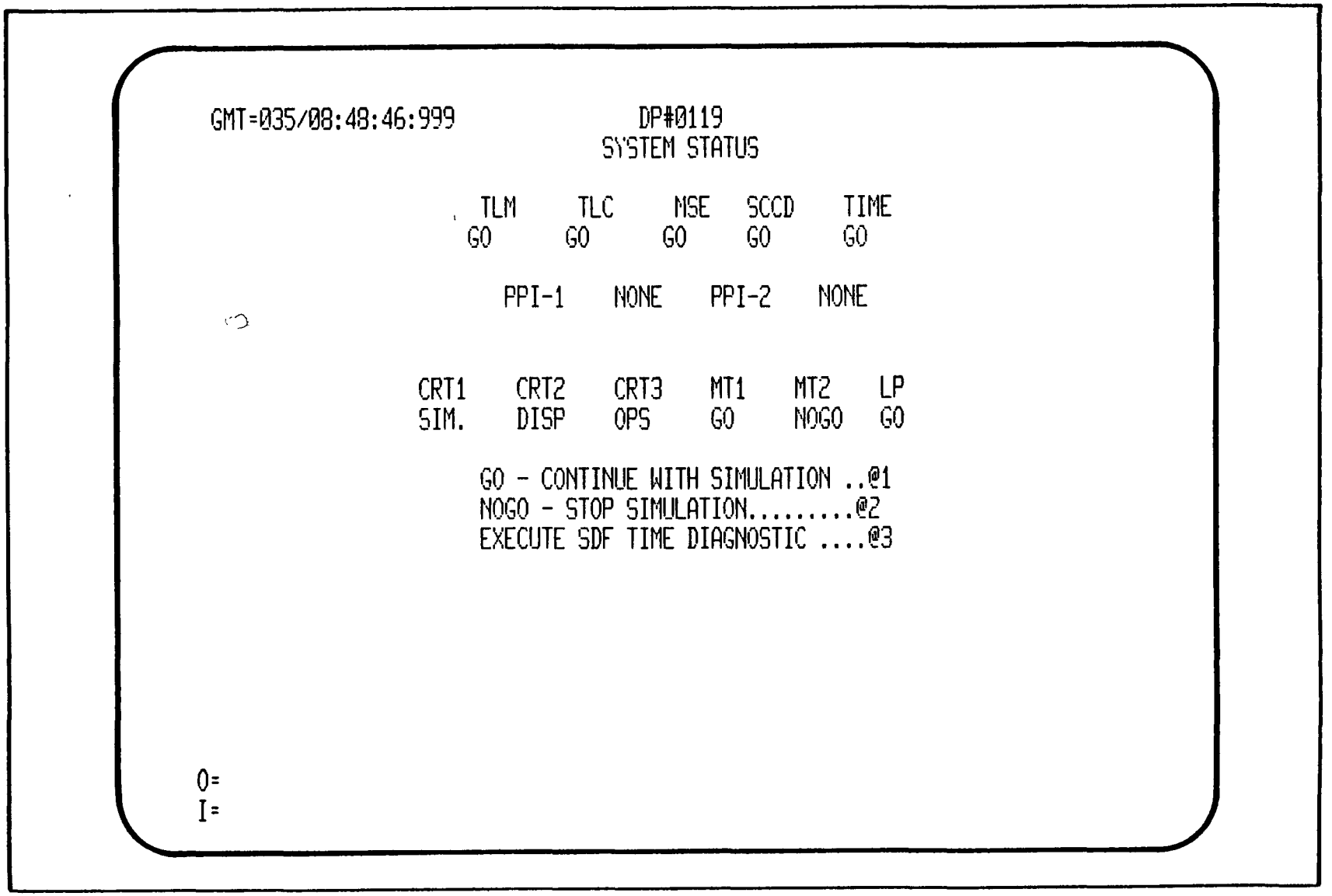

Figure 3.3-9. System Status Display (GO/NOGO)

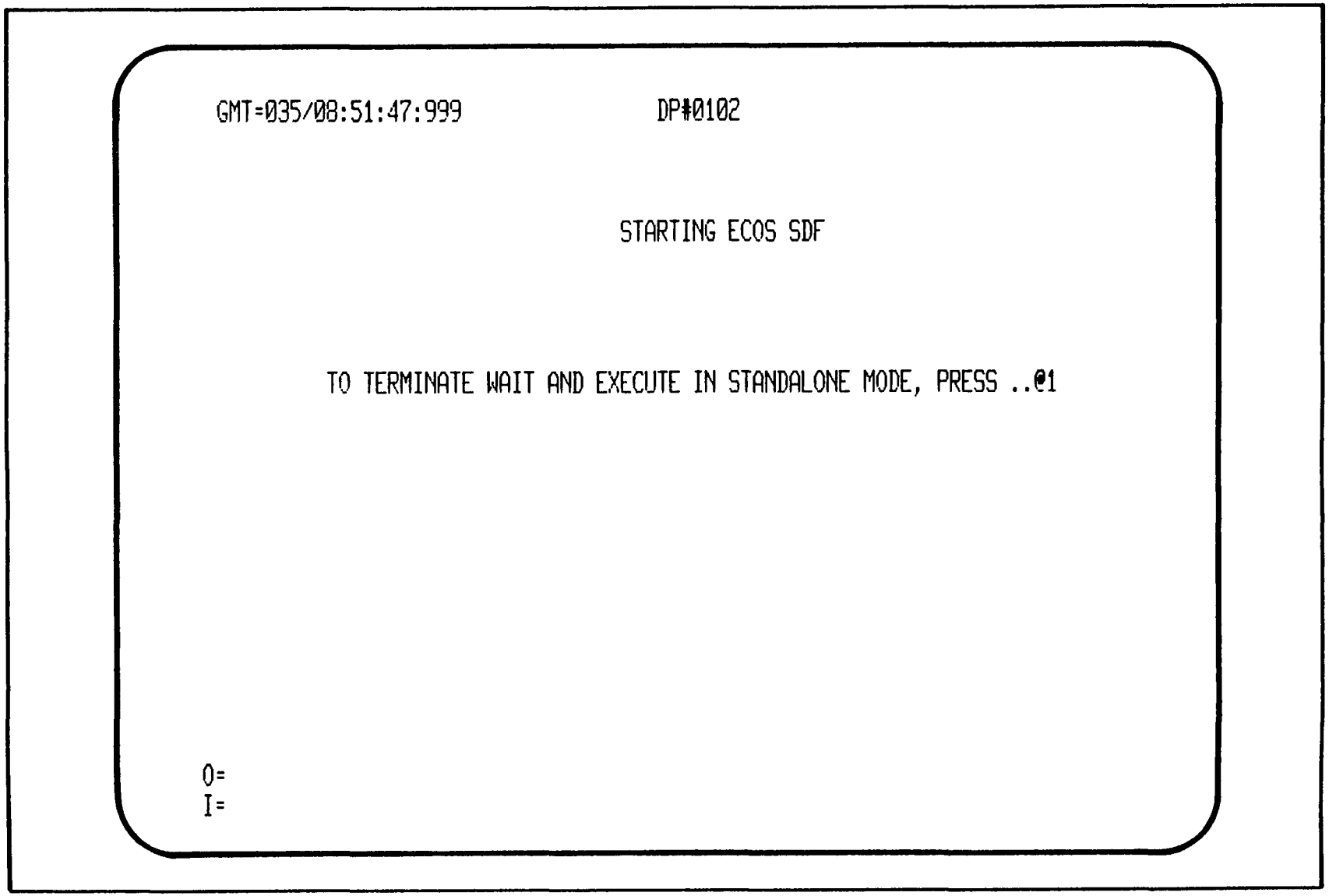

Figure 3.3-10. SDF ECOS Starting Display

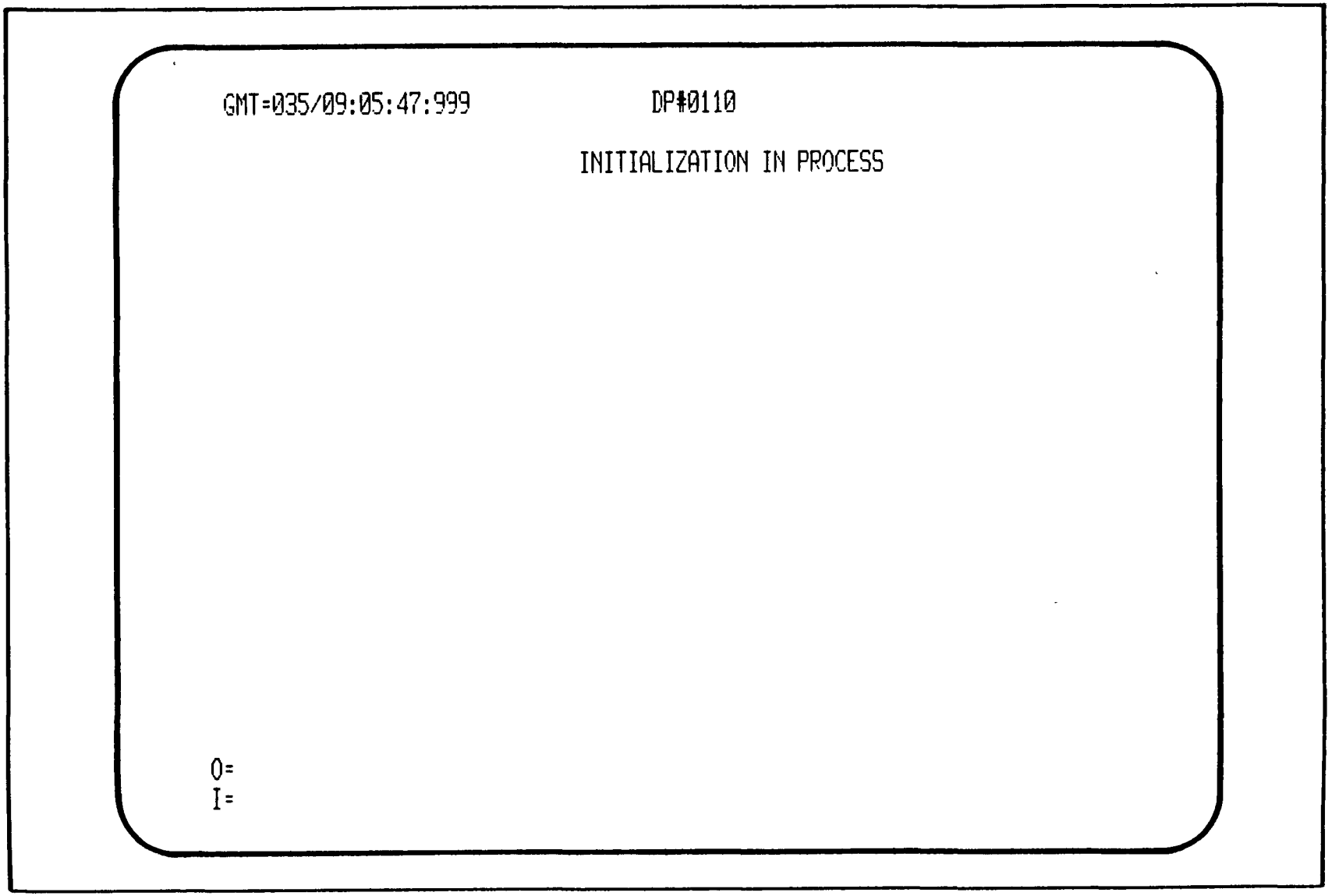

Figure 3.3-11. Initialization Started Display

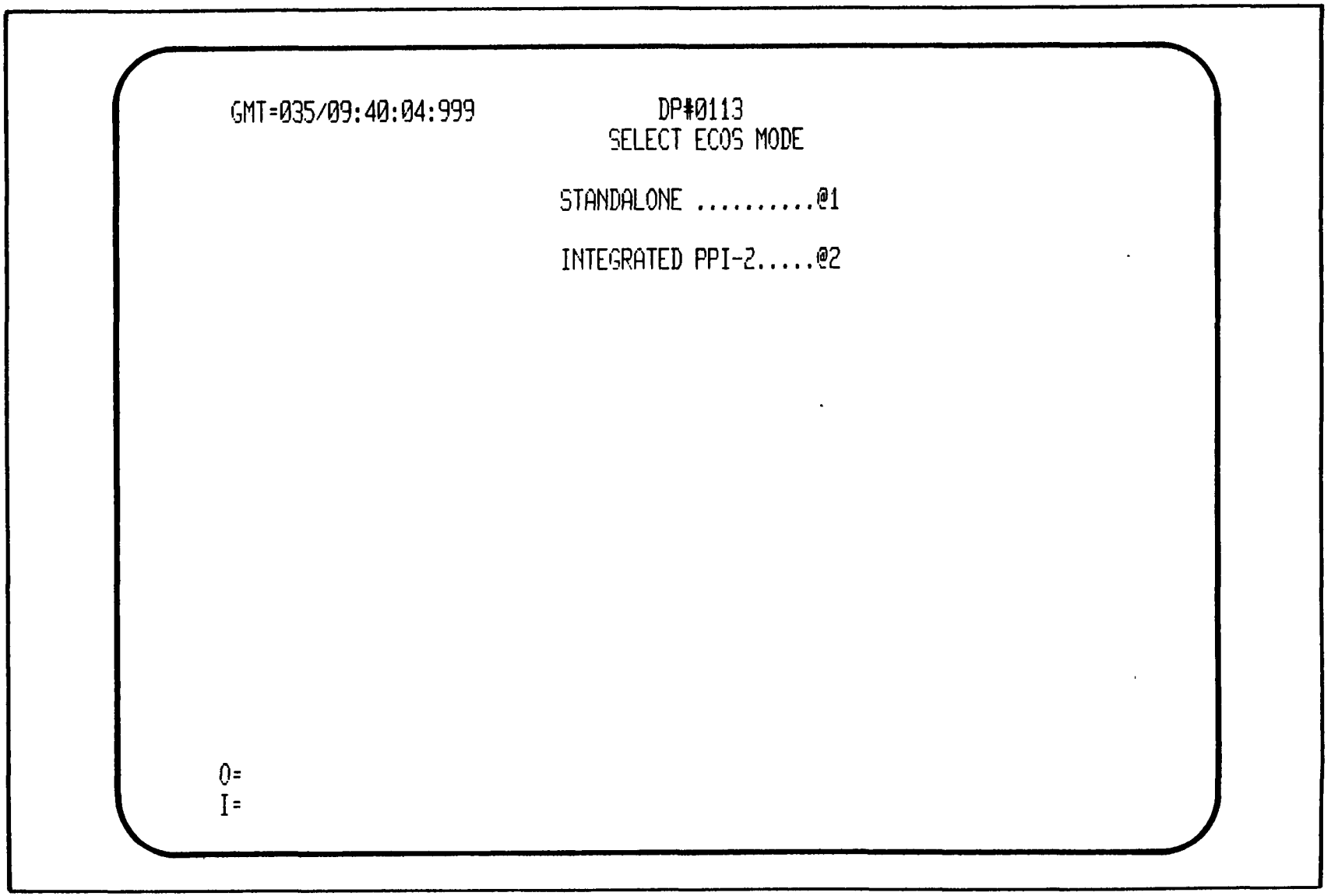

Figure 3.3-12. Select ECOS Mode Display Menu

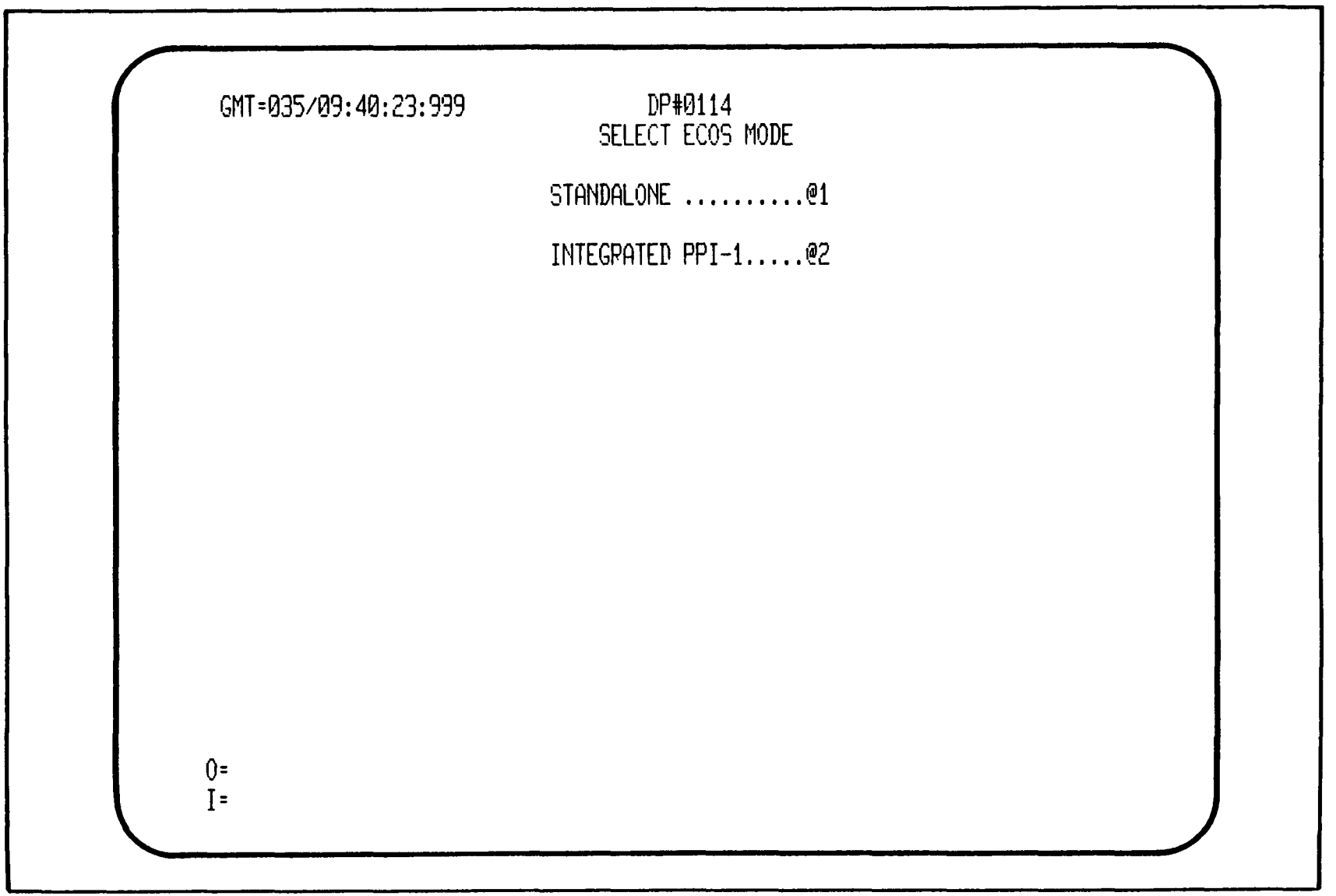

Figure 3.3-13. Select ECOS Mode Display

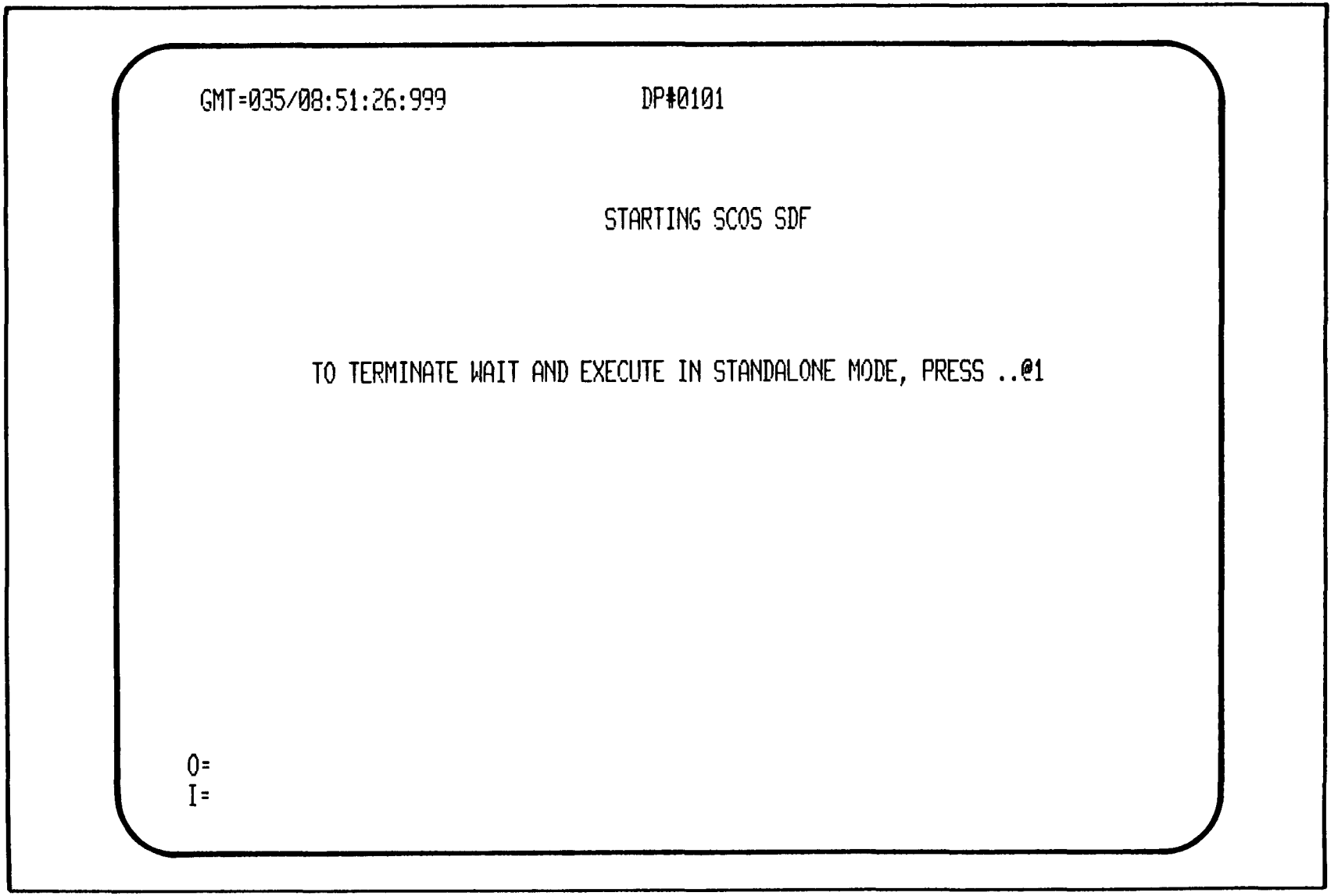

Figure 3.3-14. SDF SCOS Starting Display

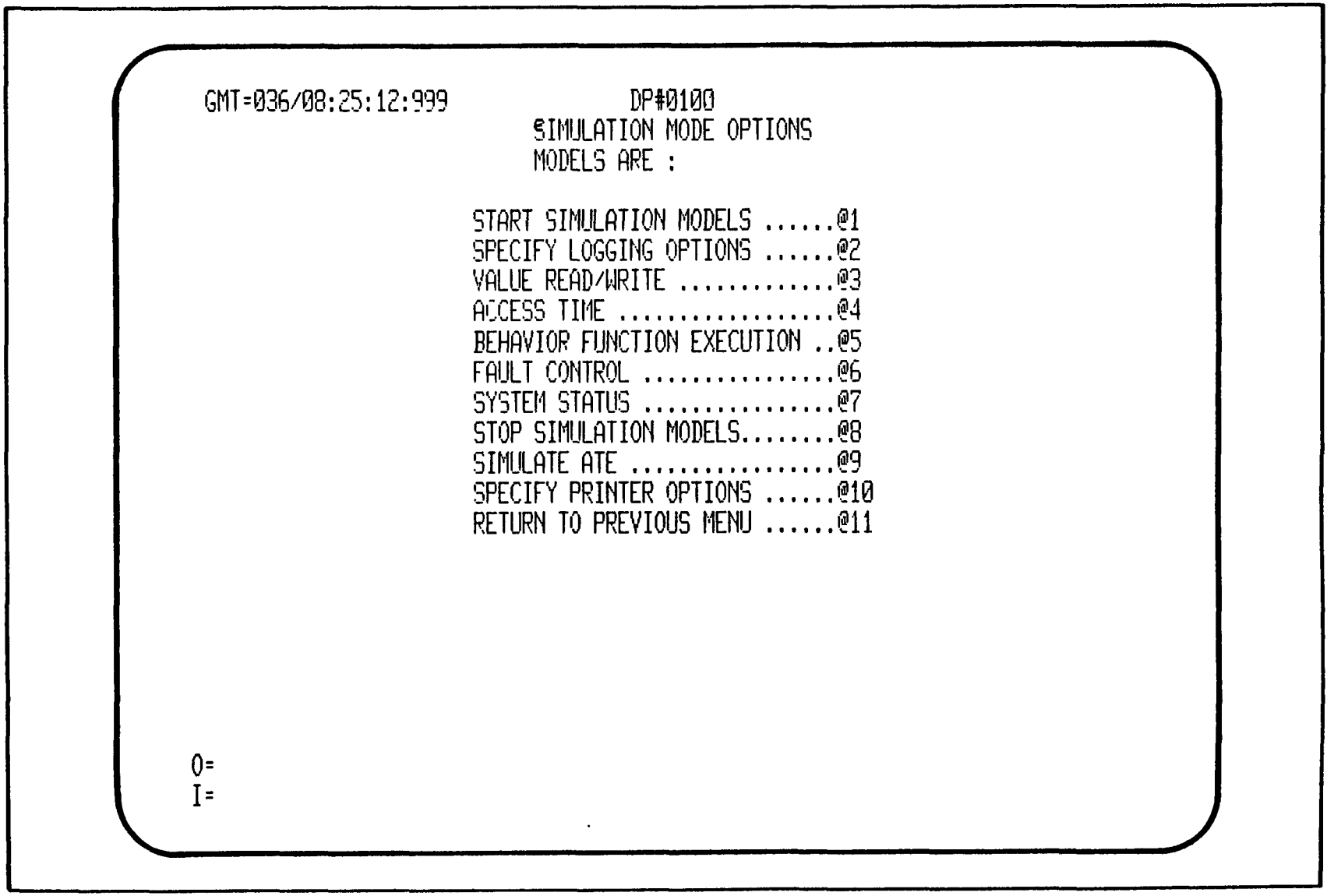

Figure 3.3-15. Simulation Mode Options

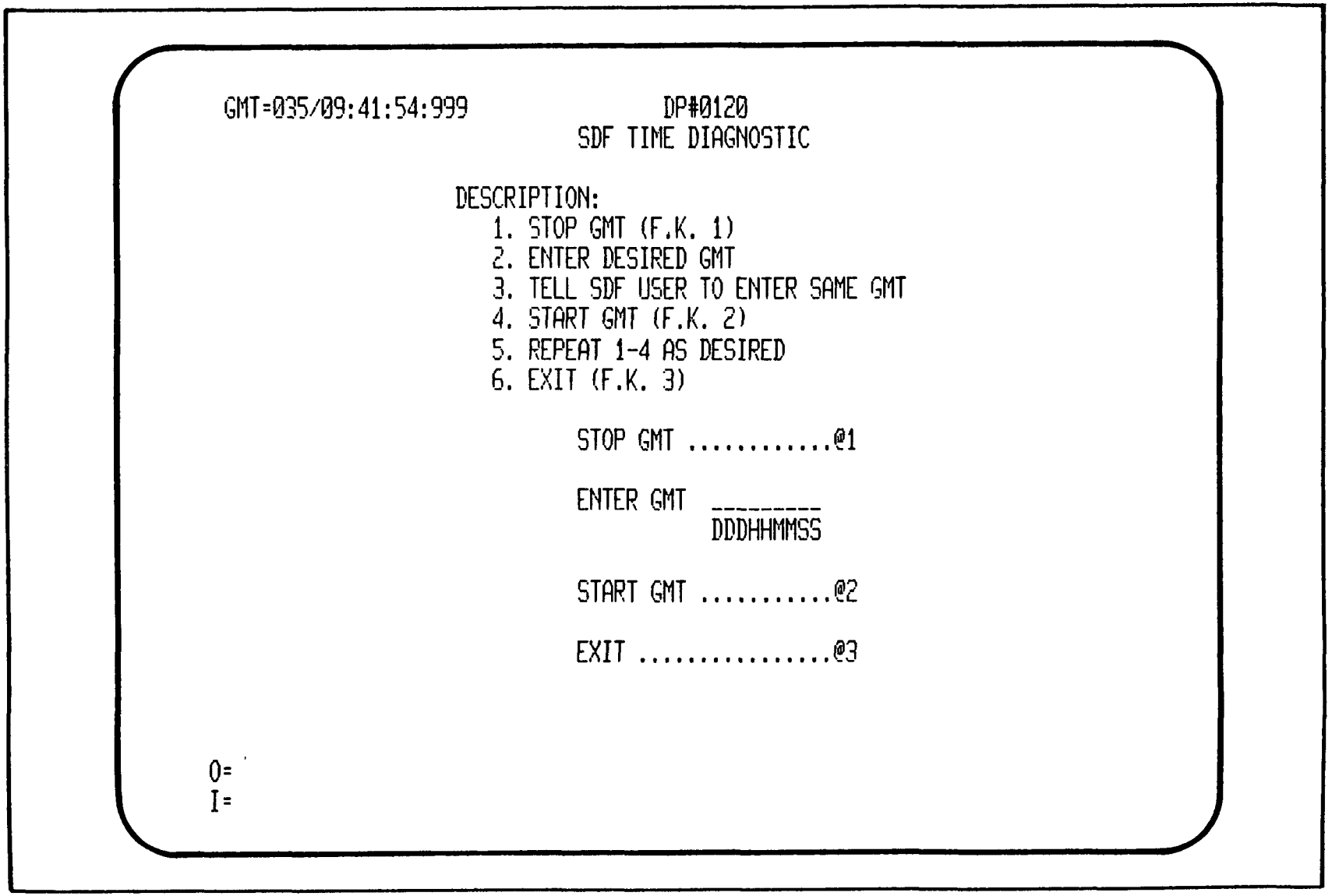

Figure 3.3-16. SDF Time Diagnostic Menu

to Access Time (@4), Execute Behavior Functions (@5), to Set Fault Control (@6), to look at System Status (@7), to Stop Simulation Models (@8), to Simulate the ATE (@9), and to Specify Printer Options (@10).

The next sequence of displays after the user has selected the mode (Standalone/Integrated) of operation for executing the simulation shall be the DUMP DATABASE OPTIONS, DP#0117 (Figure 3.3-17). The user has the option to dump the eight data base files as created by SETUP. The user can "DUMP" or "SKIP" all files.

3.3.2.2.2.1 LOGGING OPTIONS. The display DATA LOGGING FACILITY INITIALIZE DP#0130 controls logging information. The logging process is an adaptation of the process used in the SDF.

Figure 3.3-18 provides an operator interface to assign tape units, initiate logging (function key 1) and proceed to a menu of logging options, LOG RECORD TYPE Summary, DP#0131, (Page 1 of 2, Figure 3.3-19), by depressing function key 2. Function key 3 will return to the SIMULATION MODE OPTIONS display menu. When function key 2 is selected, it will show the current status of logging by record type and allow operator modification of that status. Function key 1 may be used to log all records, function key 2 to SUPPRESS ALL records. Selection of function key 3 will display DP#0132, LOG RECORD TYPE Summary (Page 2 of 2, Figure 3.3-20). This is the continuation of the record types that the user can select for logging. As with DP#0131, function key 1 (@1) will LOG ALL displayed RECORDS, function key 2 (@2) will SUPPRESS ALL RECORDS from being logged, function key 3 (#3) will return the user to the previous page, DP#0131, and function key 4 (@4) will return the user to the DATA LOGGING FACILITY INITIALIZE, DP#0130 menu display. For both of the LOG RECORD TYPE Summary pages, the user can select individual record types as displayed via the TAB key on the console keyboard. At the desired record type, the user enters "LOG" at this time.

3.3.2.2.2.2 PRINTER OPTIONS. The PRINTER OPTIONS display, DP#0200 (Figure 3.3-21), allows control of print options. Entering an "E" or "D" in the status fields will ENABLE/DISABLE the Class A/Class B error messages, the error numbers, the compose fields, the shifted/unshifted function keys, I-line

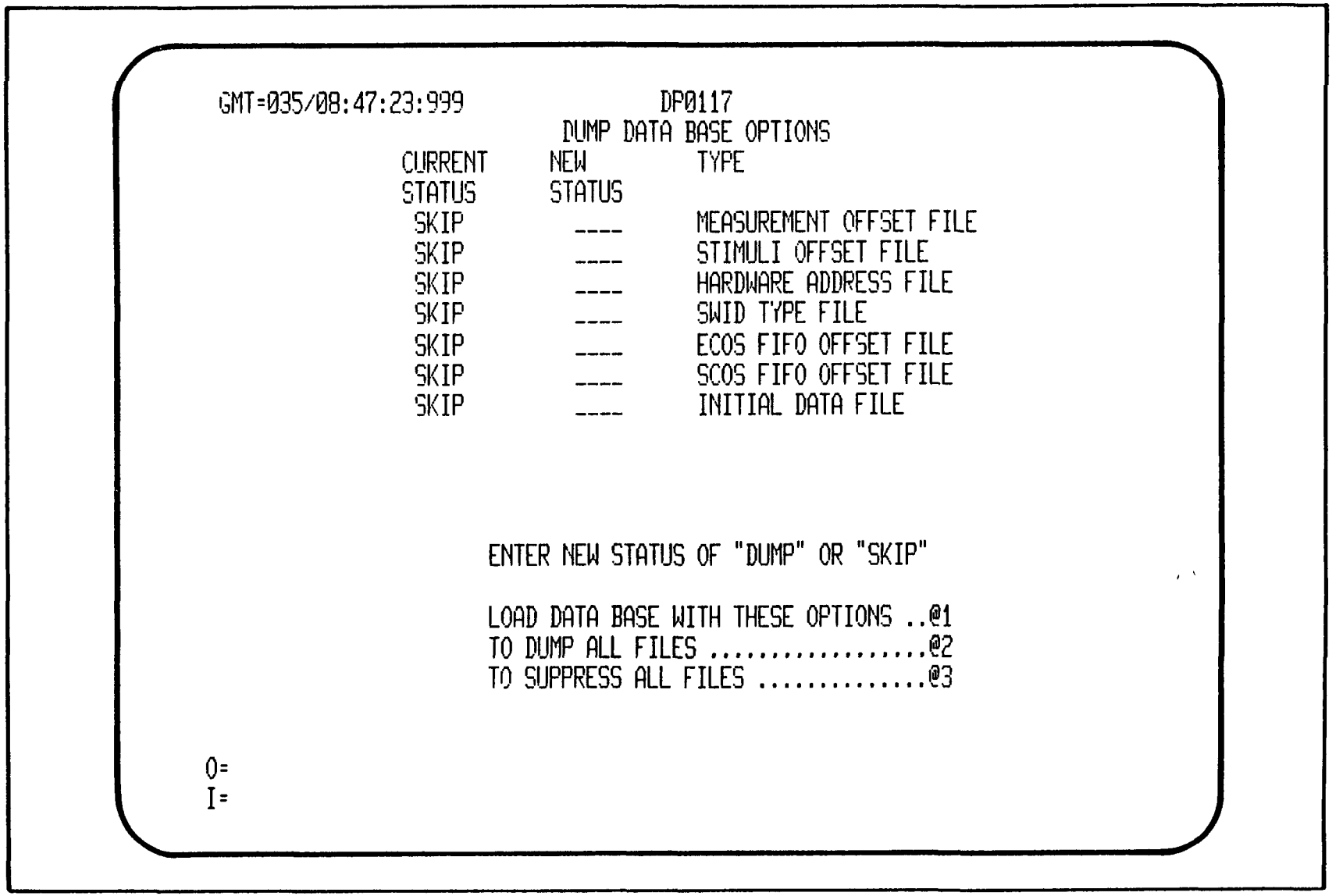

Figure 3.3-17. Dump Data Base Options Menu

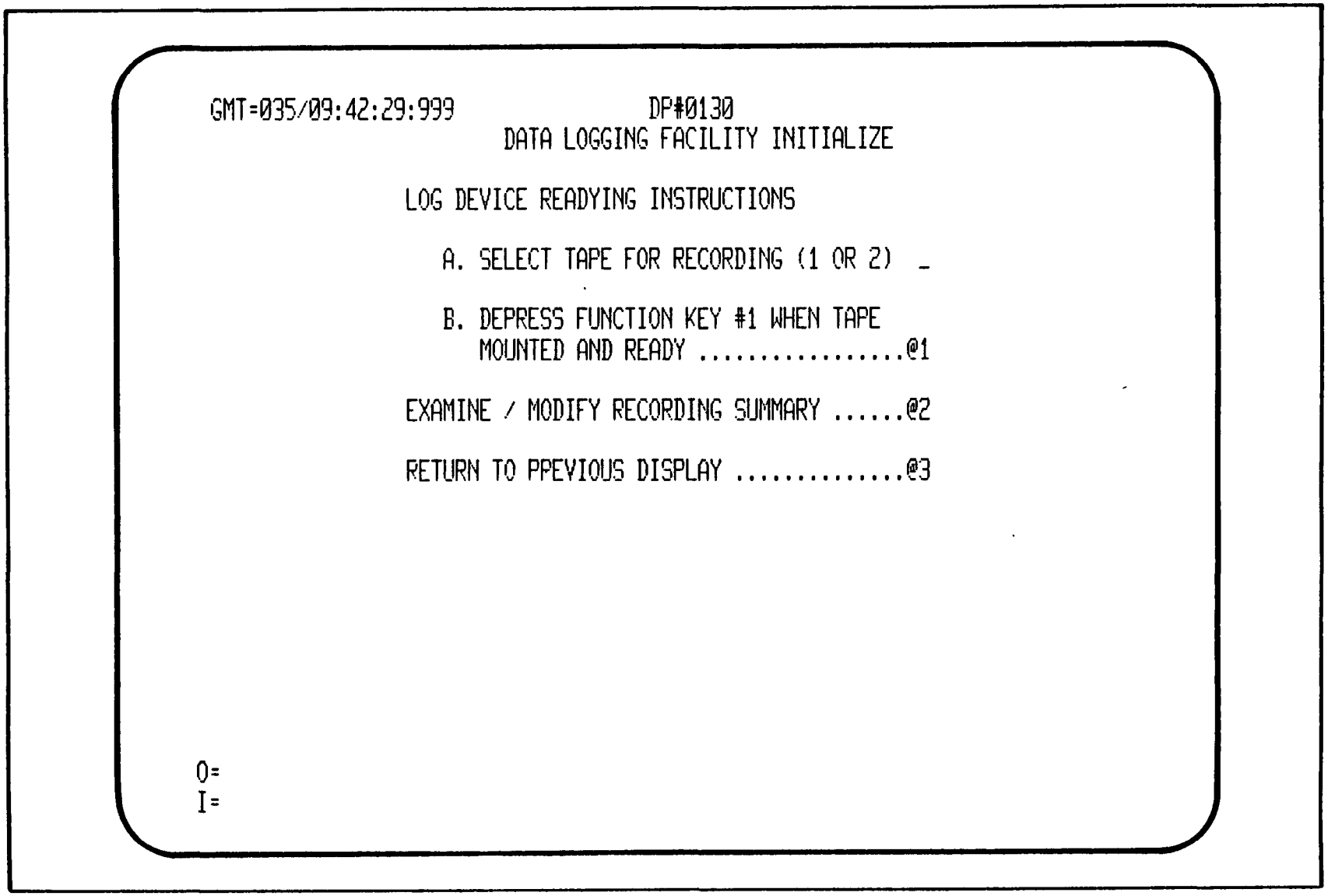

Figure 3.3-18. Data Logging Facility Initialize

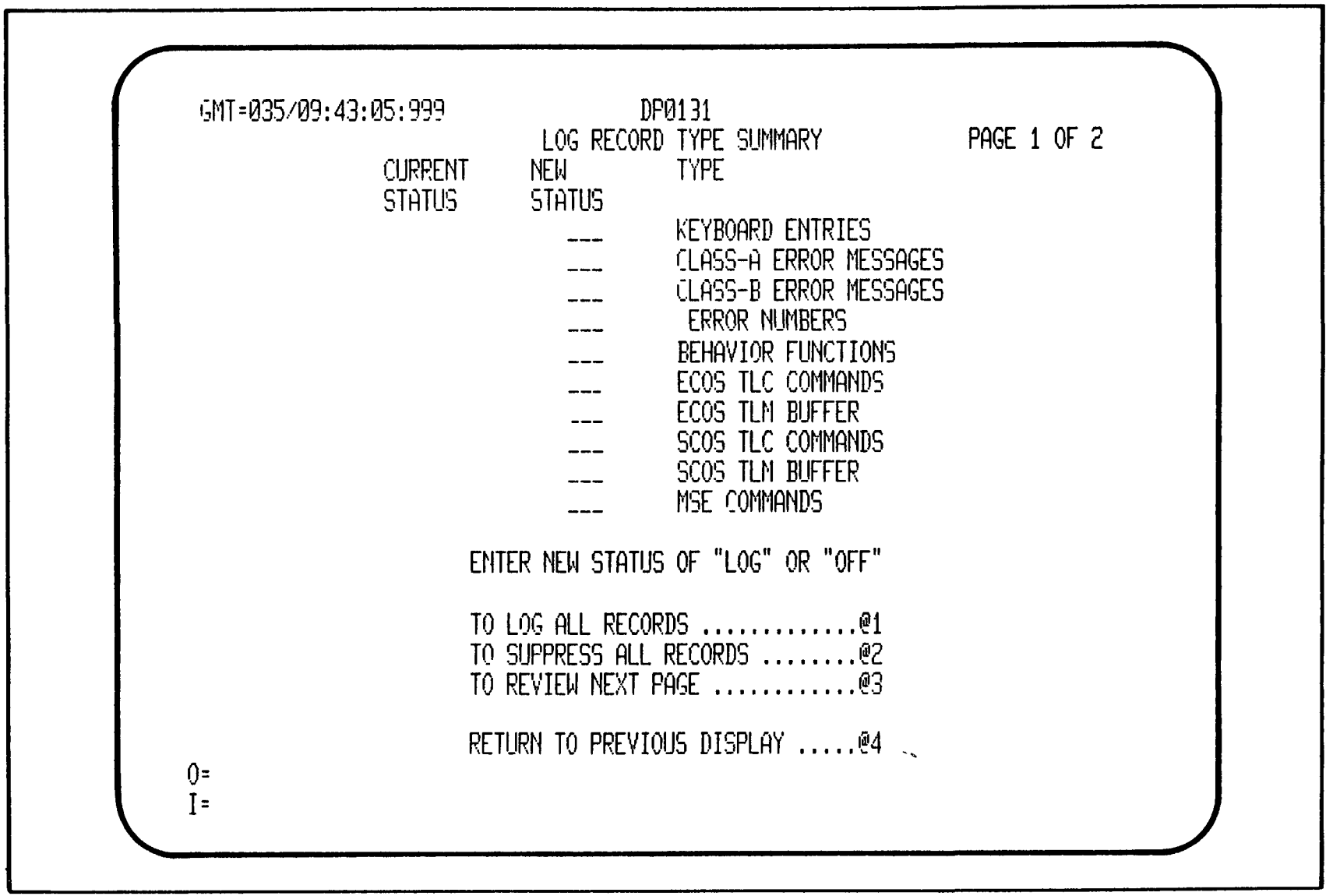

Figure 3.3-19. Log Record Type Summary (1 of 2)

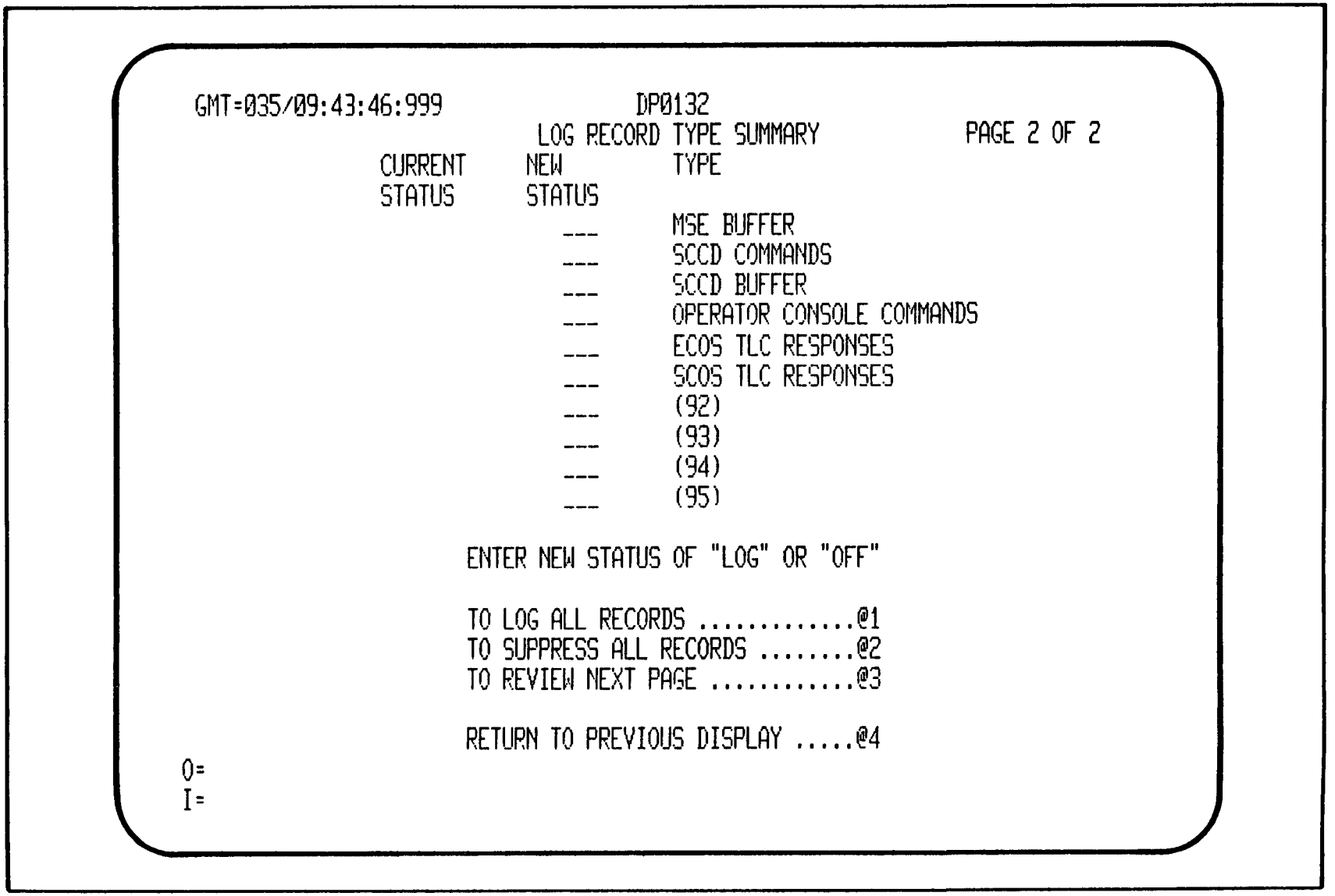

Figure 3.3-20. Log Record Type Summary (2 of 2)

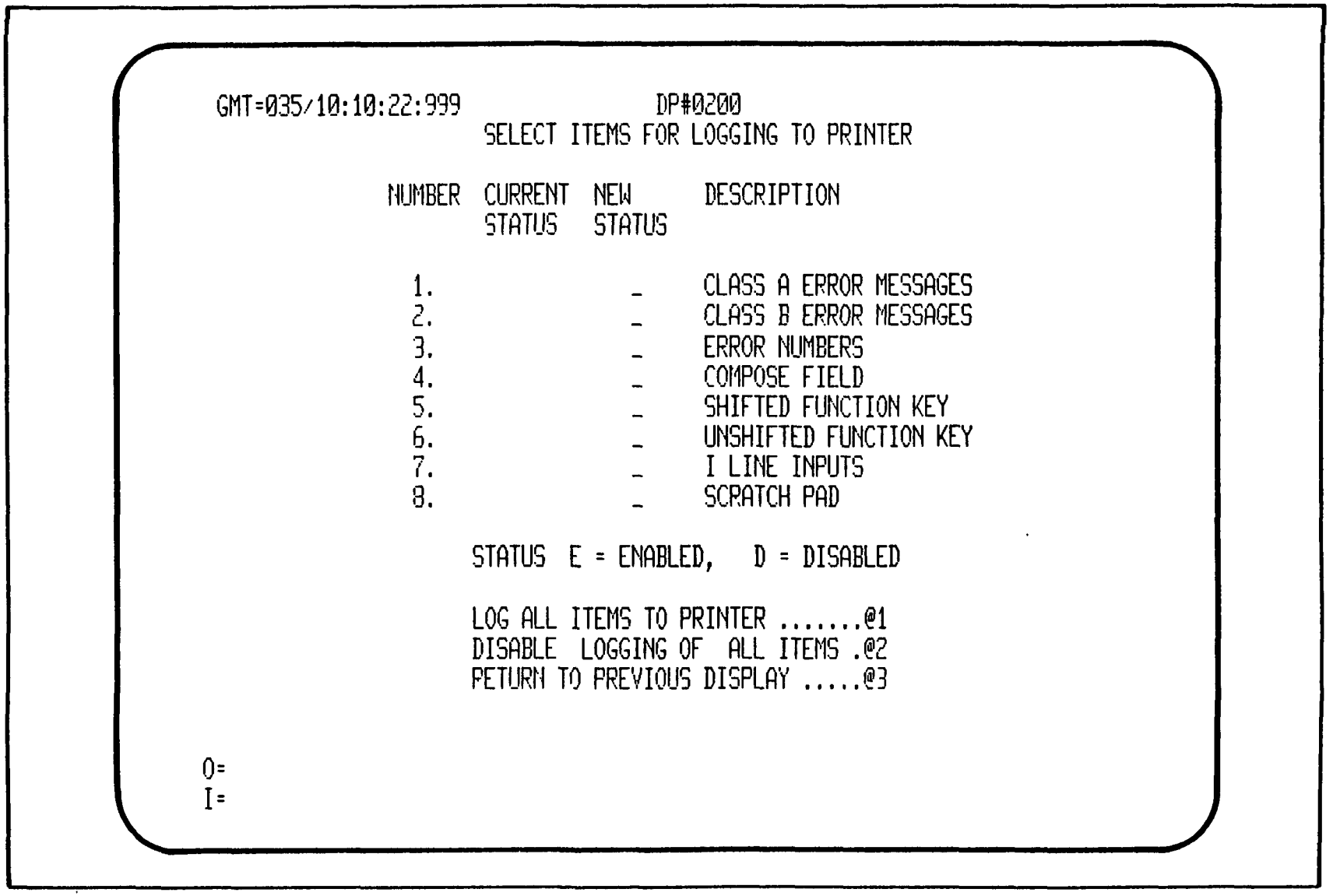

Figure 3.3-21. Printer Options Menu

inputs, and scratch pad messages. Function key 1 will LOG ALL ITEMS to PRINTER, function key 2 will DISABLE LOGGING OF ALL ITEMS to the printer, function key 3 will return to the SIMULATION MODE OPTIONS display.

3.3.2.2.2.3 VALUE READ/WRITE. The display which allows the reading or writing of values is depicted in Figure 3.3-22, DP#0140. To read a value, position the cursor, enter the SWID or SMID identifier number and press the "SEND" key. The display shall return the digital value in hexadecimal, the calibrated value, the short "SYMBOLIC NAME OF THE INSTRUMENT" (SNI), and the engineering units for the input number. For a discrete signal, the calibrated value will be the binary value, and the engineering units will be "TRUE", "FALSE", "ON", or "OFF", etc., indicating the state of the value of "0" or "1" based on the SLDB definition.

To write a value, position the cursor, enter the value, then press the "SEND" key. For a discrete value, enter the value of a 16-bit field containing the bits to be written and press the "SEND" key.

If an attempt is made to read or write an invalid SWID/SMID number, the END ITEM TYPE will be displayed as "UNDEFINED SWID".

Value Read/Write allows the user to "LOCK OUT" actions to alter SWID data by the simulation. This is especially useful for testing special cases, or to perturbate data which would (or might be) immediately over-written by the normal operation of the simulation. Selecting L (lock) will prevent changes except by Value Read/Write. Selecting U (unlock) will restore the access to the variable to its normal state.

3.3.2.2.2.4 ACCESS TIME. The GCID maintains two time values, Greenwich Mean Time (GMT), and Mission Elapsed Time (MET). GMT originates in the GSMF host and is the time used by the operating system for system-related timing operations (e.g., waits, scheduling) because of special modifications made to the operating system. This time may also be set or reset by the GSMF user. MET originates in the ATE computer and may not be affected directly from the GSMF side of the simulation. To allow perturbation of MET, a MET BIAS (offset) is maintained in the GCID which will bias MET as set by the ATE. These time values may be accessed by ACCESS_TIME. Display DP#0150 (Figure 3.3-23), represents the operator interface to this process. When activated, ACCESS_TIME displays both the current GMT and the MET bias.

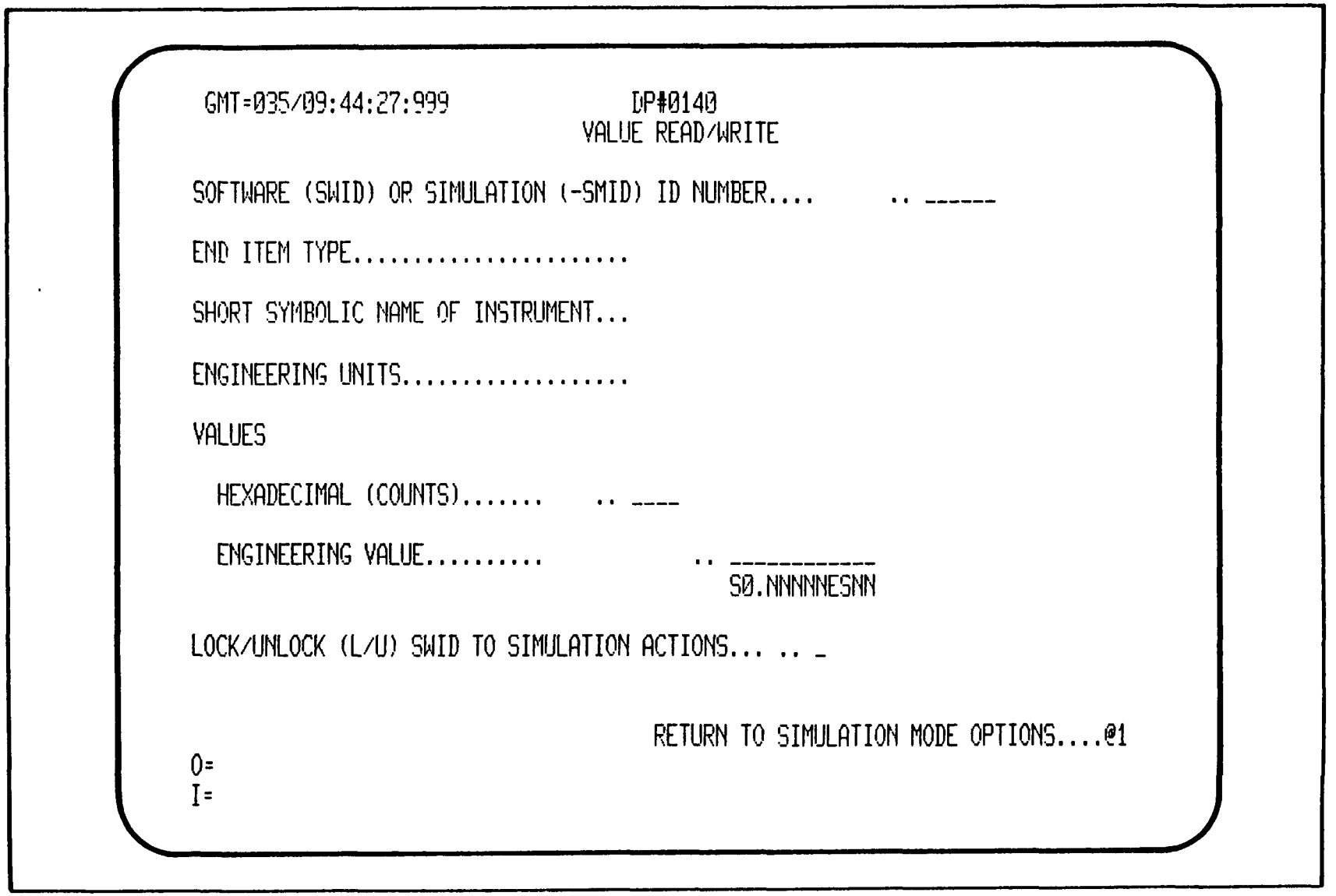

Figure 3.3-22. Value Read/Write Display

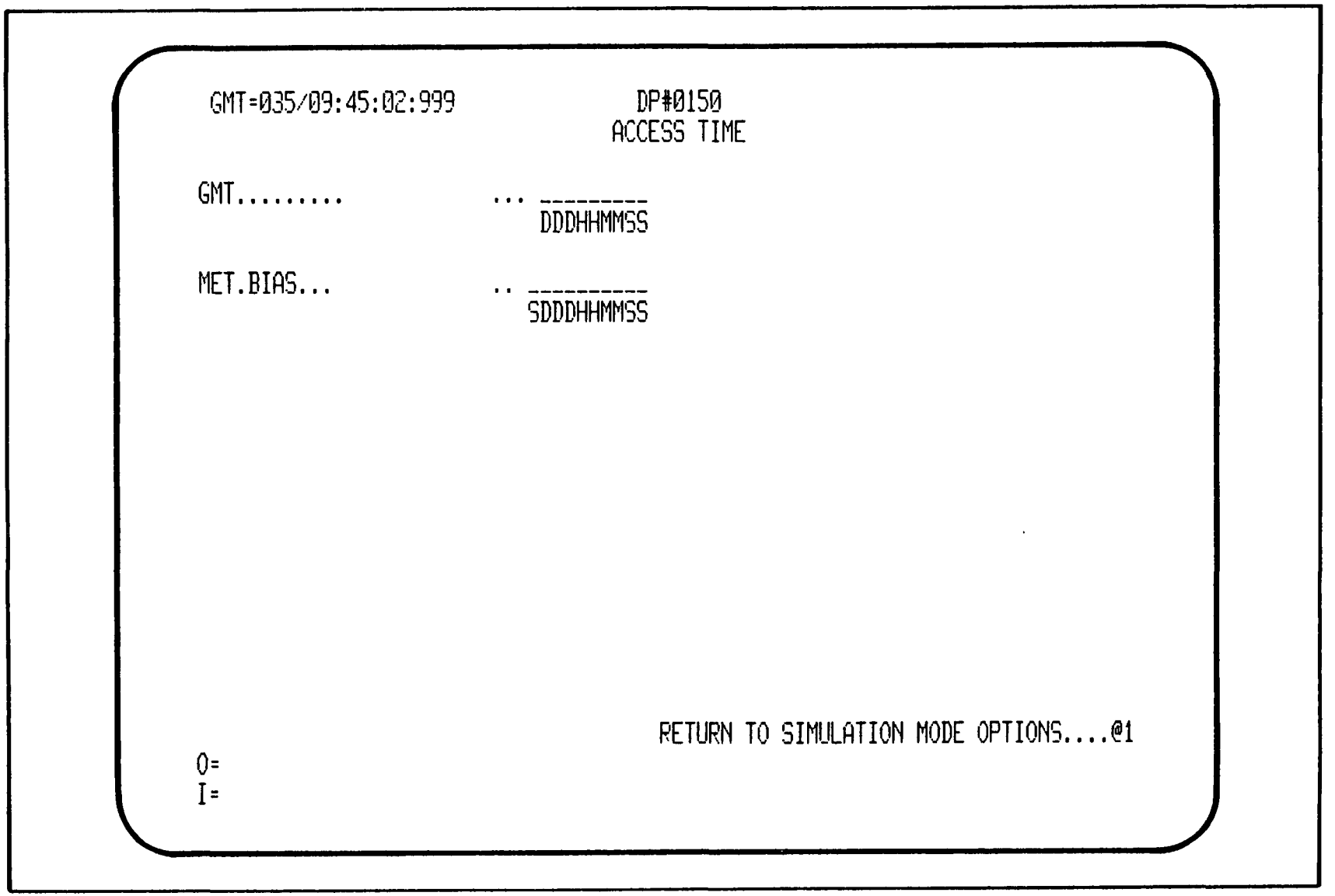

Figure 3.3-23. Access Time Display

To change either of the time values, the new value shall be entered as indicated on the display. Both times consist of a day, hour, minute, and second component. The MET BIAS also includes provision for a sign so the offset might be in either direction in time from the current MET.

Selection of function key 1 shall return the user to the SIMULATION MODE OPTIONS menu.

3.3.2.2.2.5 Behavior Function Execution. Selecting "BEHAVIOR FUNCTION EXECUTION" from the SIMULATION MODE OPTIONS menu (@5) (Figure 3.3-15), displays the EXECUTE BEHAVIOR FUNCTION menu. Figure 3.3-24, DP#0160, depicts the EXECUTE BEHAVIOR FUNCTION menu. The user shall enter the SWID number, Command Words 1 and 2, and then press function key 1 to execute the Behavior Function, or function key 2 to return to the previous menu.

3.3.2.2.2.6 Fault Control. To readily test ATE link-related perturbations/failures, a process named FAULT_CONTROL is provided. The GCID uses error counts stored in its memory to determine if certain link-related errors are to be generated. If those error counts are positive, the GCID shall generate the specific error and decrement the count. When the counter is 0, no fault is generated for that particular error. FAULT_CONTROL allows those counts in the GCID to be set. In addition, each link has an indicator that allows the GSMF user to pause or start the link at will, simulating complete link failure. Several faults are controlled in the GSMF, TLM time and PIOL failures and SCCD overall health.

This process shall begin with a menu of link/fault relationships. Display DP#0170 (Figure 3.3-25), illustrates the menu and the selections the operator may make to select a link on which to review or set fault conditions. Each link perturbation process shall be accessed by function key selection. On completion, each of those secondary processes shall return to the initial screen, from which additional links might be selected, or by selection of Function Key 6, the user shall be returned to the SIMULATION MODE OPTIONS menu.

When a fault insertion screen for a link is activated, the number of errors scheduled for each link-related fault is displayed (on a snap-shot basis) and an indication of whether fault insertion is active and whether the link is running or paused is shown. The user may change the counts, activate

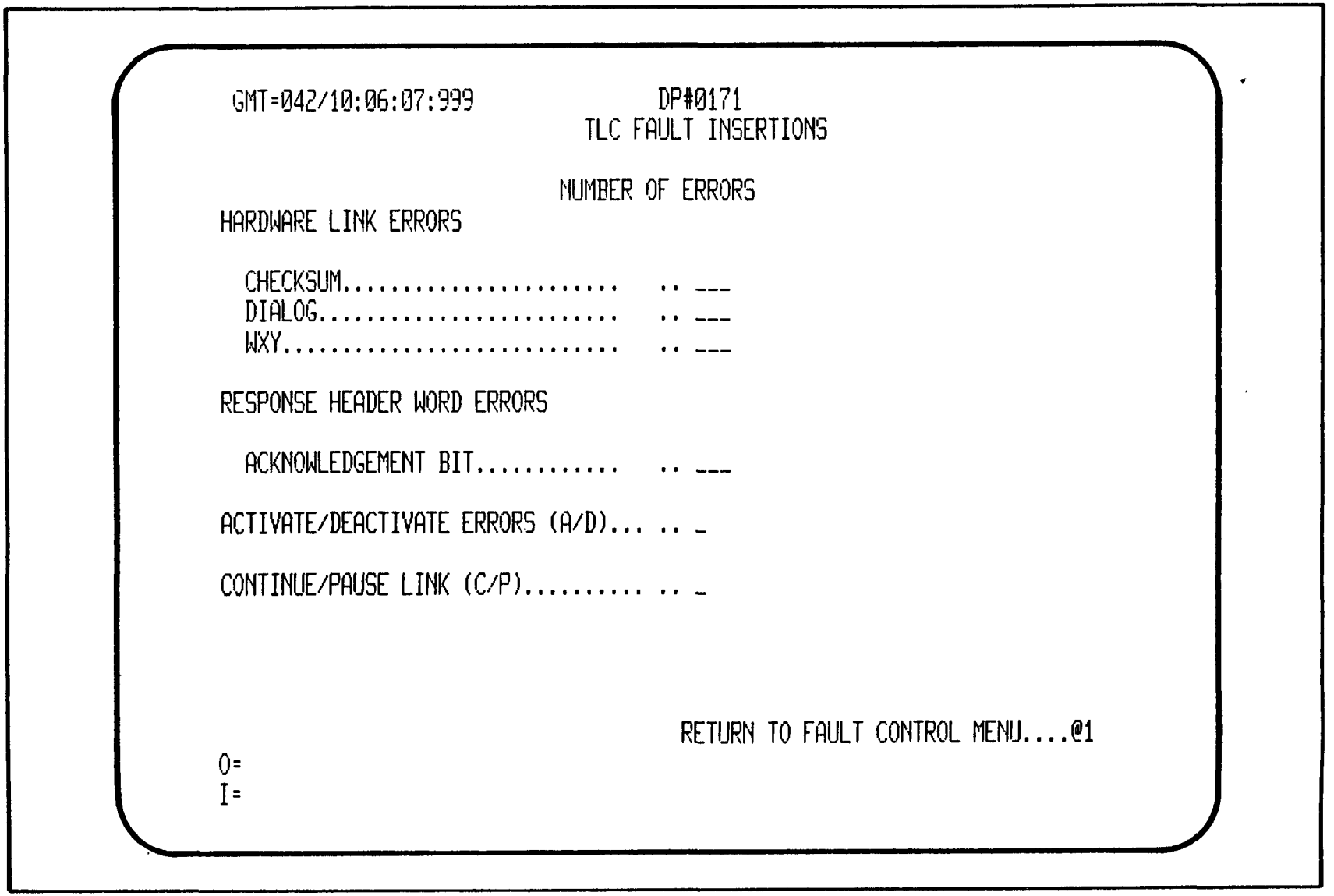

Figure 3.3-24. Execute Behavior Function Menu

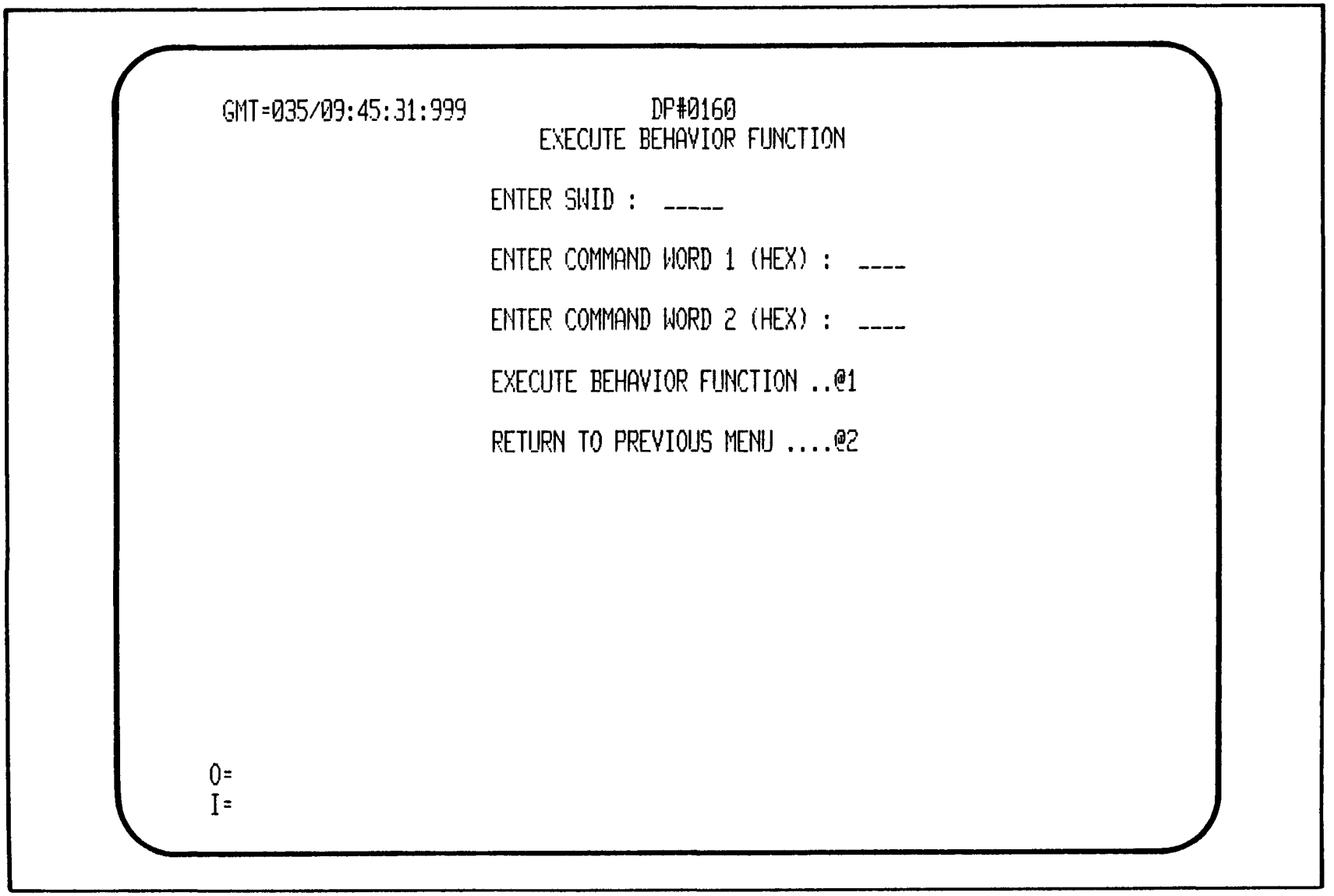

Figure 3.3-25. Fault Control Menu

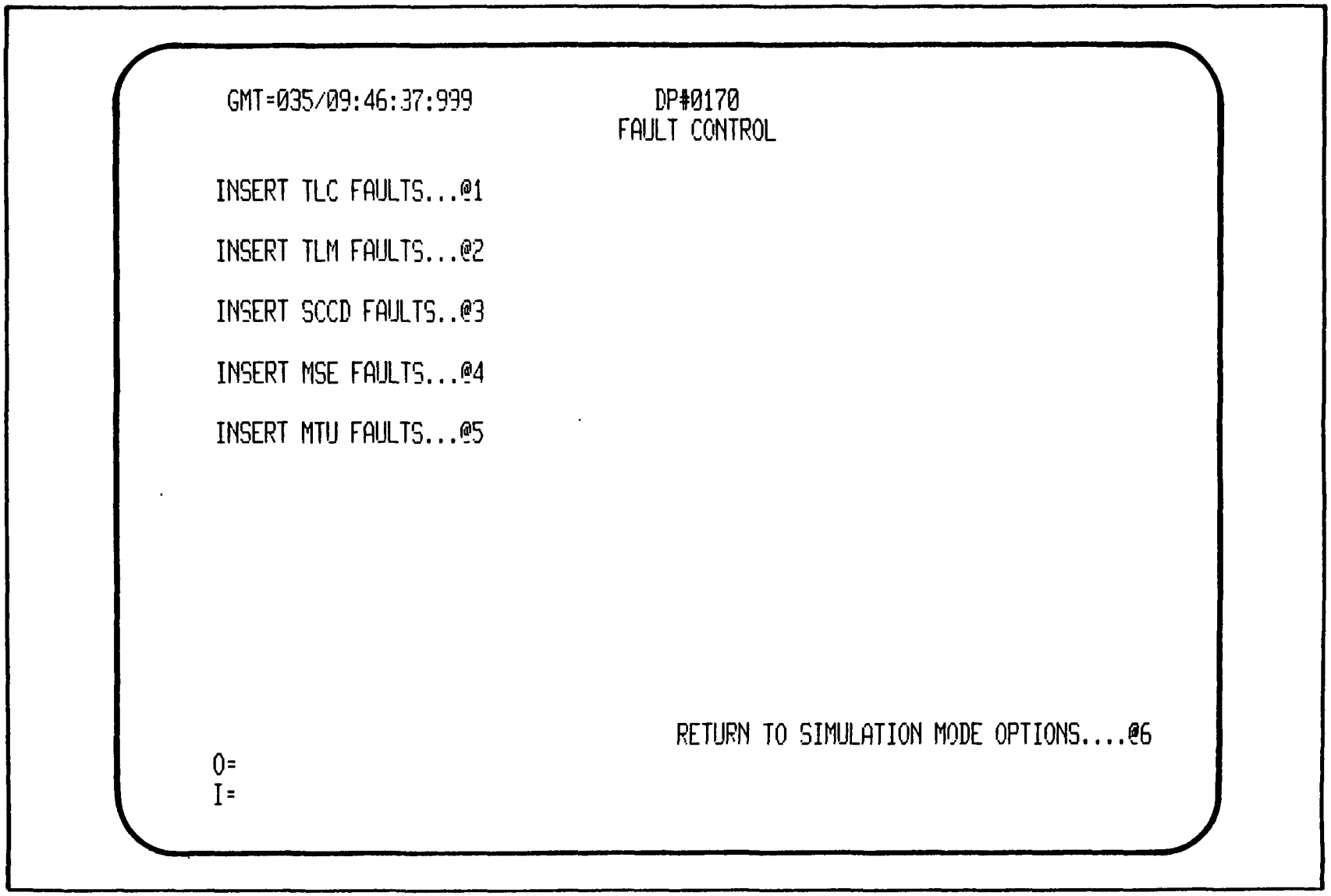

Figure 3.3-26. TLC Fault Insertion Menu

or deactivate error insertion, or start or pause the link by entries to the display. If error generation is active for the link related to that error, the changes to error counts are immediately sent to the GCID. If error generation is inactive, the counts shall be maintained in the GSMF host until error insertion is activated, then sent to the GCID. If the operator deactivates error insertion, any error counts remaining to be processed by the GCID shall be stored in the GSMF host and displayed and the error count in the GCID set to 0, precluding further error insertion. Those stored counts may be modified as desired. If fault insertion is reactivated, the currently displayed counts shall be stored in the GCID enabling those faults that have unexpired or newly entered fault counts.

3.3.2.2.2.6.1 TLC FAULT INSERTIONS. With each fault insertion menu, function key 1 shall return the user to the FAULT CONTROL menu.

TLC faults are initiated by use of display DP#0171 (Figure 3.3-26). TLC faults include hardware link errors (DIALOG error, CHECKSUM error, and WXY error), and ACKNOWLEDGEMENT BIT error in the RESPONSE HEADER word pausing the TLC link.

3.3.2.2.2.6.2 TLM FAULT INSERTIONS. TLM faults will be initiated by use of display DP#0172 (Figure 3.3-27). TLM faults include FREEZE ECOS/SCOS TMB PIOL counter and FREEZE ECOS/SCOS GMT. These faults will be simulated entirely in the GSMF. TLM DMA PARITY ERROR faults may be inserted by the GCID.

3.3.2.2.2.6.3 SCCD FAULT INSERTIONS. SCCD faults will be initiated by use of display DP#0173 (Figure 3.3-28). SCCD faults include OVERALL HEALTH error (high-order bit of SCCD status buffer). This fault will be simulated entirely in the GSMF. There are no SCCD faults inserted by the GCID except pausing the link.

3.3.2.2.2.6.4 MSE FAULT INSERTIONS. MSE faults will be initiated by use of display DP#0174 (Figure 3.3-29). MSE faults include COMPLEMENT error and pausing the MSE link.

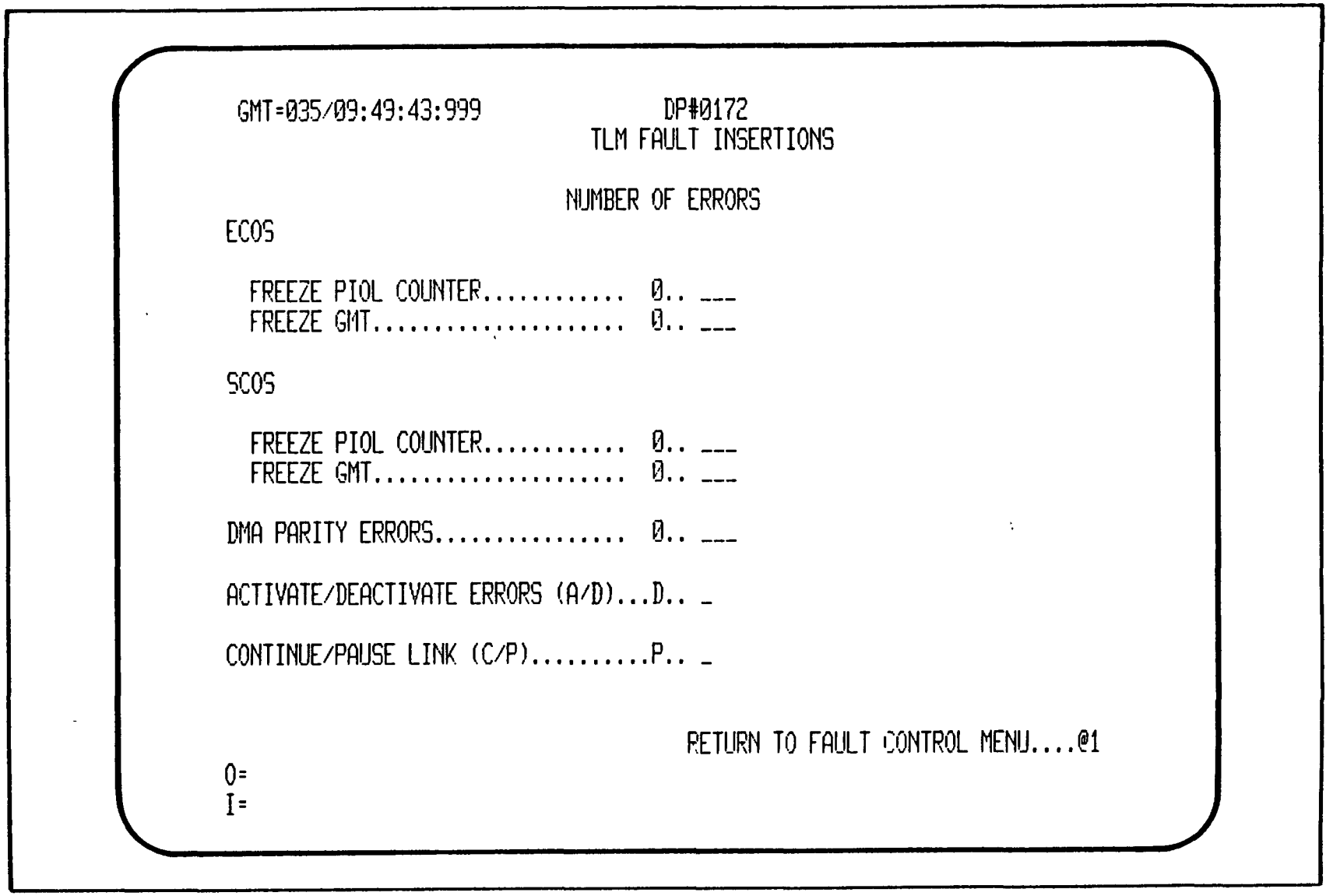

Figure 3.3-27. TLM Fault Insertions Menu

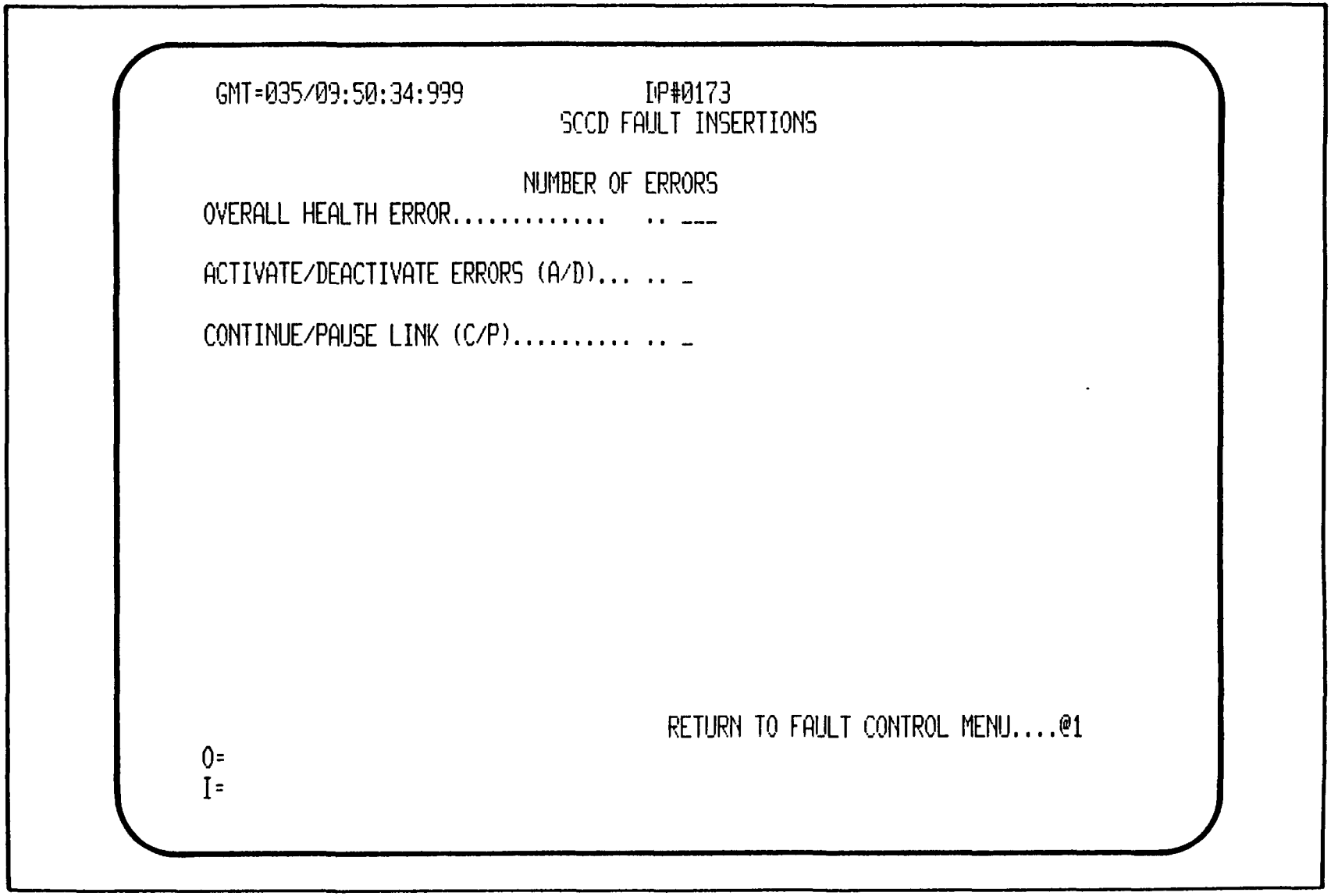

Figure 3.3-28. SCCD Fault Insertions Display

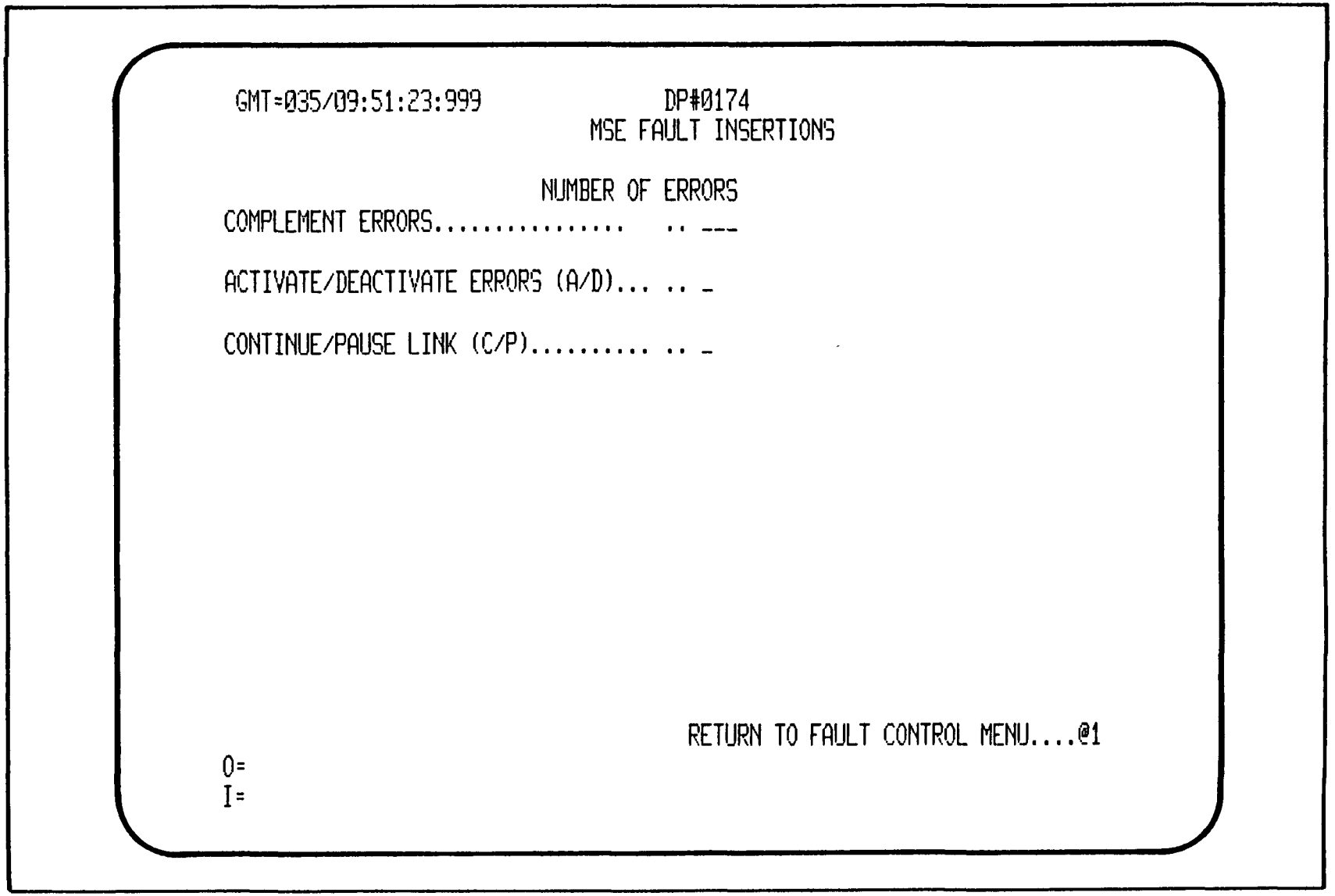

Figure 3.3-29. MSE Fault Insertions Display

3.3.2.2.2.6.5 TIME FAULT INSERTIONS. The faults to the time link are limited to pausing the link. A perturbation of the time link process is also provided via ACCESS_TIME (see Section 3.3.2.2.2.4). Display DP#0175 (Figure 3.3-30), depicts the TIME (MTU) FAULT INSERTIONS menu.

3.3.2.2.2.7 SYSTEM STATUS DISPLAY. The status display shows the GO-NOGO state of each GCID processor and of the PPI interface. It also shows which GSMF peripherals are attached and running. Figure 3.3-31 depicts the SYSTEM STATUS DISPLAY, DP#0180. The status display is shown by selecting function key 7 of the SIMULATION MODE OPTIONS menu (Figure 3.3-15).

3.3.2.2.2.8 STOP SIMULATION MODELS. When the user selects function key 8 of the SIMULATION MODE OPTIONS menu (Figure 3.3-15), to stop the simulation models, "INACTIVE" will be displayed to the right of "Models are: _ _ _ _ " in the header of the display. DP#0010 remains displayed.

3.3.2.2.2.9 ATE Simulated Options. Selecting Function Key 9 will invoke a simulation test mode allowing the simulation mode Host software to be exercised without GCID or SDFs connected. Figure 3.3-32, DP#0190, depicts the ATE SIMULATOR OPTIONS menu. There are seven function keys from which the user may select. The following is a list of the display screens that shall be displayed for the respective function key depressed:

Key	Figure Number
@1	3.3-33
@2	3.3-34
@3	3.3-35
@4	3.3-36
@5	3.3-37
@6	3.3-38
@7	3.3-15

Appendix A details how to execute the ATE Simulator Options.

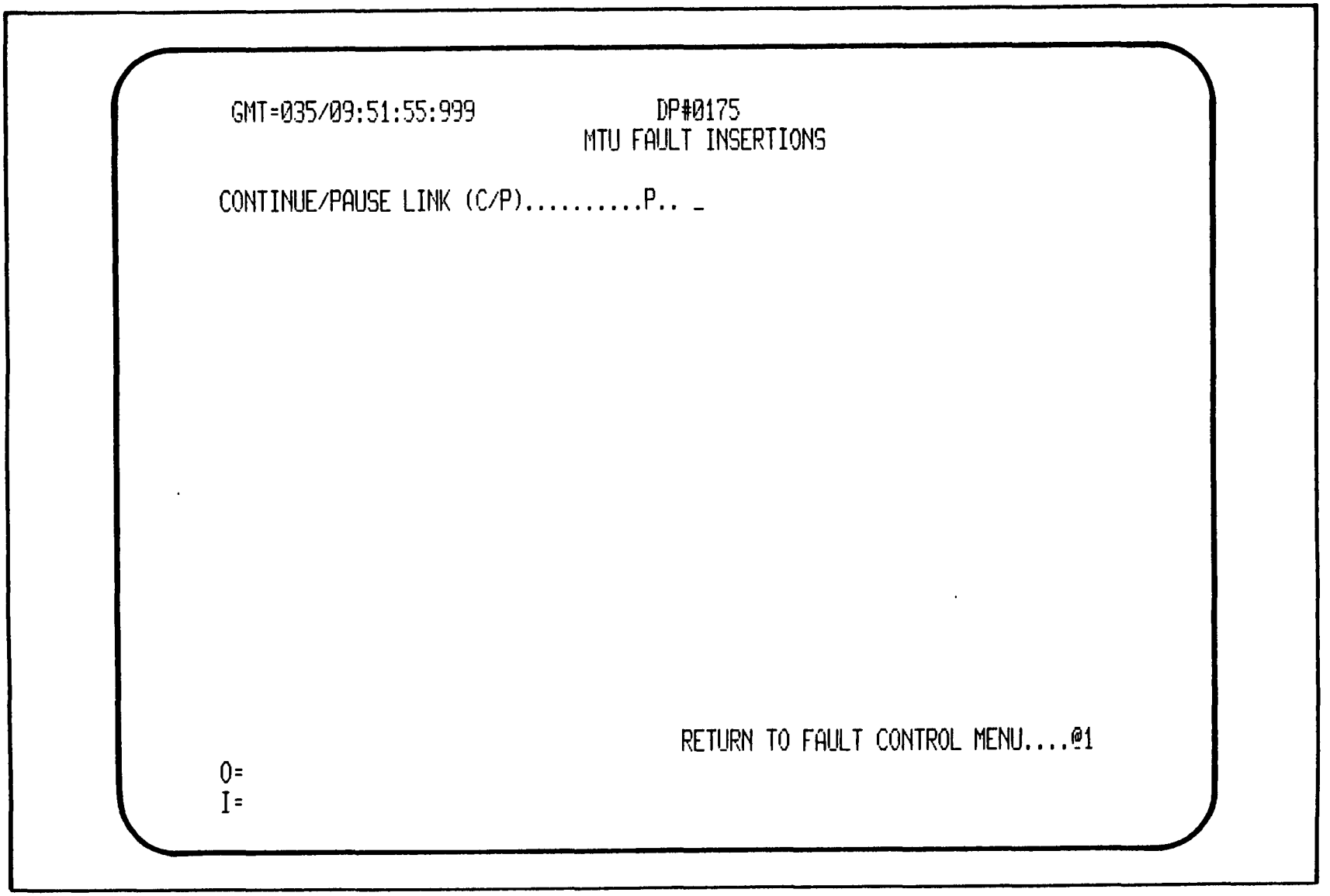

Figure 3.3-30. MTU Fault Insertions Display

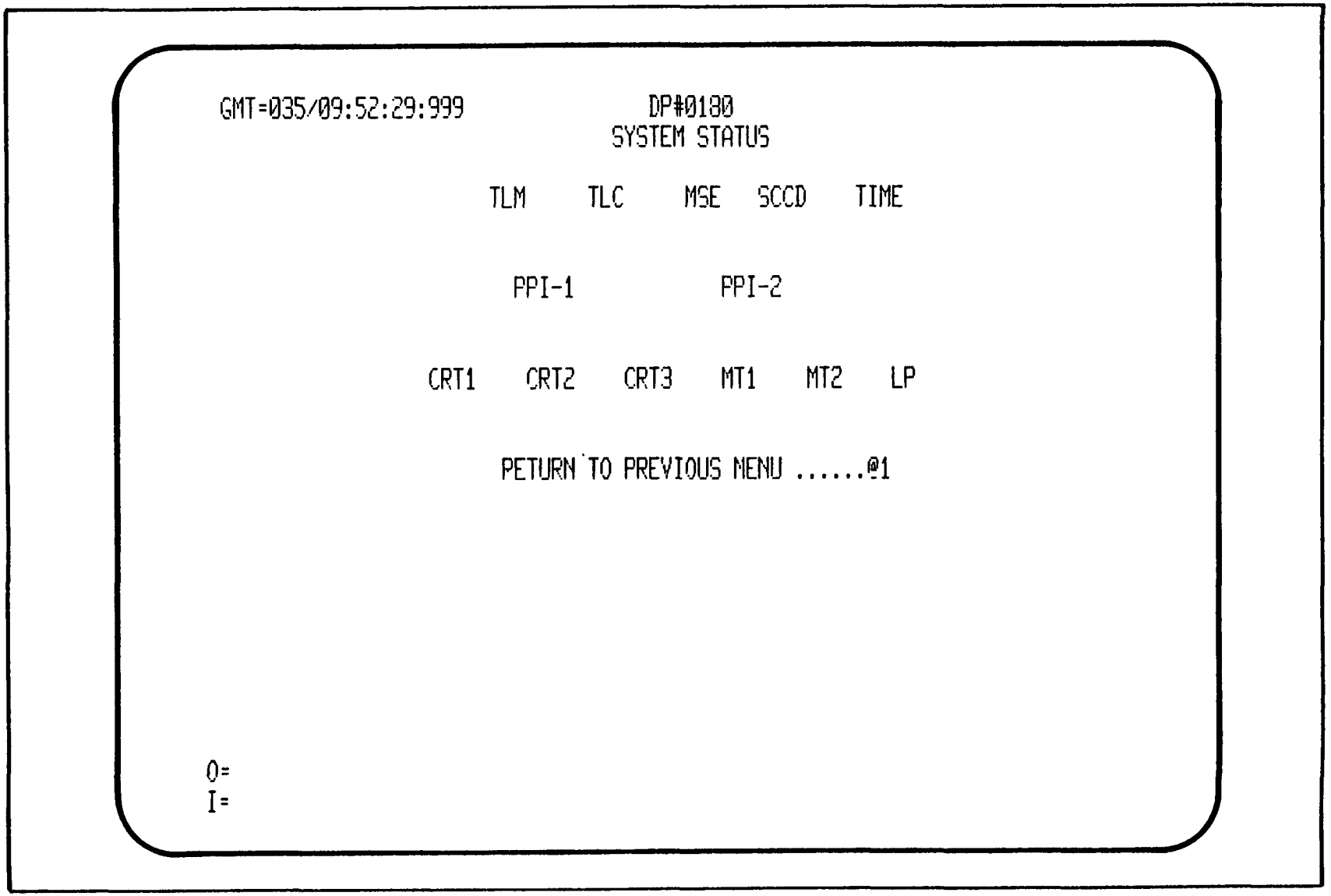

Figure 3.3-31. System Status Display

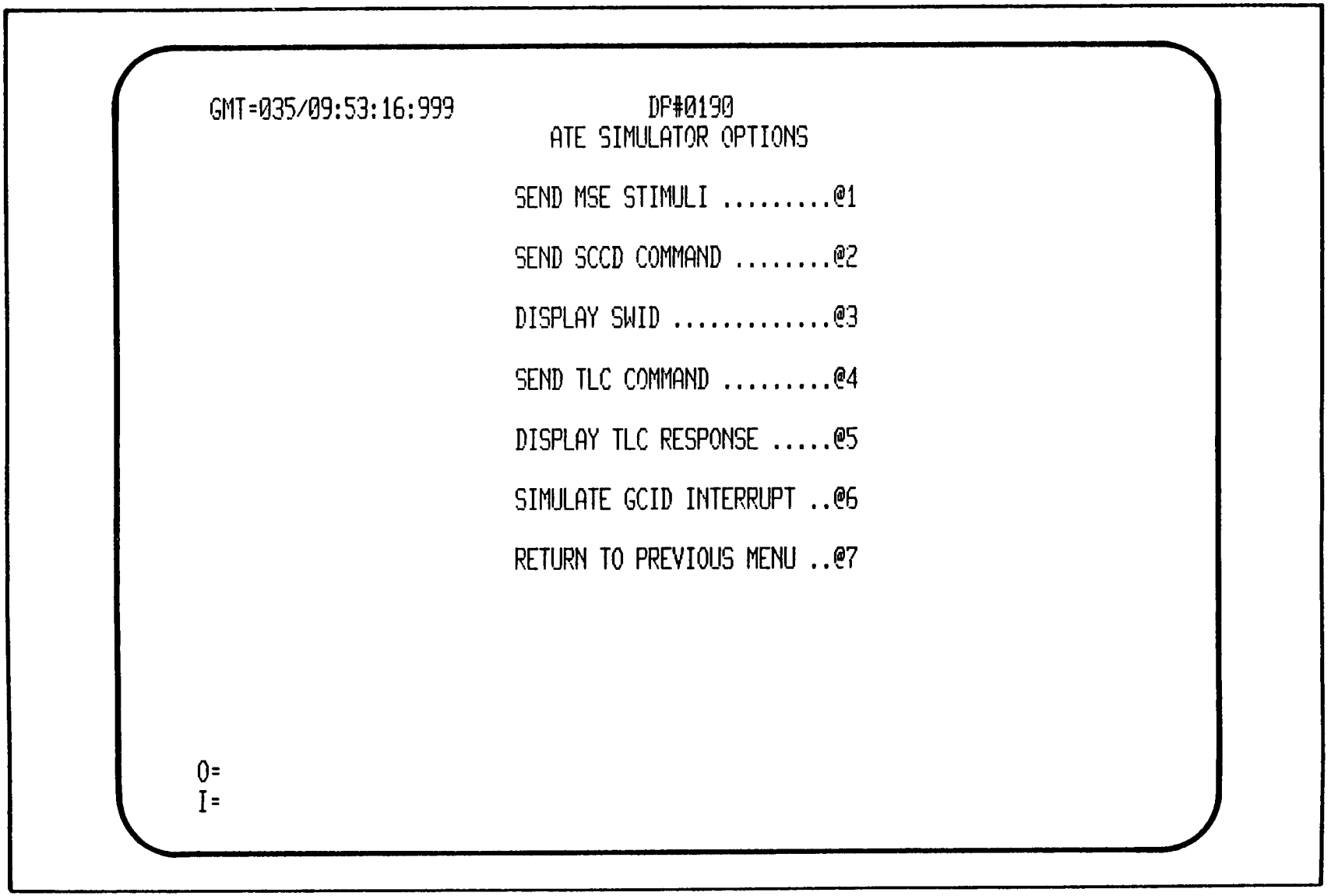

Figure 3.3-32. ATE Simulator Options Menu

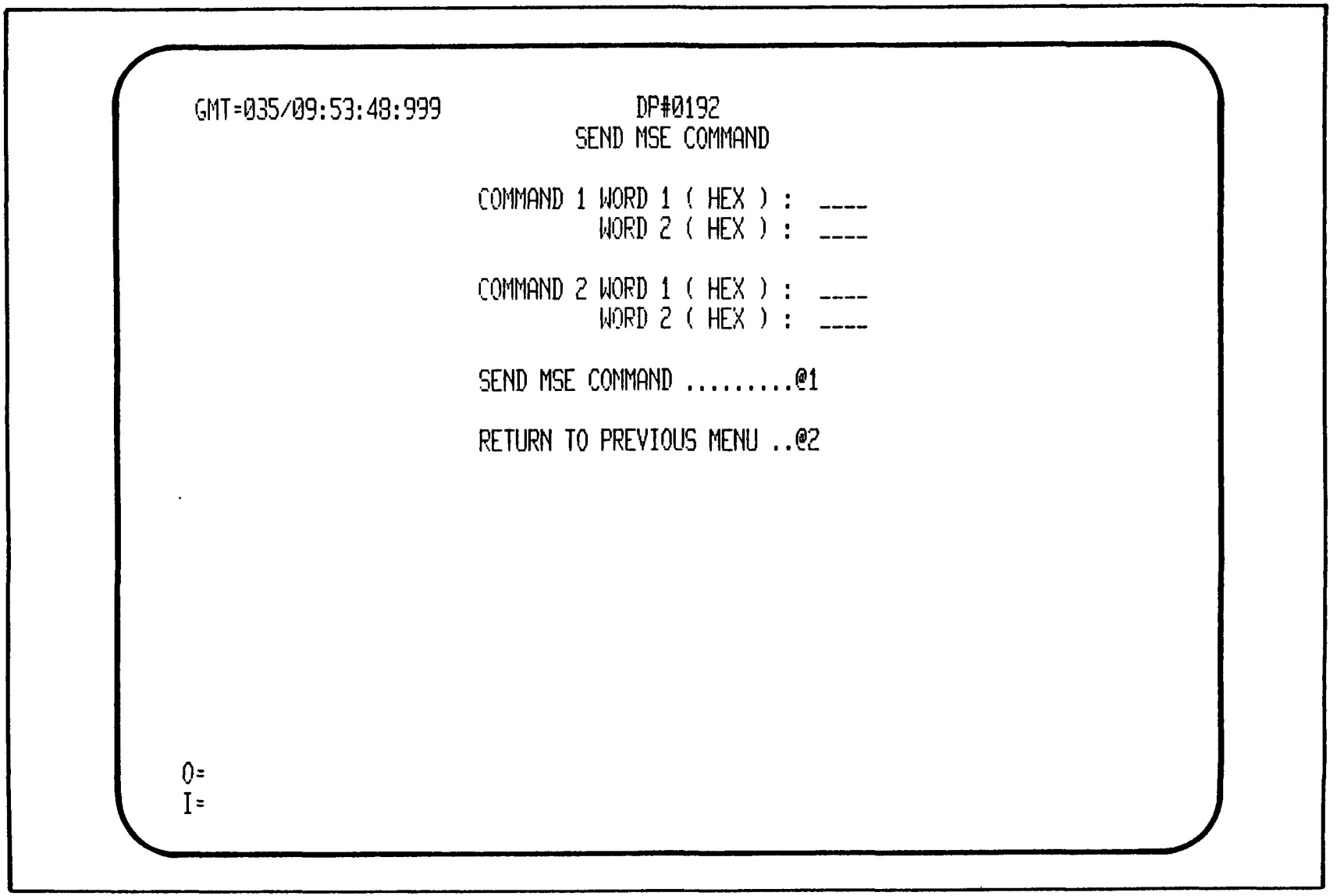

Figure 3.3-33. Send MSE Command Display

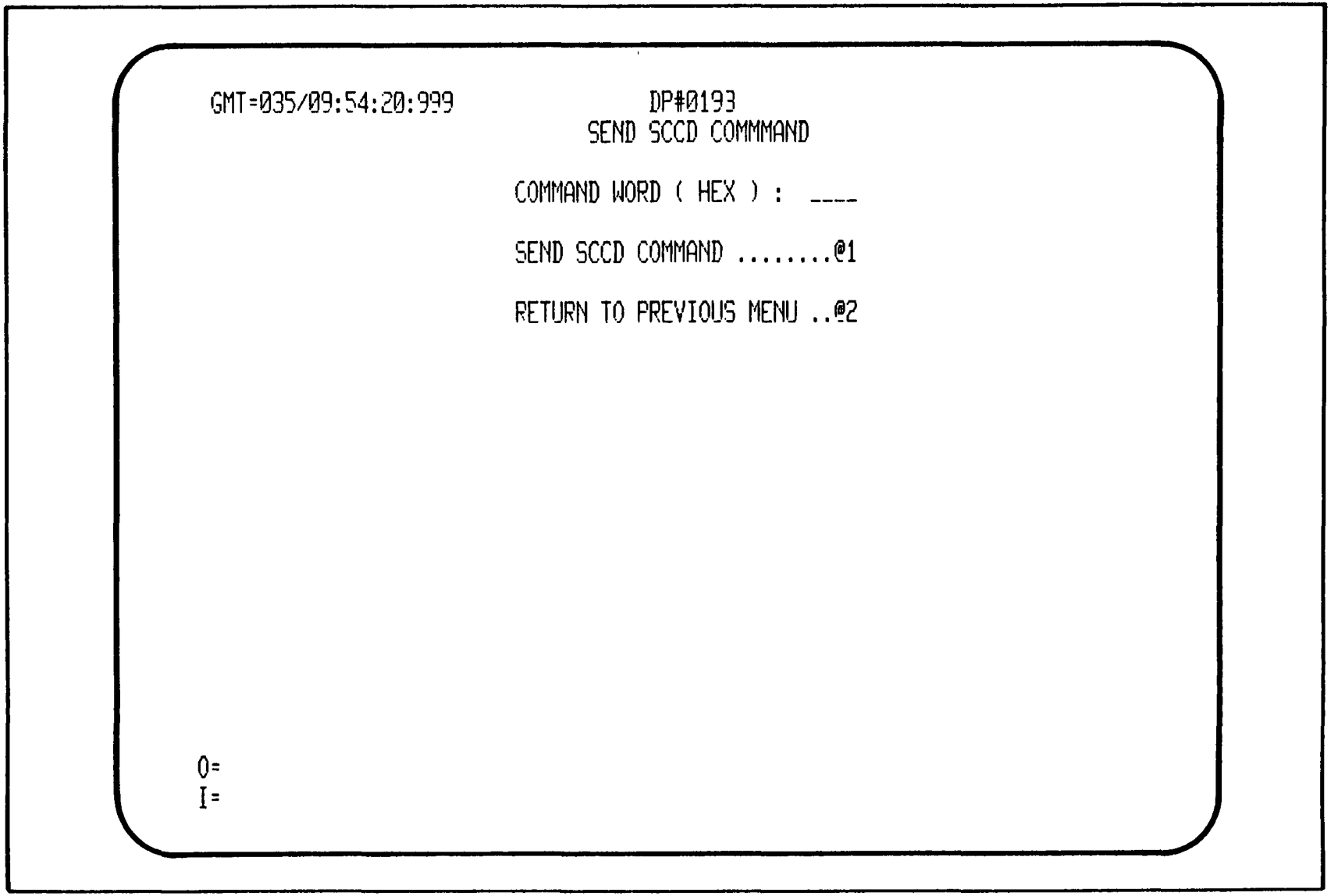

Figure 3.3-34. Send SCCD Command Display

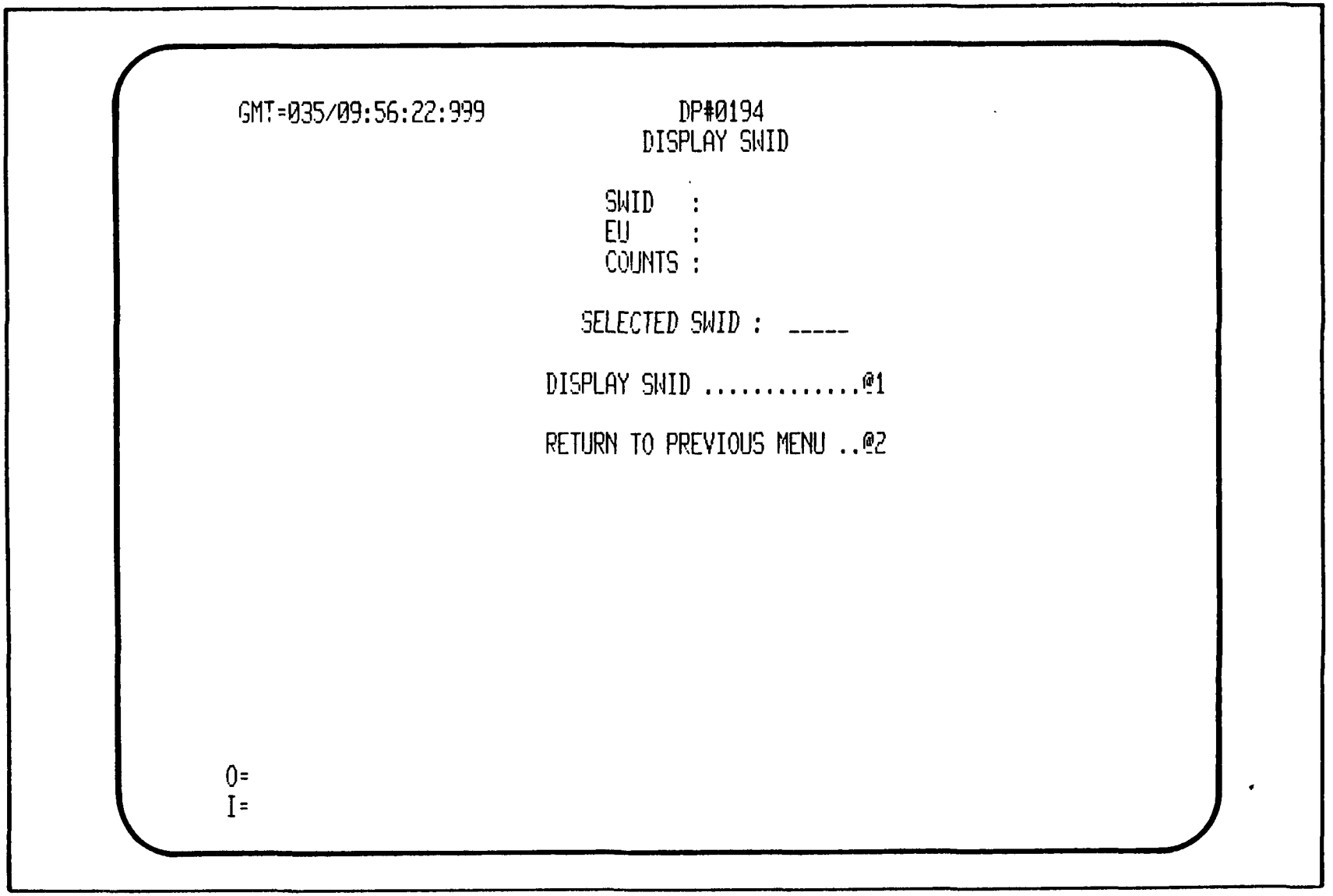

Figure 3.3-35. Display SWID Menu

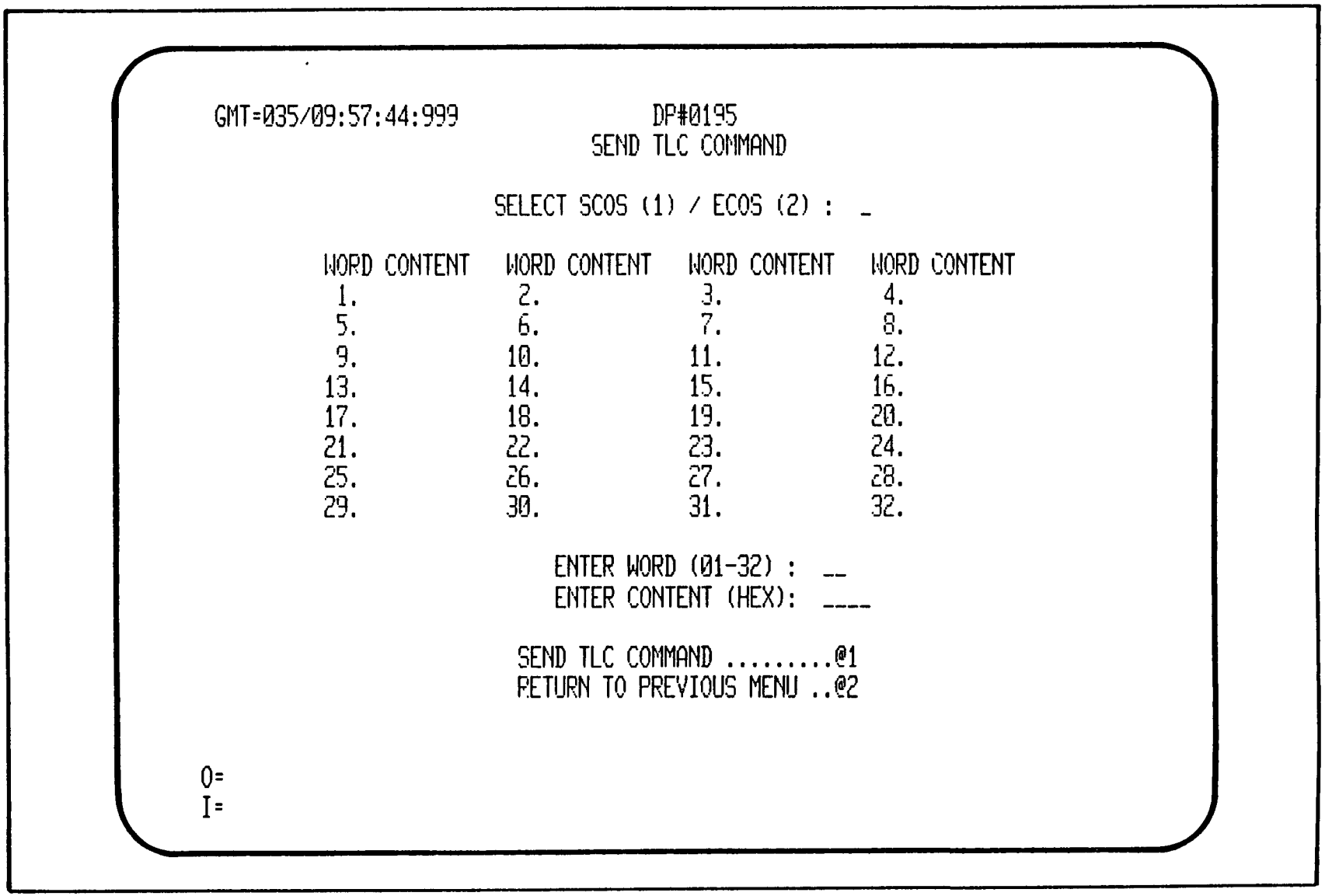

Figure 3.3-36. Send TLC Command Display

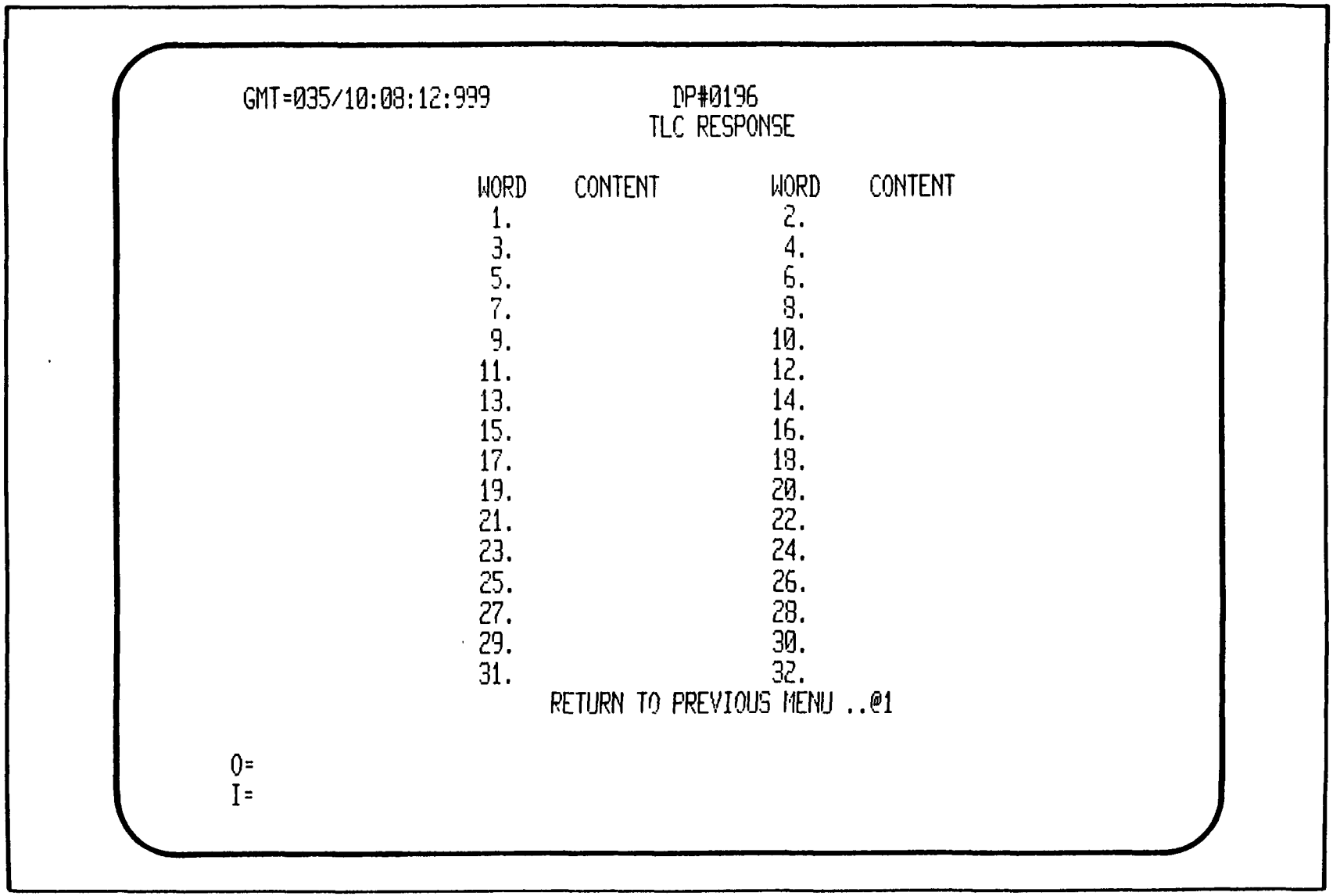

Figure 3.3-37. TLC Response Display Screen

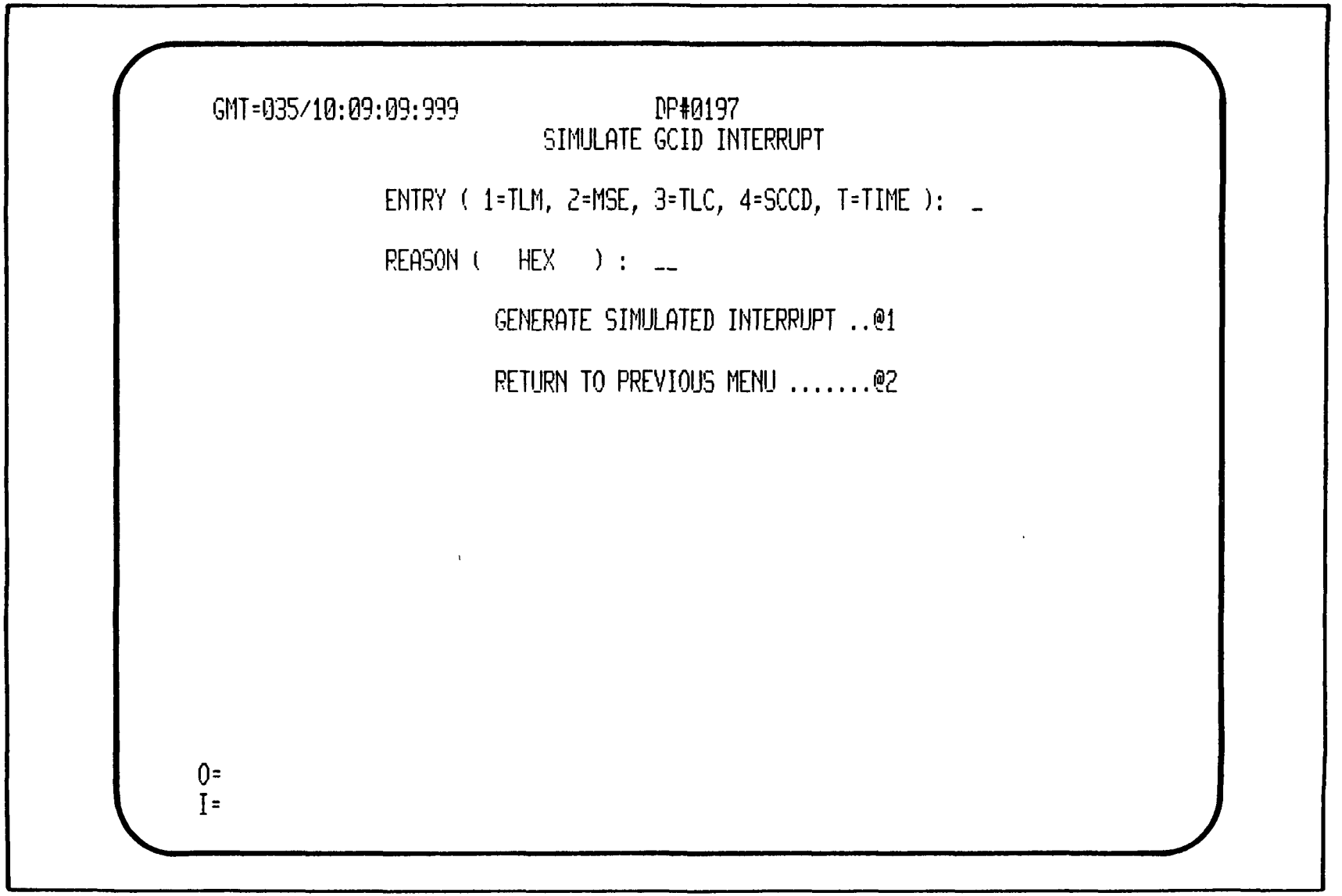

Figure 3.3-38. Simulate GCID Interrupt Display

3.3.2.2.2.10 Exitting Simulation Mode. Selecting function key 11 of the SIMULATION MODE OPTIONS menu will display DP#0103 (Figure 3.3-39, EXITTING SIMULATION MODE.

3.3.2.2.2.11 Operator's Console Simulation. When the user selects function key 1 from the SIMULATION MODE OPTIONS menu (Figure 3.3-15). START SIMULATION MODELS, the system will activate the Ops Console program. This program will display the first of eight screens on Terminal A19. This screen, as depicted in Figure 3.3-40, displays the STATUS DISPLAY for the operator's console simulation. The remaining seven screens that can be displayed from the STATUS DISPLAY screen via the respective function keys are as follows:

Screen	Function Key	Figure Number
Caution and Warning Display	F14	3.3-41
Emergency Panel	F15	3.3-42
Help	F16	3.3-43
System Station C&D Display 1	<F13>*	3.3-44
System Station C&D Display 2	<F14>*	3.3-45
System Station C&D Display 3	<F15>*	3.3-46
EGSE Station C&D Display	<F16>*	3.3-47

* '< >' indicate "SHIFT" then function key stroke.

Through the function key select capability, the user can select any of the other seven screens from a particular screen.

The status of the lamps, switches, and pushbuttons that the Ops Console simulation is controlled by either: 1) the ATE computer executing ITTS/GCOS/GOAL/VALIDATION programs, 2) through Value Read/Write from the GSMF host computer, or 3) via the Ops Console display keyboard for the respective simulation being displayed.

The Ops Console simulation is displayed on Terminal A19 during the GSMF simulation. When the simulation mode is exitted, the ops console simulation will be terminated.

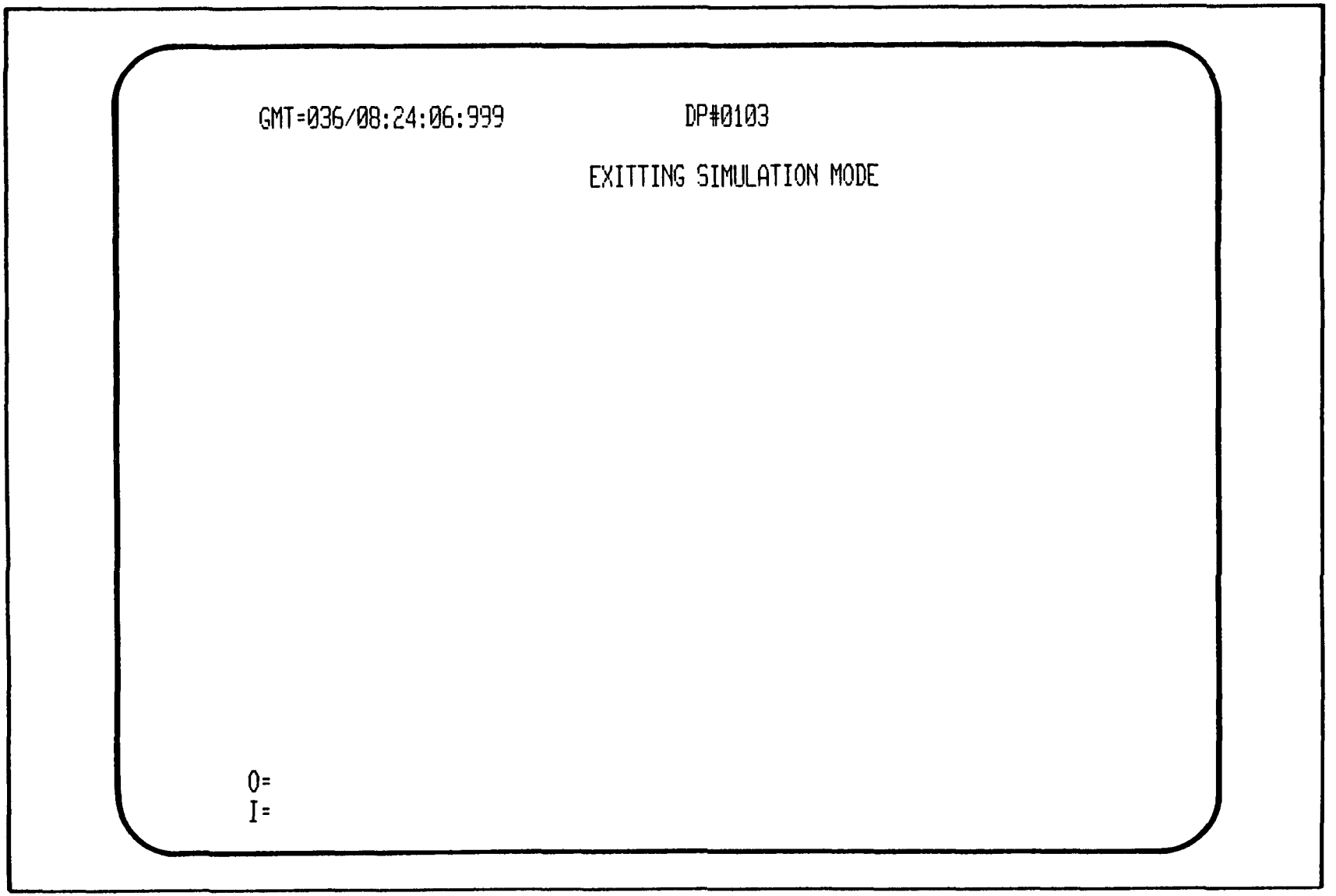

Figure 3.3-39. Exitting Simulation Mode Display

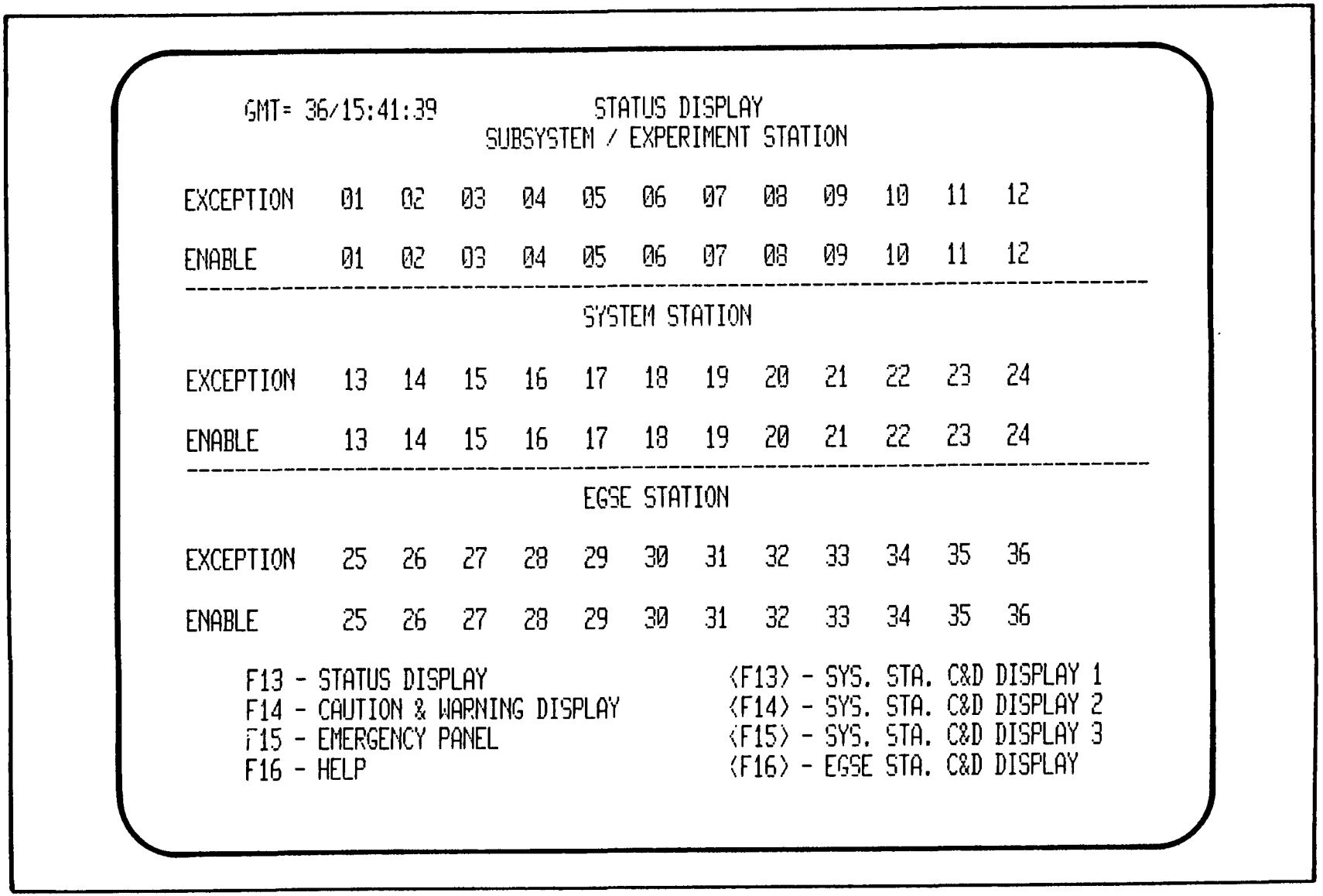

Figure 3.3-40. Operators Console - Status Display (1 of 8)

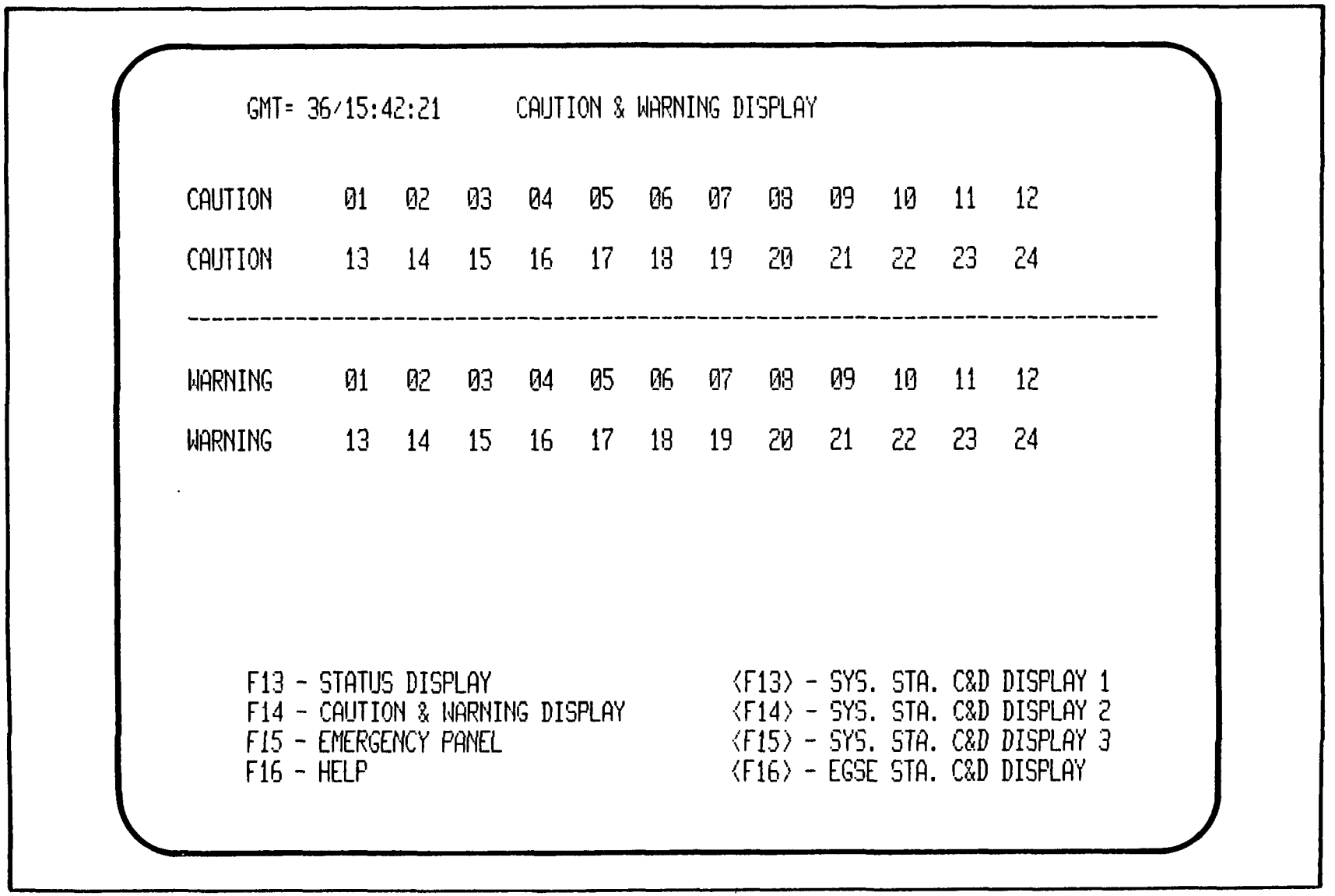

Figure 3.3-41. Operators Console - Caution and Warning Display (2 of 8)

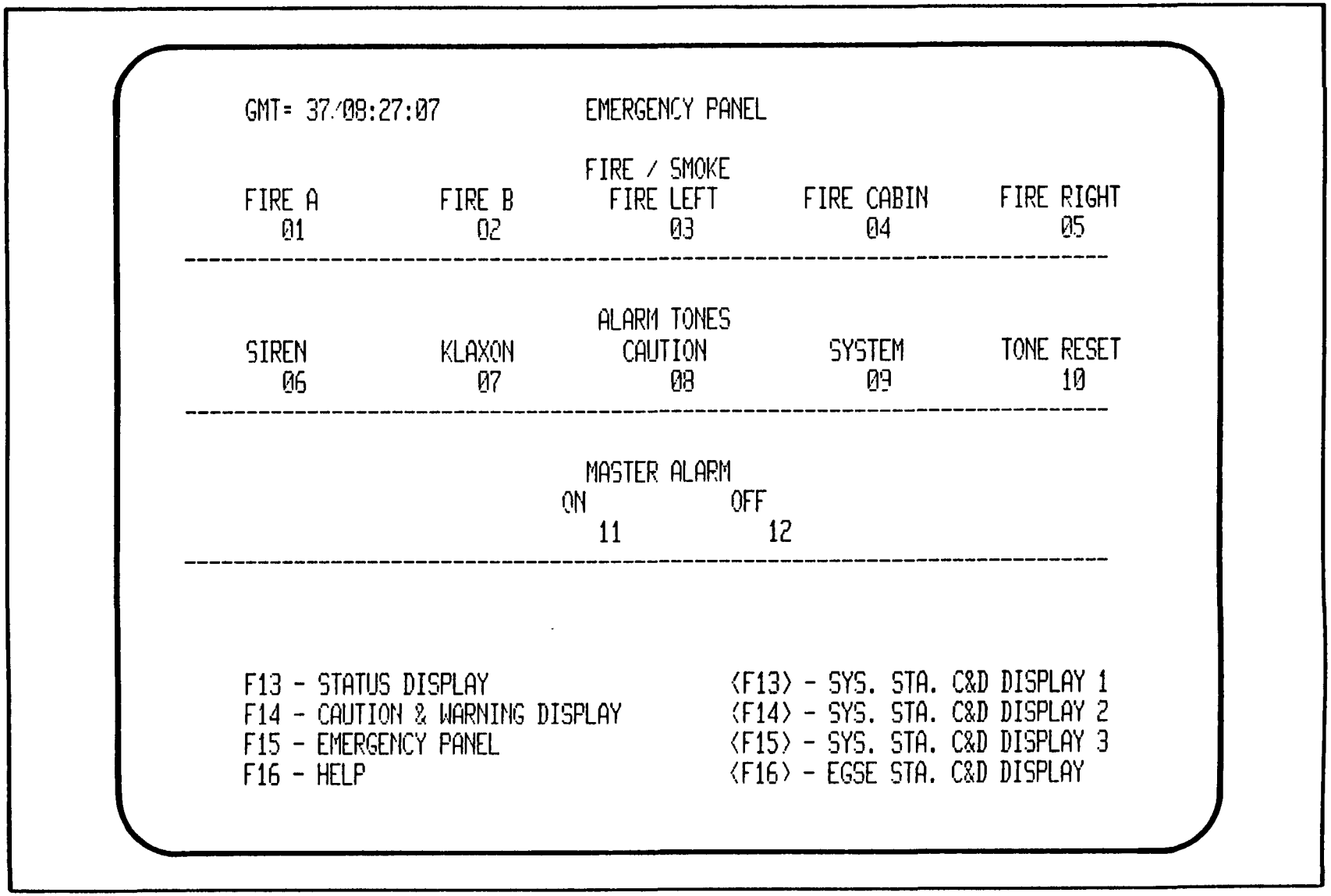

Figure 3.3-42. Operators Console - Emergency Panel (3 of 8)

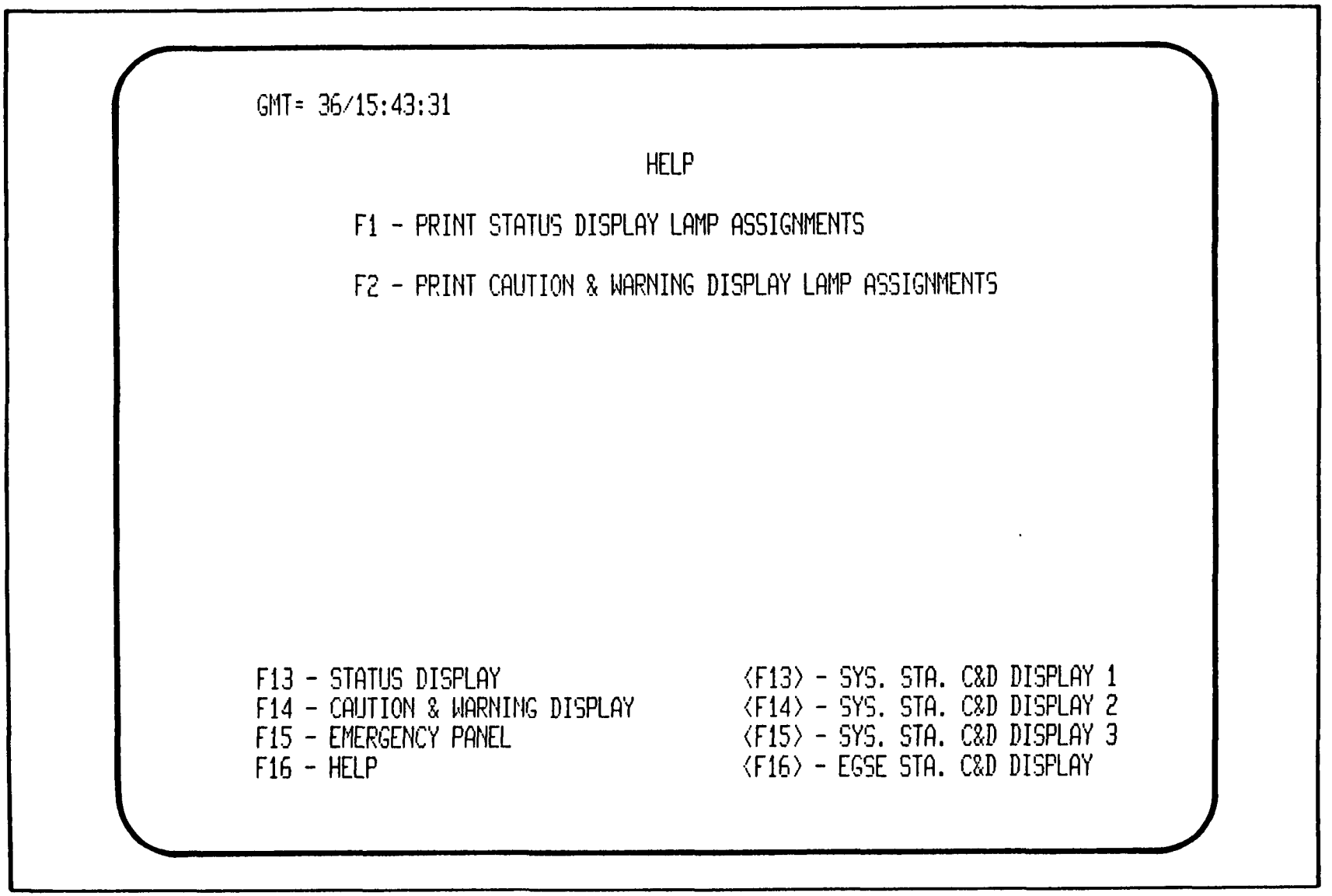

Figure 3.3-43. Operators Console - Help Screen (4 of 8)

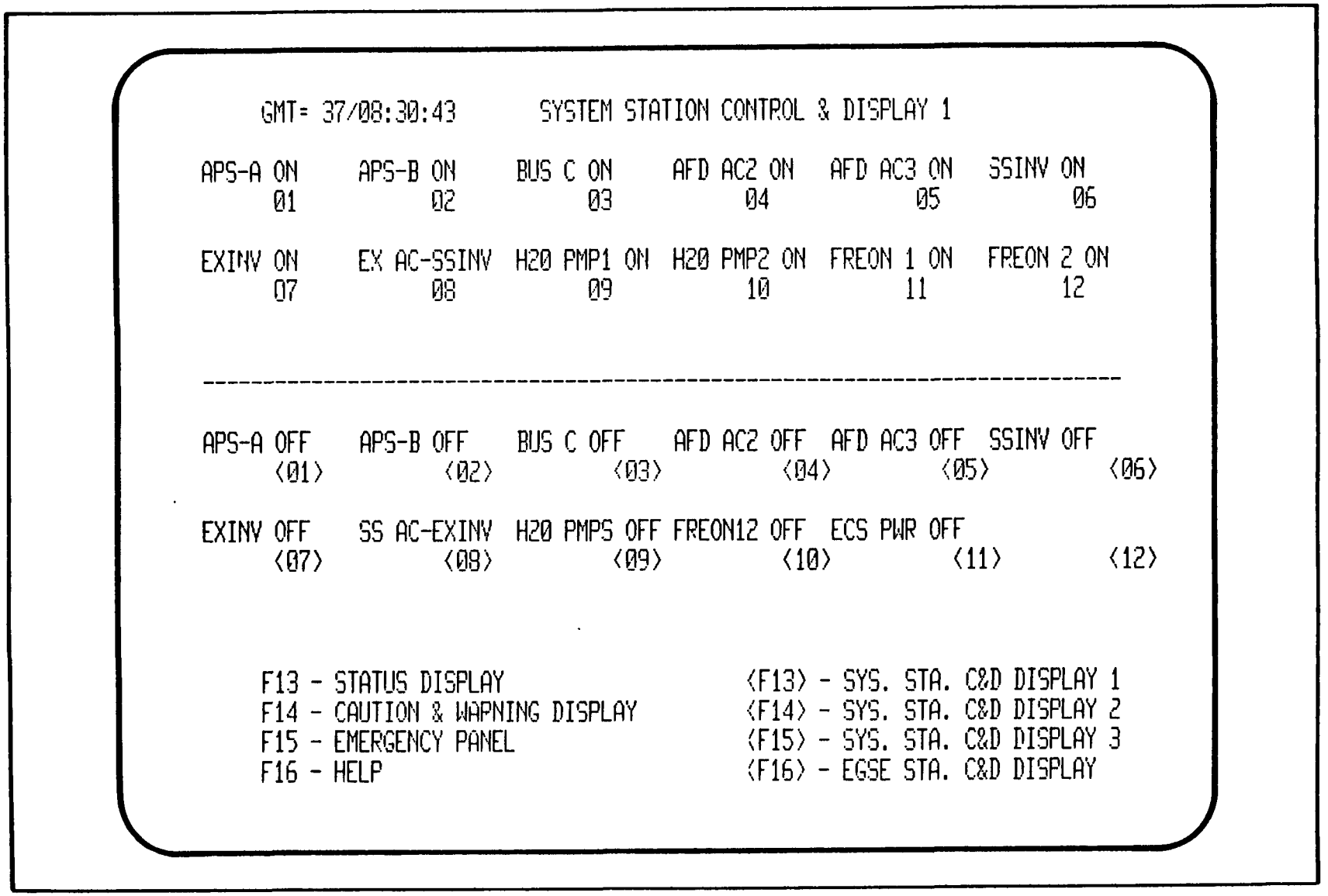

Figure 3.3-44. Operators Console - SYS STA C&D 1 (5 of 8)

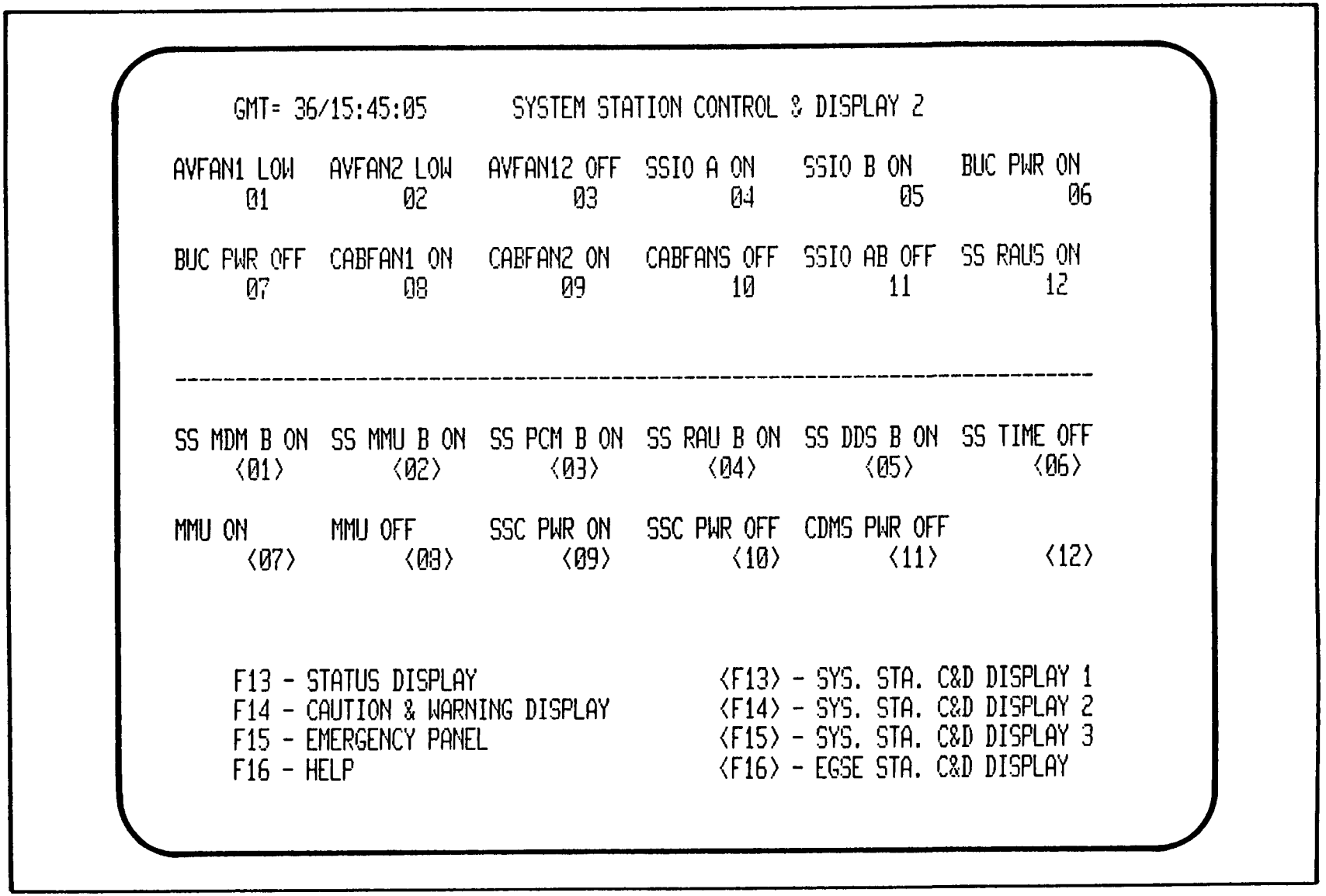

Figure 3.3-45. Operators Console - SYS STA C&D 2 (6 of 8)

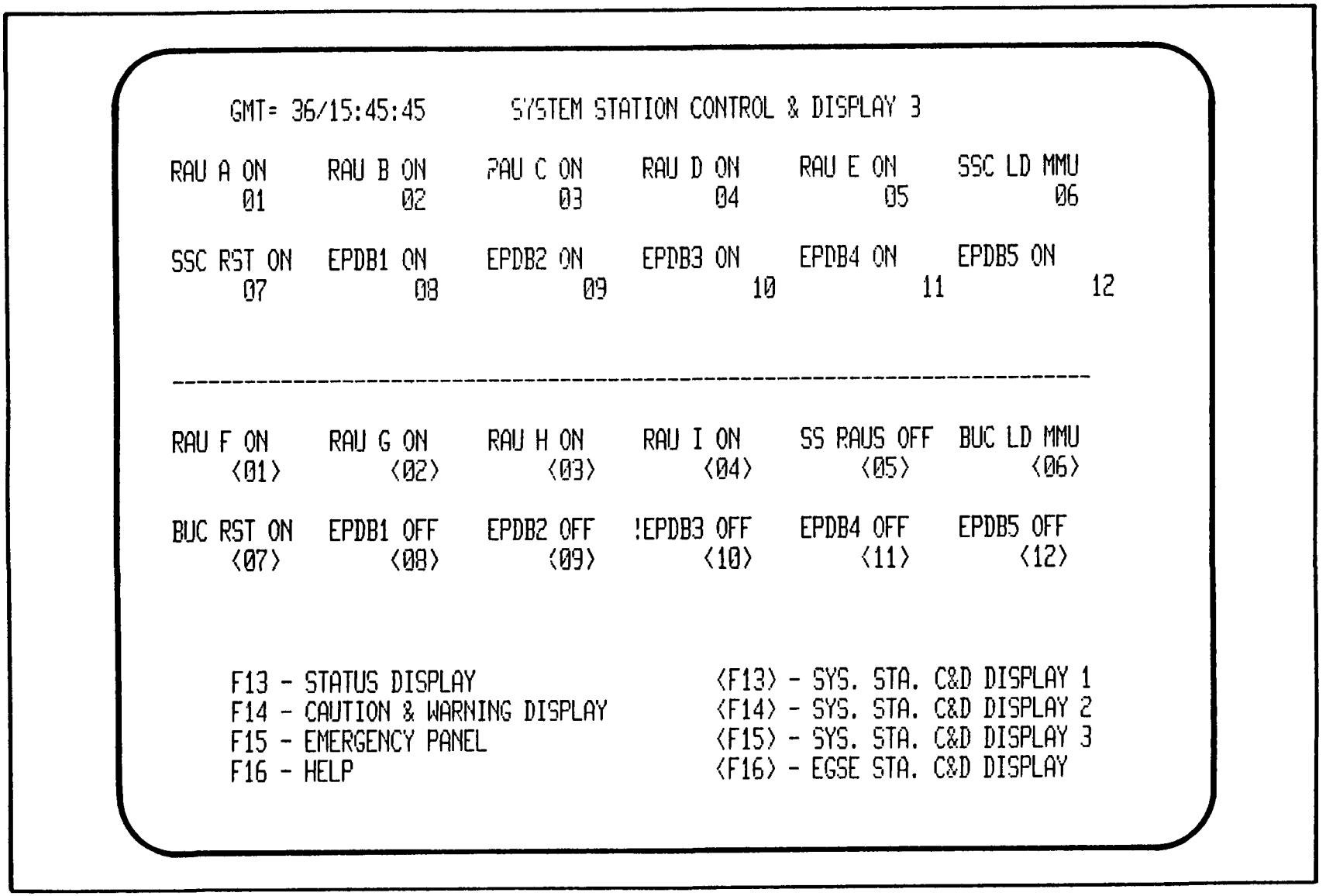

Figure 3.3-46. Operators Console - SYS STA C&D 3 (7 of 8)

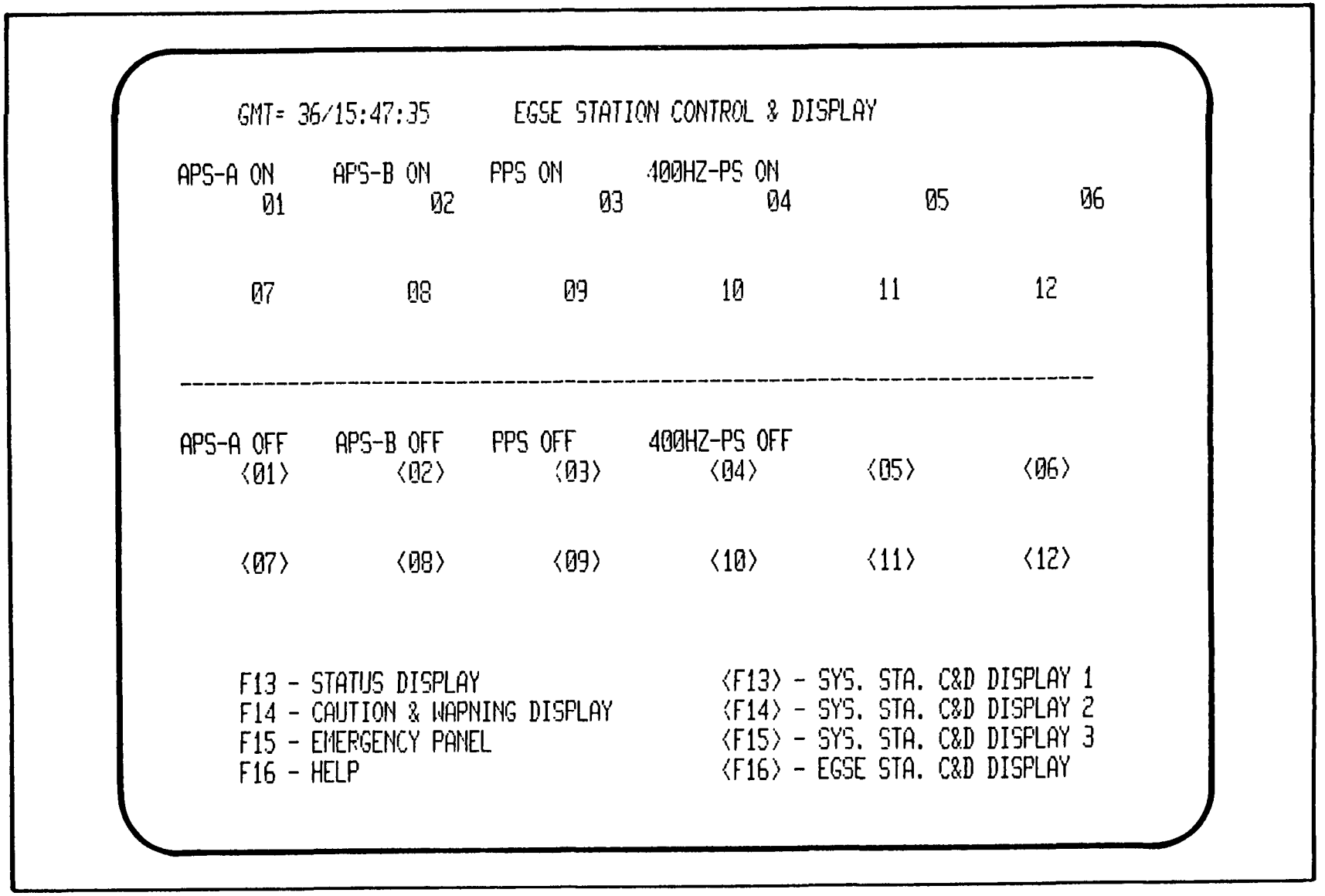

Figure 3.3-47. Operators Console - EGSE STA C&D (8 of 8)

3.3.2.2.2.12 SWID/SMID Data Display. As with the Ops Console simulation, the SWID/SMID data display screen is displayed on Terminal A19 when the user starts the simulation models. The user enters the file name that contains the SWID/SMIDs that are to be displayed and updated. Through the Offline File Build utility, Section 3.7.3.1, the user creates the data files that contain the SWID/SMID numbers that are to be monitored. Each data file contains up to and including 16 numbers.

Figure 3.3-48 is a graphic representation of the SWID/SMID data display screen. For each SWID/SMID, the hex counts, engineering value, engineering unit (EU) code, and Short Symbolic Name Indicator (SSNI) is represented. These values are extracted from the GSMF SLDB.

The user has the option to enter new data files during the simulation. This is done by entering the file name via the A19 keyboard and depressing 'SEND.'

SWID/SMID data display is terminated when the GSMF simulation mode is 'EXITTED.'

3.3.3 SIMULATION Mode Output

3.3.3.1 Log Tape

A log of events/activities may be created during a SIMULATION run at the users console (A17) by using the LOGGING OPTIONS menu (Section 3.3.2.2.2.1). This tape may be read by the Post-Processing software for data reduction and analysis. A list of possible content and operator selectable during the run, is contained on Figure 3.3-19 (DP#0131). The log tape is a 1600 b.p.i., 9-track, unlabeled tape.

3.3.3.2 Printer

The printed output from a SIMULATION run shall be used to document operator activity and/or SWID/SMID values. All printer output is under operator control (see Section 3.3.2.2.2.2). Figure 3.3-21 (DP#0200), lists the 8 items that can be logged to the printer.

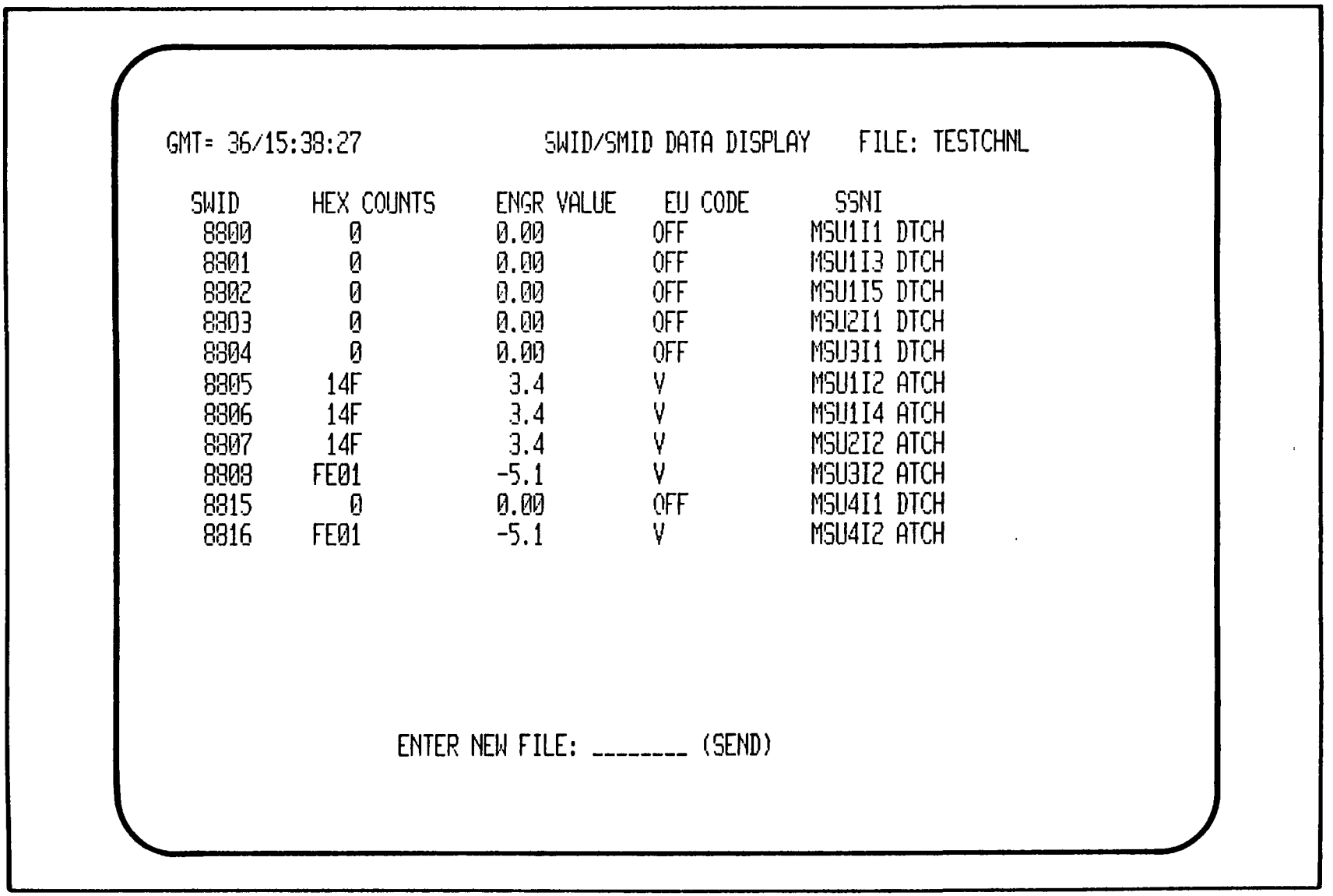

Figure 3.3-48. SWID/SMID Data Display Screen

3.3.3.3 Displays

The displays shall contain the most frequent output of SIMULATION runs. The control displays and menus are described in Section 3.3.2.2. The SWID/SMID value displays and operations console simulation display are described in Sections 3.3.2.2.2.11 and 3.3.2.2.2.12.

3.3.4 SIMULATION Mode Procedures

3.3.4.1 Pre-SIMULATION Events

The GSMF power-up sequence, as described in Appendix A, should be performed for SIMULATION mode, Standalone or Integrated (SCOS and/or ECOS). When these events have been performed successfully, the GSMF MODE SELECTION menu shall be displayed on Terminal A17 (the default GSMF operator control terminal), as described in Section 3.3.2.2.1. The SIMULATION mode is then ready to execute.

3.3.4.2 SIMULATION Operations

The test specific functions that must be performed to support a GCOS or GOAL test may be done before and/or after the start of simulation execution. These functions shall be accessed via the SIMULATION MODE OPTIONS Menu and consist of the following:

1) Assign display functions to terminals

2) Assign logging data to be recorded

3) Print hardcopy values by SWID or SMID and control activation of operator action listing

4) View and change values by SWID or SMID, and GMT and MET BIAS times

5) Execute behavior functions to change SWID or SMID values or to simulate errors

6) Cause repetitive faults.

These functions may be performed in any order at any time during the SIMULATION mode. The normal sequence of events for a GCOS test would be as follows:

1) Perform pre-GCOS start functions from above list

2) Start simulation

3) Verify that it is running (time changes)

4) Start GCOS (from ATE VDUs)

5) Perform functions from above list during run to satisfy GCOS or GOAL test case creation and document results of test

6) Stop simulation

7) Remove output tape/listing and ready for next operation (to run another simulation, refer to Appendix A sequence of events). Note: the tape and listing should be labelled for later recognition and association with the test case run.

3.3.4.2.1 SIMULATION Mode Normal Completion

The normal completion of a simulation run occurs when the operator enters function key 11 of the SIMULATION MODE OPTIONS menu. The message "EXITTING SIMULATION MODE" shall be displayed (Figure 3.3-39).

3.3.4.2.2 SIMULATION Error Conditions

Several error messages may appear on the GSMF operator display, near the bottom of the screen following the "0=" which is always present. A message shall be printed to document this error. Following are the error messages that may appear, with an explanation of what should be done in response.

DISPLAY: UNDEFINED BEHAVIOR FUNCTION REQUEST
PRINT: BEHAVIOR FUNCTION - XXXXXX - WAS REQUESTED IN RESPONSE TO ACTION YYYYYY AND WAS NOT FOUND 12:46:46

GSMF personnel should be notified and shown the printed error message. XXXXXX will be the name of the Behavior Function that could not be found and YYY...Y will be dependent on what action caused the request. The action could be a GCOS operation or a behavior function operation. For a GCOS operation, the field YYYYYY shall contain the complex adapter name upon which the action took place and the hardware address and value of the operation. For a behavior function operation, the YYYYYY shall contain the name of the requesting behavior function.

DISPLAY: GCID FAILURE DETECTED
PRINT: GCID FAILED PROCESSOR 3 09:24:26

GSMF personnel should be notified. They shall want control of the system to run the GCID diagnostics to isolate the failure.

DISPLAY: PPI FAILURE DETECTED
PRINT: PPI-SDF2 FAILURE 09:25:26

GSMF personnel should be notified. They shall run GSMF diagnostics to isolate the failure to GSMF host or SDF.

A detailed description of all error messages for each module will be included in this document for final delivery.

3.3.4.3 SIMULATION Mode Termination

The simulation mode is terminated by pressing function key 5 from the GSMF MODE SELECTION menu, DP#0010 (see Section 3.3.2.2.2). The log tape and printout should be labeled such that they can be referenced to the test case run during later analysis or review. The display DP#0002, Figure 3.3-5, GSMF logo will remain displayed until "UP" is entered on the Systems Operators Console or the system is IPL.

3.4 TEST MODE

The TEST mode shall control the GCID Diagnostics function. The vendor-supplied diagnostic capabilities are not a part of the TEST mode, and if needed may be exercised as described in the MITRA and Perkin-Elmer maintenance manuals. The TEST mode shall provide diagnostics for problems with the GSMF configuration-specific equipment only. The TEST mode is normally executed only when the GSMF operational status needs to be verified (e.g., after some failure has been observed) and during acceptance testing. The TEST mode provides the control for a series of specific tests with expanding functional verification. Aspects of these tests are described in the following sections.

3.4.1 TEST Mode Equipment Configuration

The TEST Mode requires no distinct equipment configuration specific to the test(s) to be run.

The GCID DIAGNOSTICS test requires the Host computer, one terminal, and the GCID. Other Host peripherals may be connected, and the GCID may be connected to the GCOS computer system. The host and GCID are interfaced through the VME bus interface device.

3.4.2 TEST Mode Input

3.4.2.1 TEST Mode Software

The test mode software shall be resident on the GSMF host computer. This software tests the data links between the GCID and GSMF host. These five data links are TLM, TLC, MSE, SCCD, and MTU.

3.4.2.2 TEST Mode Operator

The TEST mode operator shall control execution of tests from the Host computer terminal. TEST mode inputs shall be via the keyboard in response to display menus. The menu operations are described in the following sections. The display number relationships with accompanying function keys are depicted in Figure 3.4-1.

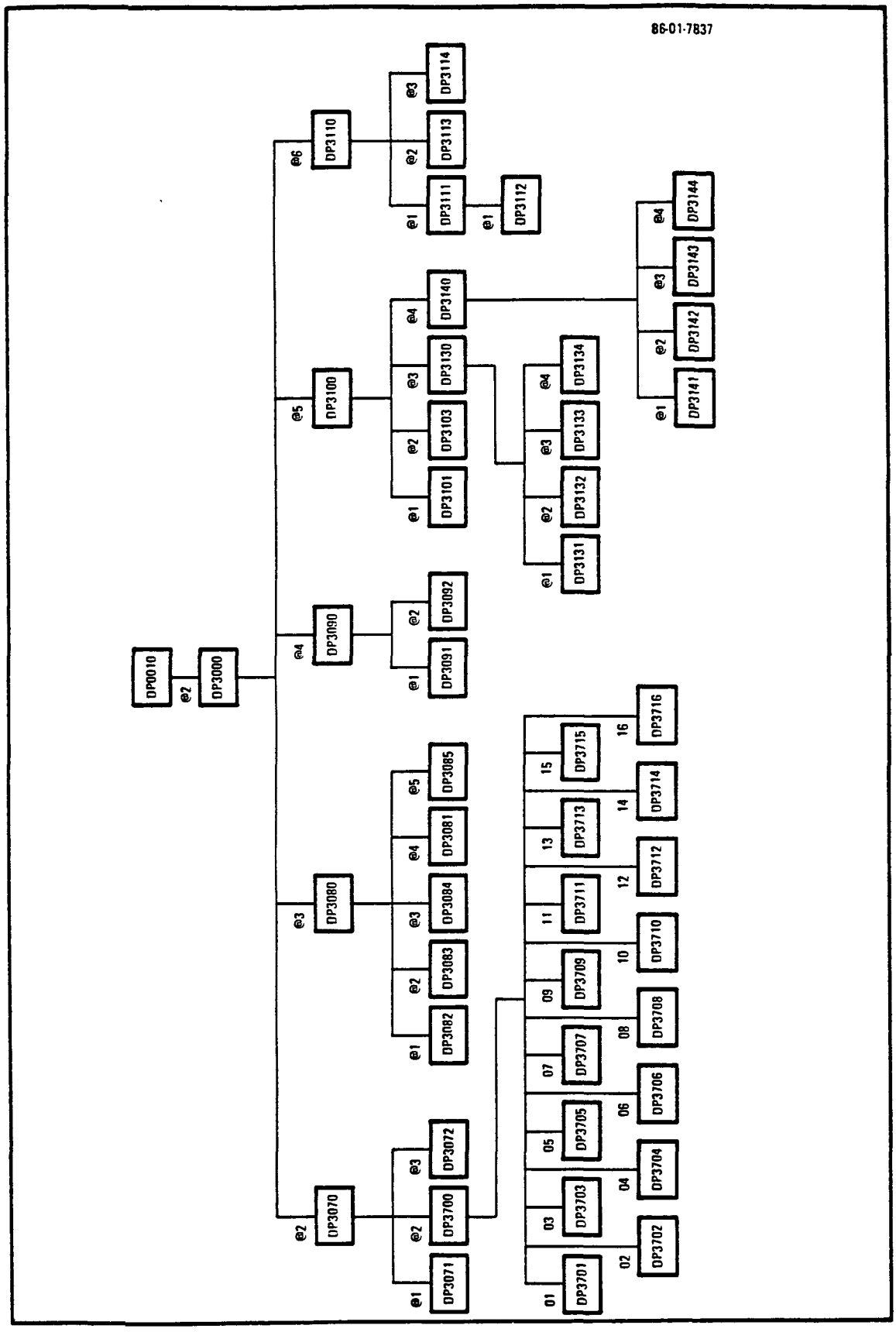

Figure 3.4-1. GCID Diagnostics Menu Hierarchy

3.4.2.2.1 TEST Control

The test mode programs are controlled by the GSMF MODE SELECTION menu, DP#0021 (Figure 3.4-2). The user selects function key 2 (@2) to activate the TEST MODE GCID DIAGNOSTICS menu, DP#3000 (Figure 3.4-3).

3.4.2.2.2 GCID DIAGNOSTIC Menu

The GCID DIAGNOSTIC menu, DP#3000 (Figure 3.4-3), provides for execution of all or one of the GCID processor's diagnostics and access to displays to view detailed diagnostic status. The diagnostic programs shall test the operation of the GCID input/output boards. They do not test I/O drivers, as these tests do not interact with any equipment other than that internal to the GCID. From the GCID Diagnostics menu, the user selects the test to run (ALL TLM TLC MSE SCCD MTU) by entering the three character representation beside TEST. Initially, the user 'TAB's to this compose field. Once this is entered, the cursor positions to 'NUMBER OF REPETITIONS.' The user enters a number from 01 to 99 for the number of times that the test program is to repeat the test (1 is the default). After entering the number of repetitions, the cursor positions to the 'TEST FAILURE OPTION' compose field. The user enters 'S' to stop on error occurrence, or 'C' to continue if an error occurs. The user at this time will depress function key 1 (@1) to Start/Stop the test that was selected. At the top of the page, under 'TEST' the test selected will be displayed, with the 'STATUS' indicating 'RUN'. If more than one run was entered, under 'REPETITION' will be displayed the number of repetitions currently running. At completion of the test, the indication of 'SUCCESS' or 'FAILURE' will be displayed. Then the user has the option to display the details of the diagnositics test run (function keys 2 through 6 with respect to test) or return to the GSMF mode selection menu (Figure 3.4-2), by depressing function key 7 (@7). Sections 3.4.2.2.2.1 through 3.4.2.2.2.5 describe these detailed screens.

3.4.2.2.2.1 TLM Diagnostics Details. The TLM diagnostics details display show test results and allows access to displays showing more detailed test results. Figure 3.4-4 is the first display, the TLM DIAGNOSTICS DETAILS, DP#3070, display. This display shows the summary pass/fail status, Watch-Dog Timer, the interrupt test BSR pass/fail status, and the count of general failures occurring during the test. It also shows the count of failures of global RAM testings by bit pattern tested.

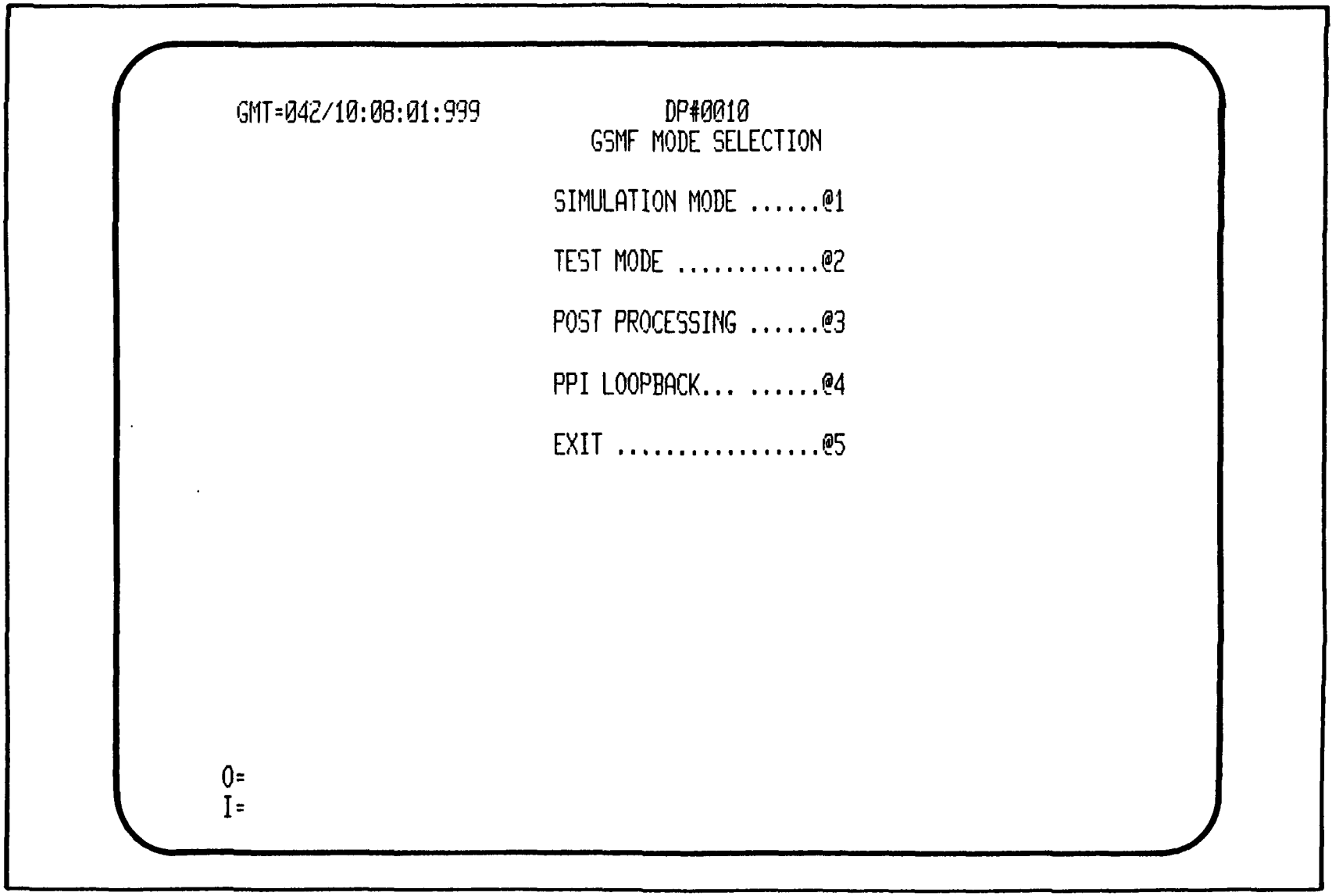

Figure 3.4-2. GSMF Mode Selection Menu

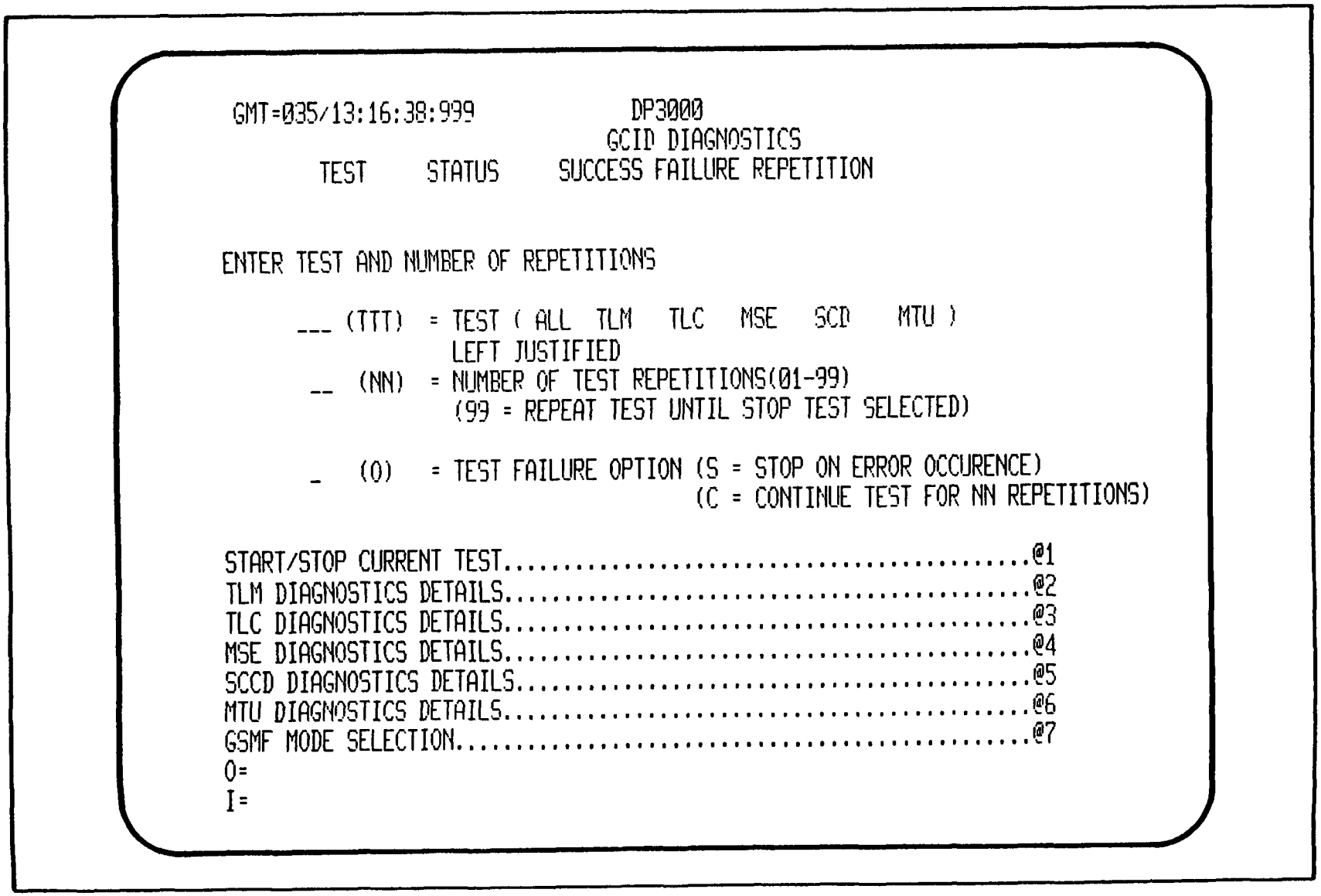

Figure 3.4-3. GCID Diagnostics Display Menu

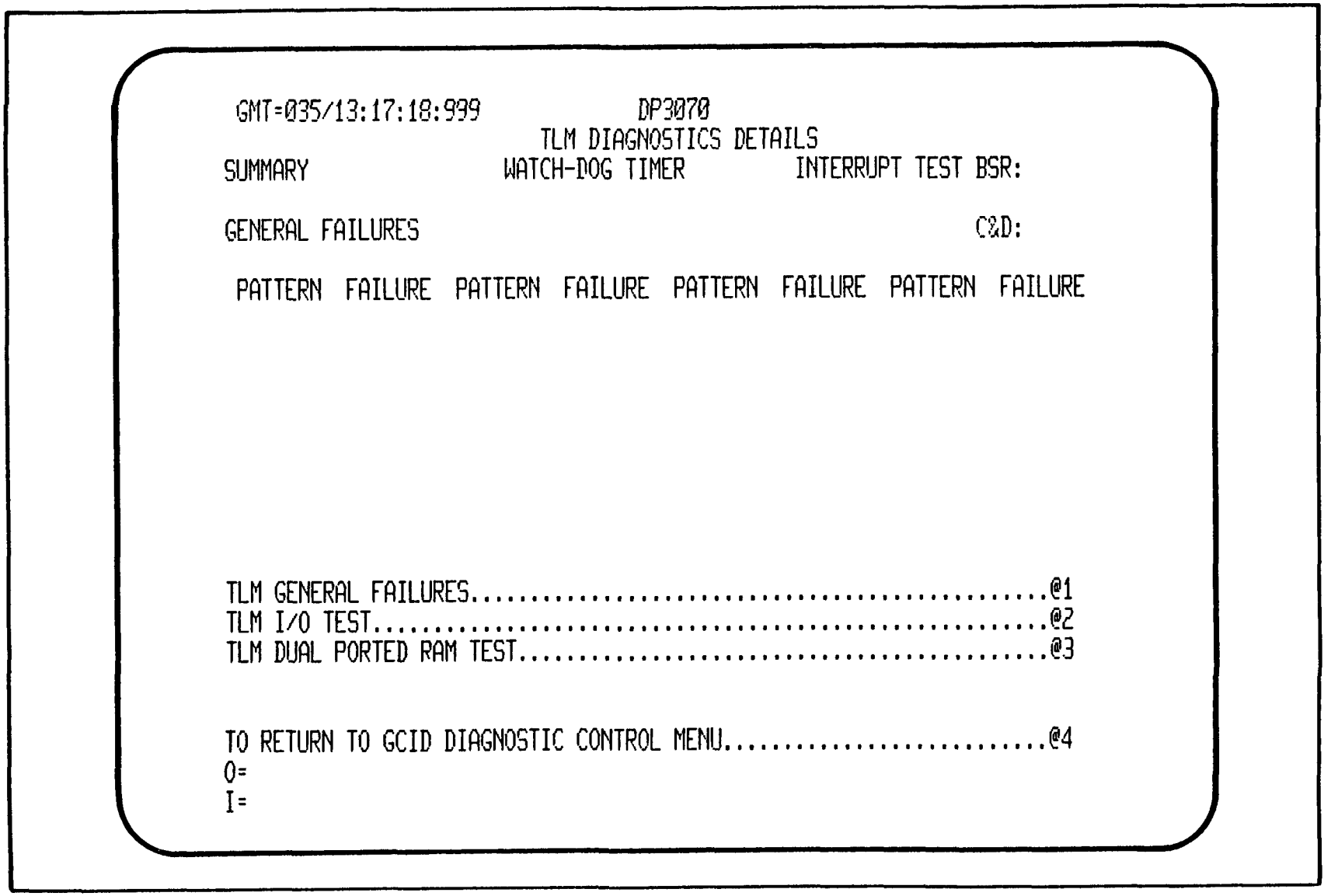

Figure 3.4-4. TLM Diagnostic Display

Function key 1 will display the GENERAL FAILURES that occurred during the test, if any. Figure 3.4-5, DP#3071, displays examples of each possible failure. Up to 13 failure code messages (see GCID Design Specification Document, Volume II, Page A-46) shall be displayed with the total error count per failure within the indicated segment number. The segment number indicates the 32-word area that was under test when the failure occurred.

Function key 2 shall display the TLM I/O summary after testing the TLM I/O Board RAM, of a total of 1,024 locations (Figure 3.4-6), DP#3700. The TLM I/O RAM addresses and related patterns locations 000. 3FF can be viewed by the user by entering the respective address range 'SUMMARY NUMBER.' The illustrated displayed for 64 RAM locations (1,024 total) per page are listed as follows:

RAM Address	Display Number	Figure Number
000 - 03F	DP3701	3.4-7
040 - 07F	DP3702	3.4-8
08C - 08F	DP3703	3.4-9
0C0 - 0FF	DP3704	3.4-10
1C0 - 13F	DP3705	3.4-11
140 - 17F	DP3706	3.4-12
180 - 1BF	DP3707	3.4-13
1C0 - 1FF	DP3708	3.4-14
200 - 23F	DP3709	3.4-15
240 - 27F	DP3710	3.4-16
280 - 28F	DP3711	3.4-17
2C0 - 2FF	DP3712	3.4-18
300 - 33F	DP3713	3.4-19
340 - 37F	DP3714	3.4-20
380 - 38F	DP3715	3.4-21
3C0 - 3FF	DP3716	3.4-22

From each I/O RAM address display page, the user can return to DP3700, TLM I/o summary display be depressing Function Key 1.

Function key 3, TLM DUAL PORTED RAM TEST, DP#3072 (Figure 3.4-23), will give the status of the five GCID boards during this test (i.e., PASS/FAIL).

3.4.2.2.2.2 TLC Diagnostics Display Menu. Figure 3.4-24, DP#3080, shows the TLC DIAGNOSTICS menu display.

Function key 1 displays the TLC UPLINK results, DP#3082 (Figure 3.4-25), and function key 2 the TLC DOWNLINK results, DP#3083 (Figure 3.4-26).

Function key 3 displays the GENERAL FAILURES which occurred during the TLC test. Figure 3.4-27, DP#3084, displays the 15 possible general failures.

C-2

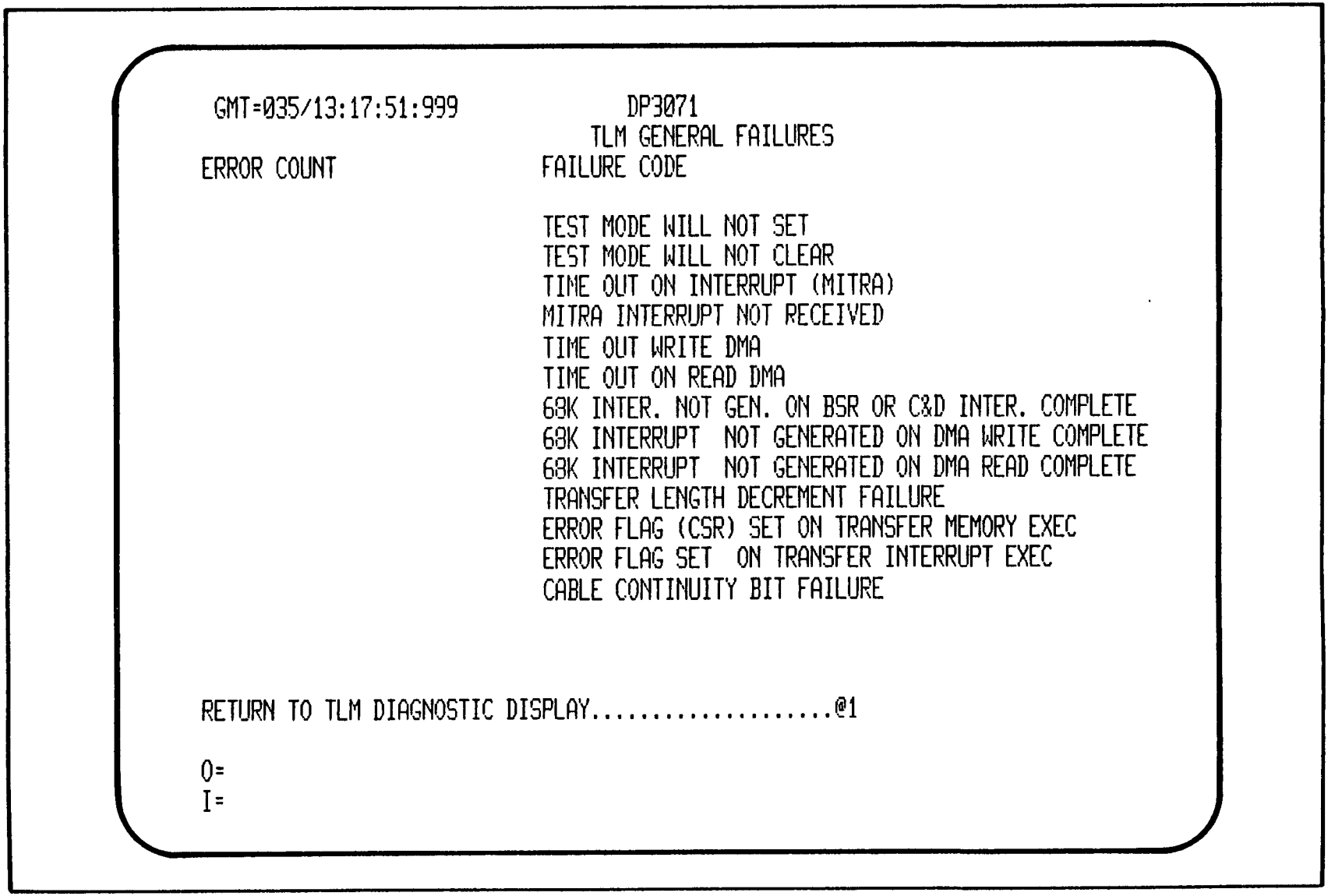

Figure 3.4-5. TLM General Failures Display

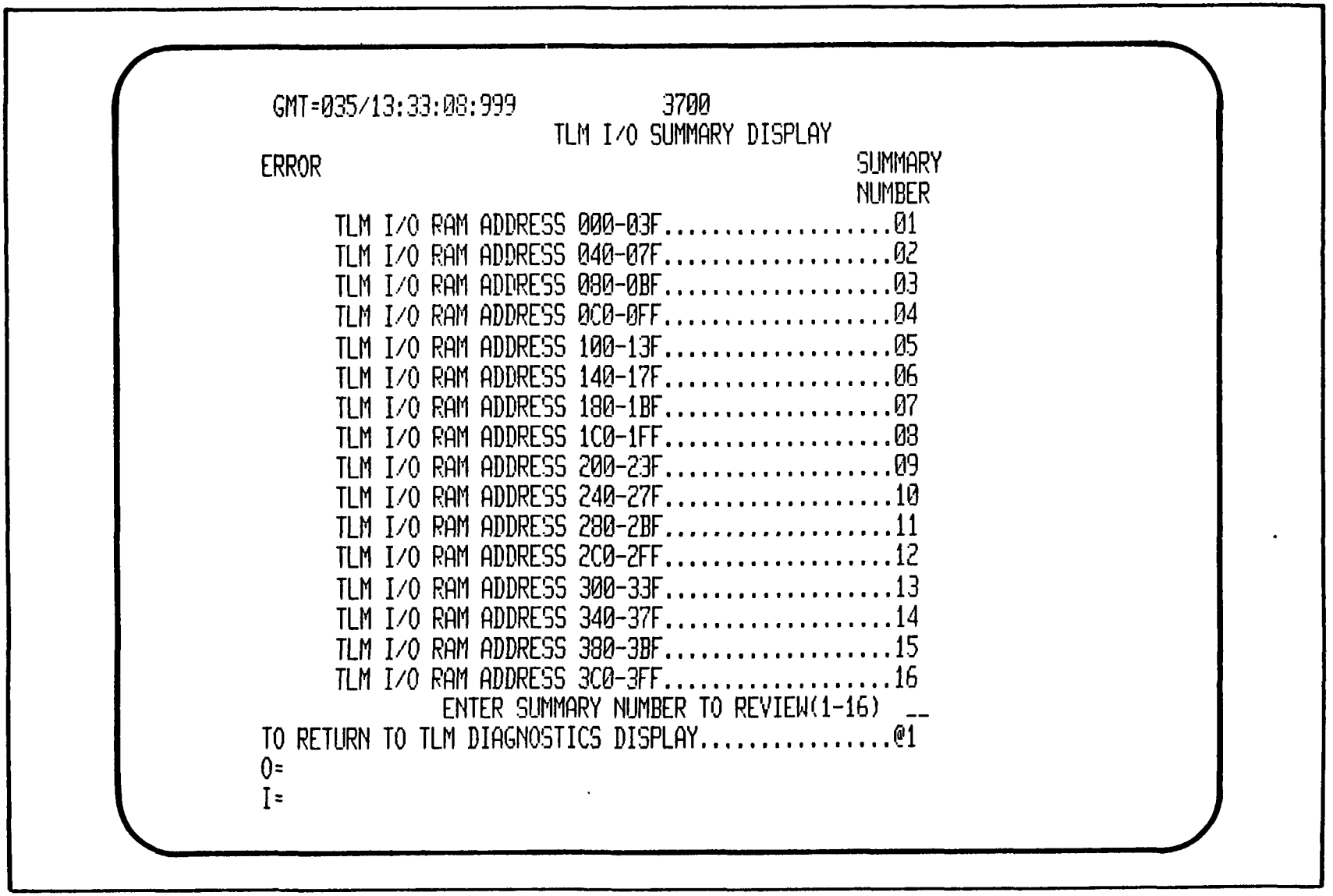

Figure 3.4-6. TLM I/O Summary Display Menu

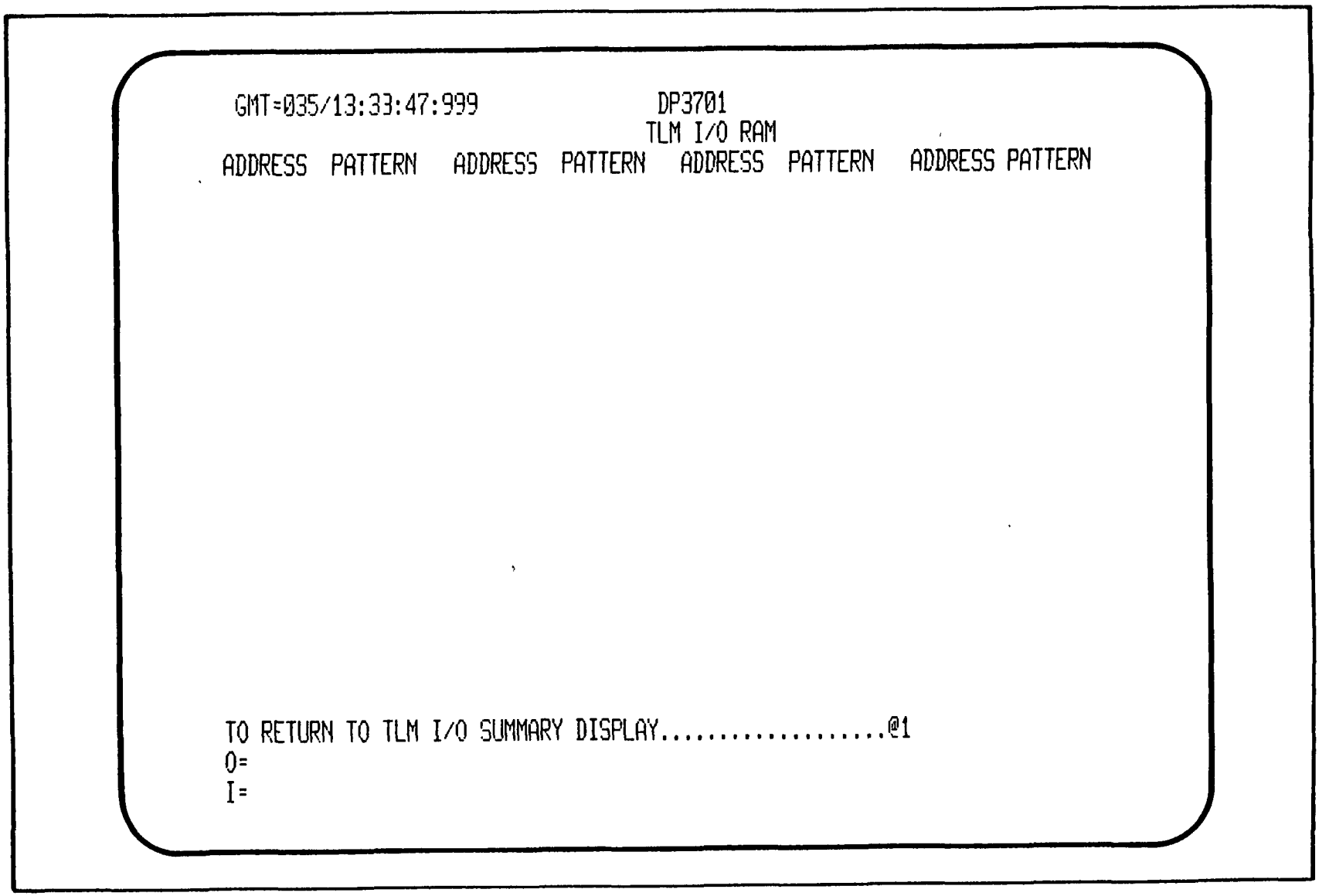

Figure 3.4-7. TLM I/O RAM Address (000-03F) Display

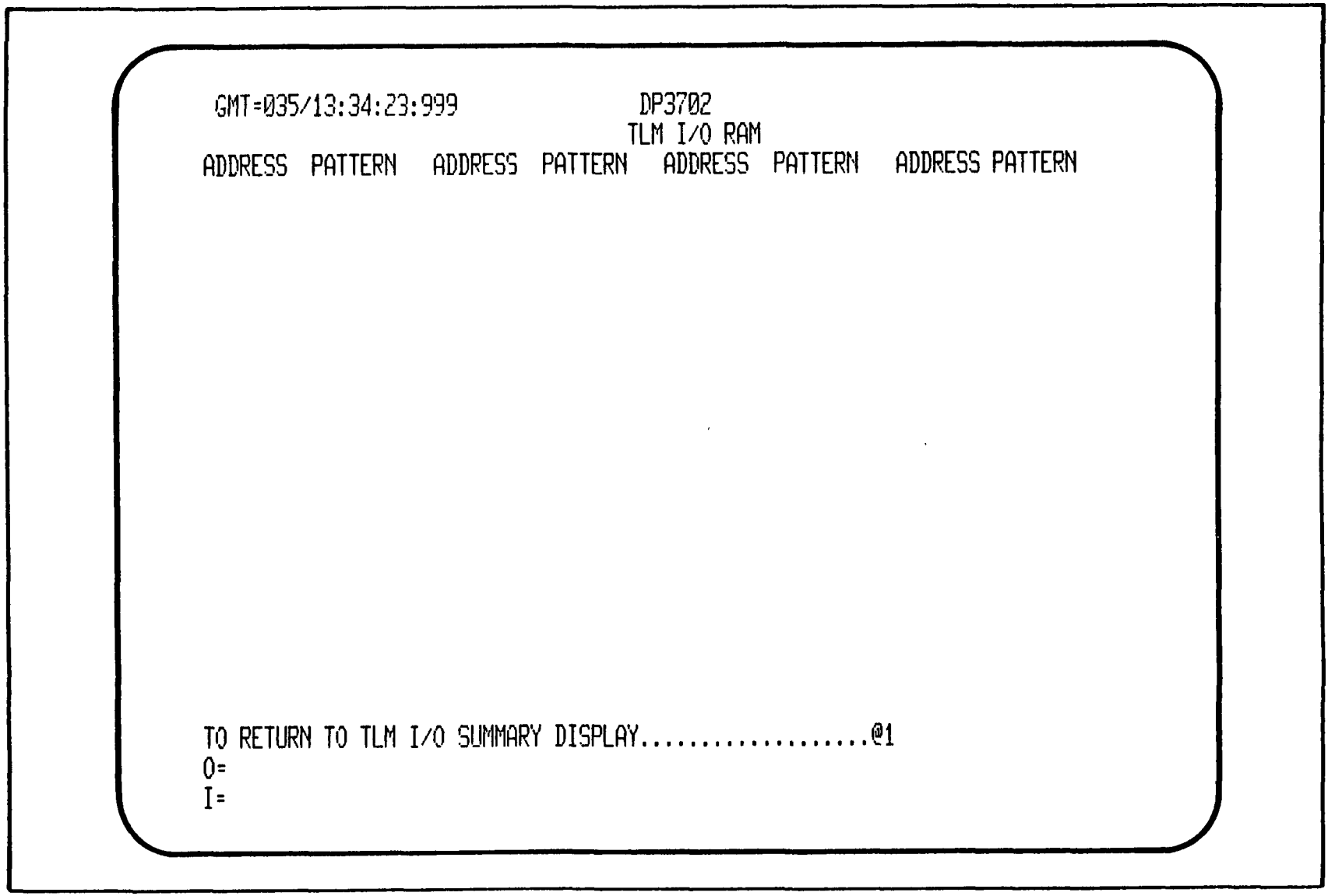

Figure 3.4-8. TLM I/O RAM Address (040-07F) Display

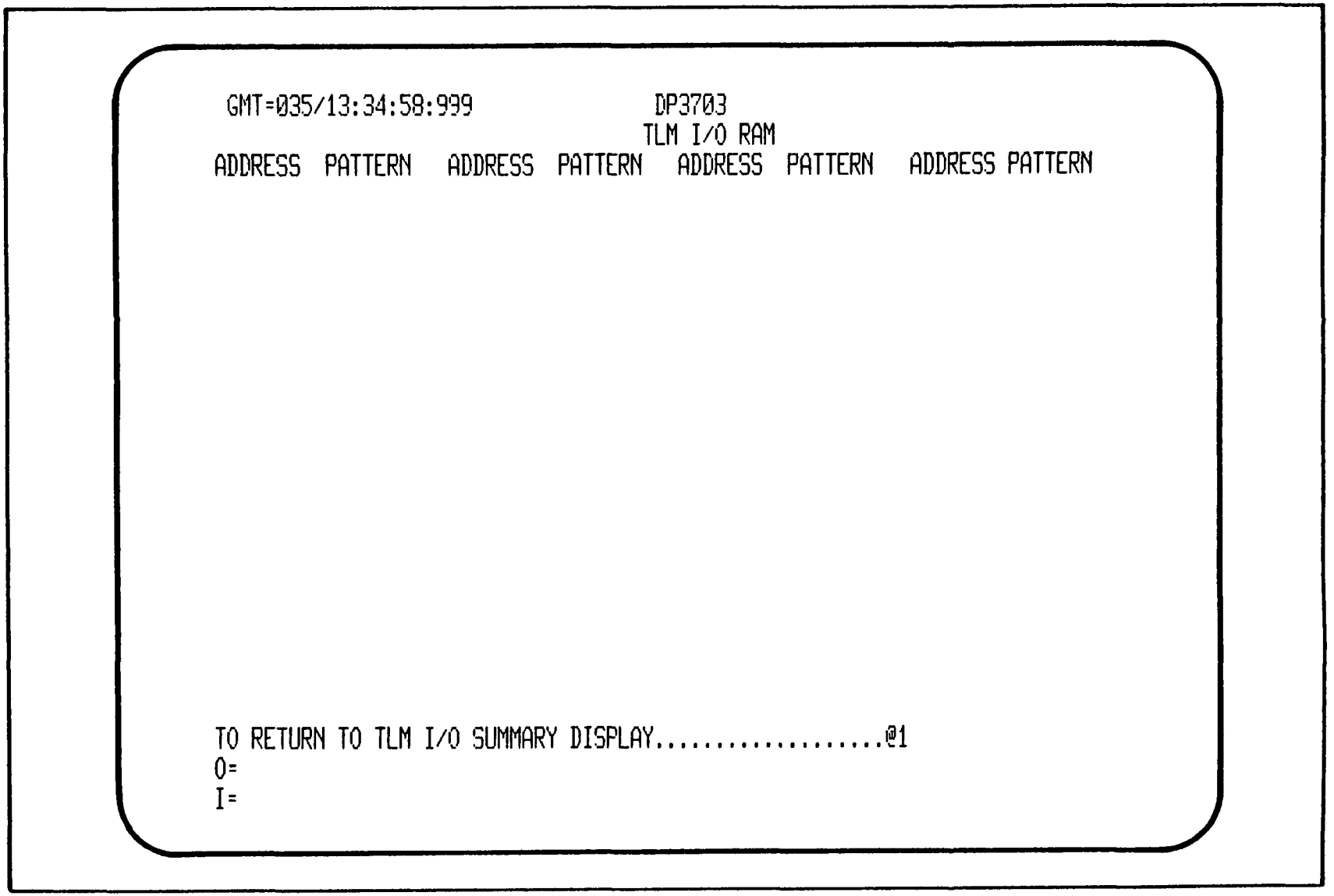

Figure 3.4-9. TLM I/O RAM Address (080-06F) Display

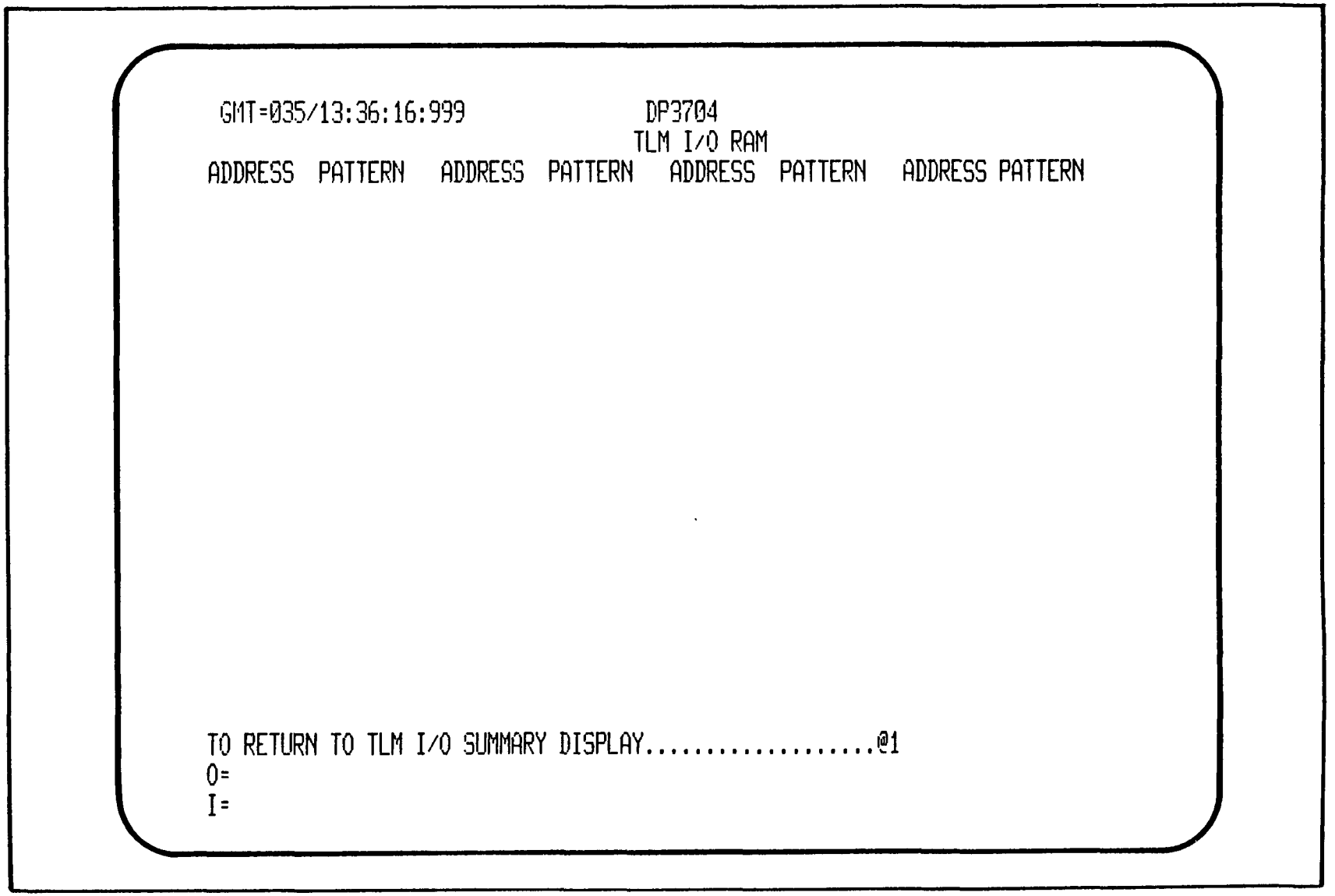

Figure 3.4-10. TLM I/O RAM Address (100-13F) Display

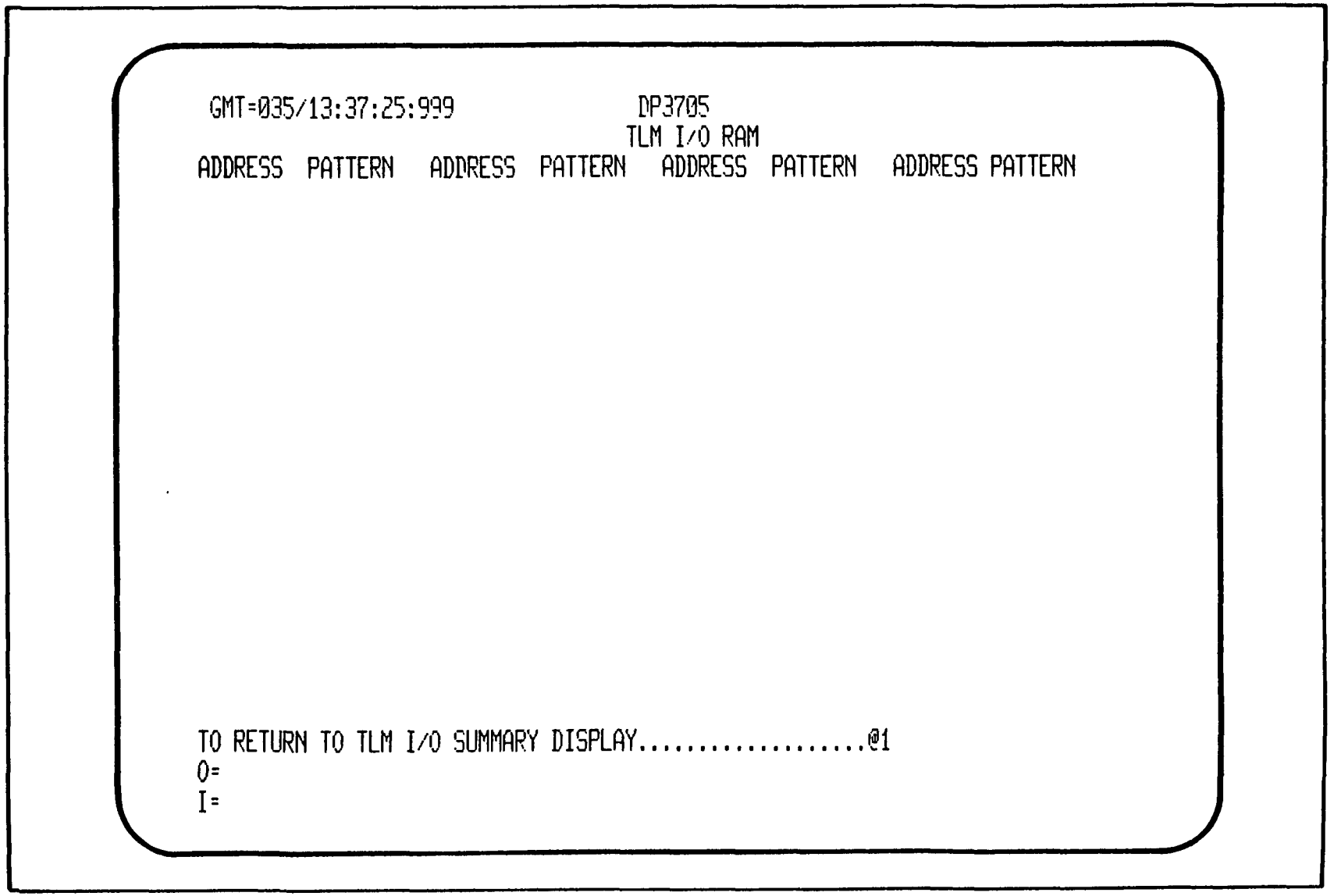

Figure 3.4-11. TLM I/O RAM Address (140-17F) Display

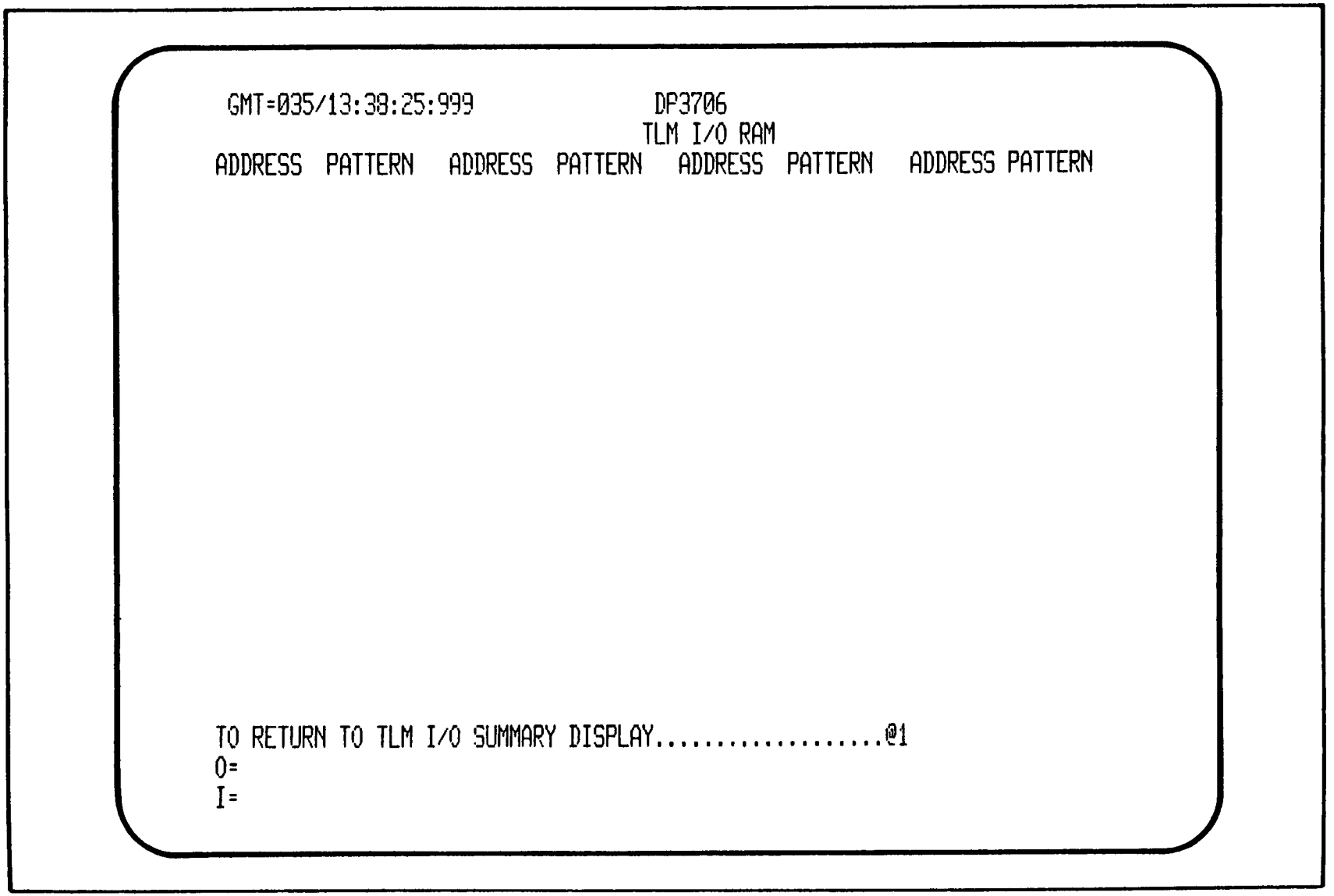

Figure 3.4-12. TLM I/O RAM Address (180-1BF) Display

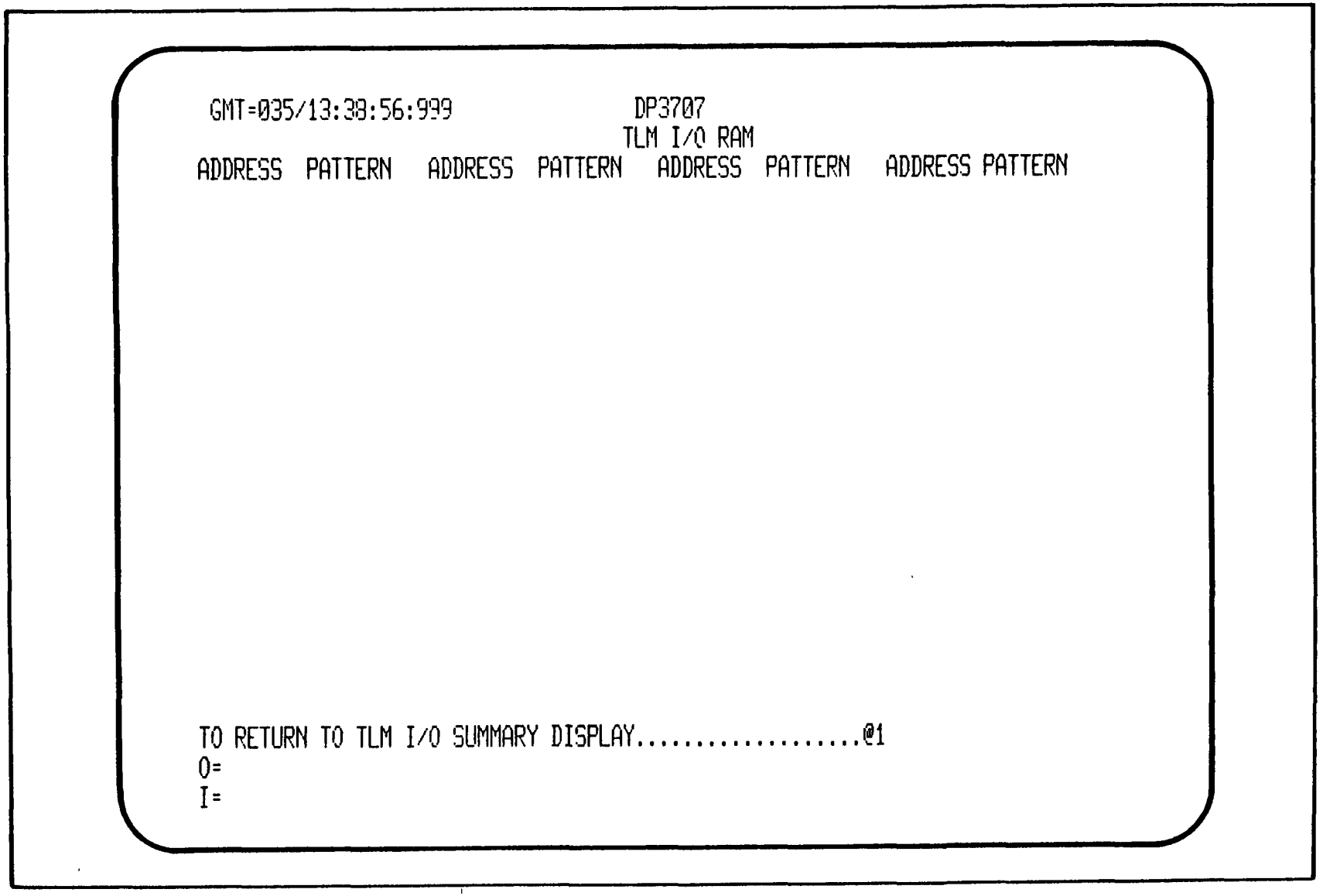

Figure 3.4-13. TLM I/O RAM Address (1C0-1FF) Display

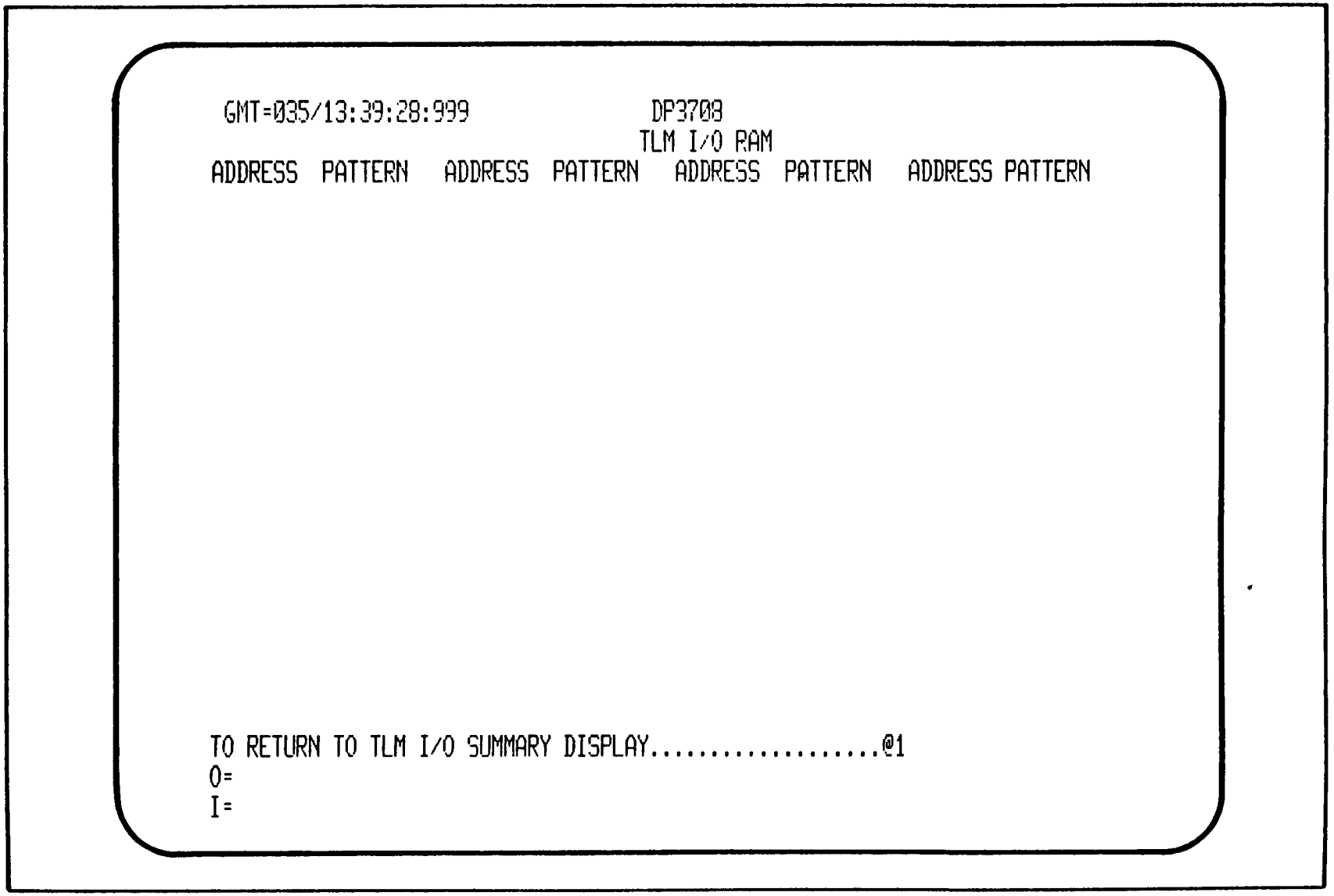

Figure 3.4-14. TLM I/O RAM Address (200-23F) Display

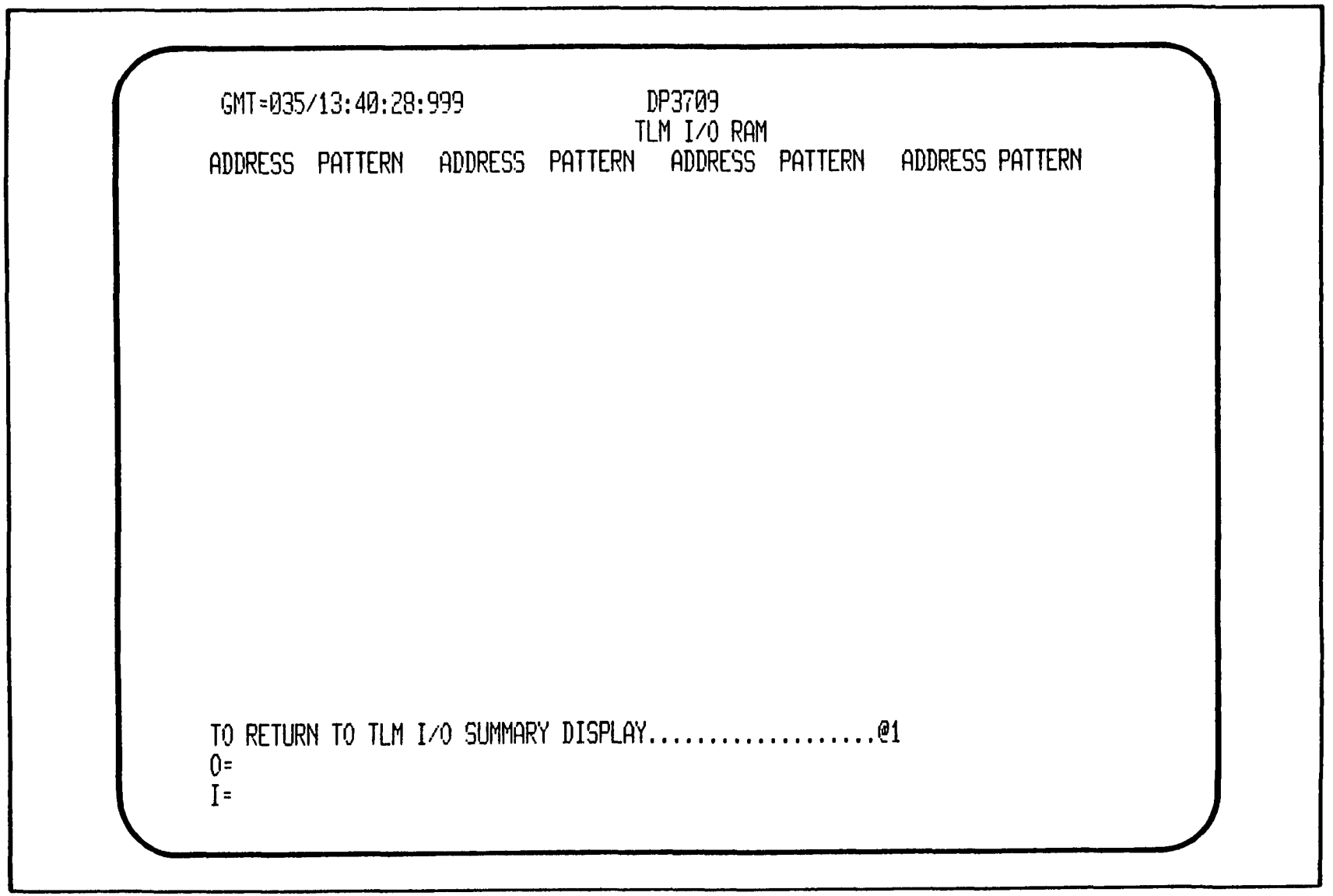

Figure 3.4-15. TLM I/O RAM Address (240-27F) Display

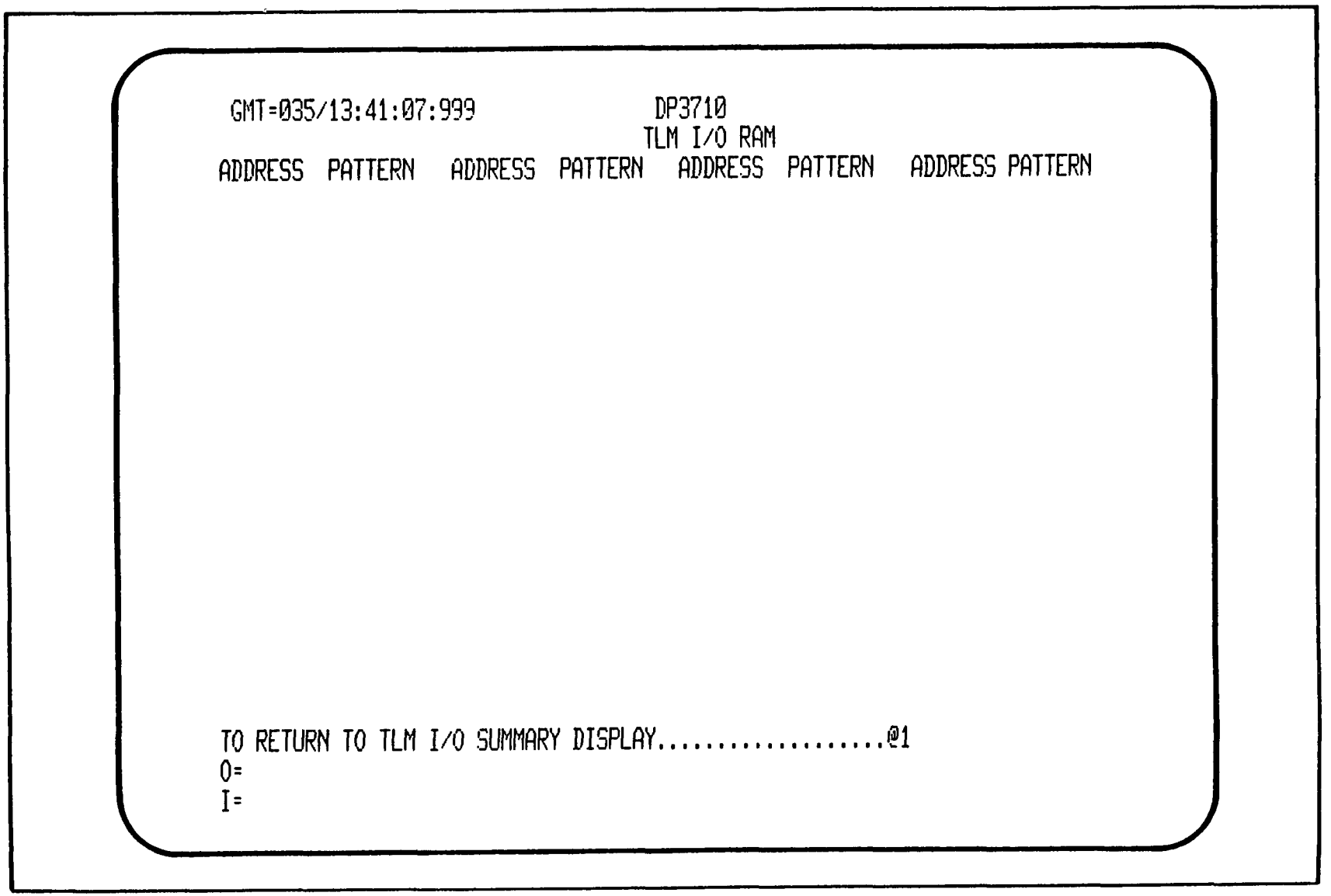

Figure 3.4-16. TLM I/O RAM Address (280-2BF) Display

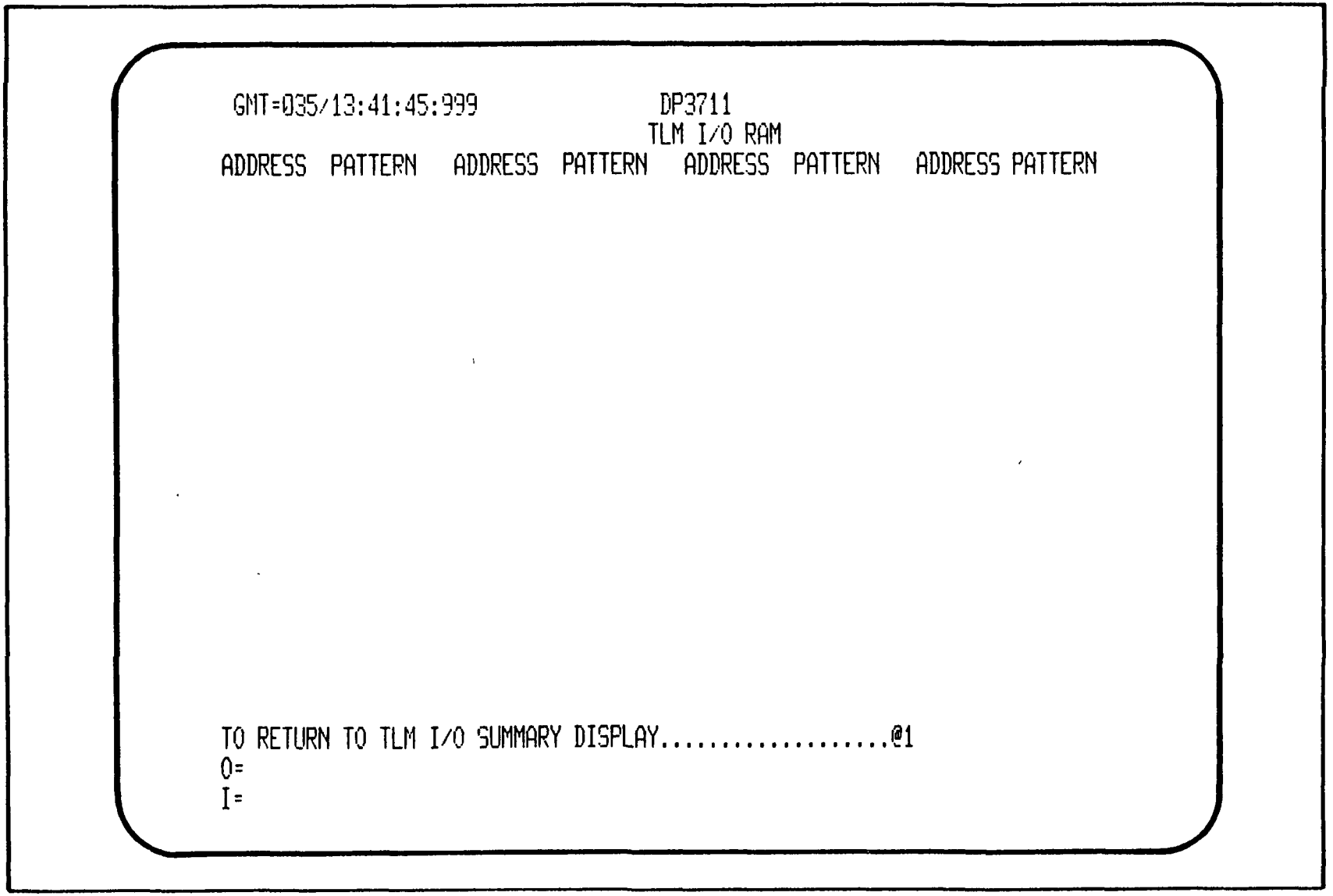

Figure 3.4-17. TLM I/O RAM Address (2C0-2FF) Display

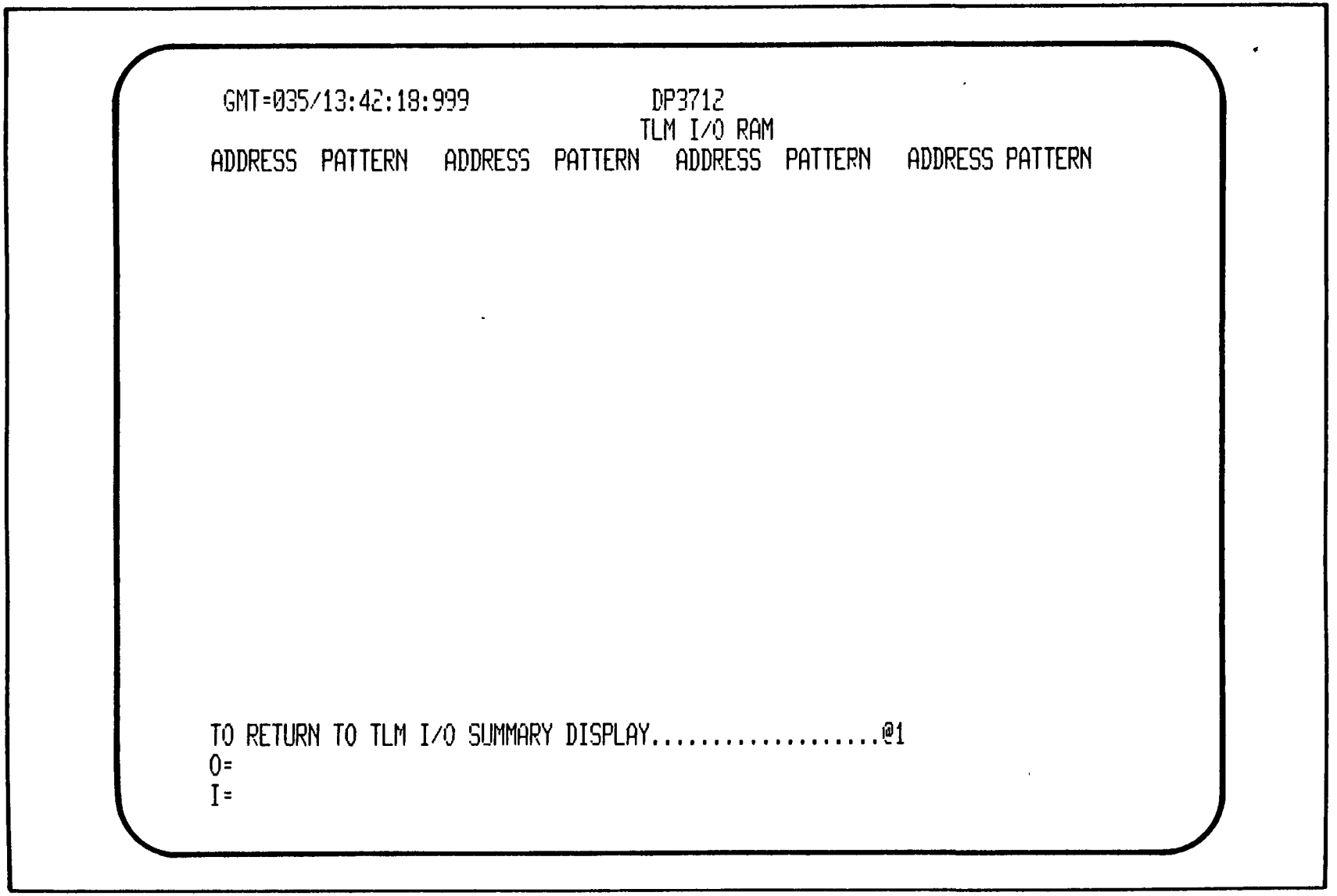

Figure 3.4-18. TLM I/O RAM Address (300-33F) Display

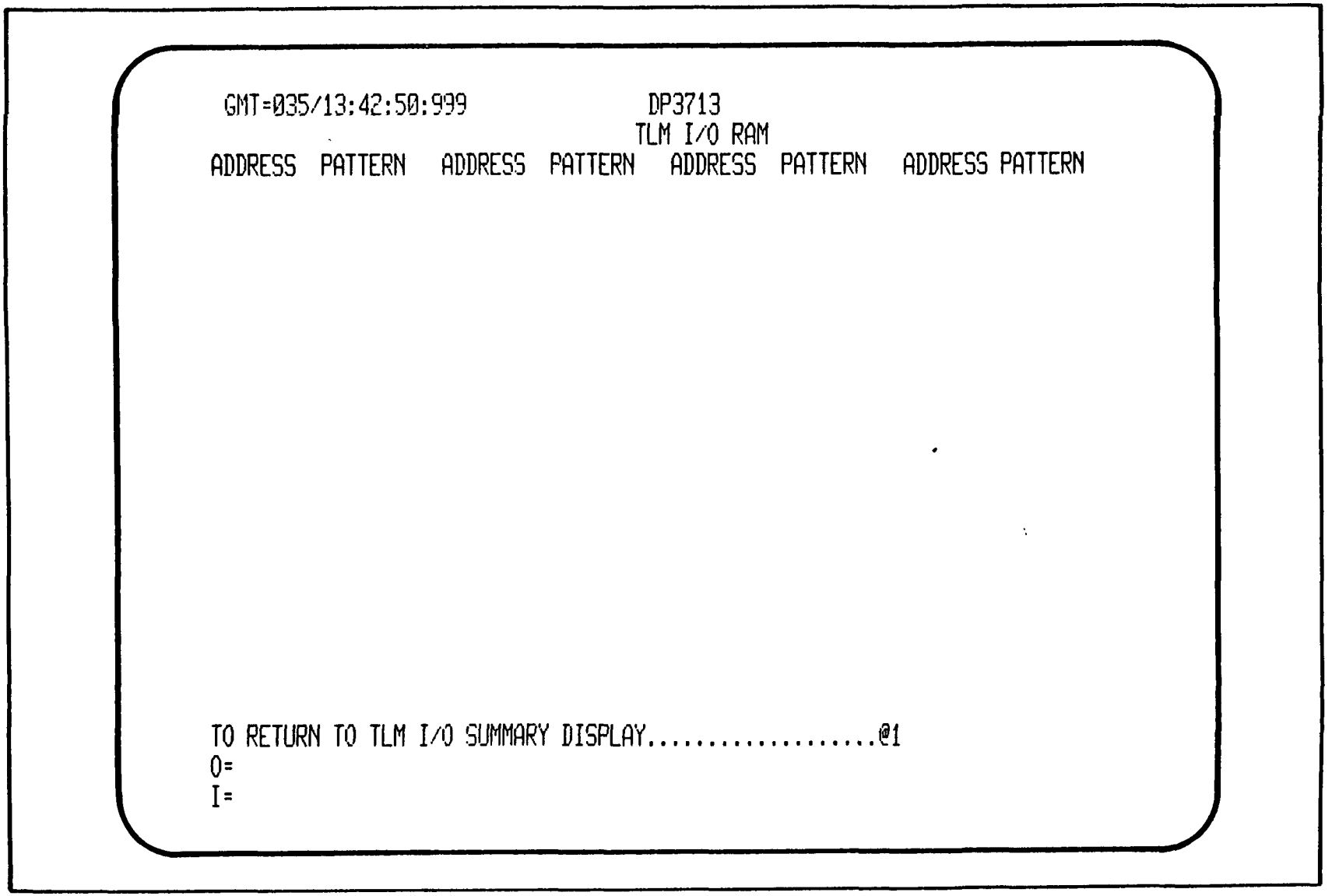

Figure 3.4-19. TLM I/O RAM Address (340-37F) Display

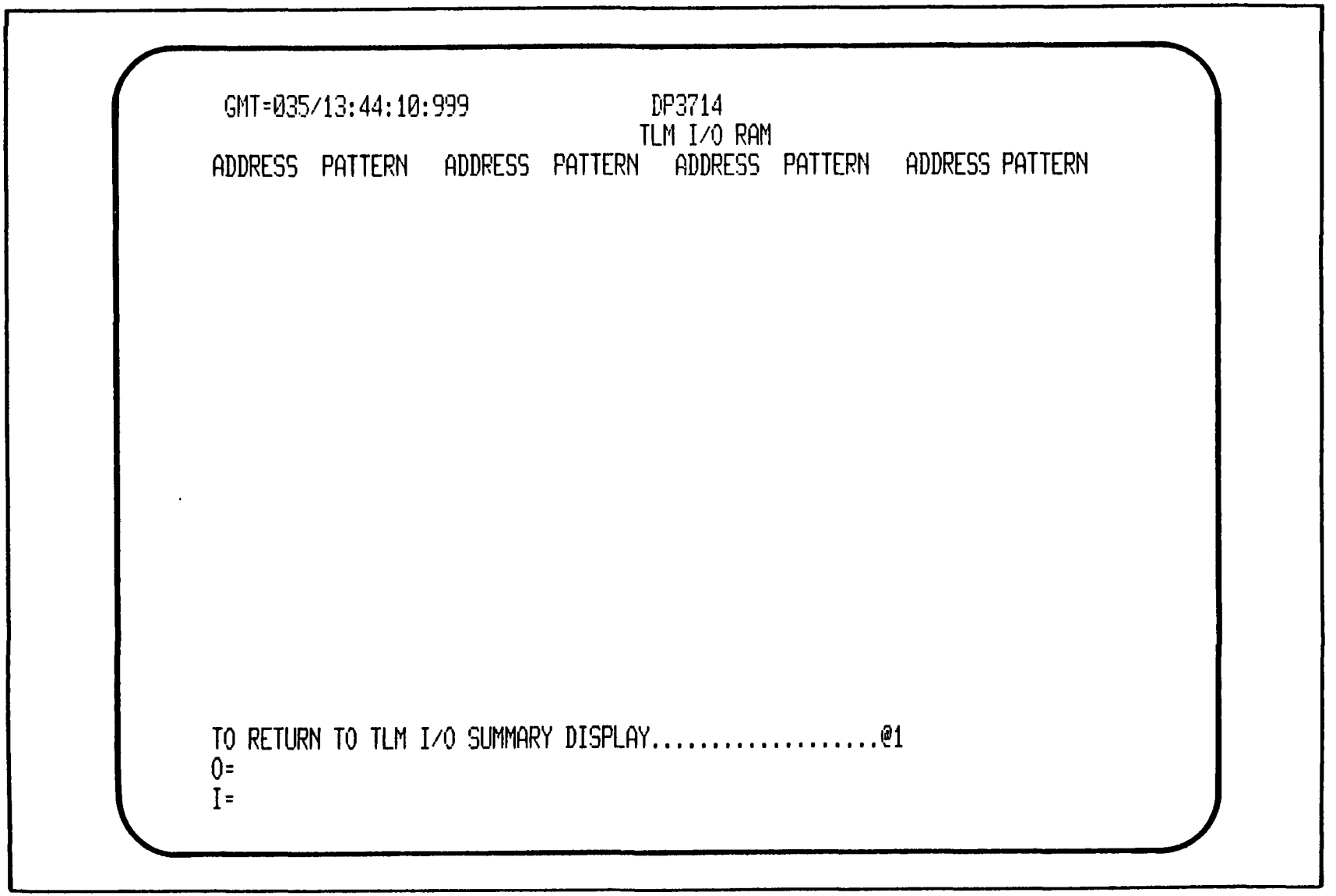

Figure 3.4-20. TLM I/O RAM Address (340-37F) Display

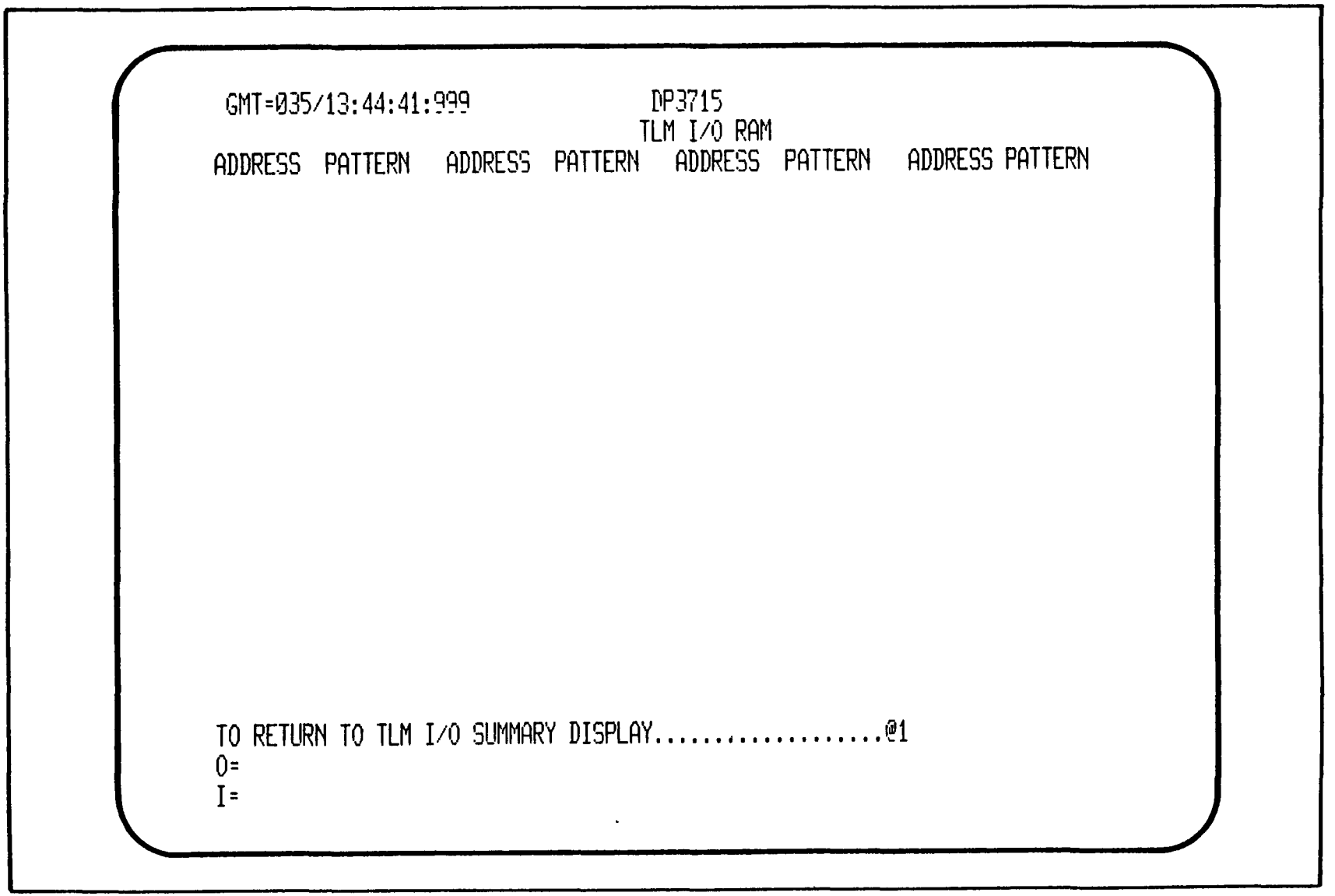

Figure 3.4-21. TLM I/O RAM Address (380-3BF) Display

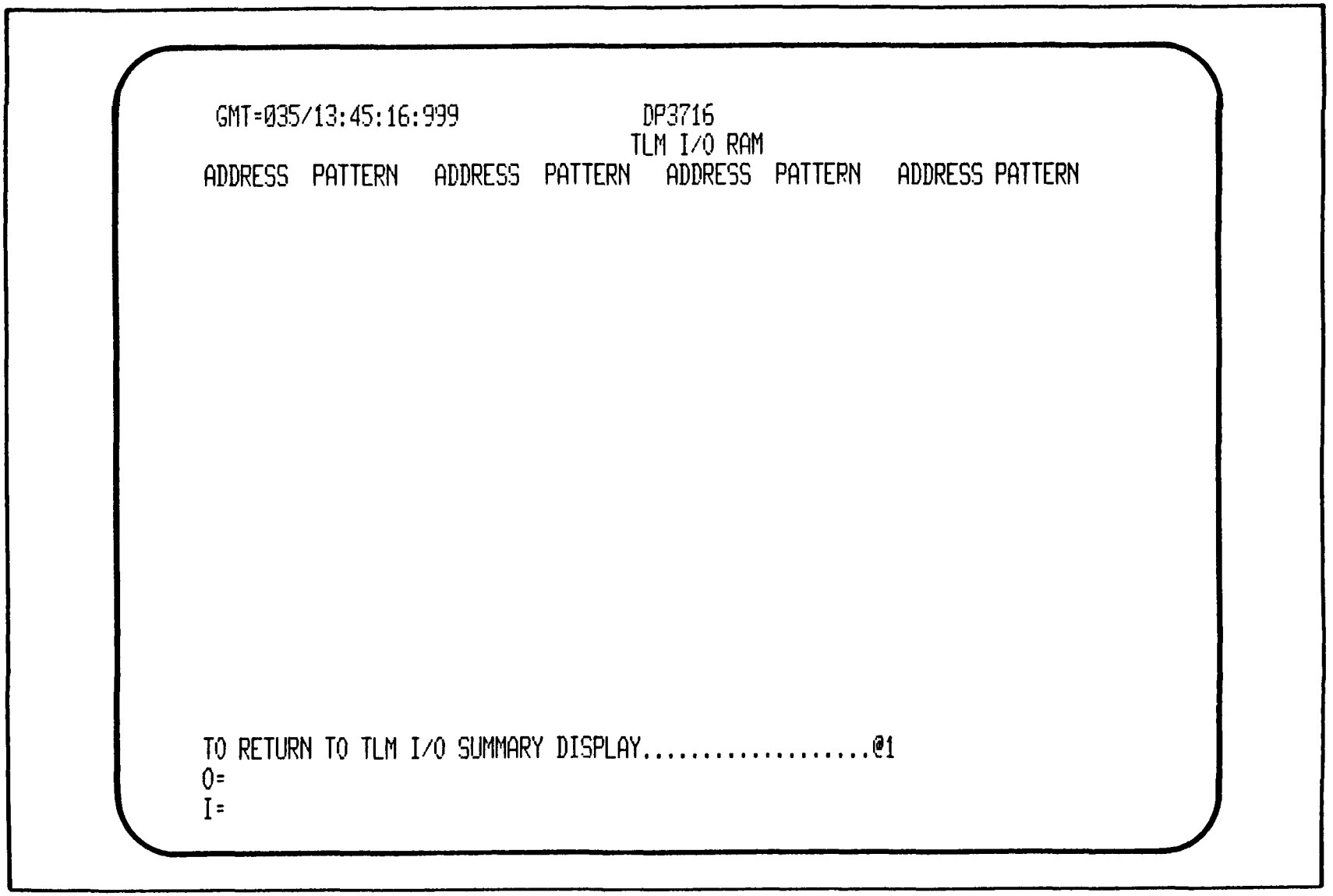

Figure 3.4-22. TLM I/O RAM Address (3C0-3FF) Display

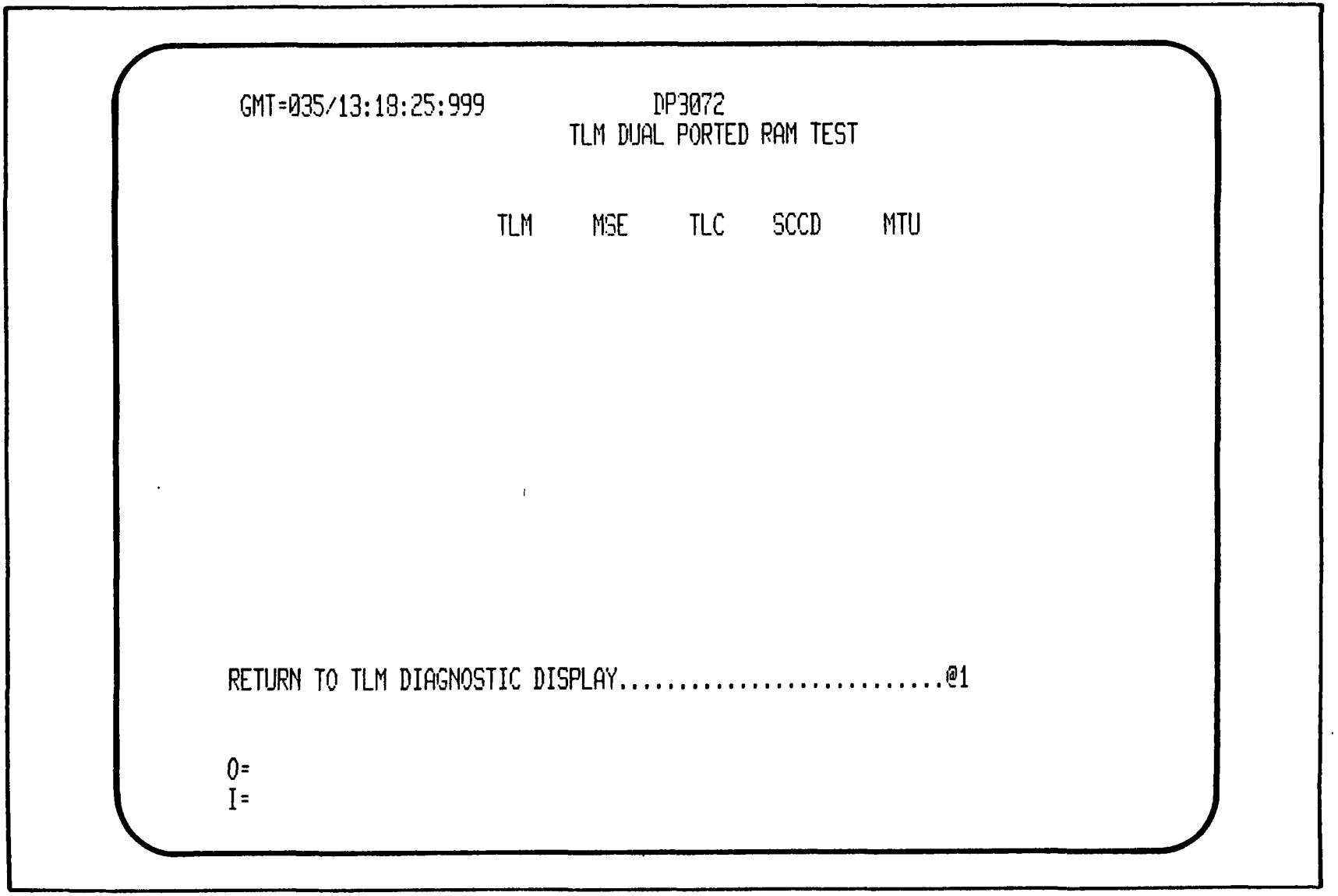

Figure 3.4-23. TLM Dual Ported RAM Test

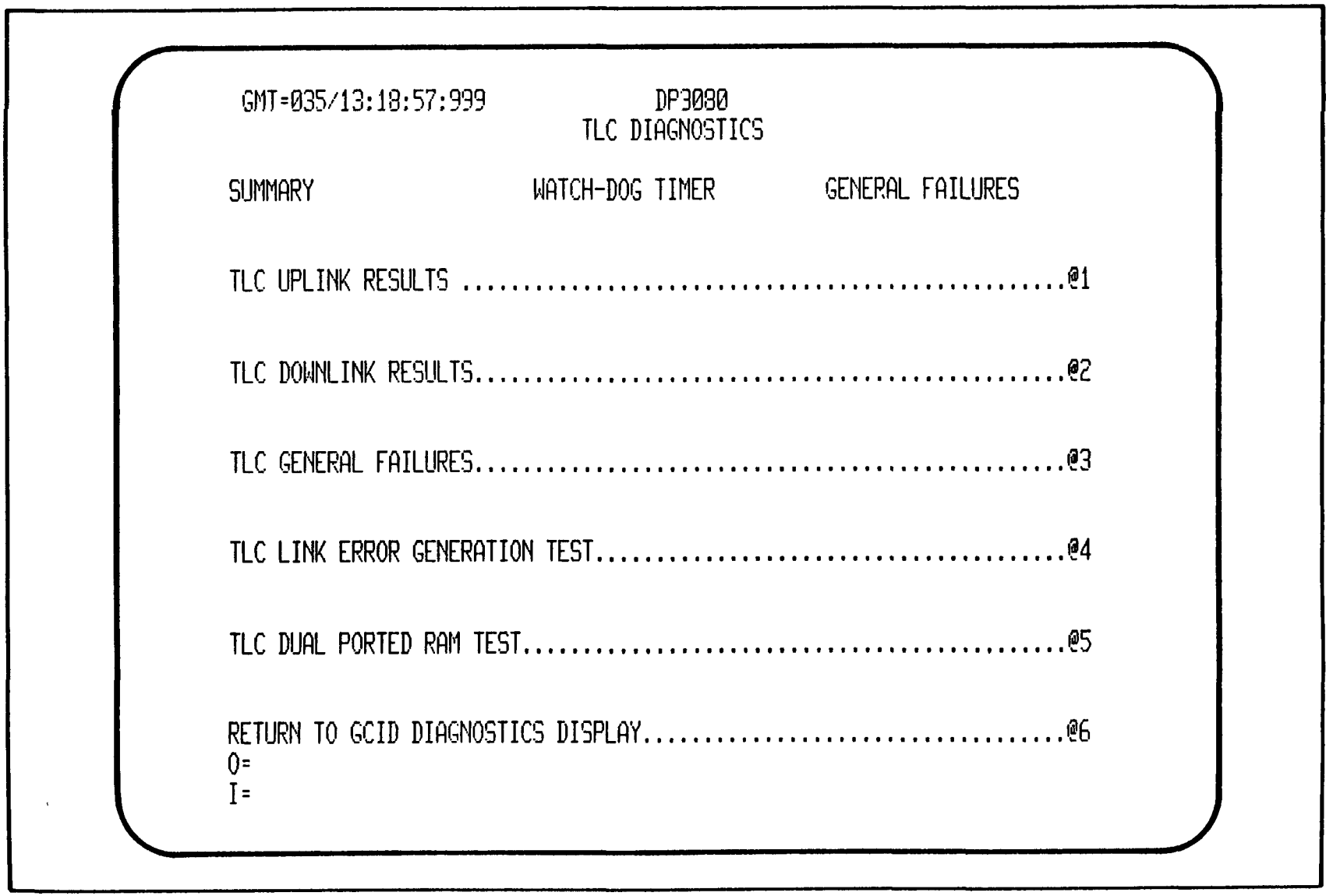

Figure 3.4-24. TLC Diagnostics Display

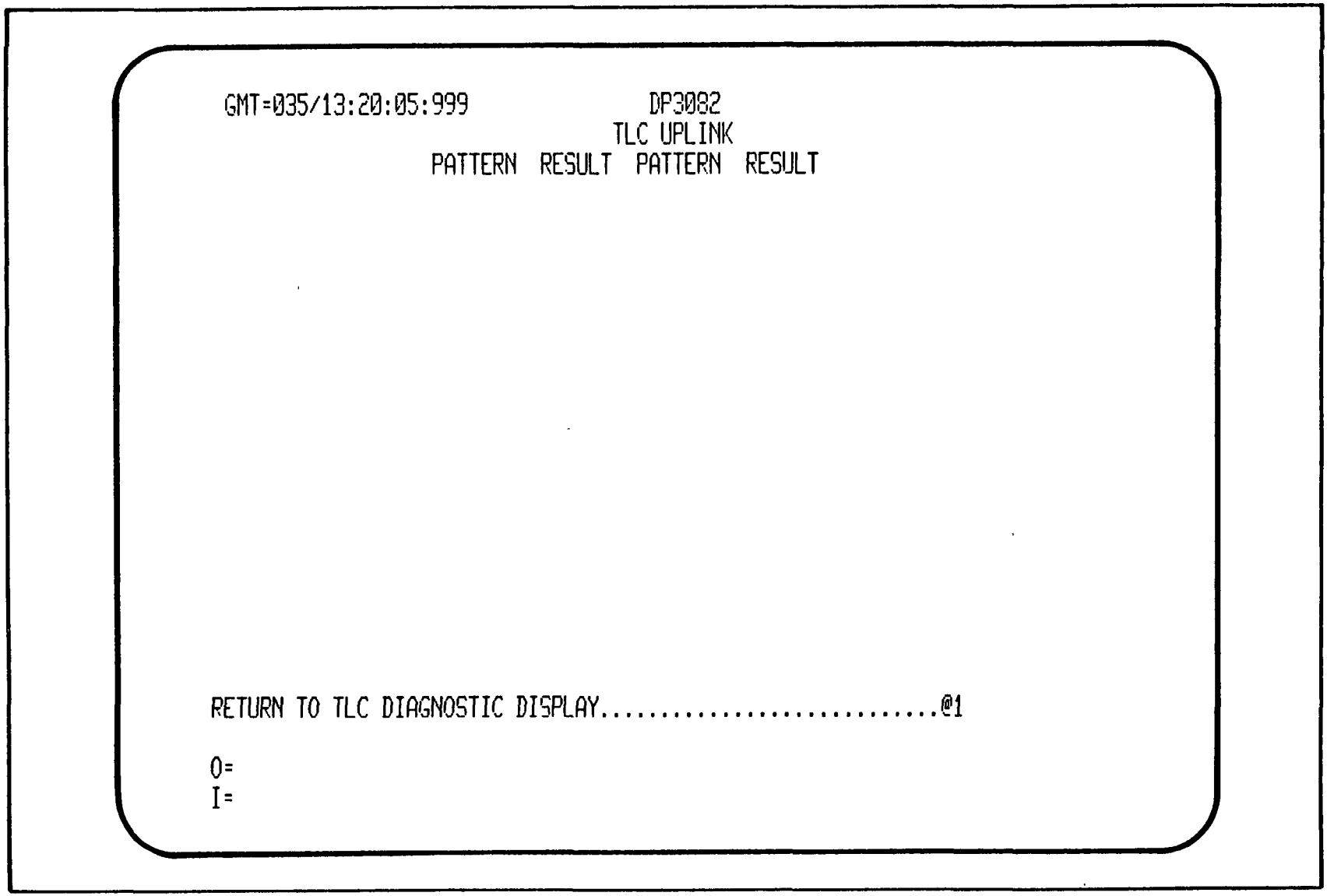

Figure 3.4-25. TLC Uplink Display

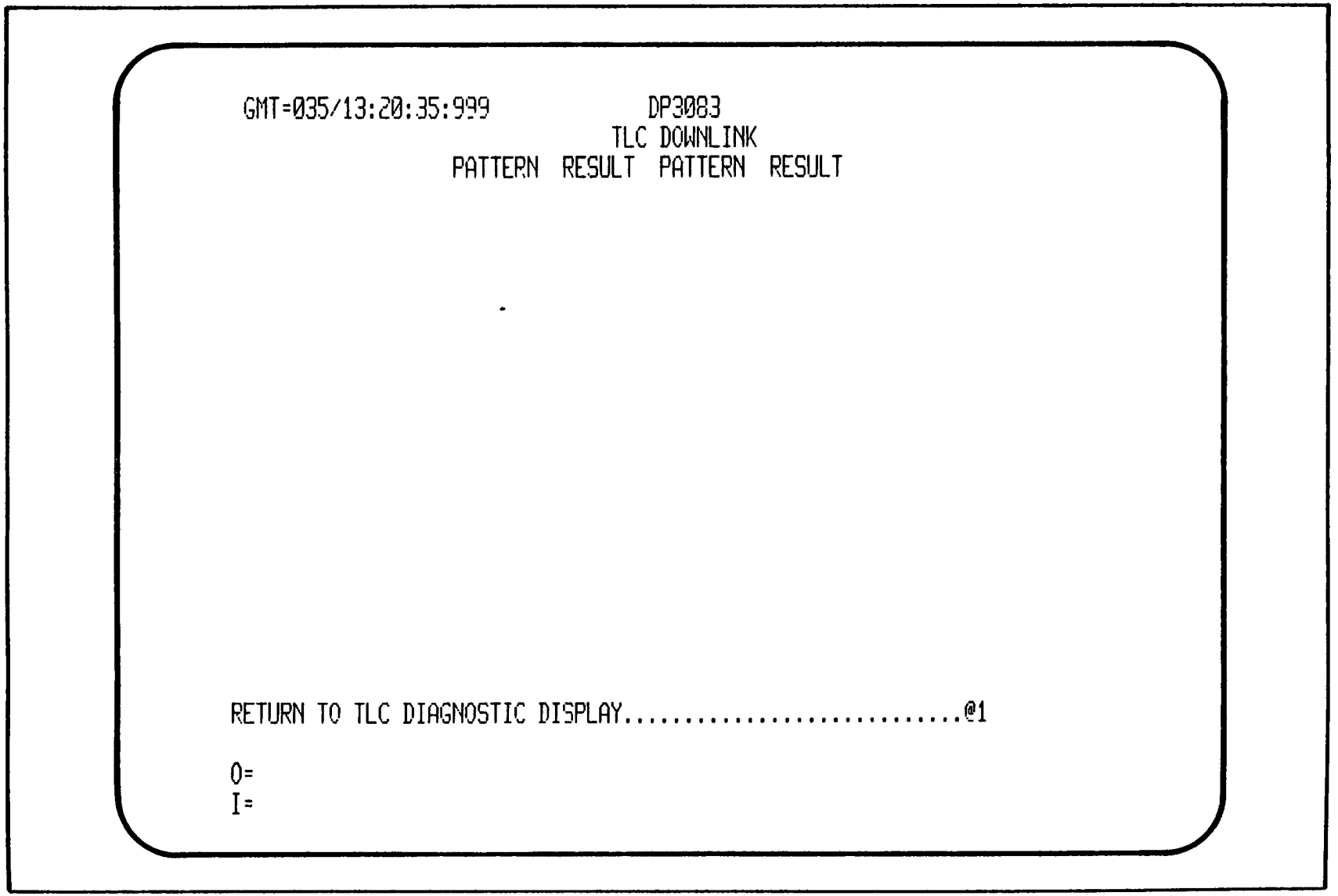

Figure 3.4-26. TLC Downlink Display

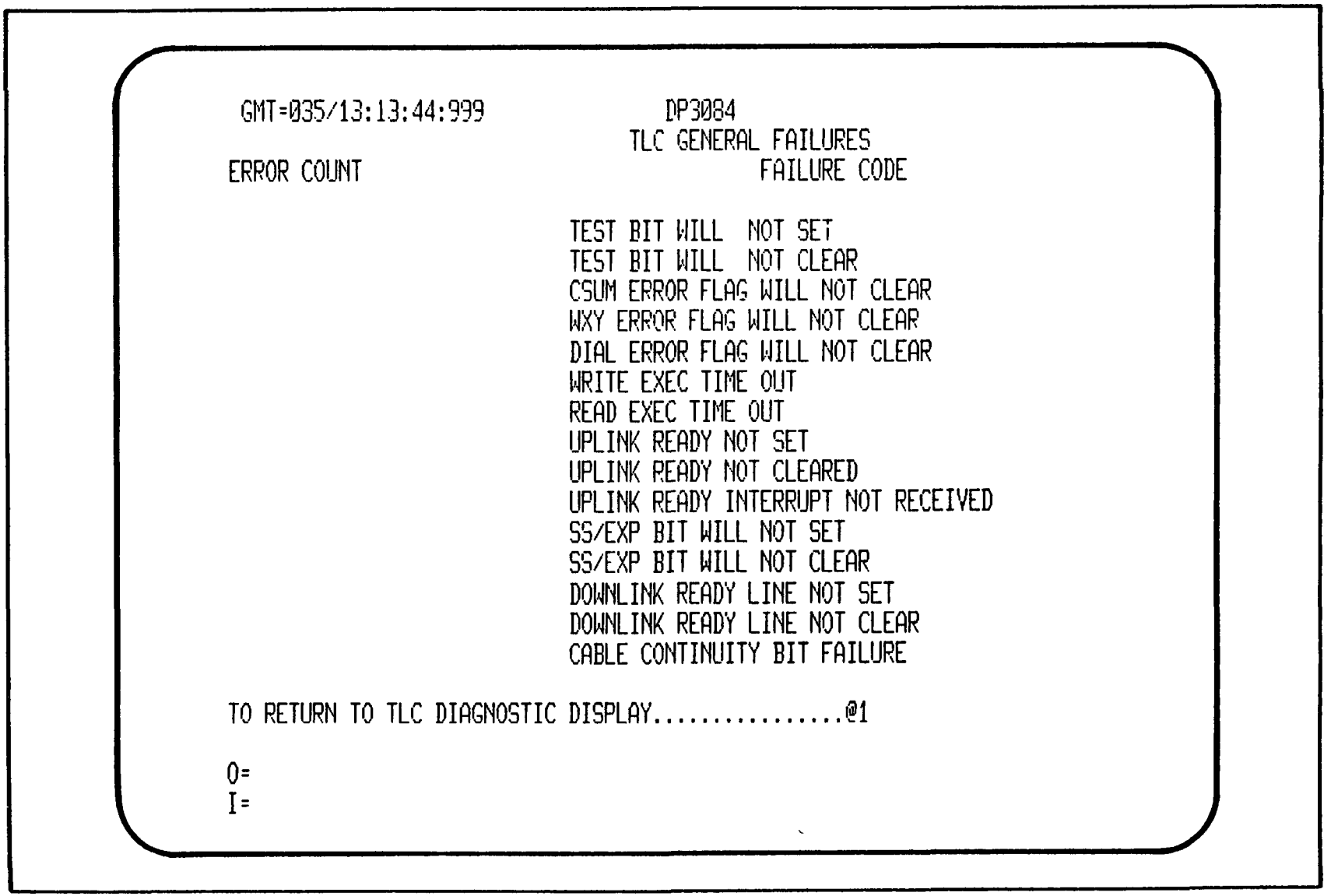

Figure 3.4-27. TLC General Failures Display

Fifteen failure code messages (see GCID Design Specification Document, Volume II, Page A-55) shall be displayed with the total error count per failure displayed.

Function key 4 displays the TLC LINK ERROR GENERATION TEST results. Figure 3.4-28, DP#3081, is an example of the display screen.

Function key 5 displays the TLC DUAL PORTED RAM TEST, DP#3085 (Figure 3.4-29), results. This will indicate the status of each GCID board during the test (i.e., PASS/FAIL).

Function key 6 returns the user to the GCID DIAGNOSTICS DISPLAY menu.

3.4.2.2.2.3 MSE Diagnostics Details. The MSE DIAGNOSTICS DETAILS display, DP#3090 (Figure 3.4-30), shows the overall success of the test, the number of general failures, the status of the FIFO test, the status of the interrupt test, the results of the status generation and command receive tests, and the Watch-Dog Timer. The stimulus column should be equal to the status command column and any discrepancy indicates an error.

Function key 1, DP#3091 (Figure 3.4-31), will display the MSE GENERAL FAILURES. There are 10 failure code messages (see GCID Design Specification Document, Volume II, Page A-50) that are displayed along with the total error count per failure.

Function key 2 displays the MSE DUAL PORTED RAM TEST, DP#3092 (Figure 3.4-32), results. This indicates the status of each GCID board during the test (i.e., PASS/FAIL).

3.4.2.2.2.4 SCCD Diagnostics Details. The SCCD DIAGNOSTICS display, DP#3100 (Figure 3.4-33), shows the pass/fail summary of the SCCD-A and SCCD-B I/O board tests. The counts of general failures occurring during these tests shall be displayed, and the SCCD-A or SCCD-B general failures list may be viewed by pressing function key 1. The results of the SCCD-B command receive test shall be displayed in tabular format showing the values used (stimulus columns) and the resultant commands received (command columns). The stimuli and command columns shall be equal for a successful test, and unequal for a failure.

The SCCD GENERAL FAILURES list, DP#3101 (Figure 3.4-34), displays the 13 failure codes for SCCD with the resultant 'ERROR COUNT' if there are any errors after running the SCCD diagnostics test.

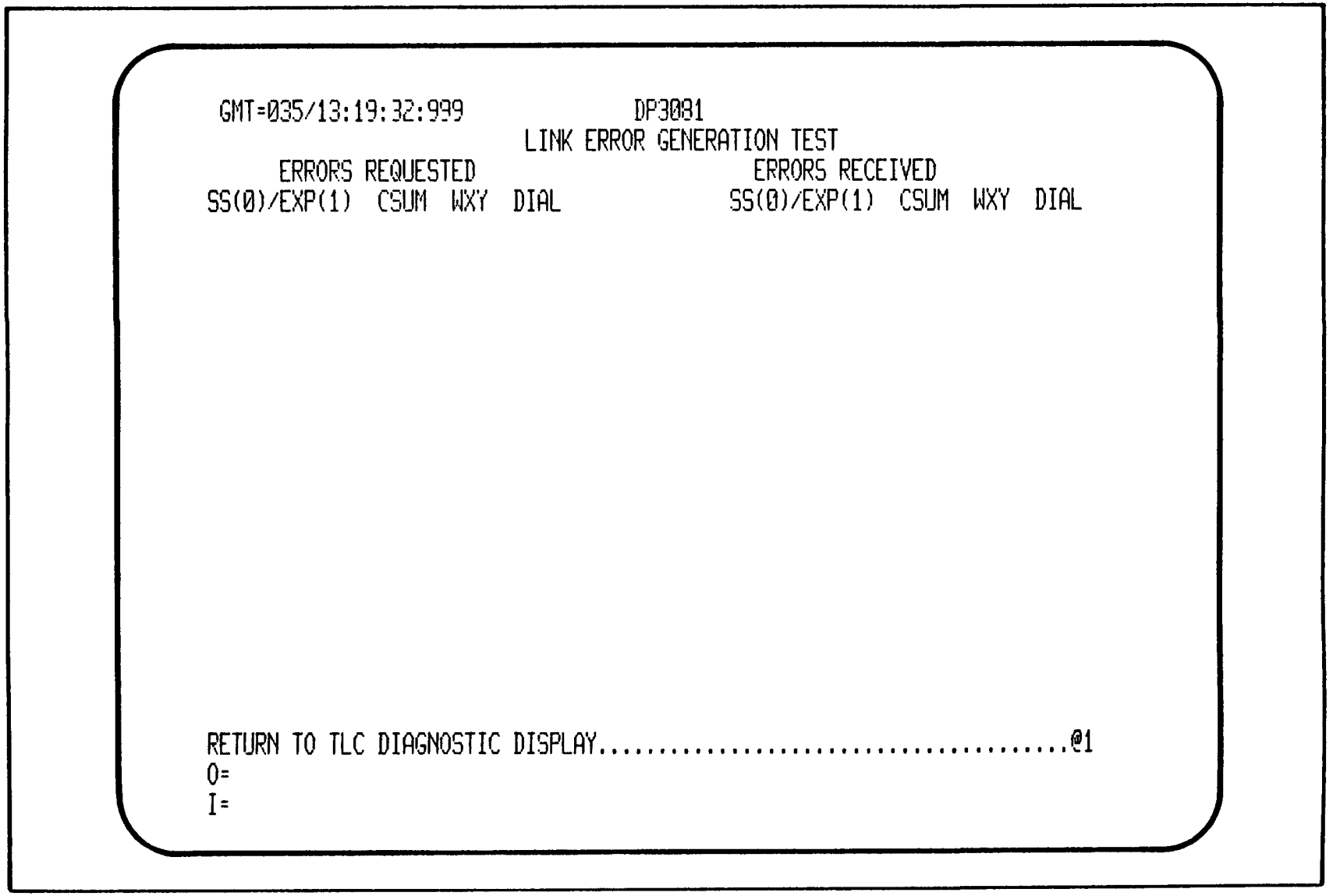

Figure 3.4-28. TLC Link Error Generation Test Display

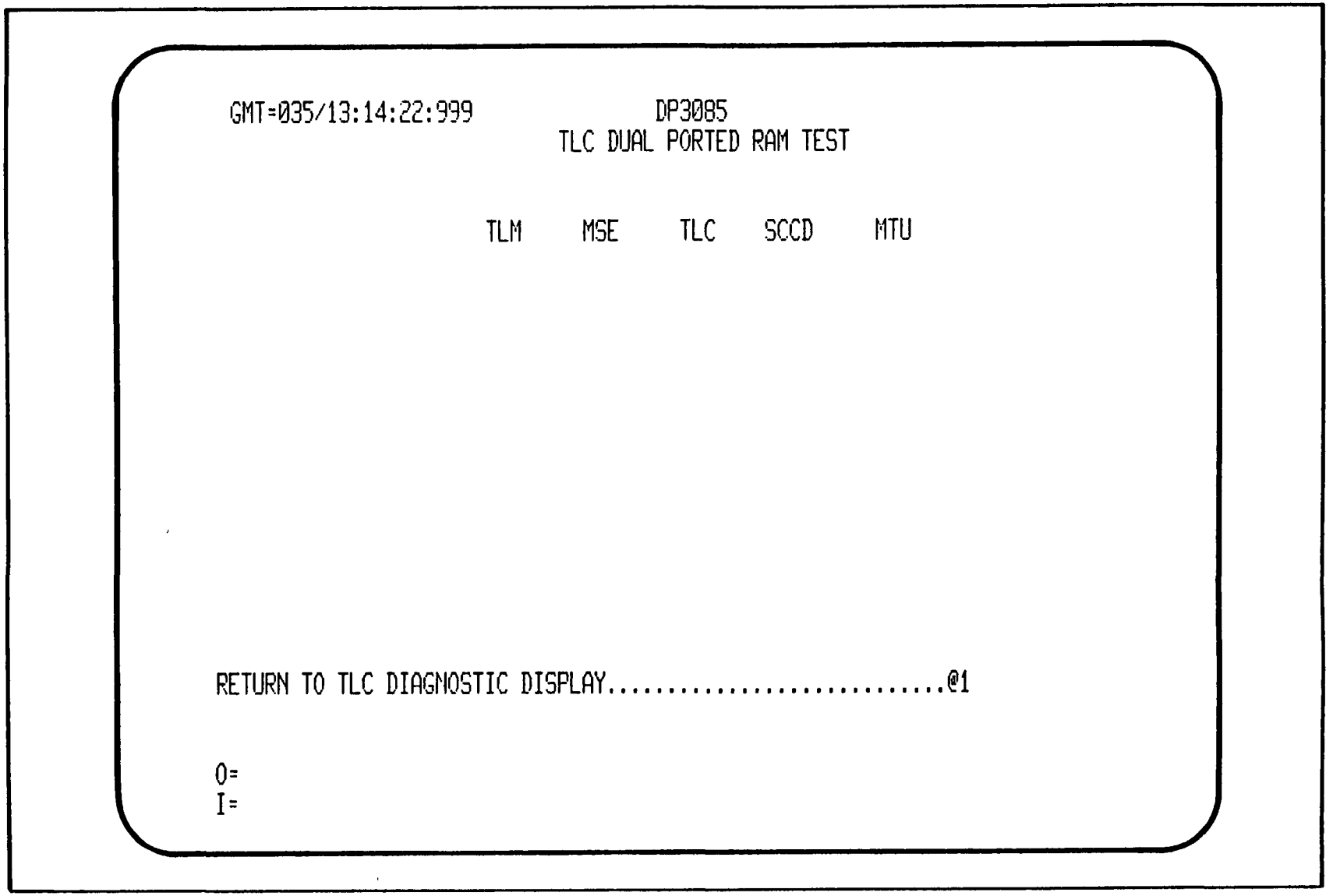

Figure 3.4-29. TLC Dual Ported RAM Test Display

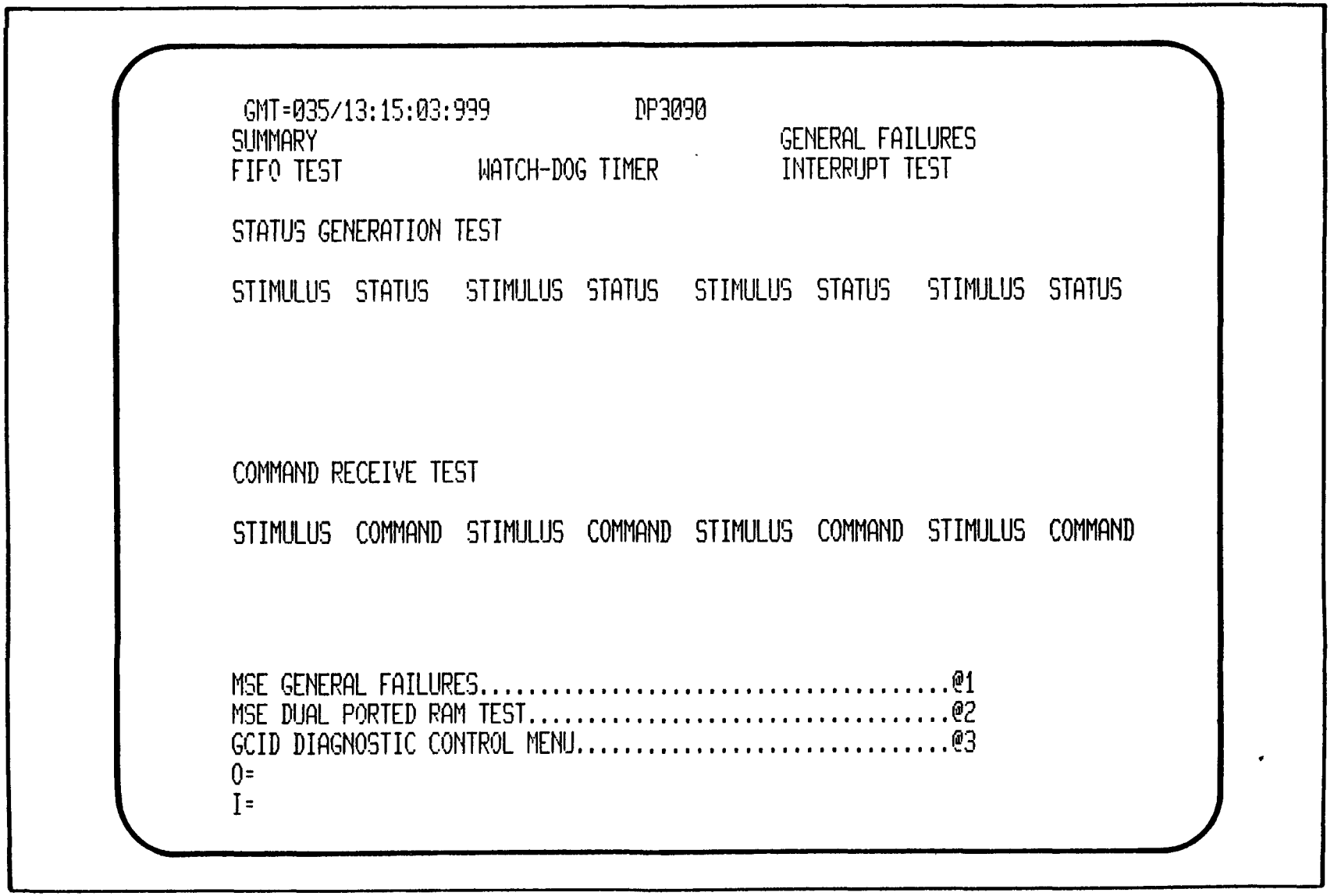

Figure 3.4-30. MSE Diagnostics Display Menu

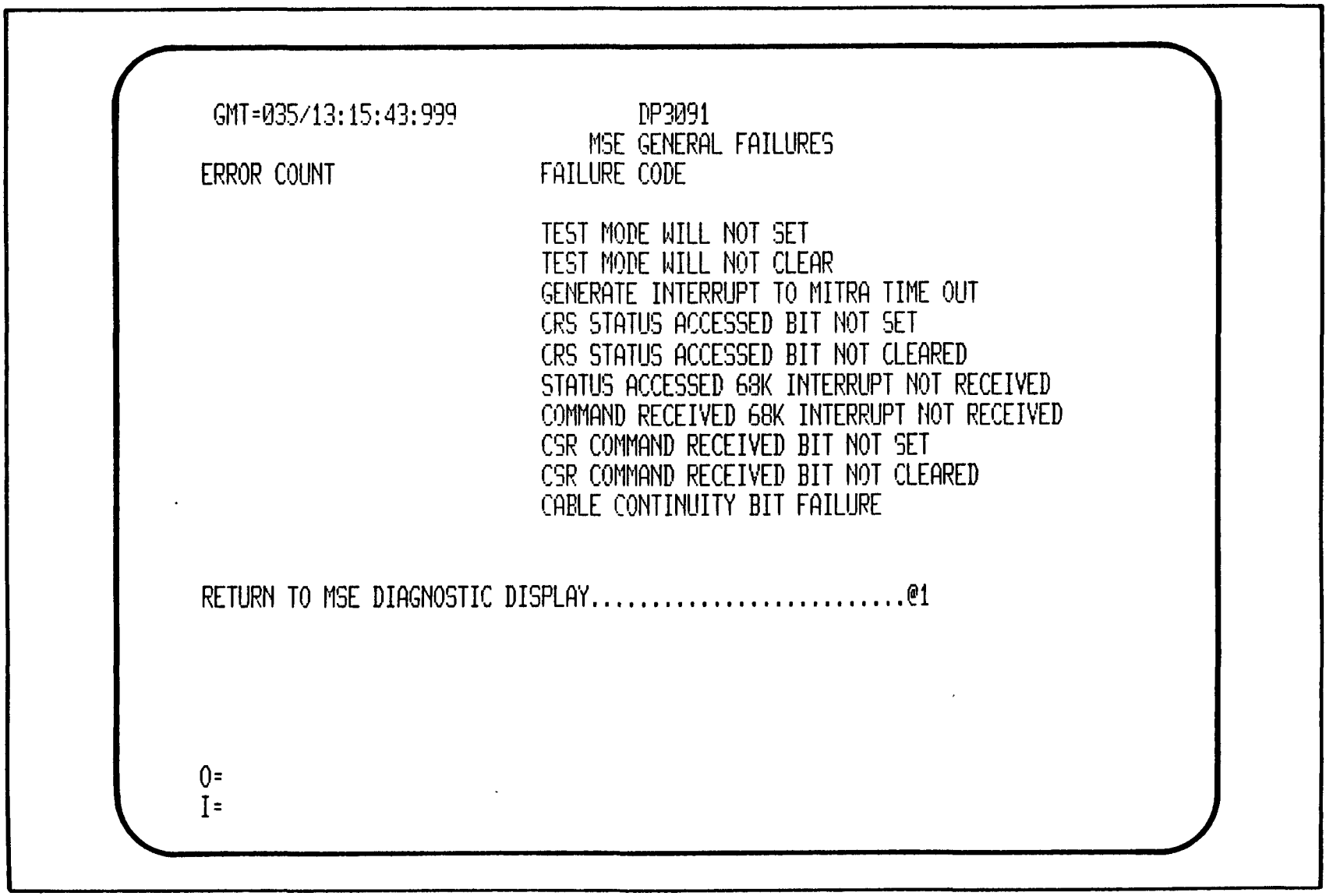

Figure 3.4-31. MSE General Failures Display

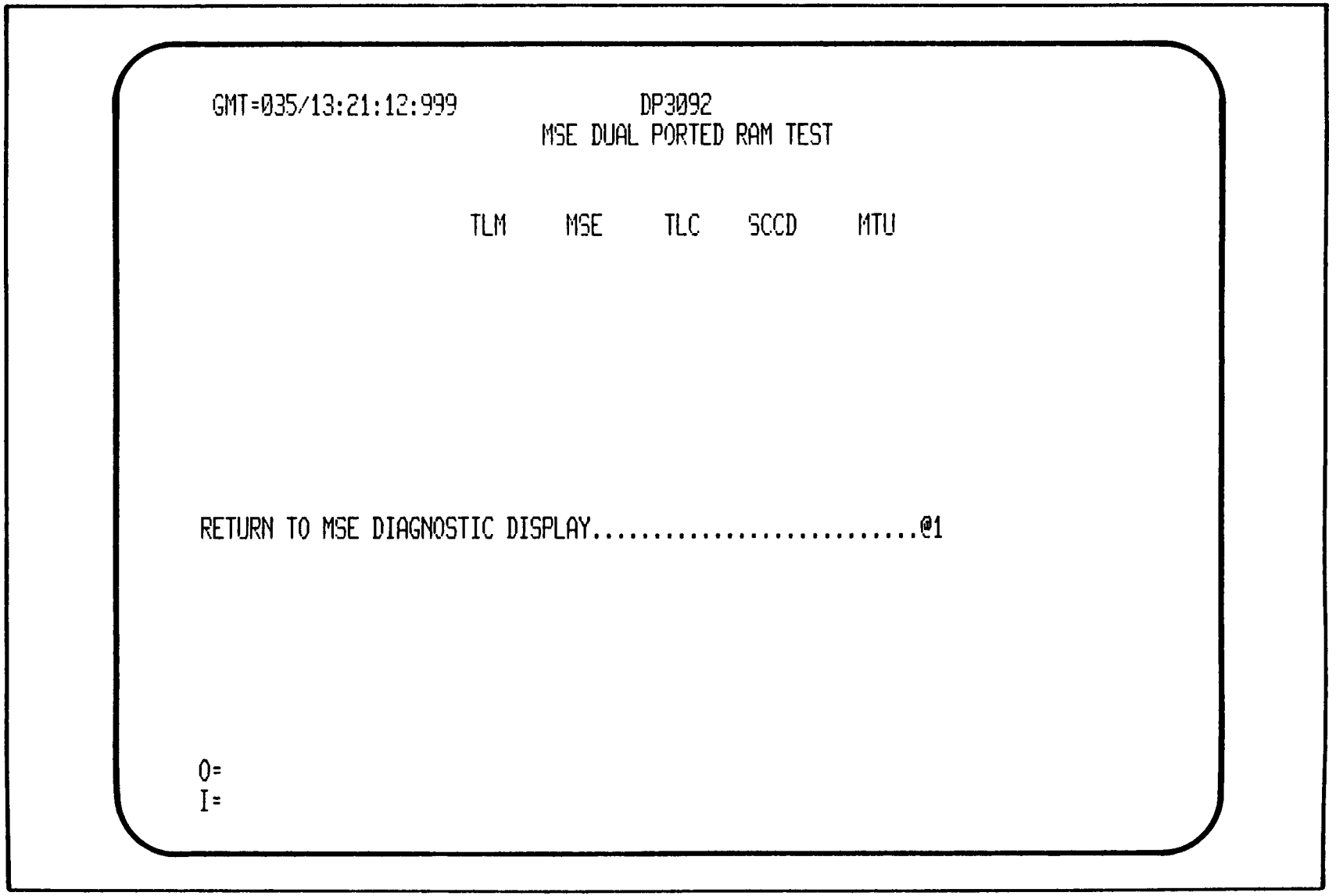

Figure 3.4-32. MSE Dual Ported RAM Test

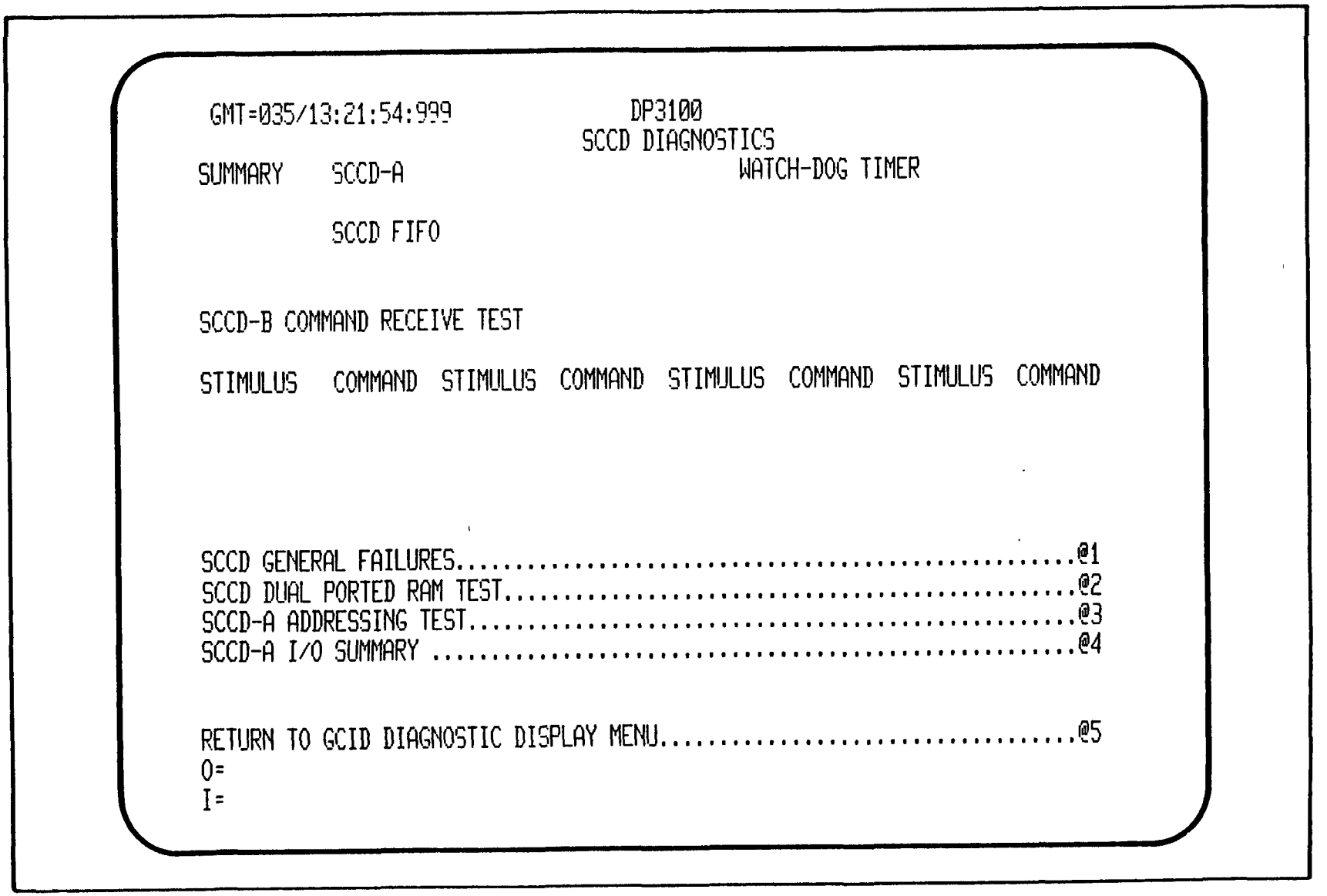

Figure 3.4-33. SCCD Diagnostics Display Menu

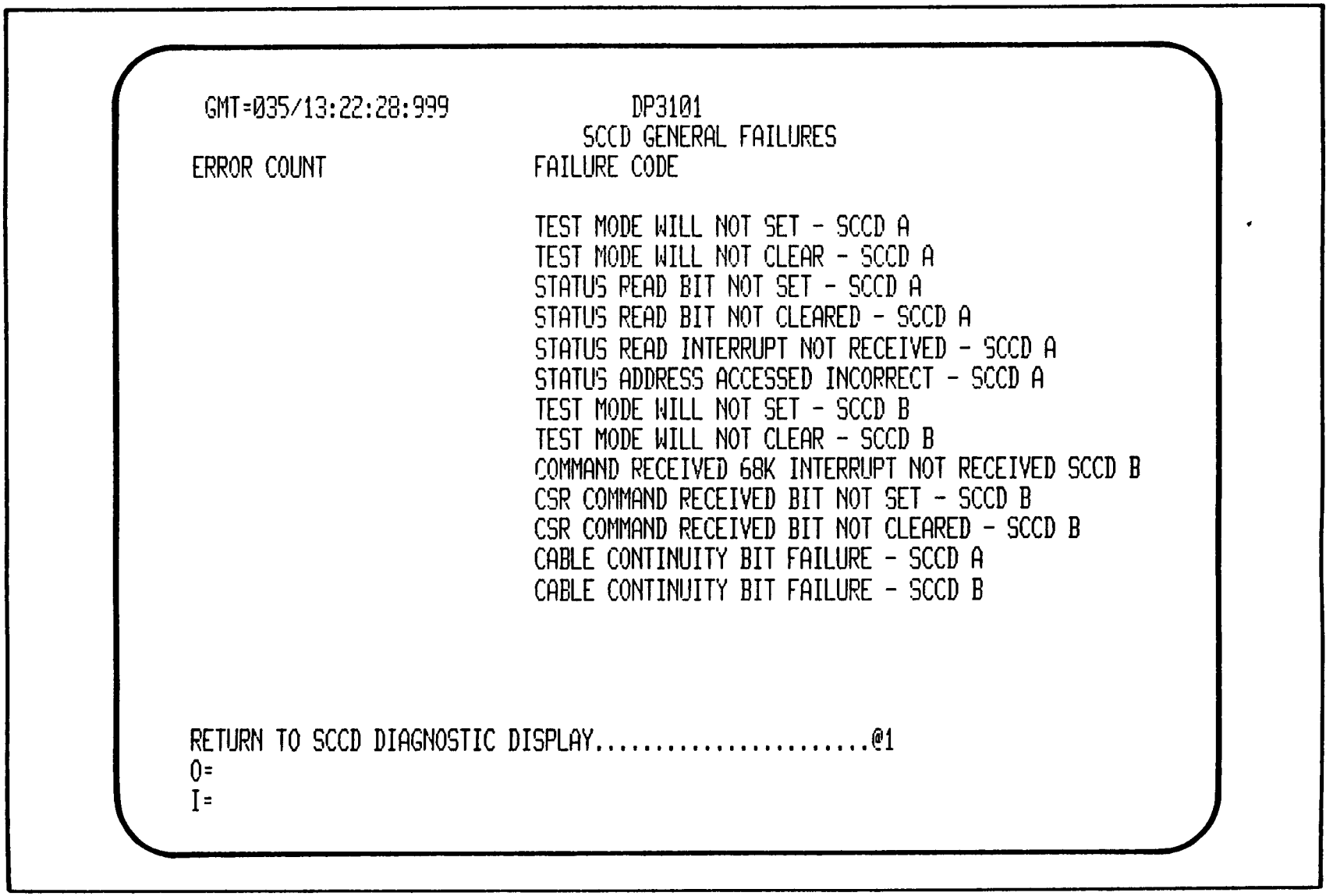

Figure 3.4-34. SCCD General Failures Display

Function key 2, DP#3103 (Figure 3.4-35), displays the SCCD DUAL PORTED RAM TEST. This indicates the status of the GCID boards (i.e., PASS/FAIL) after running the diagnostics test.

Function key 3 displays the results of the SCCD-A ADDRESSING SUMMARY DISPLAY menu DP#3130 (Figure 3.4-36). It breaks the addresses into four groups for displaying the status of the addresses from 00 to FF. Figures 3.4-37 through 3.4-40 illustrate the SCCD-A addressing statuses. A flashing asterisk (*) indicates an error corresponding to that group.

Function key 4 displays the SCCD-A I/O SUMMARY DISPLAY results (Figure 3.4-41) that allow the user to display the SCCD I/O RAM addresses from 00 to FF. The addresses are broken into four displays (Figures 3.4-42 through 3.4-45) as DISPLAY CONTROL cannot display more than 123 fill-in fields per pages. It is also operated via an offset. The pattern displayed for each address indicates the results of the test for that address. A "0" (zero) value indicates success, and a non-zero value a failure. The position of the binary one(s) indicates which test pattern(s) failed. The displayed pattern is in hexadecimal. A flashing asterisk (*) indicates an error for the corresponding group of addresses.

3.4.2.2.2.5 MTU Diagnostics. The MTU DIAGNOSTICS display, DP#3110 (Figure 3.4.-46), shows the summary of the tests and the GMT, MET, Watch-Dog Timer, and time TAG values of 30 seconds. The results of the GMT and MET set tests are shown (SET and READ columns should be equal). The number of general failures and the status (pass/fail) of the time tag set test are shown.

Function key 1 shall display the MTU GENERAL FAILURES, DP#3111 and DP#3112 (Figure 3.4-47 and Figure 3.4-48). Up to 30 failure code messages (see GCID Design Specification Document, Volume II, Page A-62) shall be displayed. Function key 1 for both screens shall allow the operator to toggle through the error list to review all 30 failure entries.

Function key 2 shall display the MTU TIME TAG RESULTS. The SET and READ columns should be equal. DP#3113 (Figure 3.4-49), is an example results display.

Function key 3, DP#3114 (Figure 3.4-50), displays the MTU DUAL PORTED RAM TEST which gives the PASS/FAIL status of the five GCID boards after running the diagnostics test.

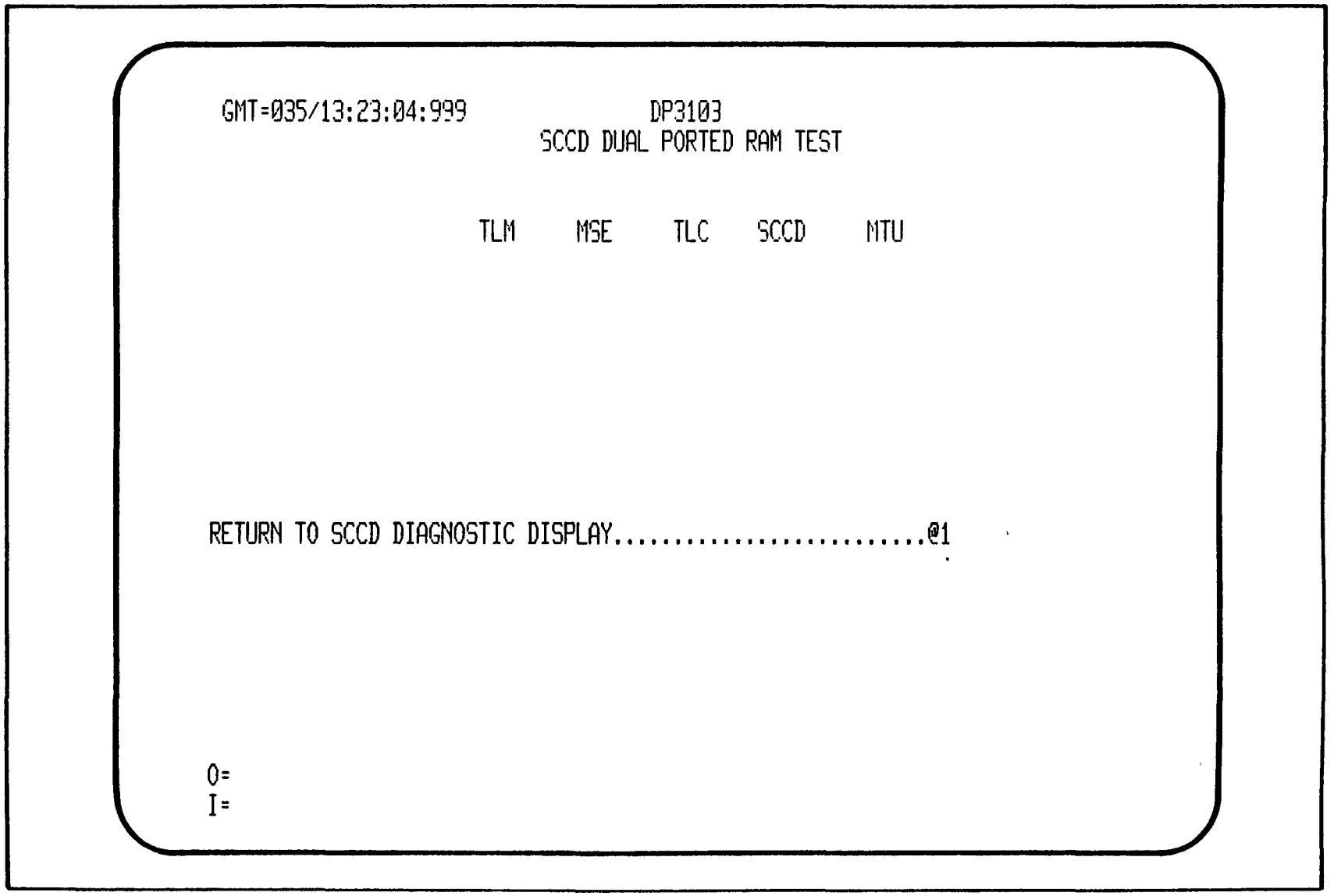

Figure 3.4-35. SCCD Dual Ported RAM Test Display

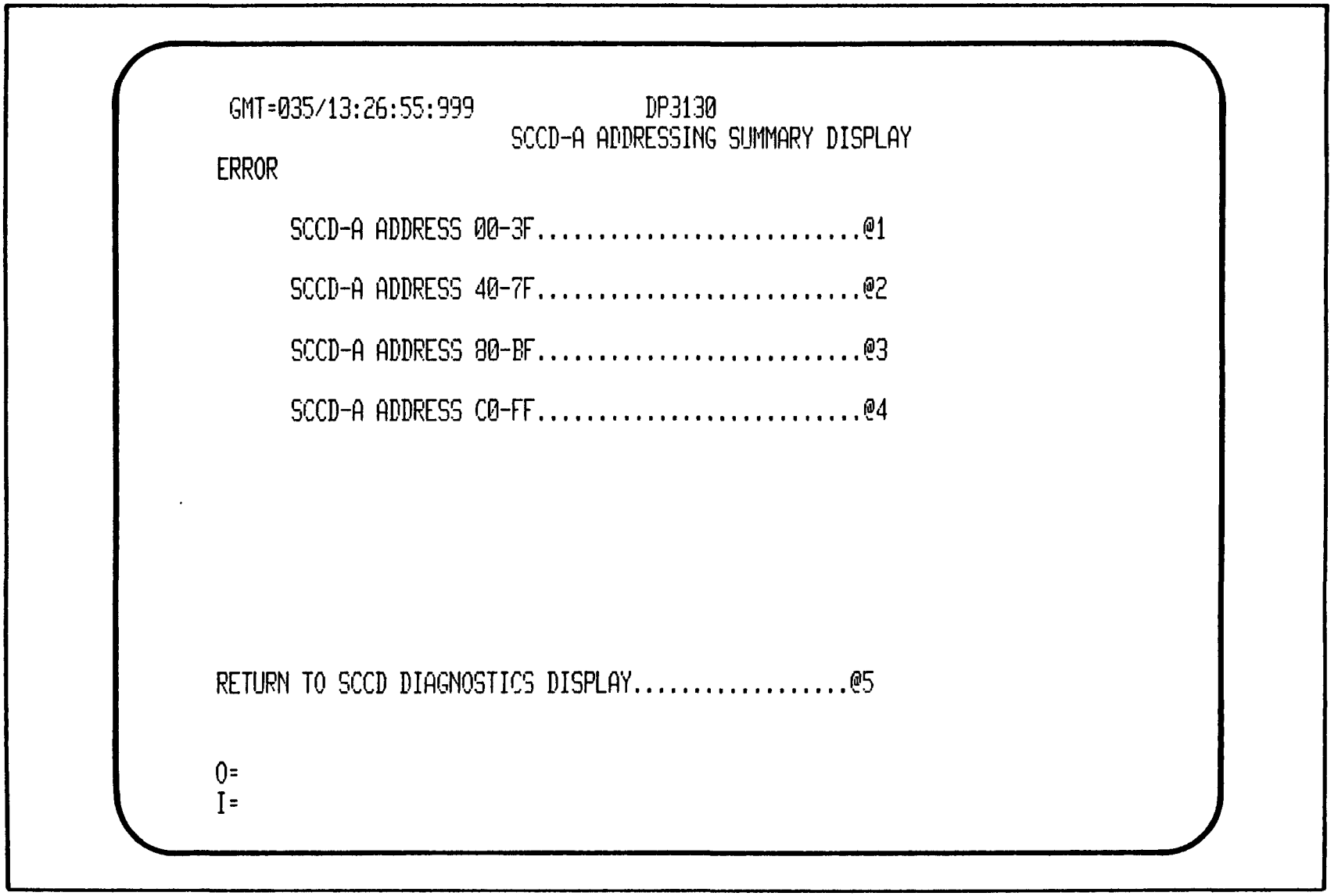

Figure 3.4-36. SCCD-A Addressing Summary Menu

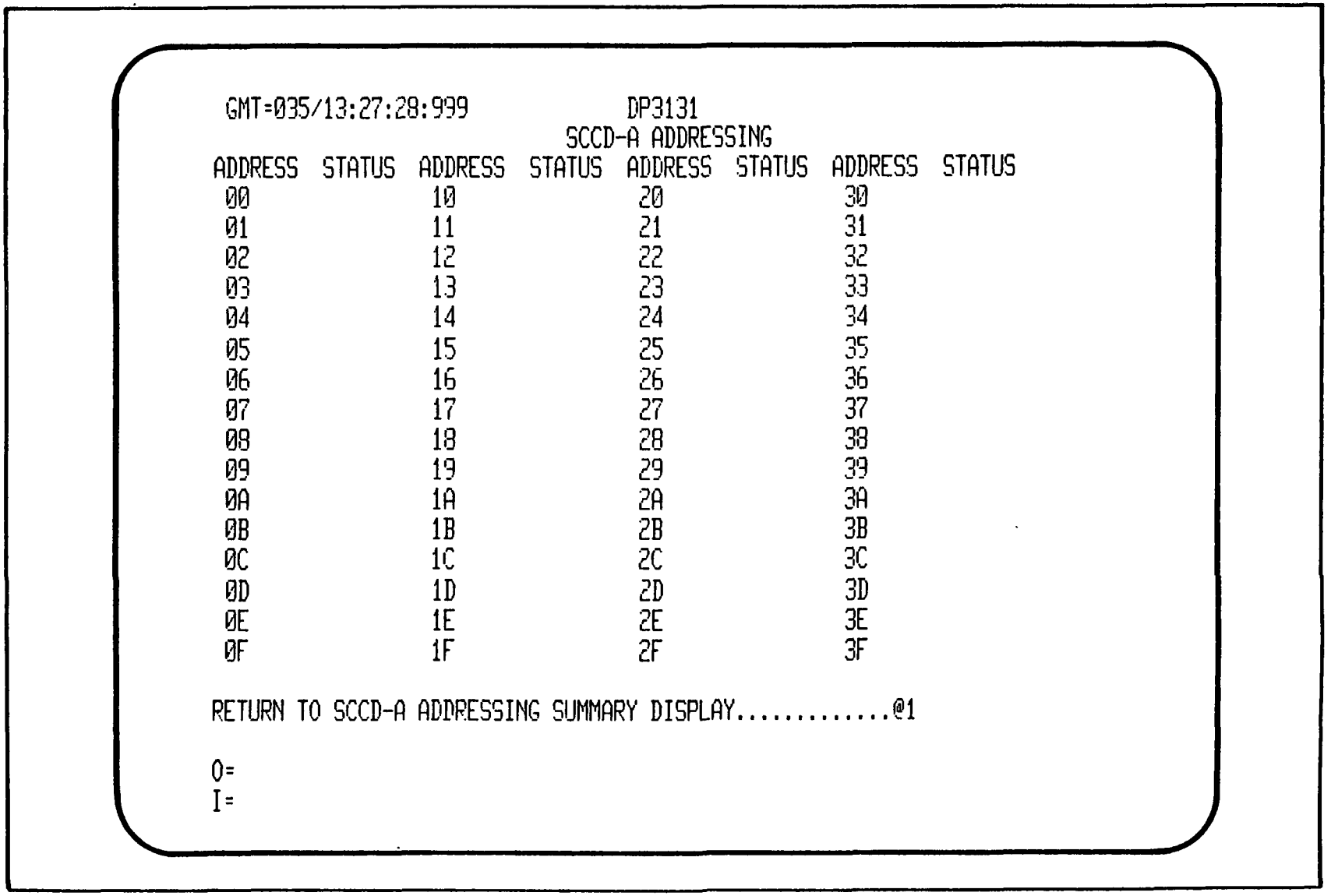

Figure 3.4-37. SCCD-A Addressing (00-3F) Display

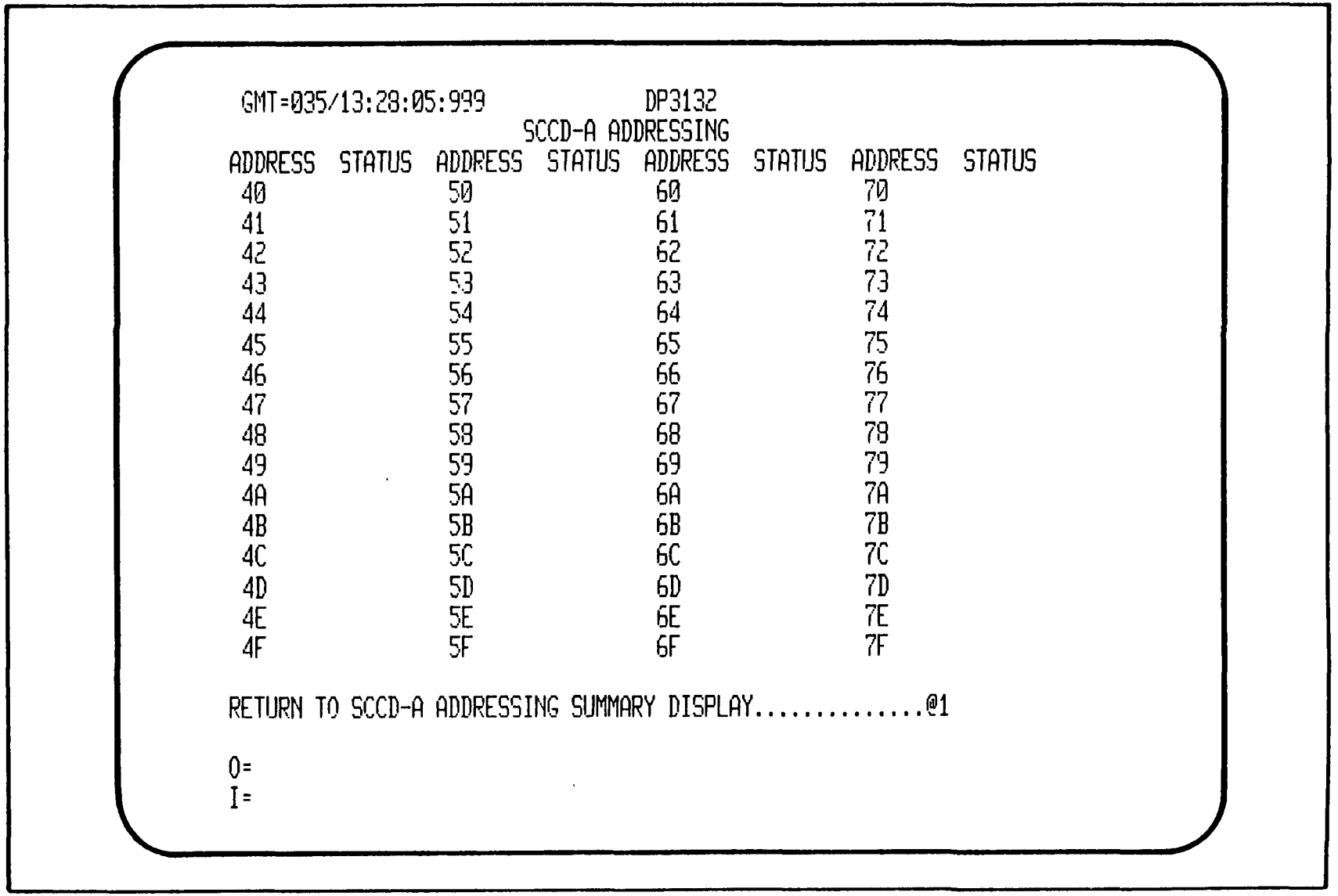

Figure 3.4-38. SCCD-A Addressing (40-7F) Display

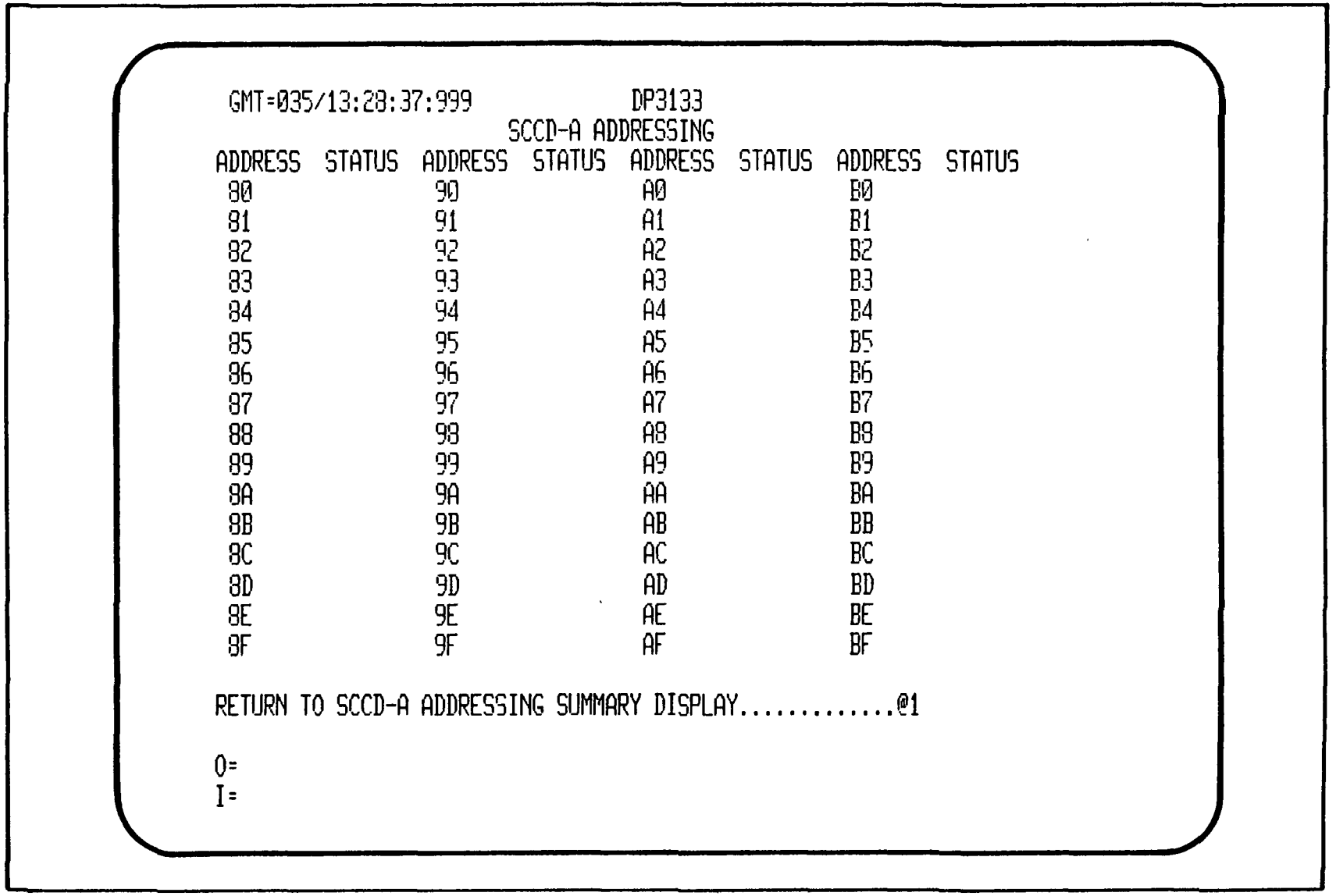

Figure 3.4-39. SCCD-A Addressing (8C-8F) Display

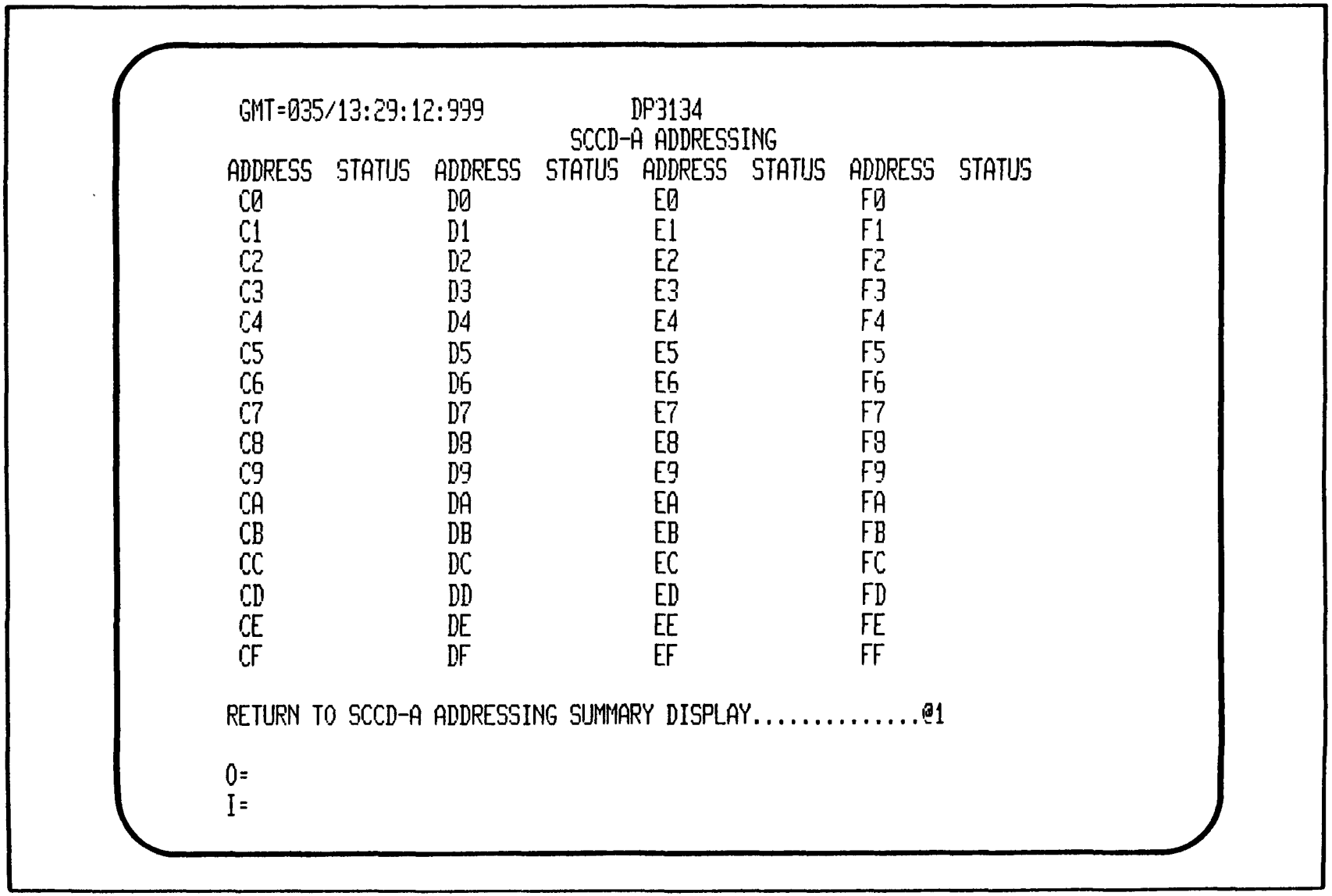

Figure 3.4-40. SCCD-A Addressing (C0-FF) Display

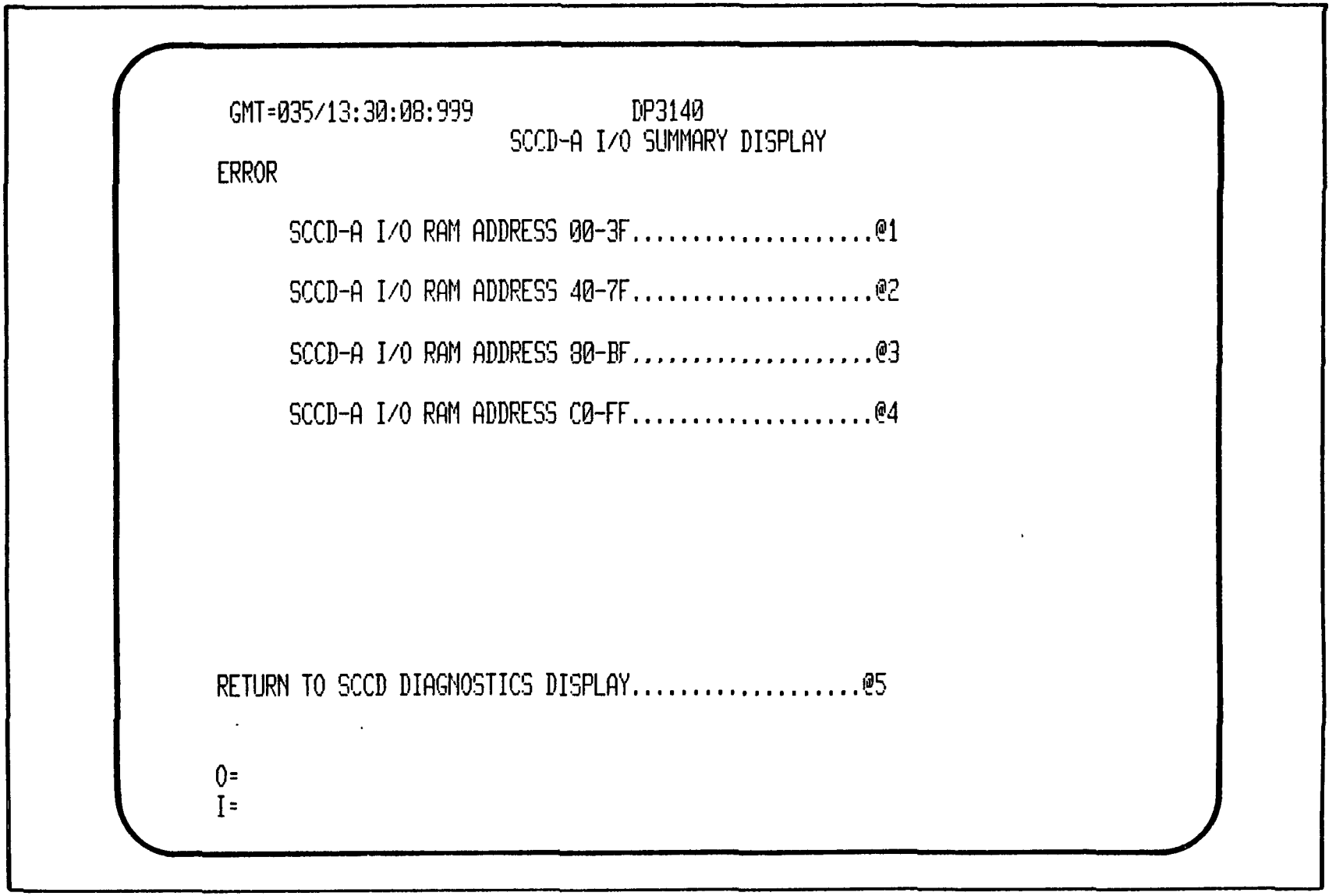

Figure 3.4-41. SCCD-A I/O Summary Display

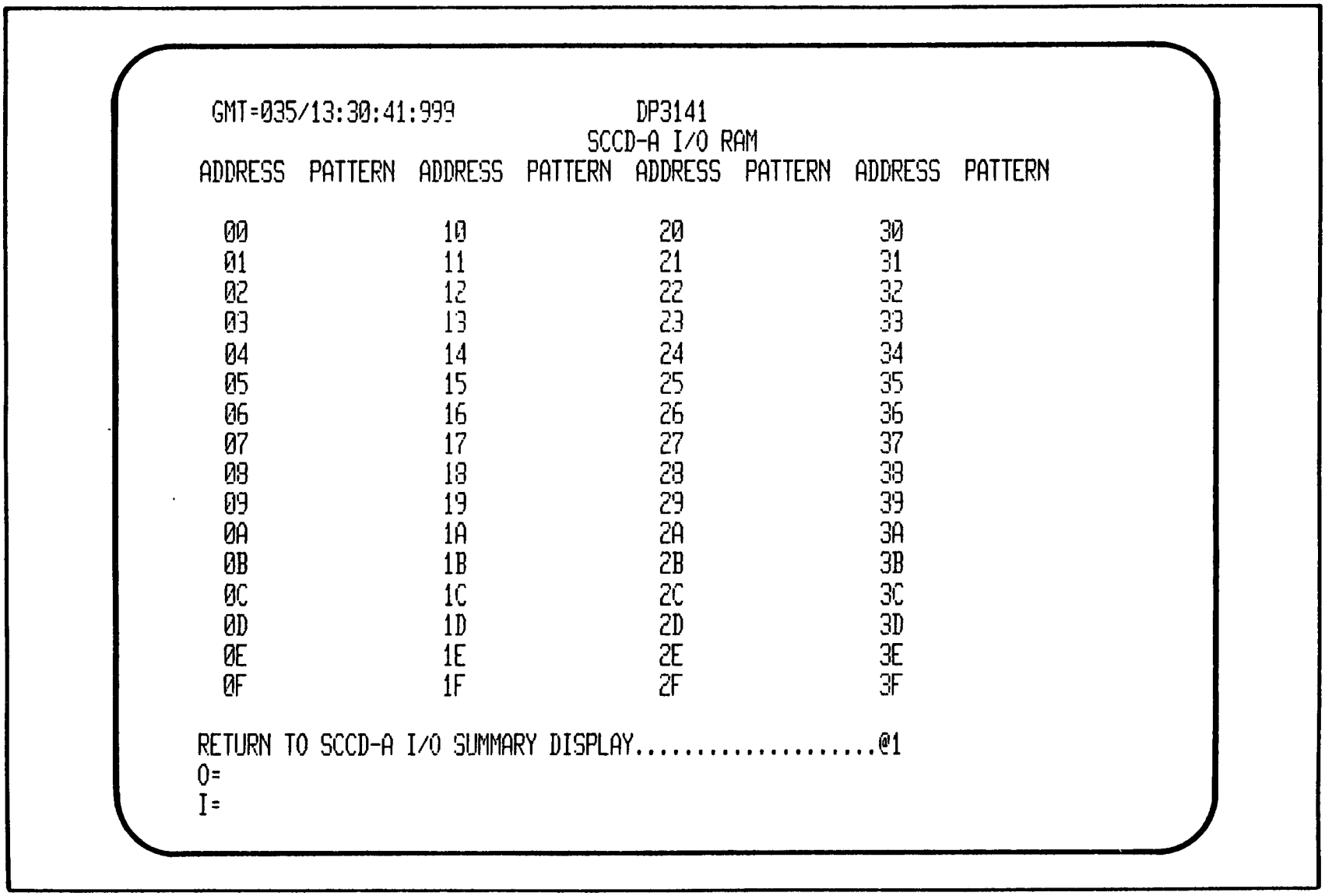

Figure 3.4-42. SCCD-A I/O RAM Address (00-3F)

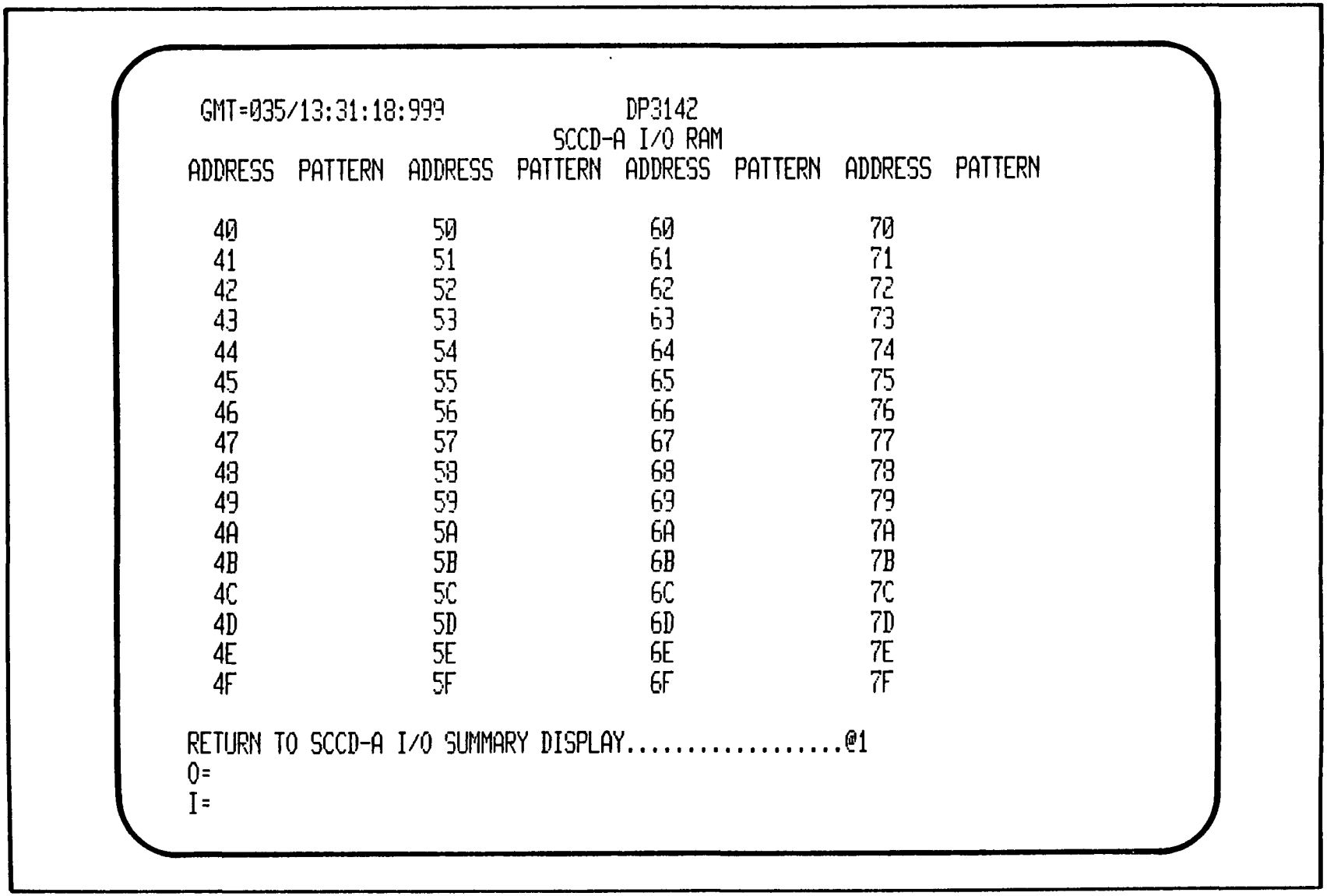

Figure 3.4-43. SCCD-A I/O RAM Address (40-7F)

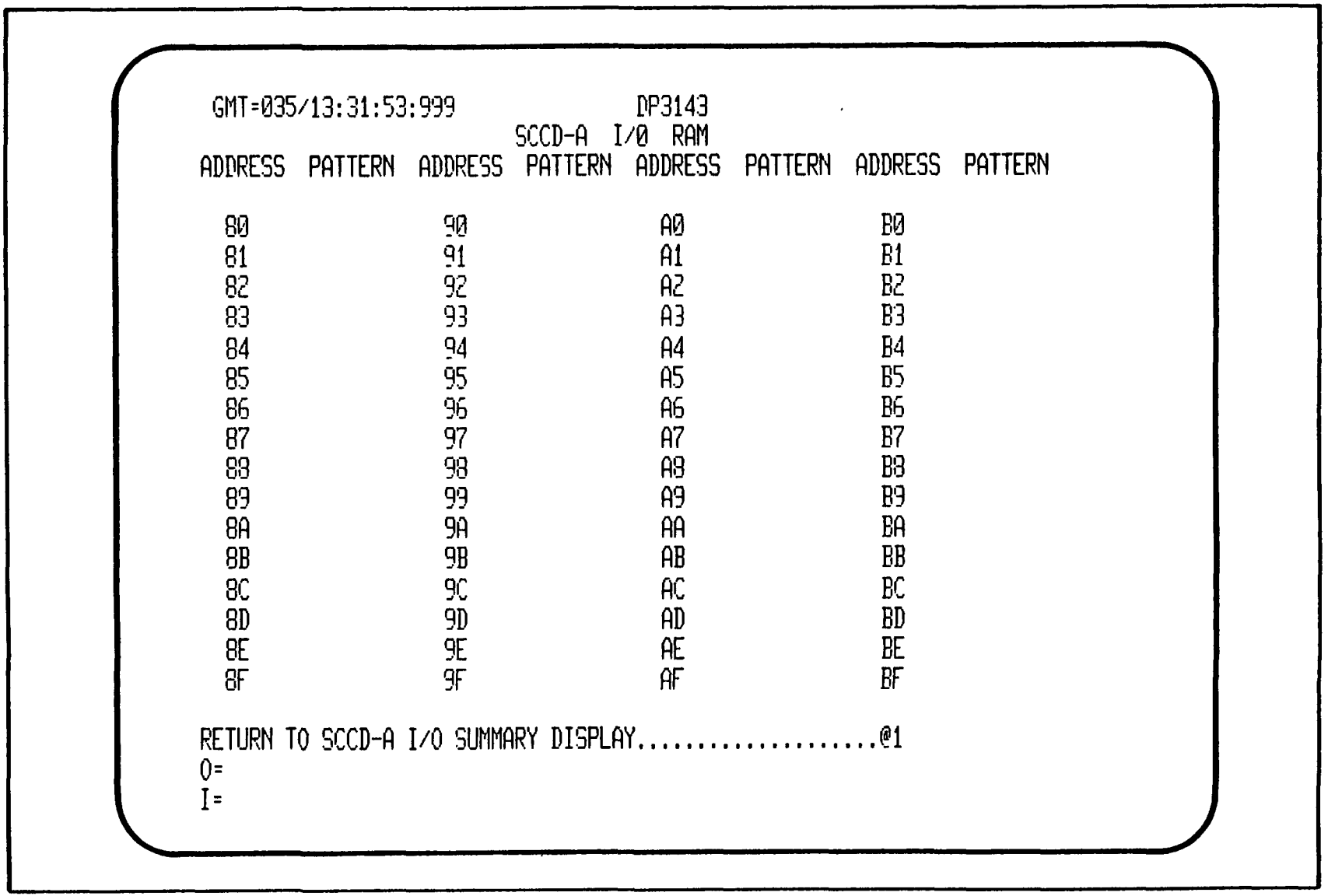

Figure 3.4-44. SCCD-A I/O RAM Address (80-8F)

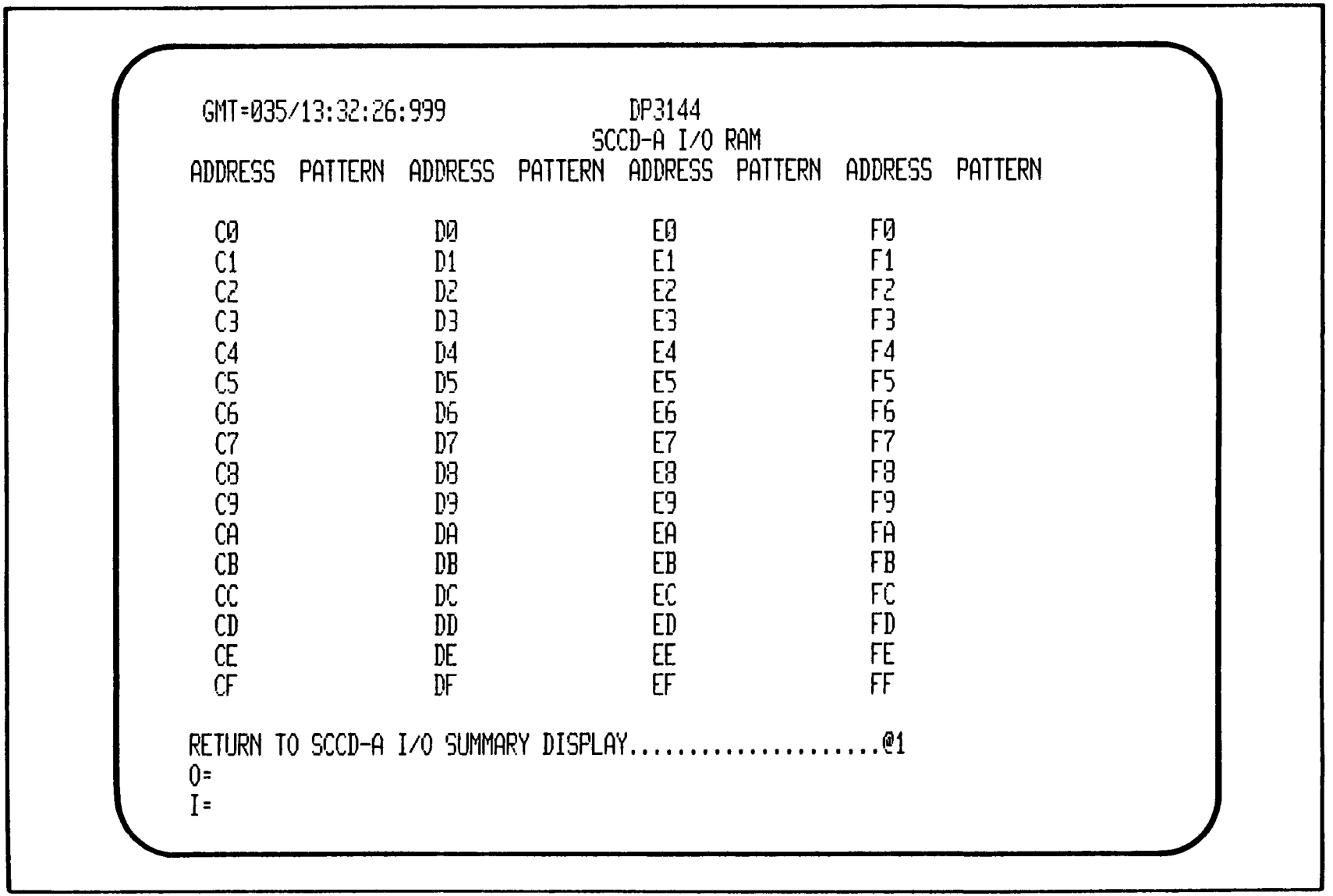

Figure 3.4-45. SCCD-A I/O RAM Address (C0-FF)

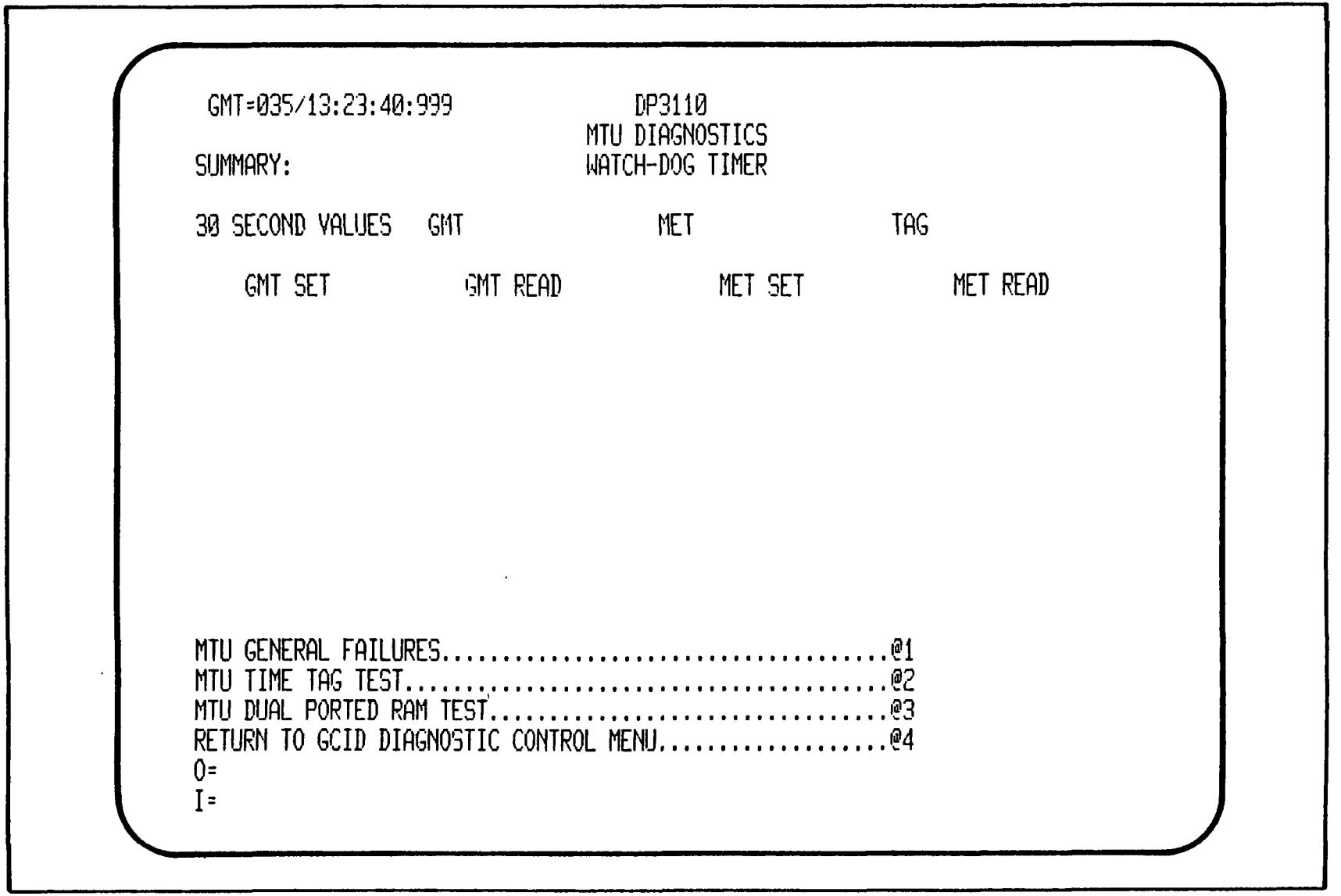

Figure 3.4-46. MTU Diagnostics Menu

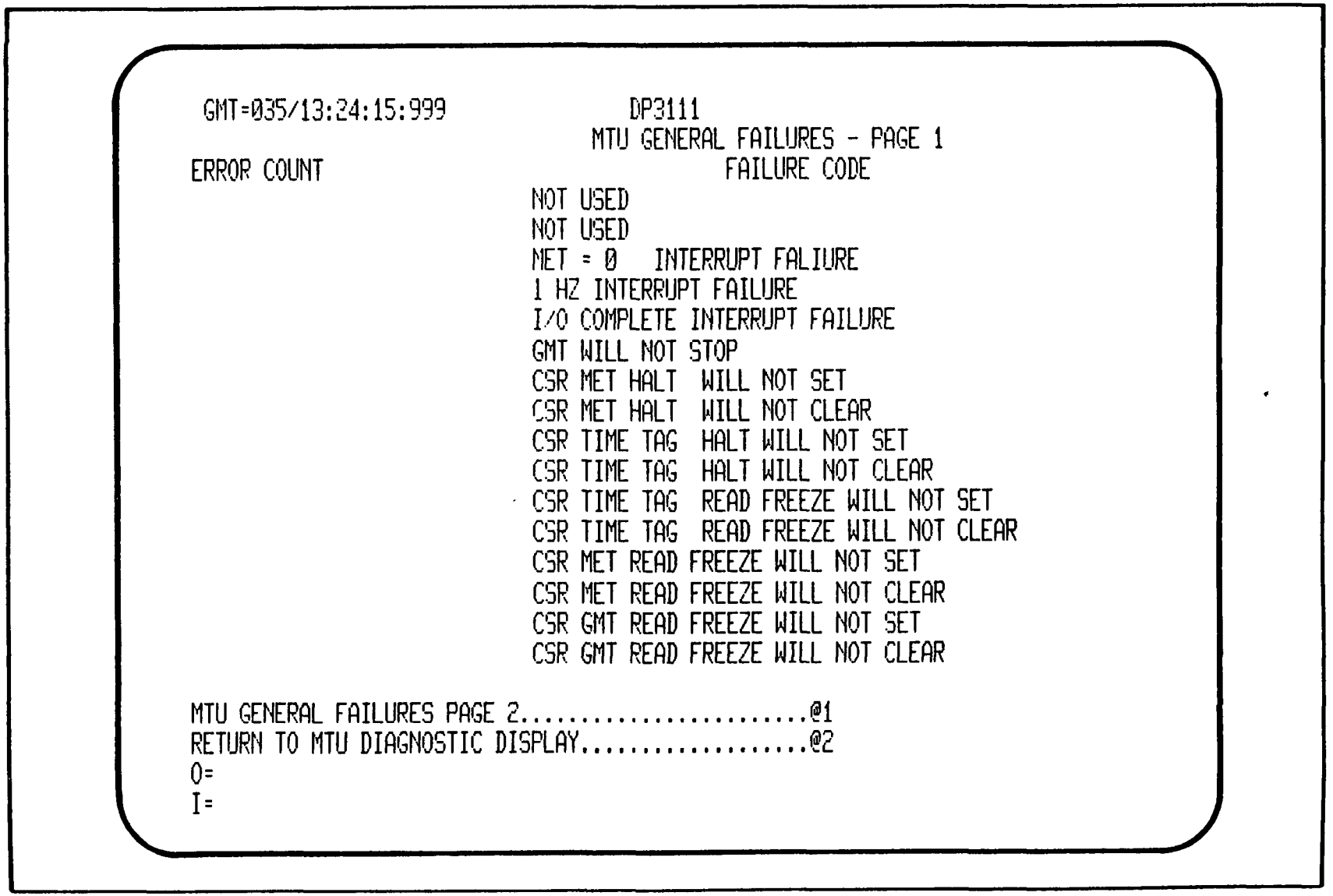

Figure 3.4-47. MTU General Failures Display (1 of 2)

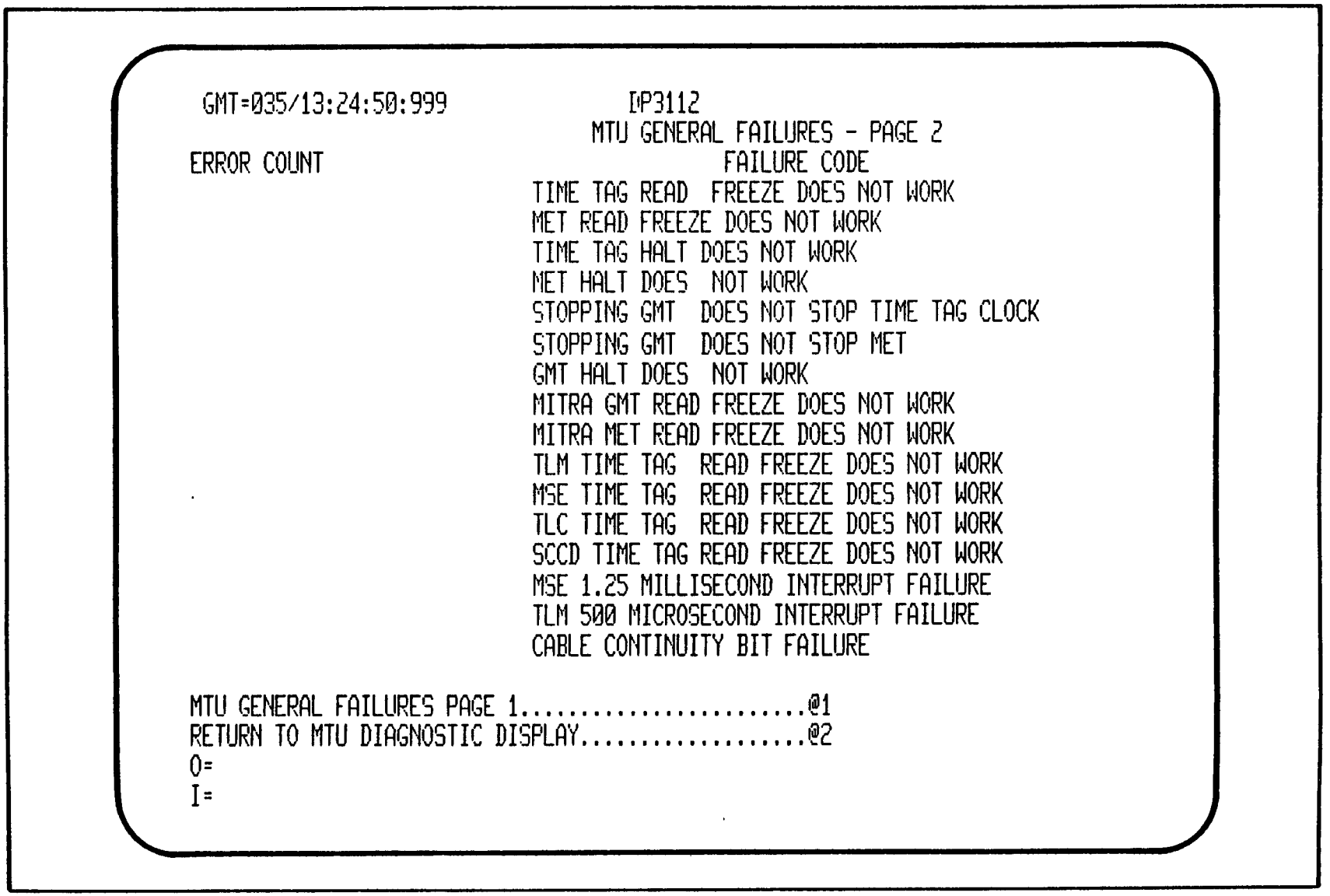

Figure 3.4-48. MTU General Failures Display (2 of 2)

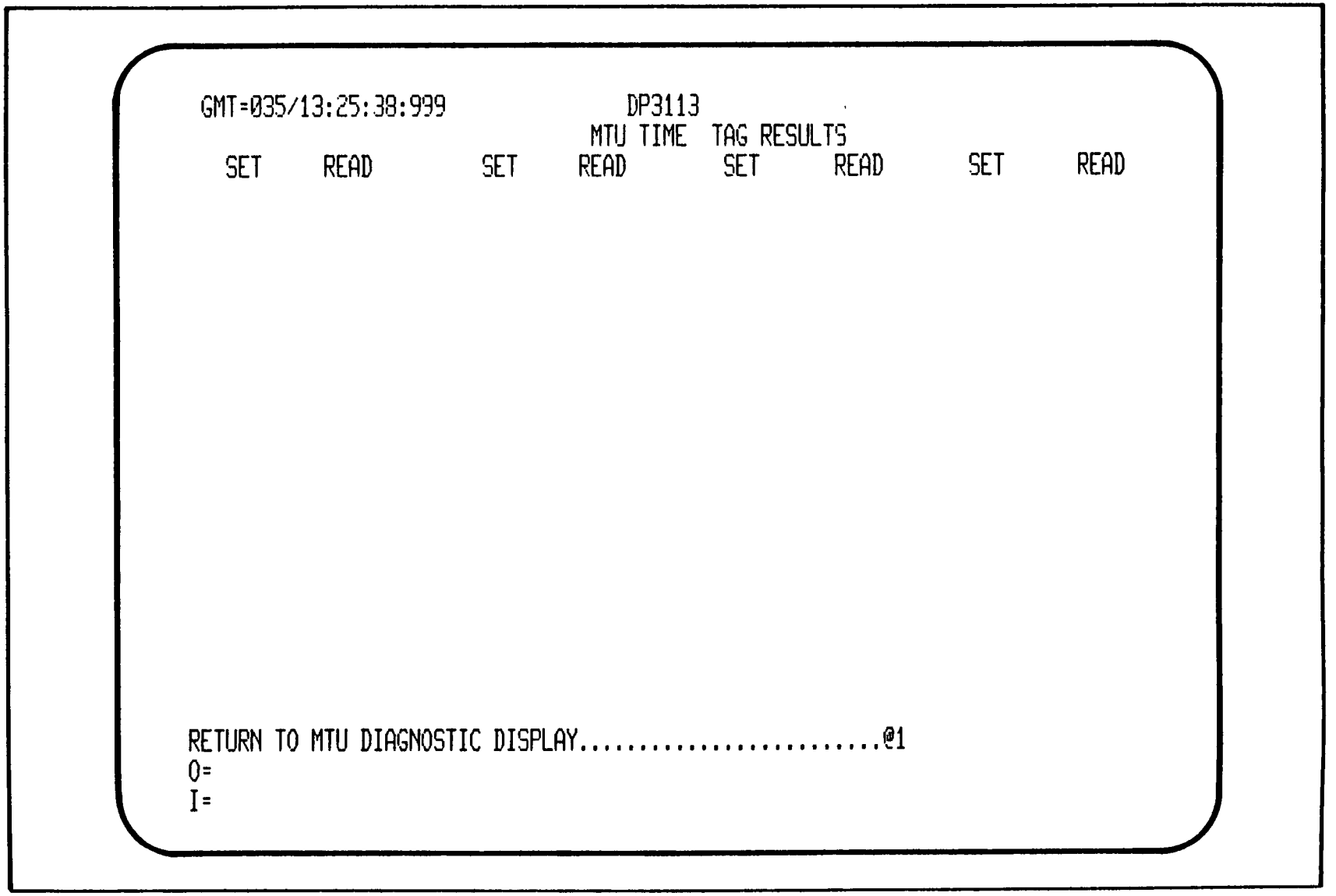

Figure 3.4-49. MTU Time Tag Results Display

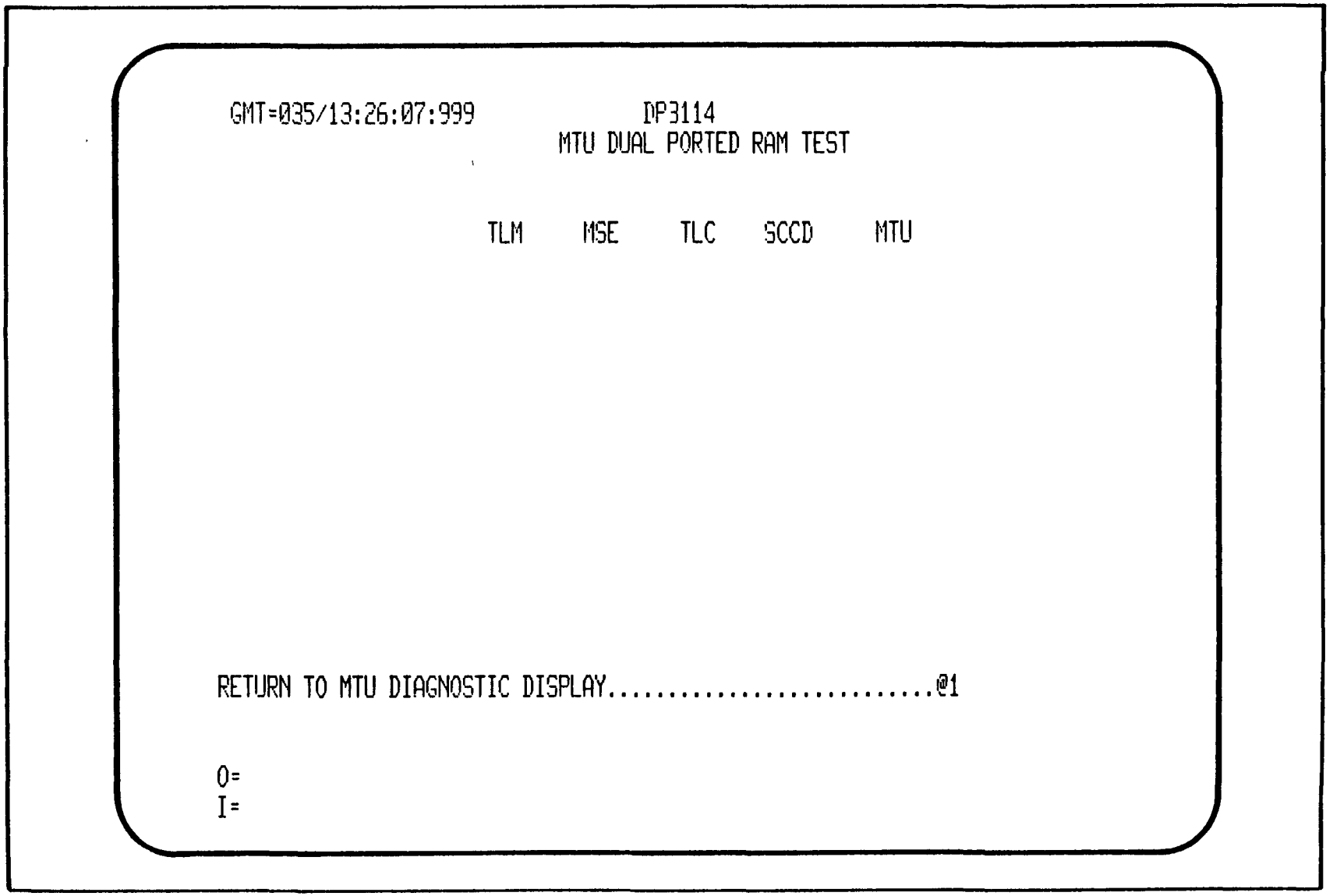

Figure 3.4-50. MTU Dual Ported RAM Display

3.4.3 Test Mode Output

The outputs of the TEST Mode programs are to document the tests for later analysis or reference and are conversational features for test control and viewing of results. The user has the option to make hardcopies of the display pages. No current effort is being made to log to tape.

3.4.4 TEST Mode Procedures

3.4.4.1 TEST Operations

All tests are operator initiated via menu inputs, and all results may be viewed on the display. A pass/fail summary shall be presented after each test, with more detailed results available through menu selections. Results may be hardcopied for later use. Where appropriate, tests may be repeated automatically by entering a repeat count.

3.4.4.1.1 TEST Mode Normal Completion

Each test (commanded set of tests) will update the current display upon completion as indicated in the display descriptions in Section 3.4.2. Since all functions are under operator control, only individual tests may be considered complete until the operator terminates the TEST mode.

3.4.4.1.2 TEST MODE Error Conditions

Several error messages may appear on the operator display when events occur that disallow operation of the test-in-progress. In general, the TEST mode will be run by diagnostic personnel, and they should resolve the problem. Some "lower-level" tests may be run to aid diagnosis of the problem.

3.4.4.2 TEST MODE Termination

The TEST MODE will be terminated by the operator selection of function key 7 from the GCID DIAGNOSTICS menu (see Figure 3.4-3). The GSMF MODE SELECTION display configuration menu shall then be displayed (see Figure 3.4-2).

3.4.5 VMEBus INTERFACE TEST Program

A test program was developed for the VMEBus INTERFACE TEST (VMEBI) device. This test ensures that the interface links between the GSMF Host computer and the GCID are working properly. Figure 3.4-51, DP#19, is the

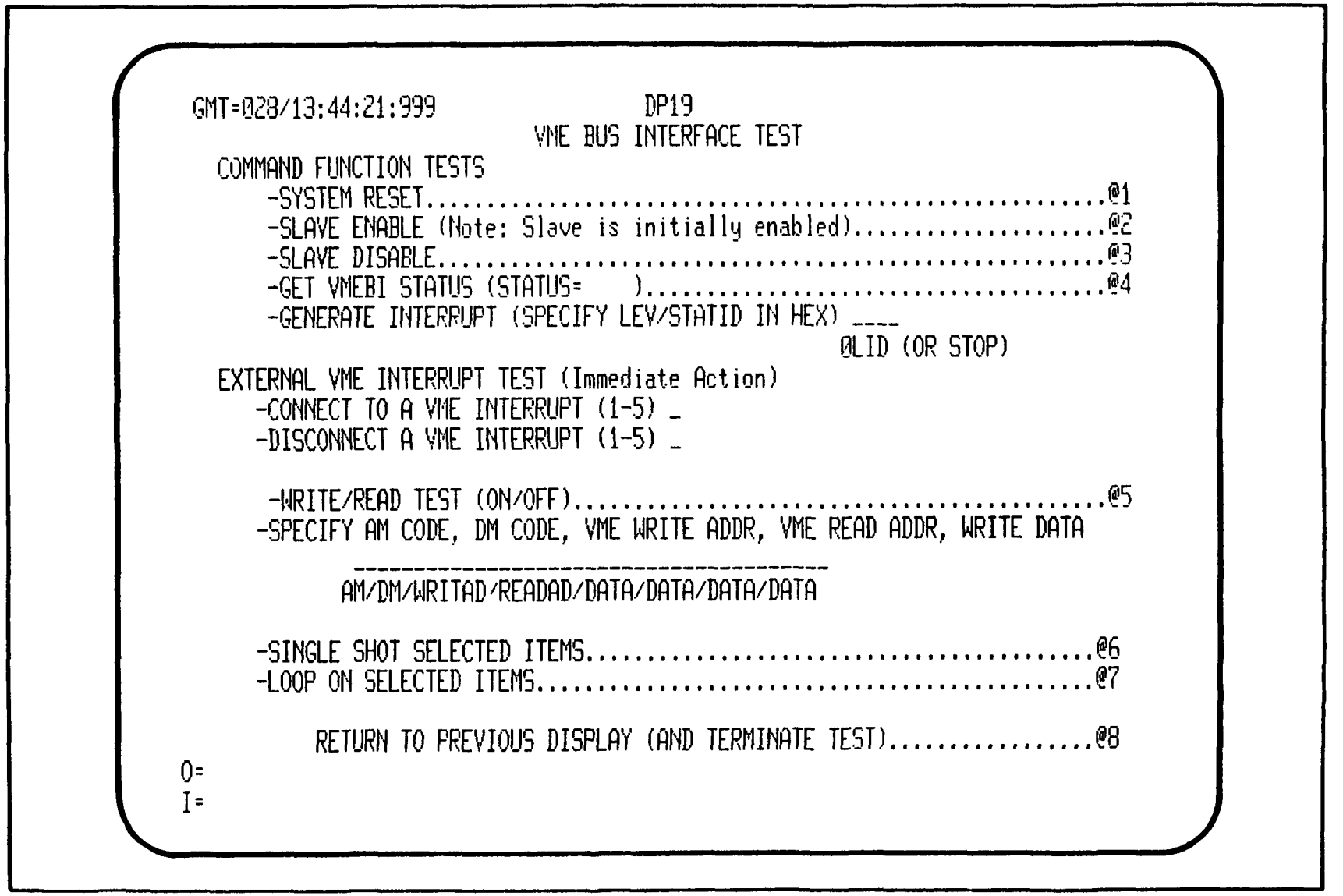

Figure 3.4-51. VME Bus Interface Test Menu

display that allows the user to run the series of tests. This program performs requested I/O to the VME Bus Interface in either single shot or loop mode. The functions performed include:

- System reset
- SLAVE enable
- SLAVE disable
- Get status
- Generate interrupt
- Select a default write/read sequence of 4, 16-bit half words to/from a fixed VME address or specify complete control information relating to the write/read sequence
- Connect and disconnect from any of the supported external VME interrupts.

The remaining sections under Section 3.4.5 will detail the actual VMEBI test operations.

3.4.5.1 VMEBI Test Program LOAD/EXECUTE

The VMEBI test program is loaded and started by display control from the user's console via an I-line entry as shown in Figure 3.4-52. This can be done from any screen, i.e., DP3000 is simply an example.

D 19 is the I-line command that will display the VMEBI Interface Test menu, DP19, Figure 3.4-51.

The following instructions detail the function key selection, operation, test operation, and user input instructions.

All command function tests are invoked by a two-step function key sequence.

1) Select the function command to test
   Response - Blinking 'ON' will appear opposite the selected command function test.

2) Select single shot (@6) or loop on (@7) selected items.
   Response - An 'ON' value will appear opposite the selected function.

To stop or cancel any selected command function test, reselect the test and the 'ON' value will disappear, indicating the test is turned off.

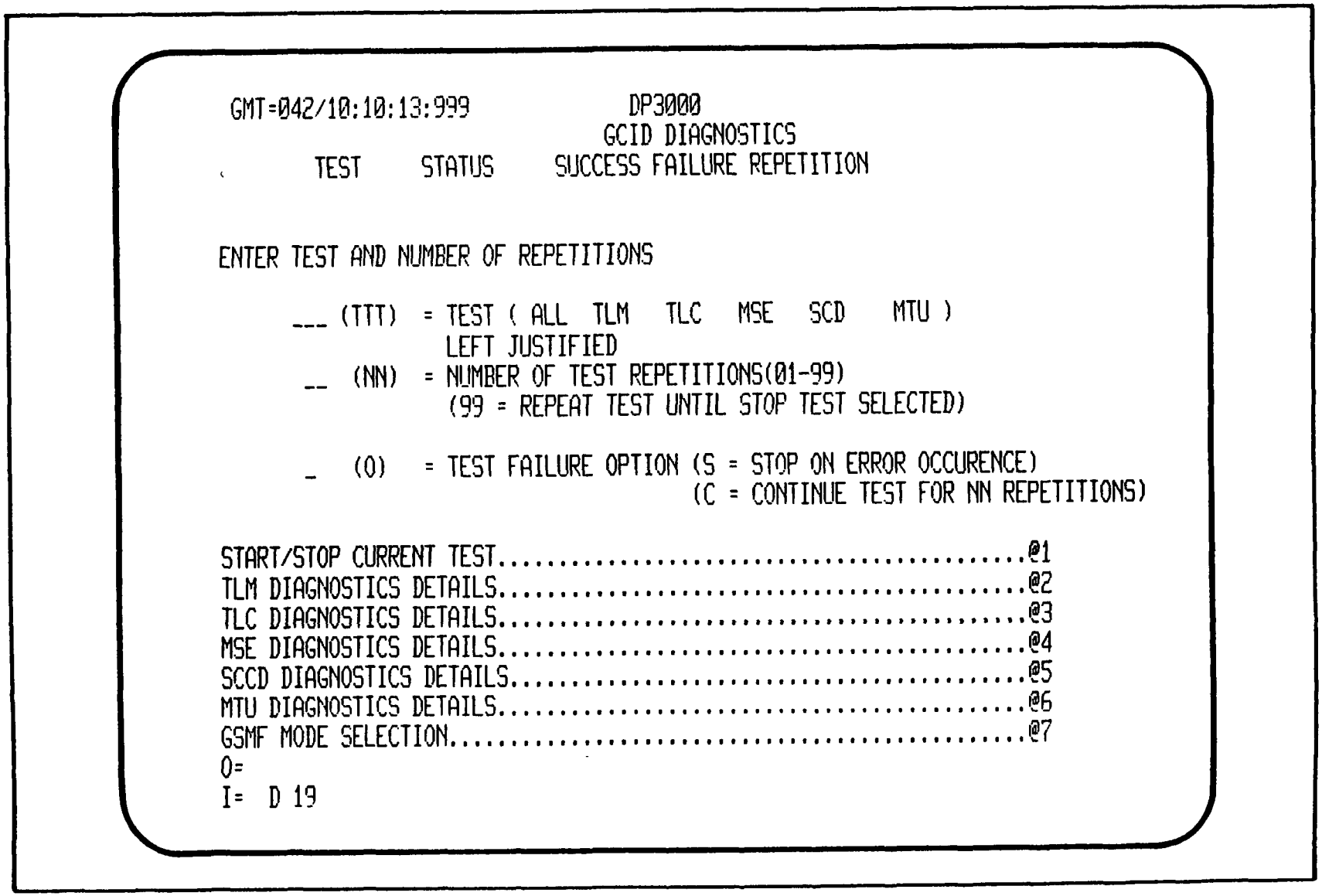

Figure 3.4-52. Example of VMEBI Test Program LOAD/EXECUTE

SYSTEM RESET

- SYSTEM RESET . . . . . @1

This function causes the VME Bus System Reset signal to be activated for at least one second. The System Reset command execution is indicated by the halt indicator light on each of the five GCID boards.

EXAMPLE

ON - SYSTEM RESET . . . . . @1

SINGLE SHOT SELECTED ITEMS . . . . . @6

SLAVE ENABLE

- SLAVE ENABLE (NOTE: Slave is initially enabled) . . . . . @2

TURN OFF SYSTEM RESET . . . . . @1

SINGLE SHOT SELECTED ITEMS . . . . . @6

This function causes the VMEBI slave to be enabled. The normal state of the VMEBI is for the slave to be enabled. Upon a power restored, the VMEBI driver will either enable or disable the slave in accordance with the state of the VMEBI at power failure.

EXAMPLE

ON - SLAVE ENABLE (NOTE: Slave is initially enabled) . . . . . @2

SLAVE DISABLE

- SLAVE DISABLE . . . . . @3

This function causes the VMEBI slave to be disabled. The normal state of the VMEBI is for the slave to be enabled. Upon a power restore, the VMEBI driver will either enable or disable the slave in accordance with the state of the VMEBI at power failure.

EXAMPLE

ON - SLAVE DISABLE . . . . . @3

GET STATUS

- GET VMEBI STATUS (STATUS=) . . . . . @4

This function causes the VMEBI driver to return the VMEBI device status of a GINT request. The returned status codes are defined as follows:

Status Code	Description
X'000'	Normal completion; no errors
X'00XX'	Status returned upon completion of GET STATUS command function; 'XX' is the VMEBI device status
X'82XX'	unrecoverable error; "XX' is the VMEBI device status
X'8481'	Halt I/O
X'8482'	Timeout
X'8483	Power fail
X'C000'	Illegal function code
X'C100'	illegal AM code
X'C200'	illegal DM code
X'C200'	Illegal DM code
X'C300'	Buffer error; Buffer end address not aligned properly for data mode
X'C400'	Illegal VME Bus interrupt level
X'C500'	VME interrupt pending
X'A000'	Device unavailable
X'A0XX'	Device unavailable; bad device status 'XX' is the VMEBI device status
X'A100'	VME Bus interrupt handler lockout

GENERATE INTERRUPT

- GENERATE INTERRUPT (SPECIFY LEV/STATID IN HEX) LID (OR STOP)

This function causes the VMEBI to generate a VME Bus interrupt on the level specified in the Lev Field. The interrupt level codes are defined as follows:

1 - TLM
2 - MSE
3 - TLC
4 - SCCD
5 - MTU

The status ID is read by the VMEBI interrupt handler to identify the interrupt mode. The status ID codes are defined as follows:

STATUS/ID (HEX)

41 STOP
42 ENTER LOAD MODE (PREPARE TO ACCEPT LOAD BLOCK)
43 ACCEPT RECORD (GET RECORD FROM GLOBAL RAM)
44 START (JUMP TO START LOCATION)
45 PAUSE (SAVE INTERRUPT RETURN AND WAIT FOR CONTINUE)
46 CONTINUE
47 RUN STAND-ALONE DIAGNOSTICS
48 INITIALIZE INTEGRATED DIAGNOSTICS
49 RUN INTEGRATED DIAGNOSTICS

NOTE: The interrupt level specified must be connected to the VMEBI (see VME interrupt test procedure in this document).

EXAMPLES

- GENERATE INTERRUPT (SPECIFY LEV/STATID IN HEX) 0147
LID (OR STOP)

- GENERATE INTERRUPT (SPECIFY LEV/STATID IN HEX) STOP
LID (OR STOP)

EXTERNAL VME INTERRUPT TEST (Immediate Action)

- CONNECT TO A VME INTERRUPT (1-5)___
- DISCONNECT A VME INTERRUPT (1-5)___

This function causes the VMEBI driver to connect and disconnect from any of the five supported external VME interrupts. The connect/disconnect VME interrupt values are as follows:

1 - TLM
2 - MSE
3 - TLC
4 - SCCD
5 - MTU

Entry of the VME interrupt value listed above causes immediate connect/disconnect execution and no further function operations are necessary.

EXAMPLE

- CONNECT TO A VME INTERRUPT (1-5) 1
- DISCONNECT A VME INTERRUPT (1-5) 1

WRITE/READ

- WRITE/READ TEST (ON/OFF) . . . . . @5
- SPECIFY AM CODE, DM CODE, VME WRITE ADDR, VME READ ADDR, WRITE DATA

AM/DM/WRITAD/READAD/DATA/DATA/DATA/DATA

This function causes the VMEBI driver to write/read of 4, 16-bit words to/from a fixed VME address. The write/read capabilities of the VEMBI driver is invoked through execution of a supervisor call (SVC) instruction. The SVC parameter block is a data structure that is six fullword fields. The execution of a write/read requires three field external entries in the SVC parameter block. The required external field entries are defined as follows:

AM/EXT - This field specifies the address modifier (AM) code associated with the data transfer. Valid AM codes are defined as follows:

AM Code	Description
X'3F'	Standard Supervisory Ascending Access
X'3E'	Standard Supervisory Program Access
X'3D'	Standard Supervisory Data Access
X'3B'	Standard Non-Privileged Ascending Access
X'3A'	Standard Non-Privileged Program Access
X'39'	Standard Non-Privileged Data Access
X'2D'	Short Supervisory I/O Access
X'0F'	Extended Supervisory Ascending Access
X'0E'	Extended Supervisory Program Access
X'0D'	Extended Supervisory Data Access
X'0B'	Extended Non-Privileged Ascending Access
X'0A'	Extended Non-Privileged Program Access
X'09'	Extended Non-Privileged Data Access

DM - This field is used only for data transfer requests and specifies the data mode associated with the data transfer. Valid DM codes are defined as follows:

DM Code	Description
X'04'	Byte Mode
X'08'	Halfword Mode
X'0C'	Fullword Mode

VME ADDRESS - This field is used only for data transfer requests and specifies the VME write/read addresses. Valid GCID VME addresses are listed below:

602000 - 603FFF
606000 - 607FFF
60A000 - 60BFFF
60E000 - 60FFFF
612000 - 613FFF

EXAMPLE

- WRITE/READ TEST (ON/OFF) . . . . . @5

- SPECIFY AM CODE, DM CODE, VME WRITE ADDR, VME READ ADDR, WRITE DATA
  3D/08/602000/602000/11111/2222/3333/111
  AM/DM/WRITAD/READAD/DATA/DATA/DATA/DATA

  After all required specified entries have been made, execution is performed by selection of the (@5) function key.

  Response - Blinking 'ON' value will appear opposite the write/read test, indicating the test is active.

- SINGLE SHOT SELECTION ITEMS . . . . . @6

  This function causes the VMEBI driver to execute the selected item on time.

- LOOP ON SELECTED ITEMS . . . . . @7

  This function causes the VMEBI driver to execute the selected item in a continuous loop.

- RETURN TO PREVIOUS DISPLAY (AND TERMINATE TEST) . . . . . @8

  This function causes the VMEORT test program to be cancelled (indicated by a CA VMEORT TSK at system console) and the previous display is presented at the user's console.

3.4.5.2 VMEBI Test Program Output Data

All VMEBI test program outputs are assigned to the P-E Printer. To reassign the output to a CRT console, the following entries should be performed from the System Console:

- T VMEORT
- PA
- CLO 7
- .MTM REM CRT2:
- ASS 7, CRT2:
- CONT

3.4.6 Performance Analysis Monitor

The performance analysis monitor program was developed as a utility to provide a constant monitor of the GSMF simulation during execution. It allows the user the opportunity to follow the real-time execution of the simulation.

Figure 3.4-53 is the representation of the actual monitor display. The screen display is straightforward in that the following areas of the simulation are displayed:

- Compool allocation
- Interrupt queue
- Fetch pointer position
- SDF mode
- GCID status
- Times - GMT/MET.

The monitor program screen is normally displayed on Terminal A16 within the GSMF hardware configuration. From the system console, the user will enter the following commands to execute the program:

- L MONCOMP/103
- AS 5, TCR5:
- AS 6, TCW5:
- ST

There will be no other user interface with the monitor display. Until "ANY FUNCTION KEY IS DEPRESSED" is exercised the display will remain on Terminal A16.

3.4.7 Validation Test Software

The validation software used in the GSMF configuration will verify that all I/O links (SECCD,MSE,TLC,TLM,TLC) are operative. This is accomplished by executing on the MITRA the "Validation Software". The operator will be prompted by the "Validation Software" (VDU) to execute various programs call "test sequences" which will exercise the various I/O links mentioned previously. The following paragraphs will illustrate the VDU displays used and their respective user requests.

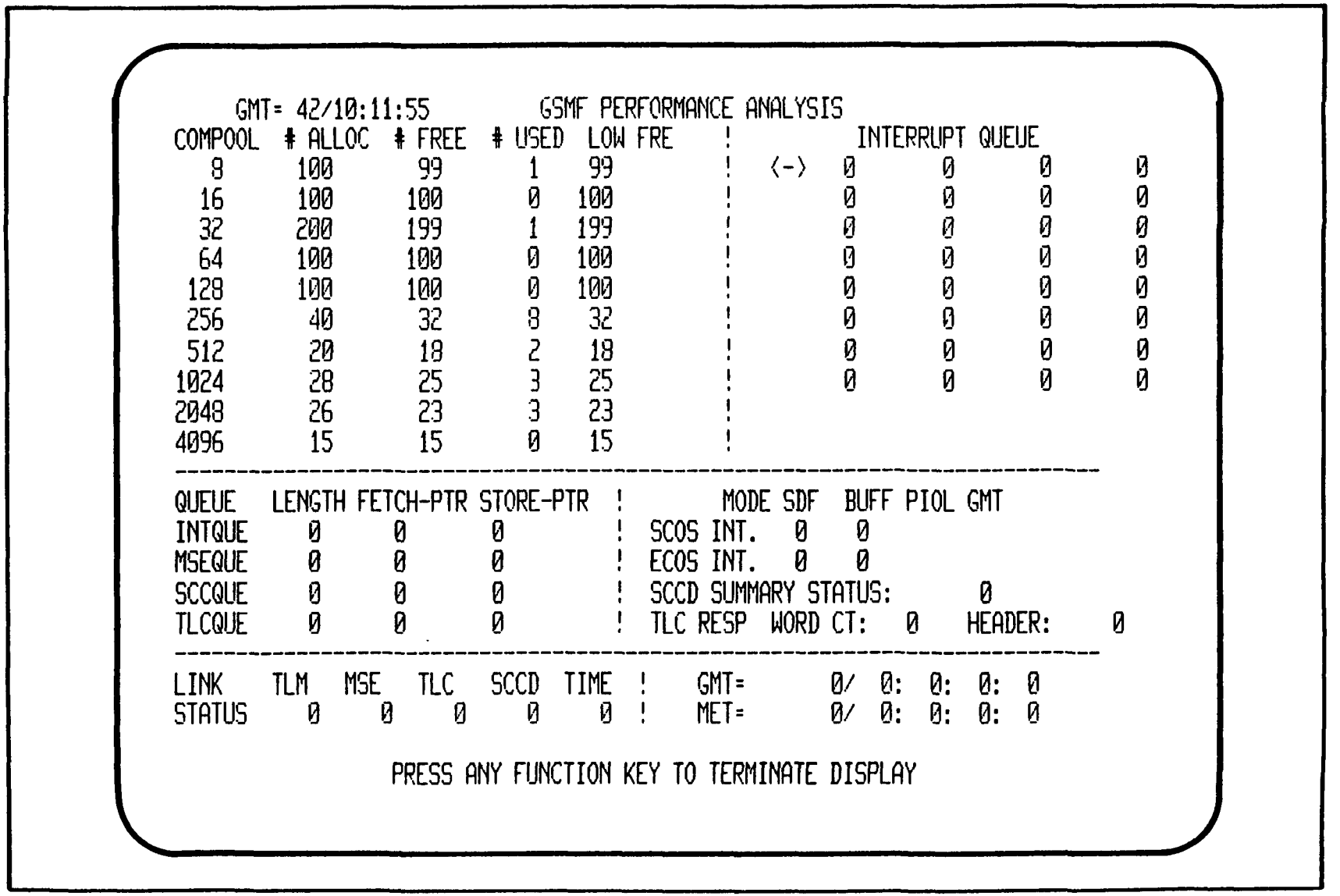

Figure 3.4-53. Performance Analysis Monitor Display

3.4.7.1 Validation Menu

The display illustrated in Figure 3.4-54 allows the user to select any one of five (5) "test sequences" (SCWT,MSET,TLCT,TIMT,TIMS) to be executed.

3.4.7.1.1 SCW1 Test Sequence

The displays illustrated in Figures 3.4-55 thru 3.4-58 prompts the user in the execution of the 'TEST SEQUENCE" to verify that the SCCD link is operative.

3.4.7.1.2 MSE1 Test Sequence

The display illustrated in Figures 3.4-59 and 3.4-60 prompts the user in the execution of the "TEST SEQUENCE" to verify that the MSE/TLM link is operative.

3.4.7.1.3 TLCT Test Sequence

The displays illustrated in Figures 3.4-61 and 3.4-62 prompts the user in the execution of the "TEST SEQUENCE" to verify that the TLC link is operative.

3.4.7.1.4 TIMT Test Sequence

The displays illustrated in Figures 3.4-63 and 3.4-64 prompts the user in the execution of the 'TEST SEQUENCE" to verify that the GMT link is operative.

3.4.7.1.5 TIMS Test Sequence

The displays illustrated in Figures 3.4-65 and 3.4-66 prompts the user in the execution of the 'TEST SEQUENCE" to verify that the MET link is operative.

3.4.7.2 Validation Software Setup

The procedure to install and powerup the GSMF configuration to execute the "Validation Software" is explained in Appendix H. Appendix H in addition to executing the validation software, lists the sequences for executing ITTS/GCOS/GOAL programs.

3.5 POST-PROCESSING

After the simulation has terminated, the user has the option to "DUMP" all or part of the simulation activities to the printer. To do this, the user must have logged operational data to tape during the simulation (see Figure 3.3-15, function key 2, DATA LOGGING OPTIONS).

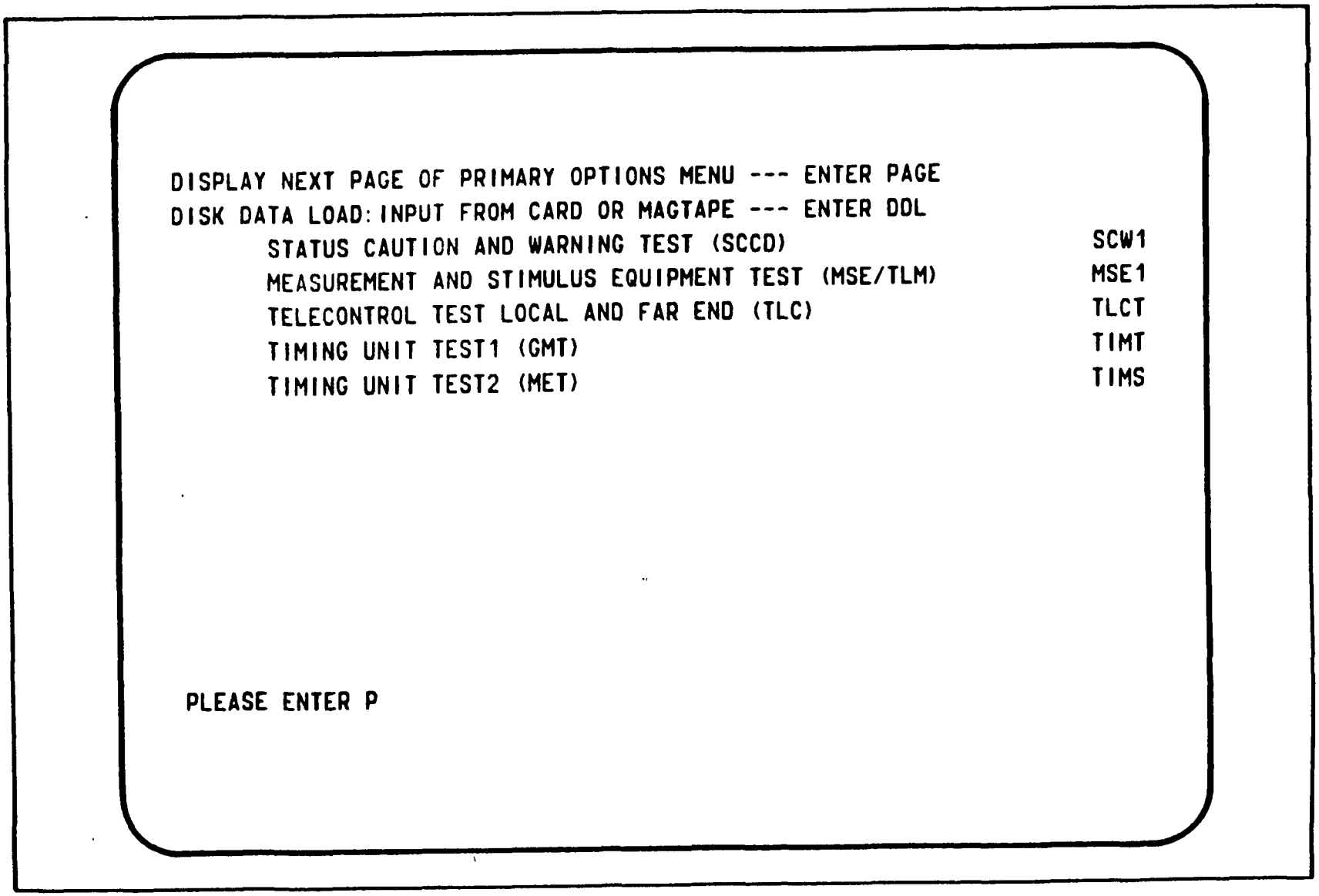

Figure 3.4-54. Validation Test Menu

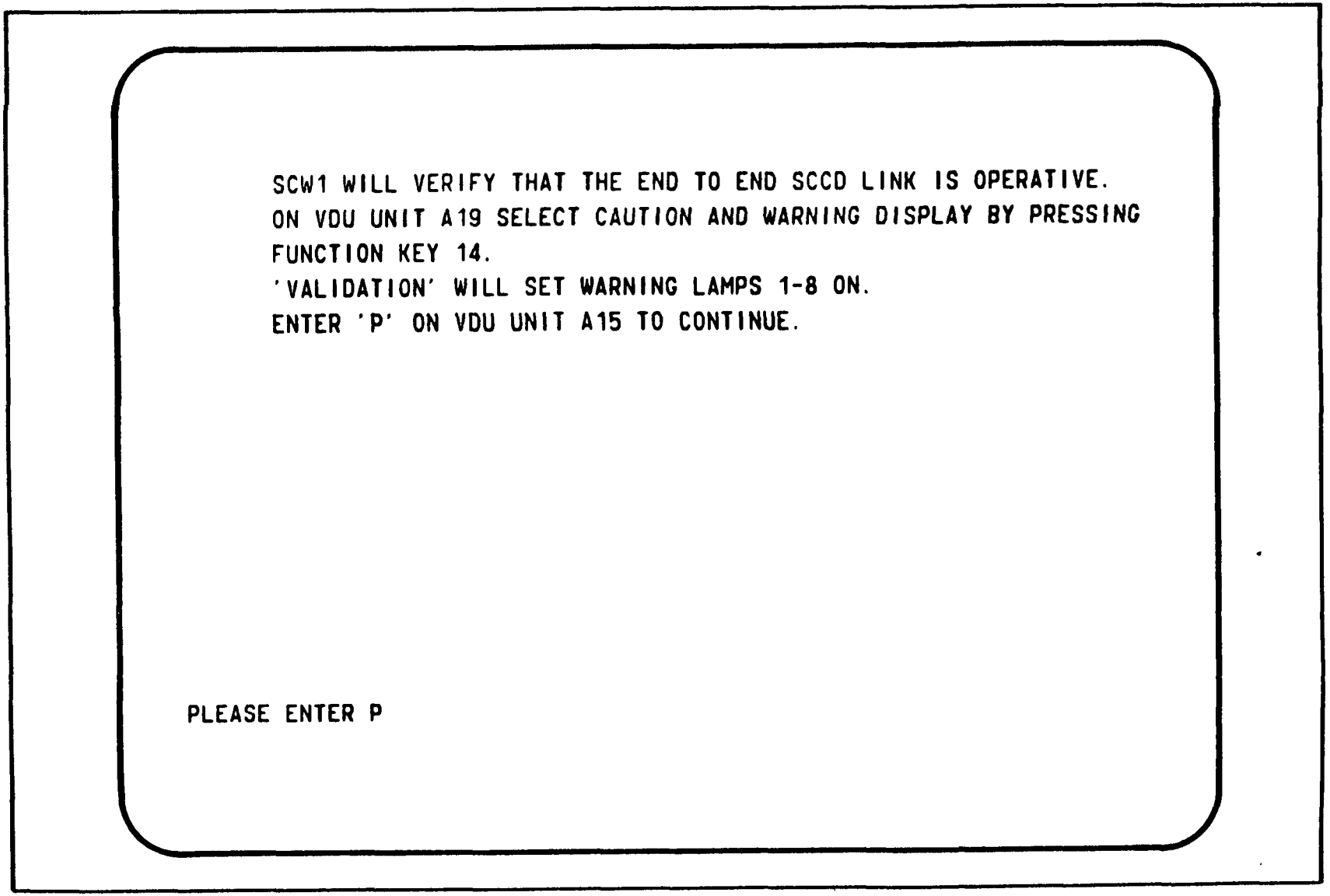

Figure 3.4-55. SCCD Validation Sequence Display (1 of 4)

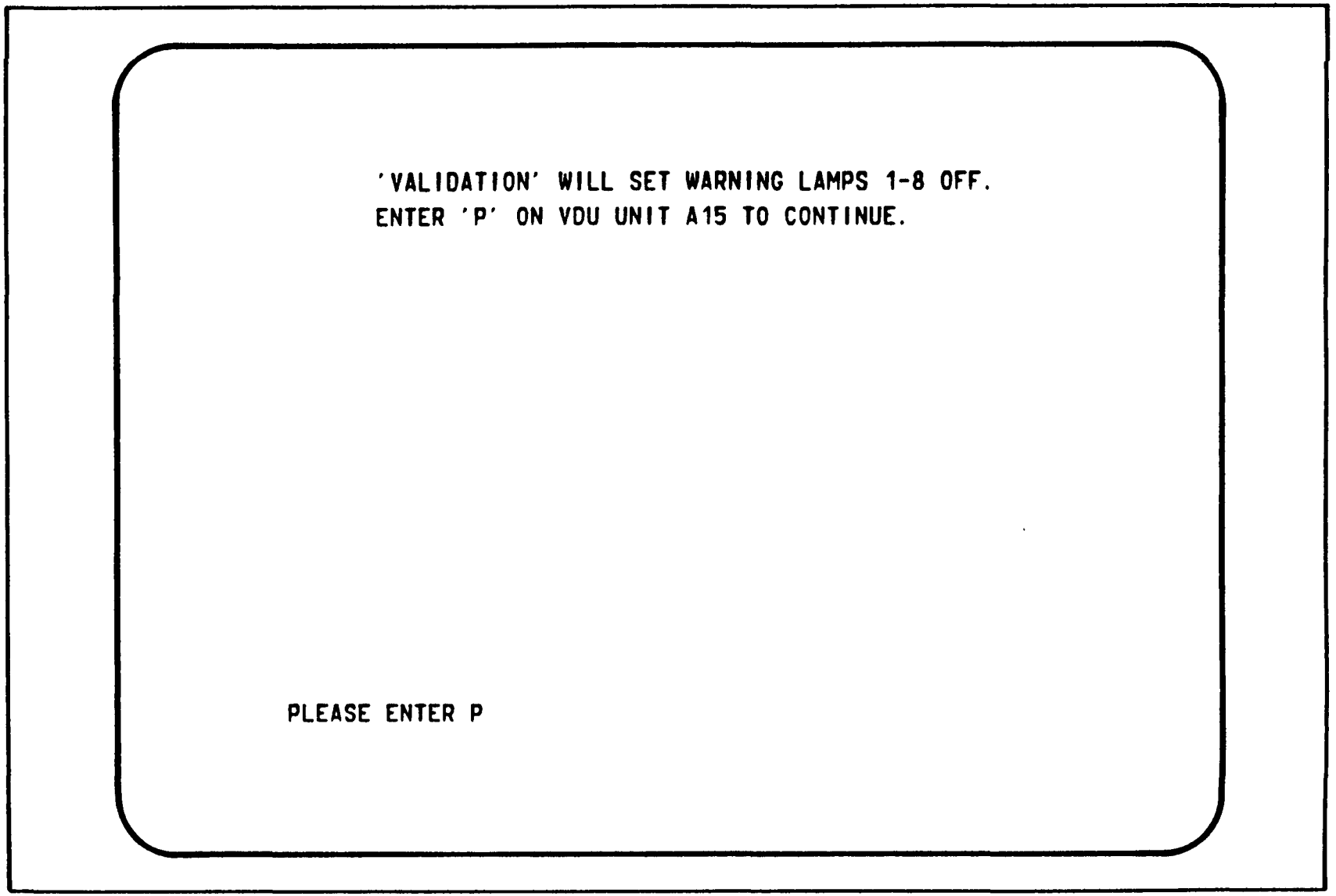

Figure 3.4-56. SCCD Validation Sequence Display (2 of 4)

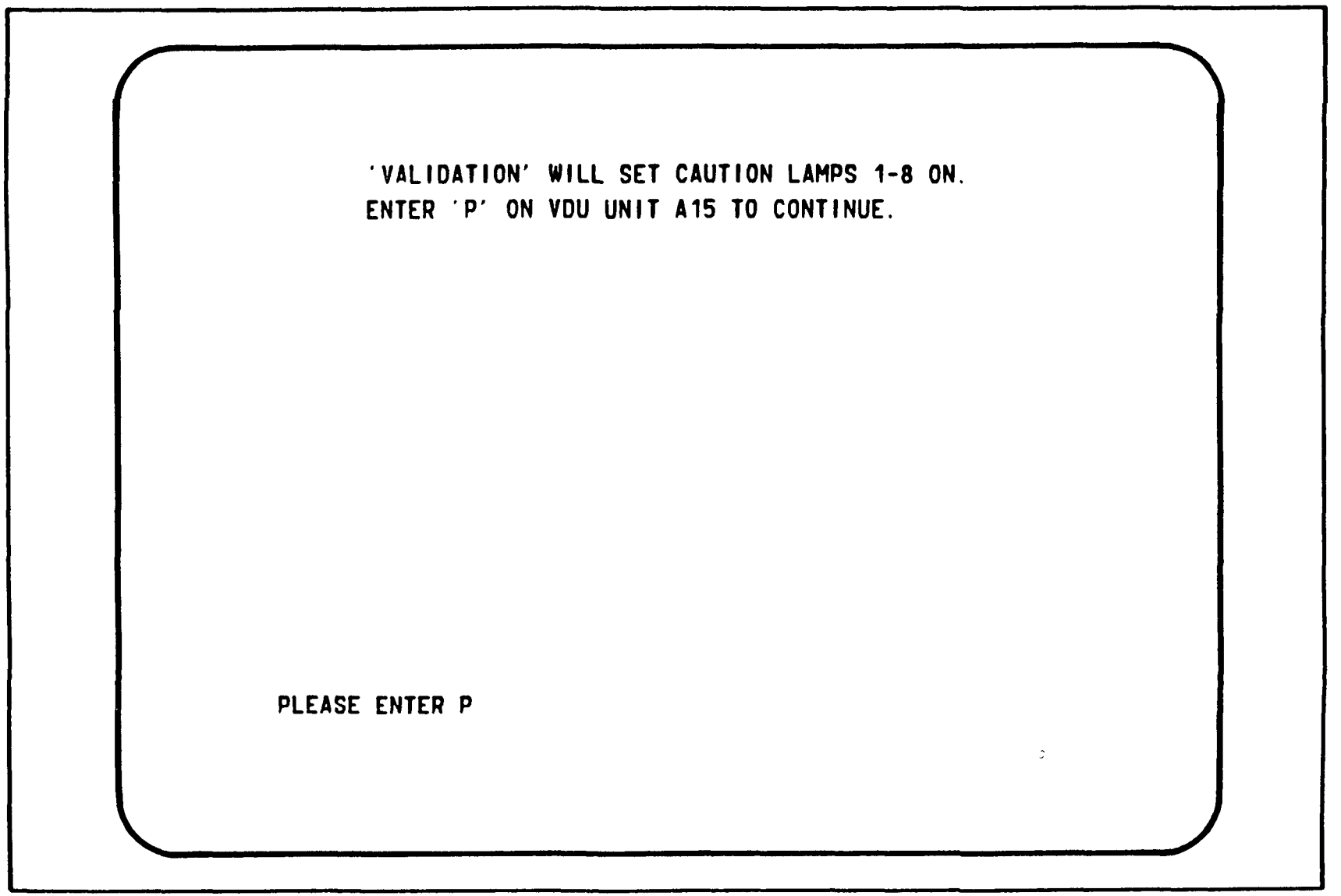

Figure 3.4-57. SCCD Validation Sequence Display (3 of 4)

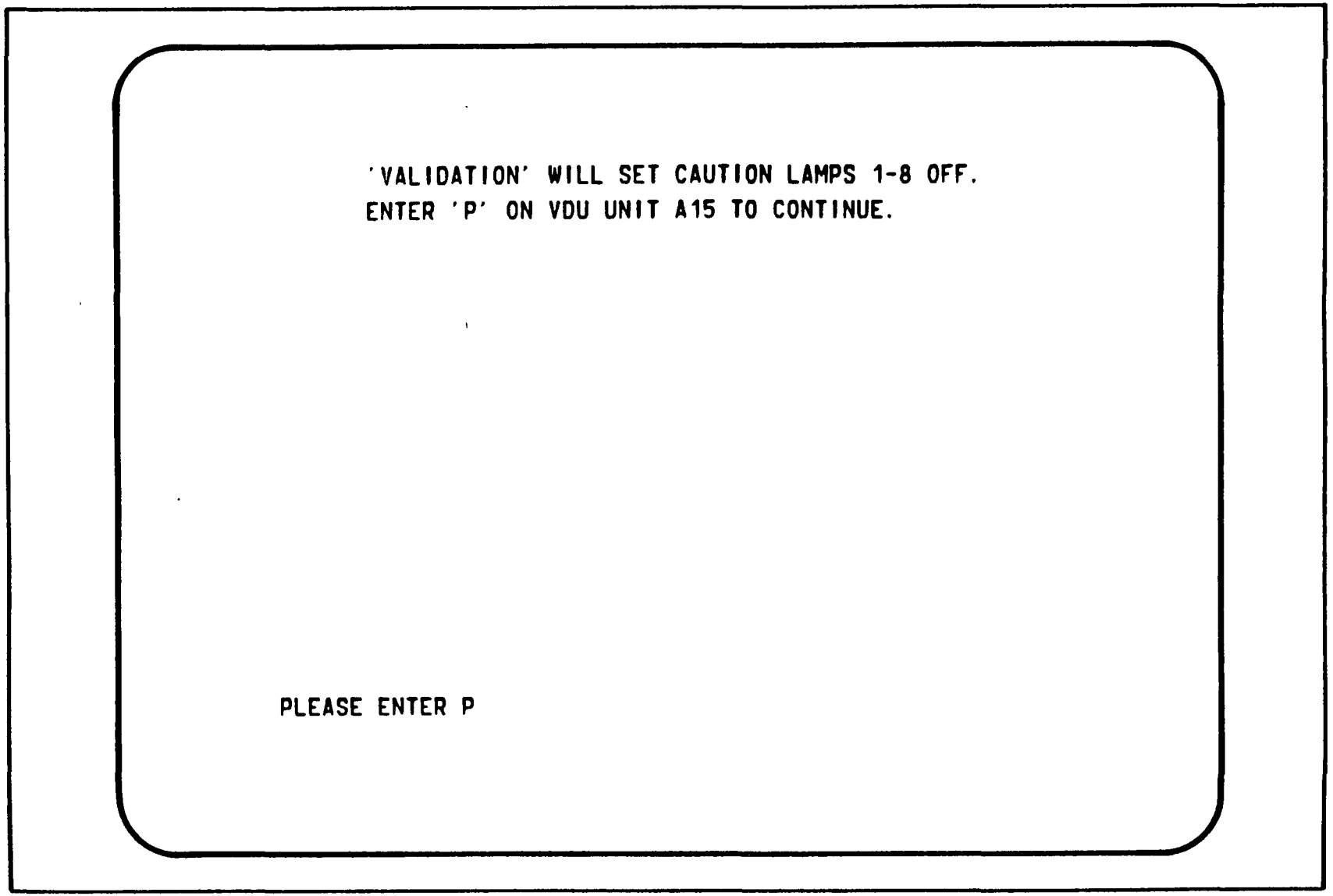

Figure 3.4-58. SCCD Validation Sequence Display (4 of 4)

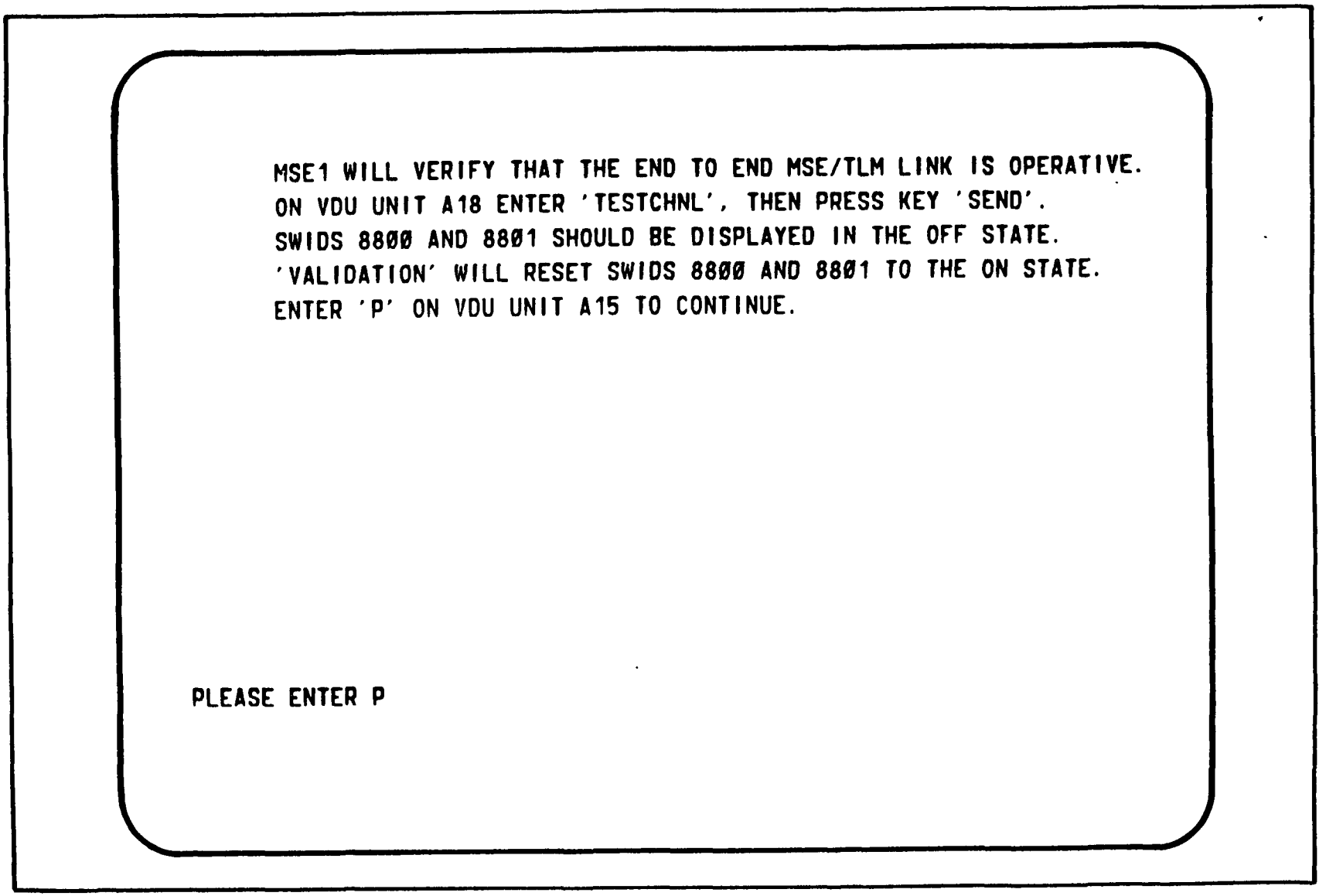

Figure 3.4-59. MSE/TLM Validation Sequence Display (1 of 2)

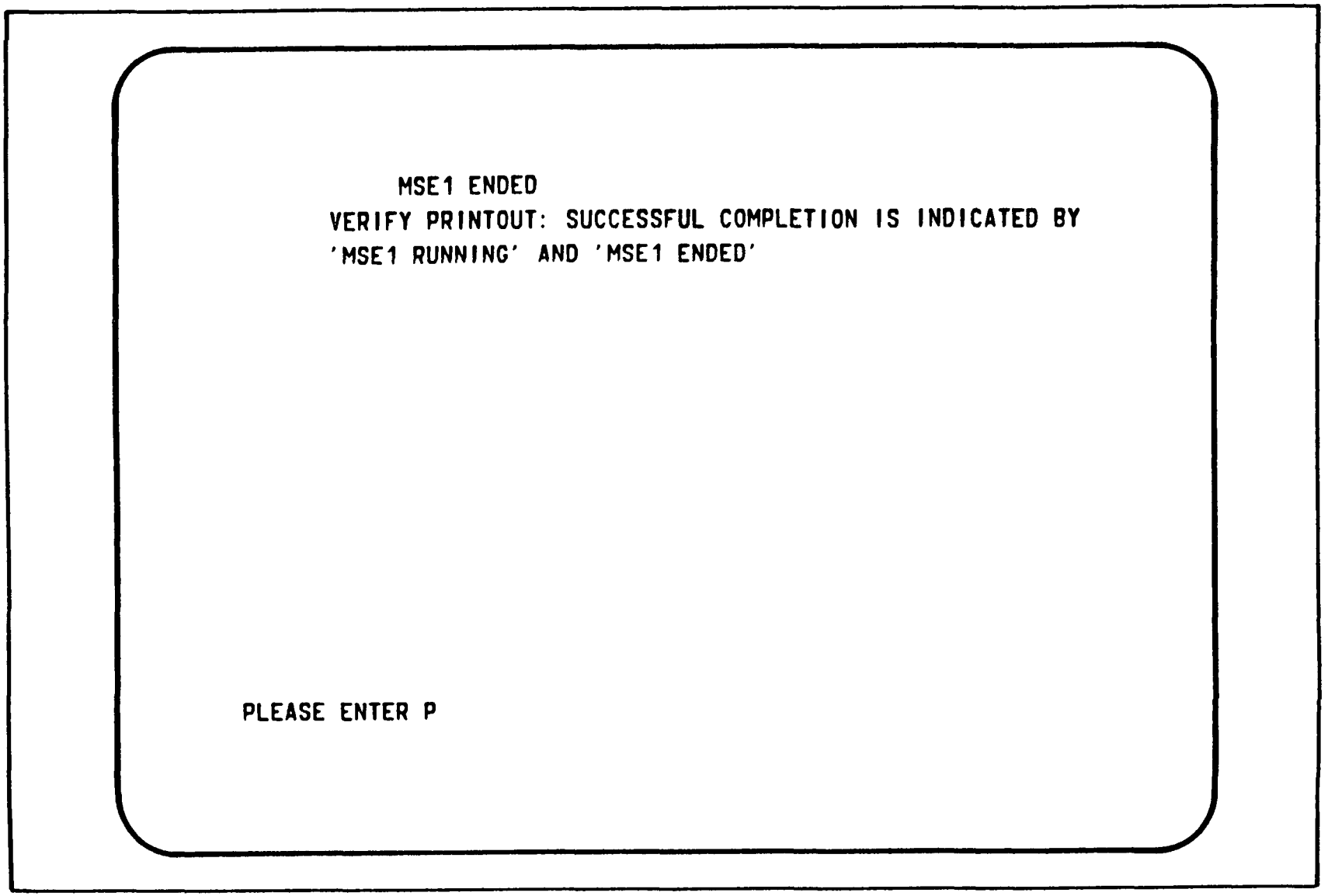

Figure 3.4-60. MSE/TLM Validation Sequence Display (2 of 2)

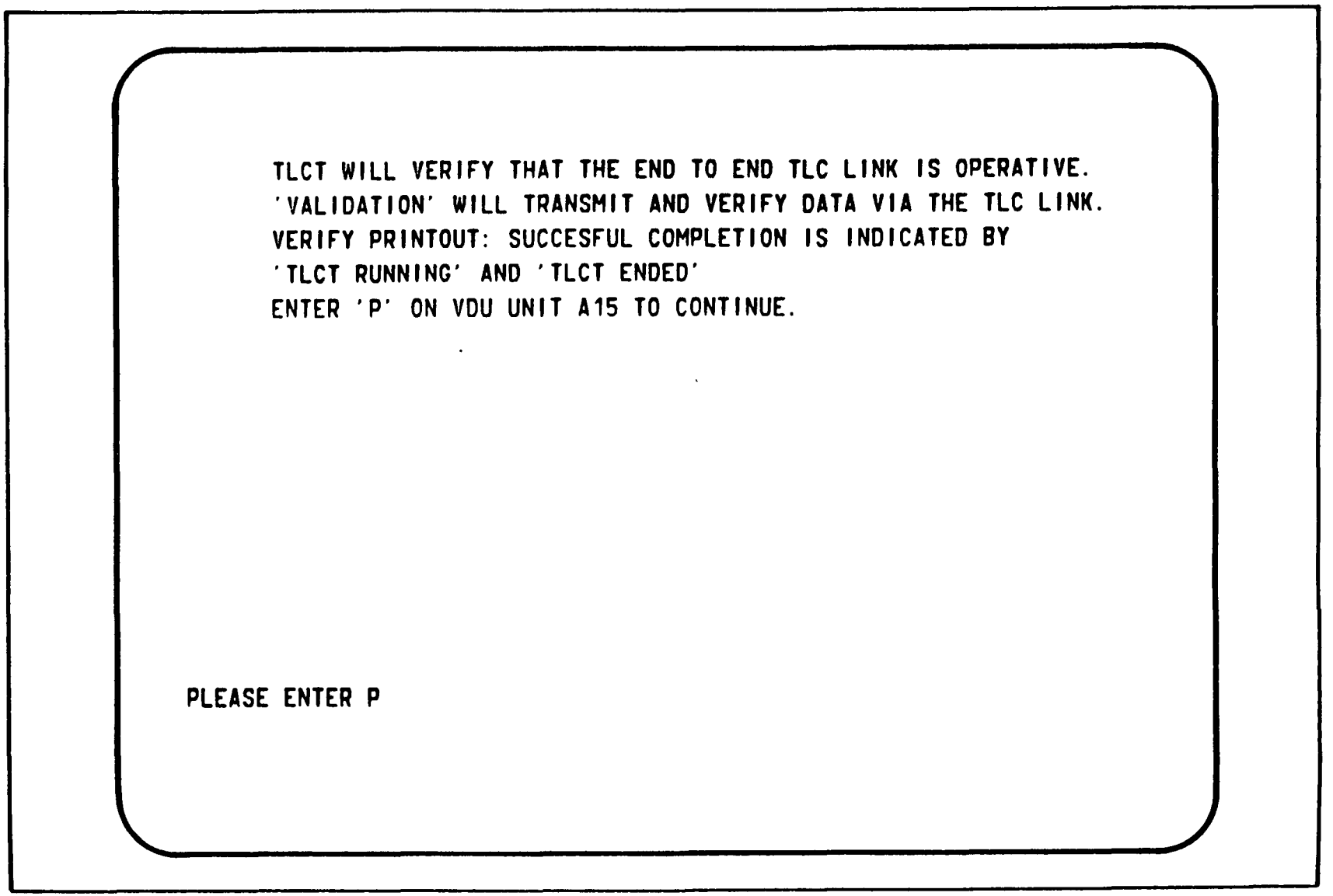

Figure 3.4-61. TLC Validation Sequence Display (1 of 2)

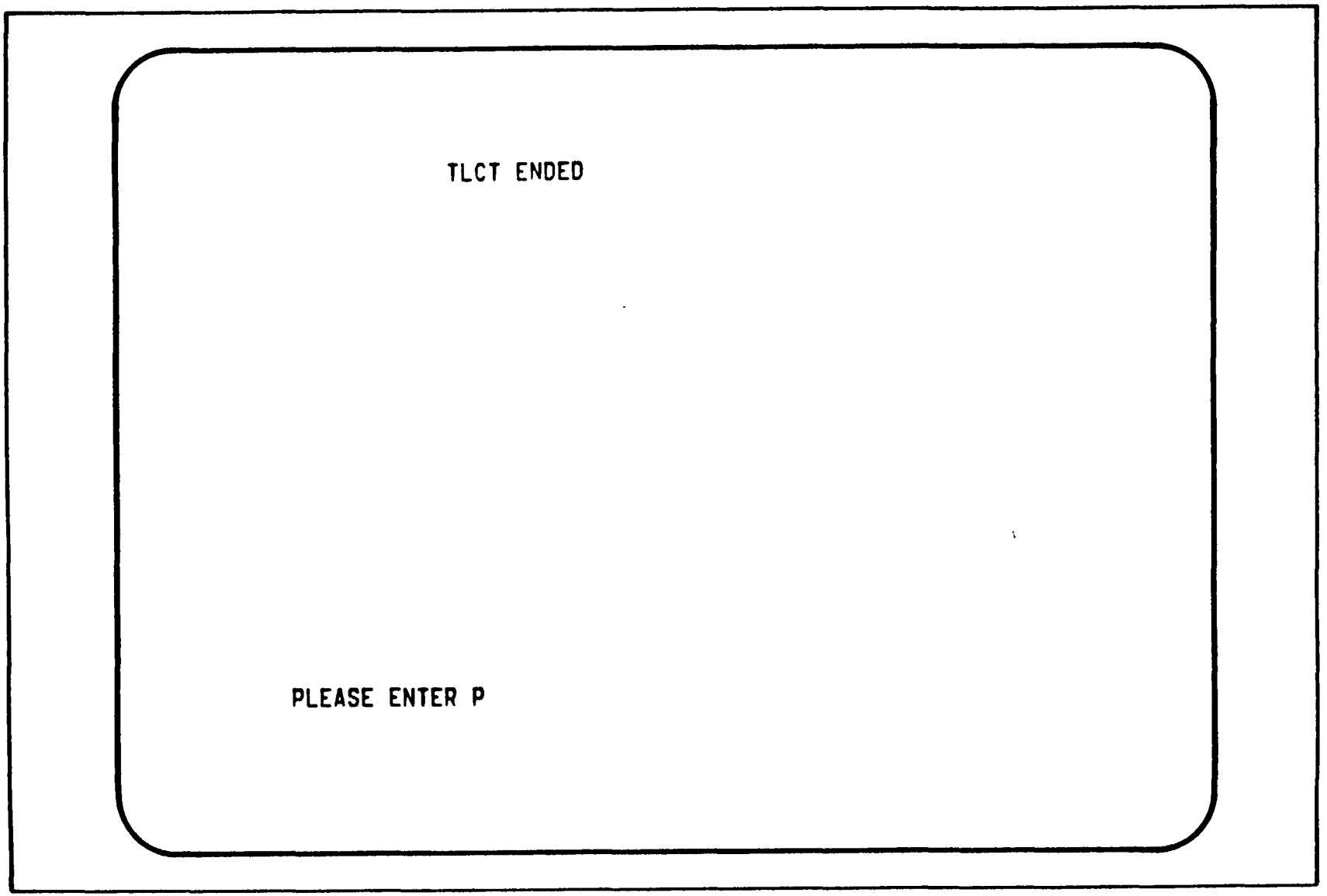

Figure 3.4-62. TLC Validation Sequence Display (2 of 2)

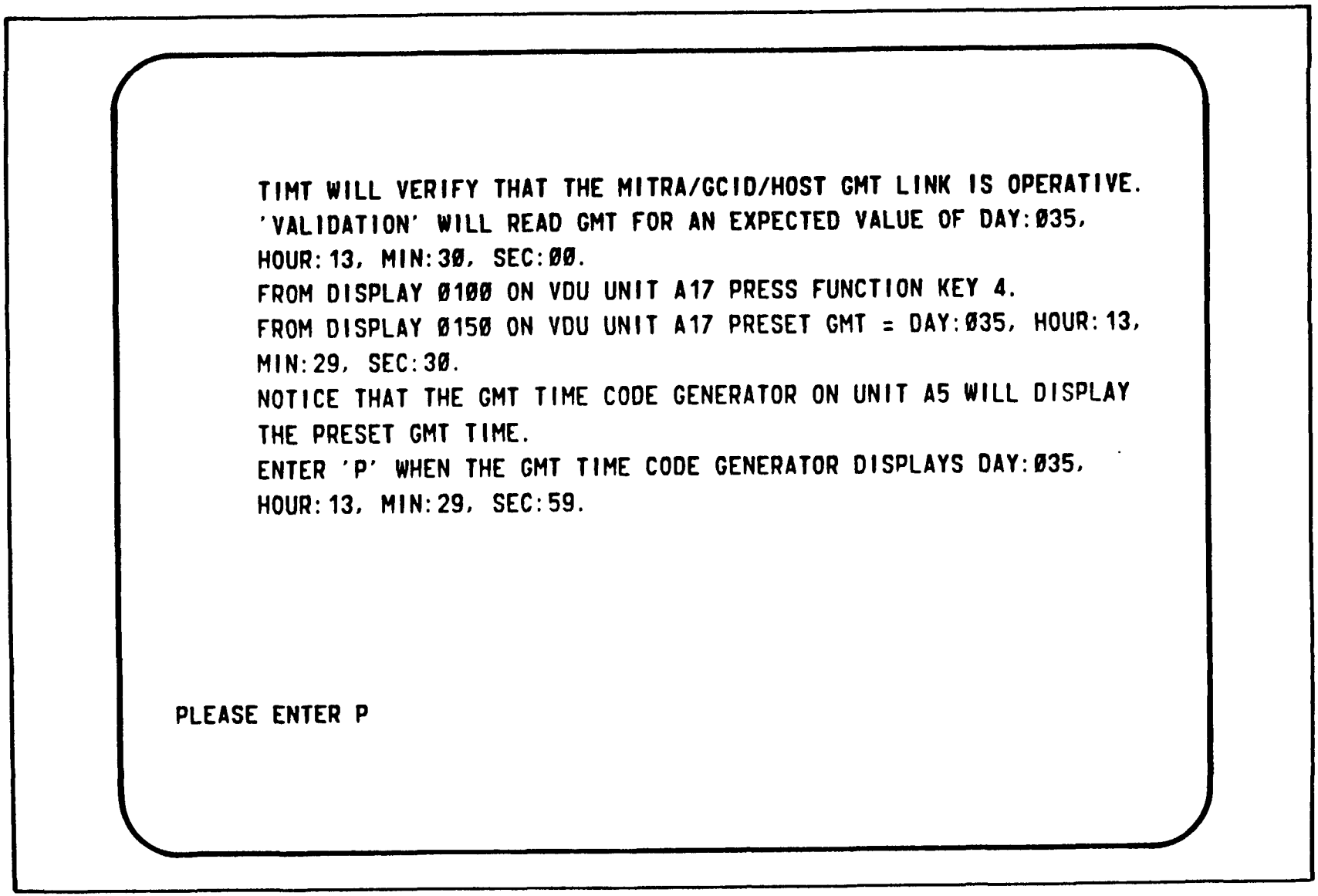

Figure 3.4-63. GMT Validation Sequence Display (1 of 2)

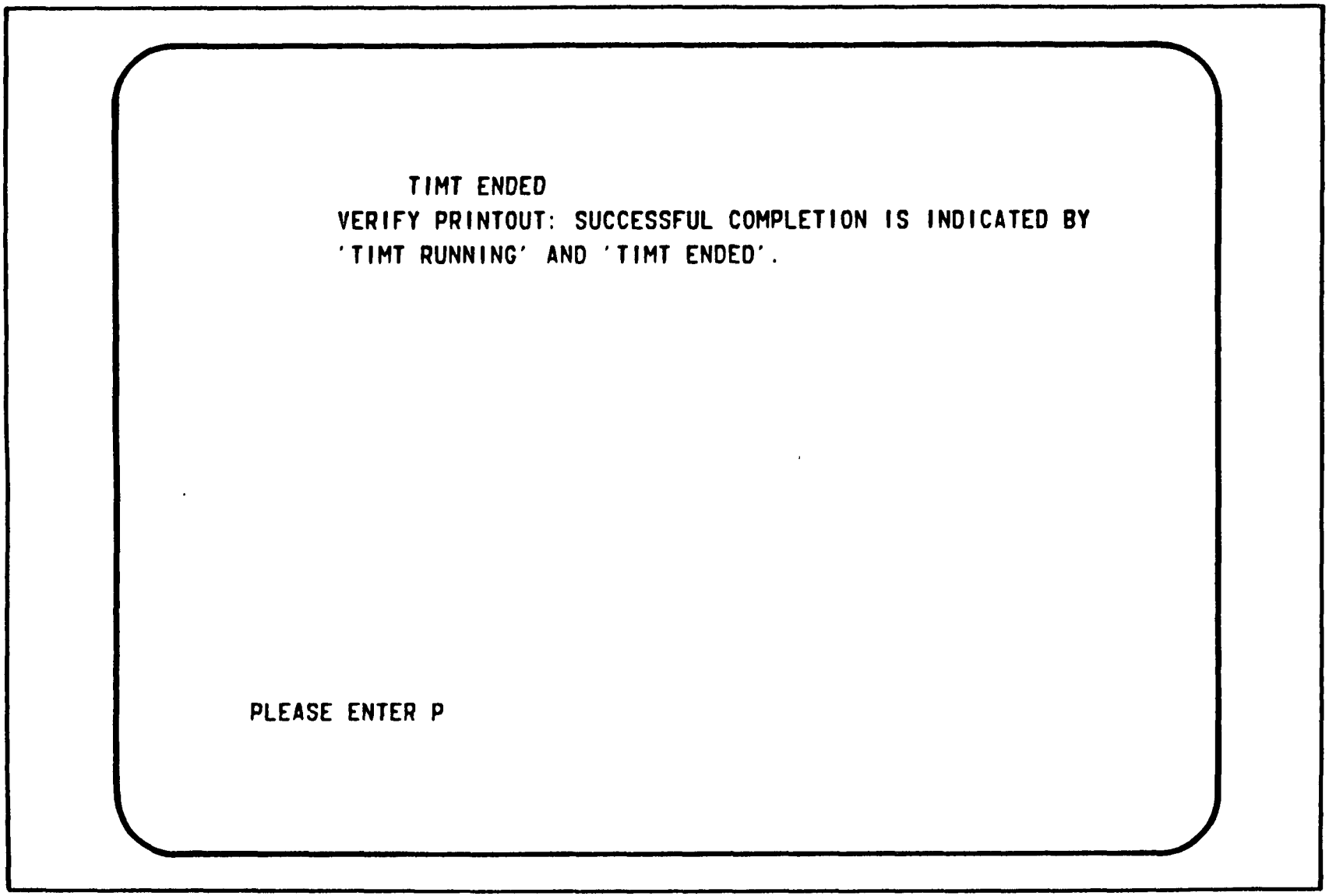

Figure 3.4-64. GMT Validation Sequence Display (2 of 2)

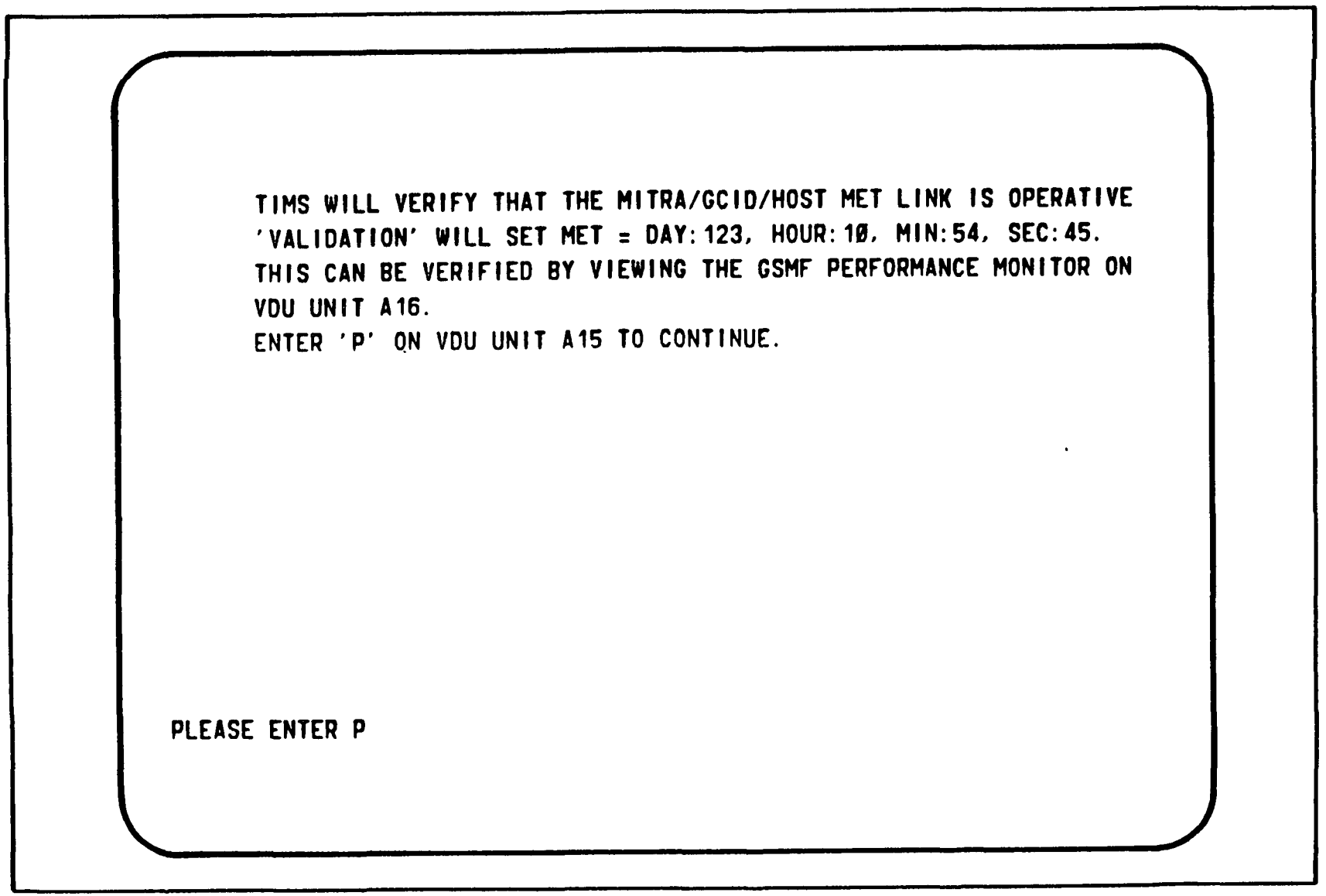

Figure 3.4-65. MET Validation Sequence Display (1 of 2)

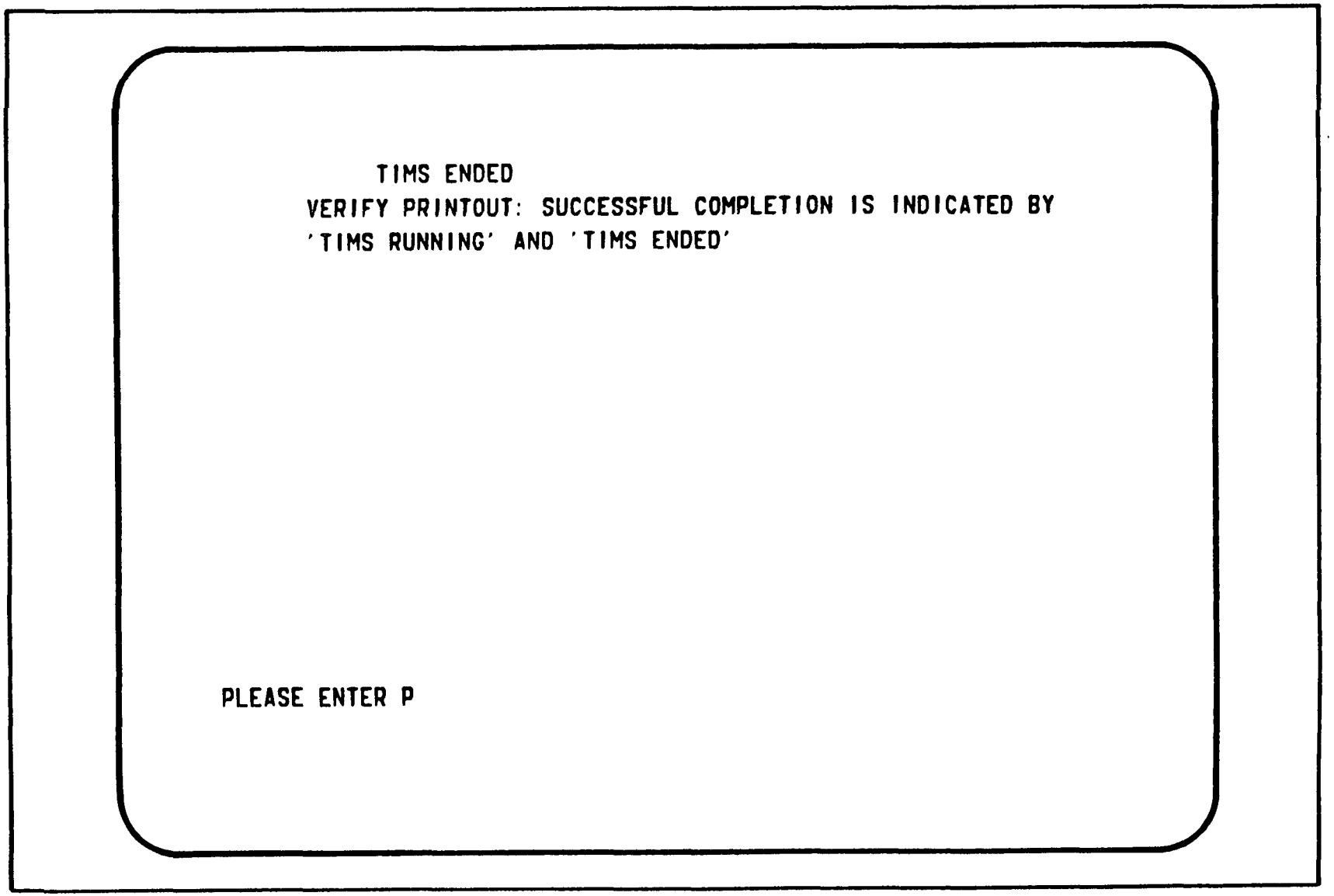

Figure 3.4-66. MET Validation Sequence Display (2 of 2)

3.5.1 Post-Processing Input/Operation

To being the post-processing data reduction, the user selects function key 3 from the GSMF MODE SELECTION menu (see Figure 3.3-4). The POST DATA REDUCTION menu, DP#0750 (Figure 3.5-1), will be displayed. From this menu, the user has the option to do the following:

- SPECIFY INPUT DEVICE @1
  - The user selects the tape drive (1,2) on which the logged data tape will be mounted. DP#0760 (Figure 3.5-2) is the screen displayed.
- SPECIFY DUMP OPTIONS @2
  - DP#0780 (Figure 3.5-3), will be displayed after depressing function key 2 from DP#0750. This menu allows the user to specify any of the four dump options:

    1) SPECIFY DUMP START/STOP TIMES @1

    - With this selection, DP#0798 (Figure 3.5-4), is displayed for user input. The user specifies the time to start printing data from the time and the time to stop printing data.
      - Function key 1 will CLEAR THE ENTRIES
      - Function key 2 prints the requested START/STOP times
      - Function key 3 returns to DP#0780.

    2) SELECTIVELY DUMP DATA @2

    - With this selection, DP#0782 (Figure 3.5-5), is displayed for the user to select which type of data to print. The user has the option to "DUMP" or "SKIP" the following record types:

      KEYBOARD ENTRIES/ERROR DATA
      BEHAVIOR FUNCTIONS
      ECOS TLC COMMANDS
      ECOS TLM BUFFER
      SCOS TLC COMMANDS
      SCOS TLM BUFFER
      MSE COMMANDS
      MSE BUFFER
      SCCD COMMANDS
      SCCD BUFFER

      After the type(s) have been selected to "DUMP" or "SKIP," the user returns to DP#0750 by depressing Function Key 3.

    - The user also has the option to "DUMP ALL RECORDS" (Function Key 1) or "SUPPRESS ALL RECORDS" (Function Key 2).

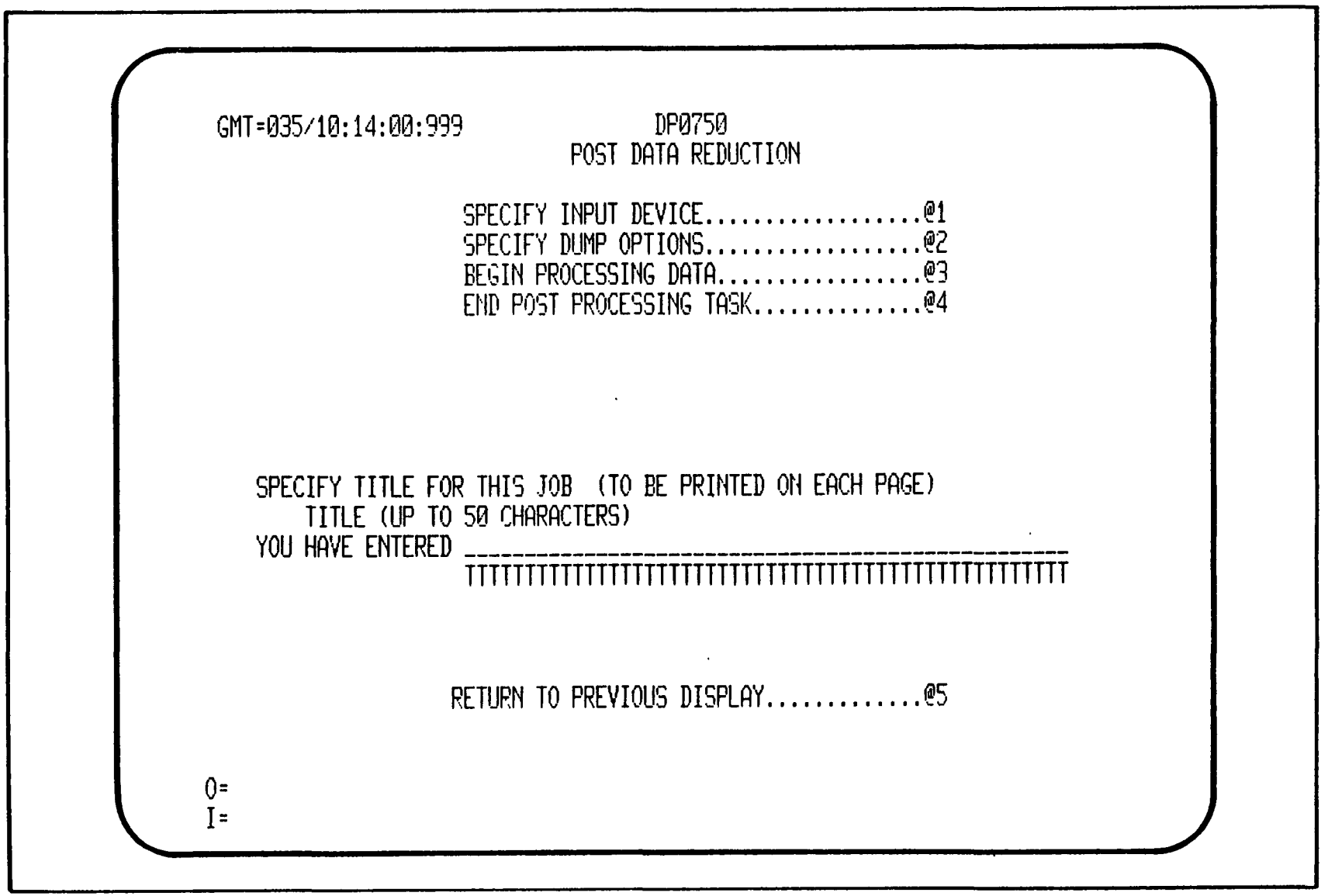

Figure 3.5-1. Post Data Reduction Menu

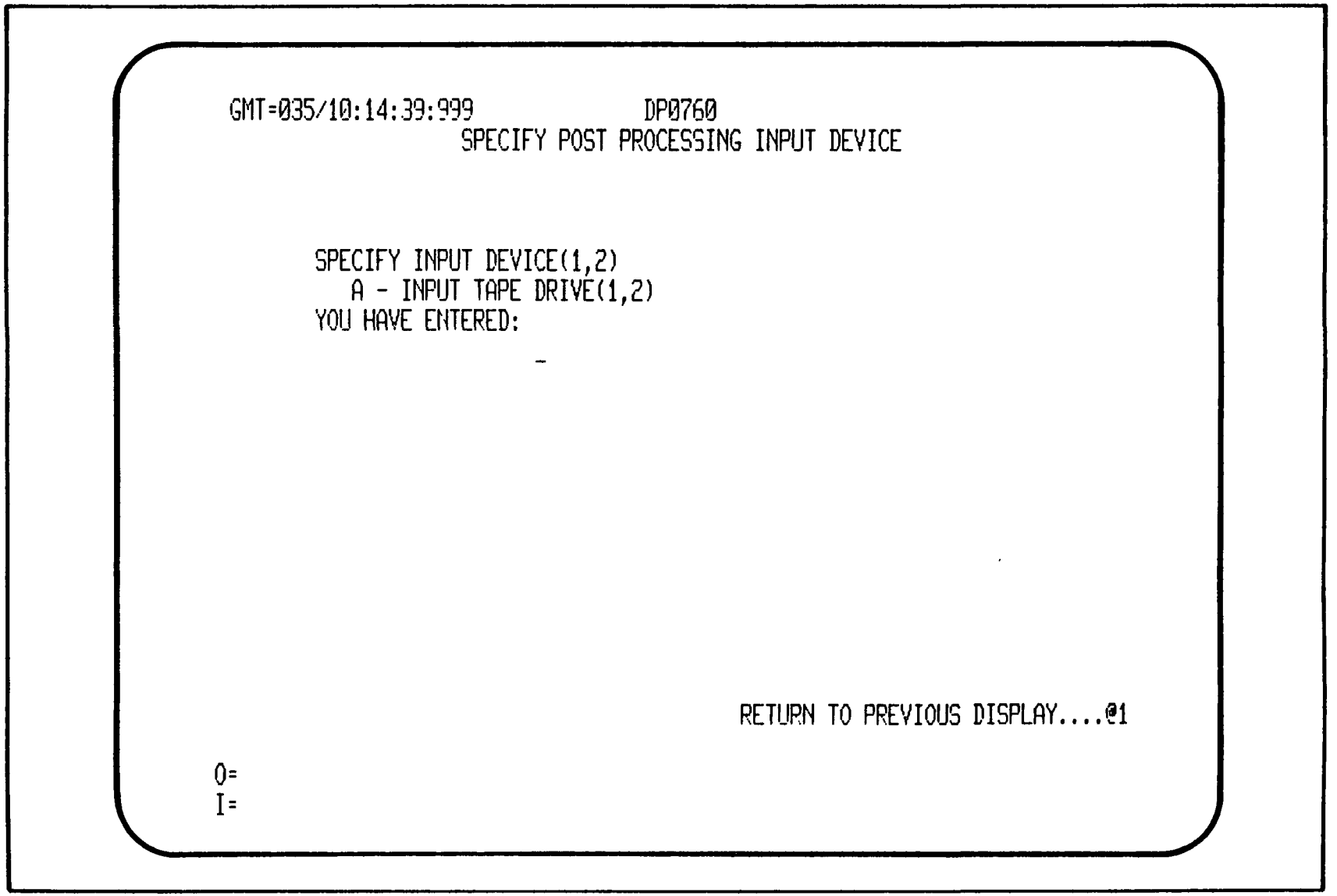

Figure 3.5-2. Post Processing Input Device Menu

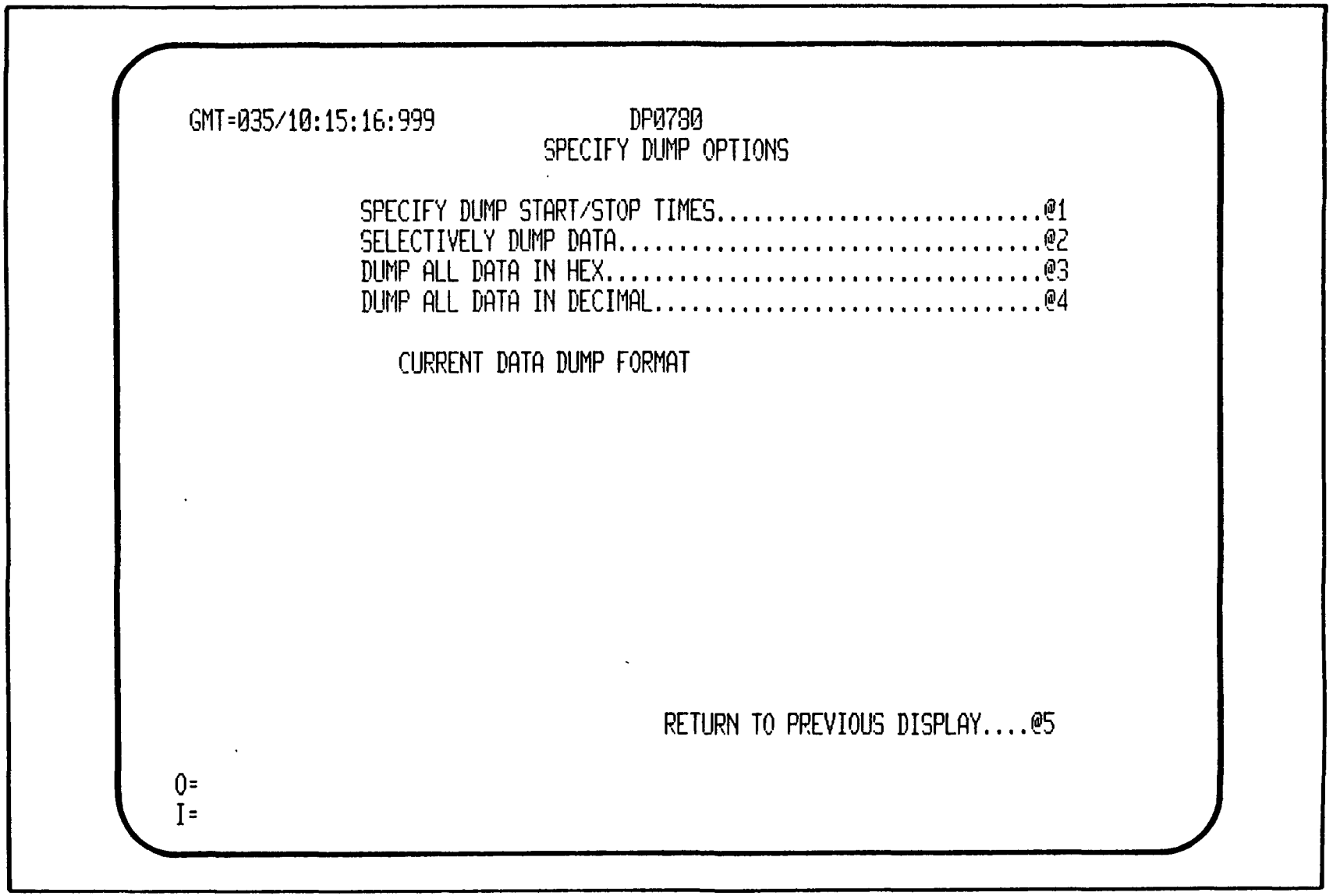

Figure 3.5-3. Specify Dump Options Menu

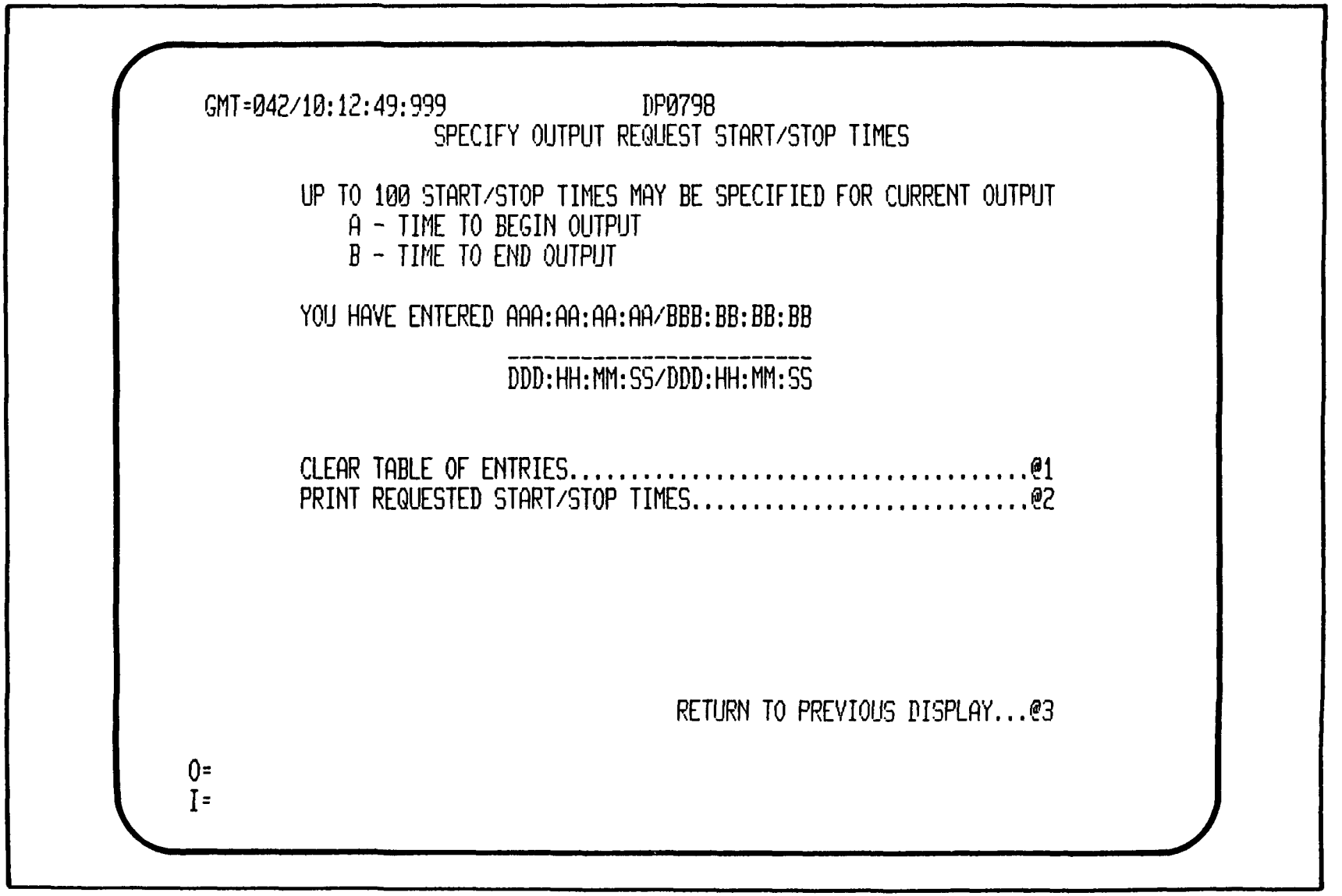

Figure 3.5-4. Output Request Start/Stop Times Menu

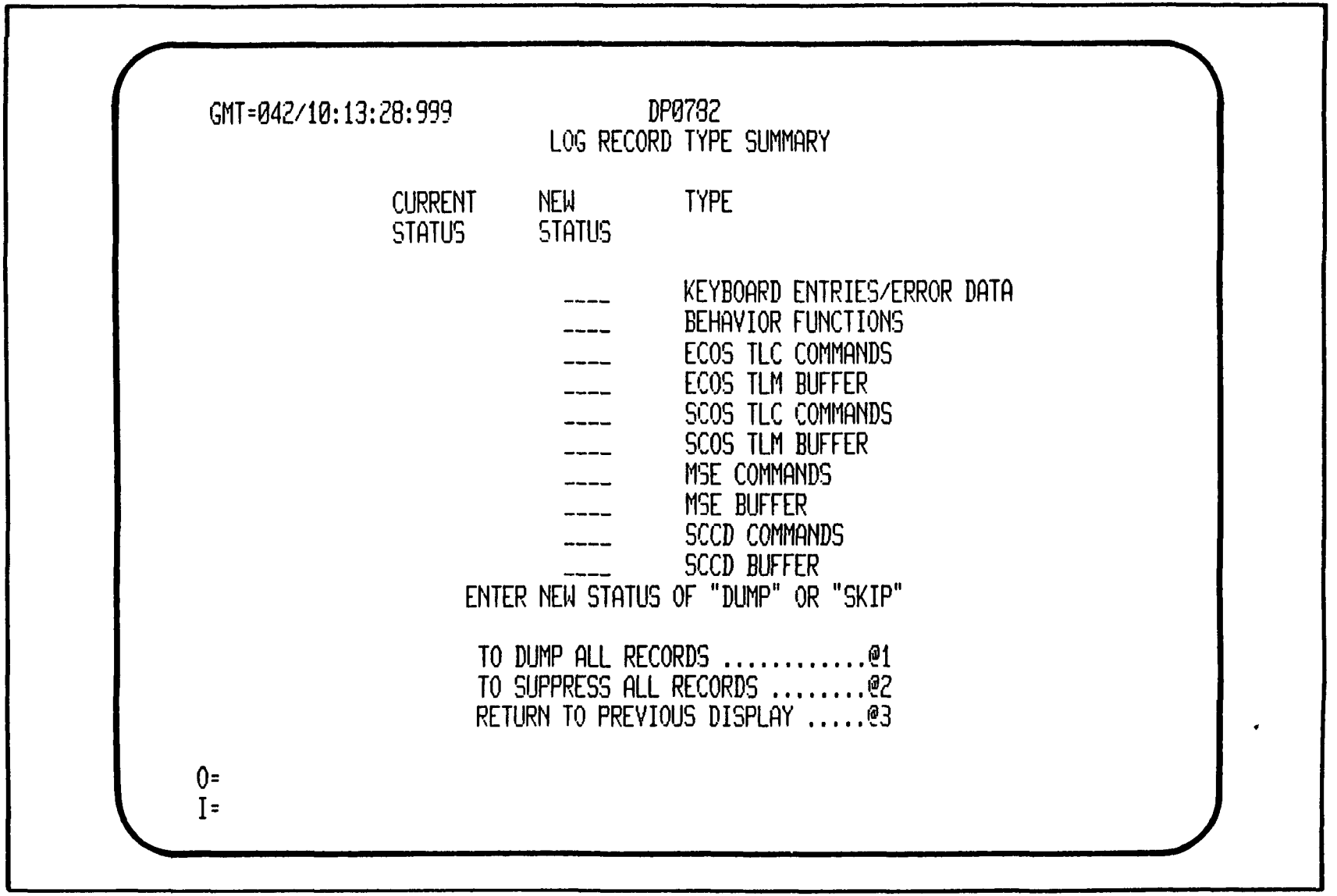

Figure 3.5-5. Log Record Type to Printer Menu

3) DUMP ALL DATA IN HEX @3

- All data will be dumped in hexidecimal format.

4) DUMP ALL DATA IN DECIMAL @4

- All data will be dumped in decimal format.

- RETURN TO PREVIOUS DISPLAY @5

  - DP#0750 will once again be displayed.

- From DP#0750, the user will enter a report title (which will be printed on every page) by pressing "TAB."

- BEGIN PROCESSING DATA @3

  - The user is now ready to start "DUMPING" simulation data as selected to the printer. DP#0799 (Figure 3.5-6), will be displayed to inform the user that POST-PROCESSING IS EXECUTING.

  -- TERMINATE PROCESS @1

  * This will terminate printing

- END POST-PROCESSING TASK @4

- RETURN TO PREVIOUS DISPLAY @5

  - This command will re-display the GSMF MODE SELECTION menu, DP#0010.

3.5.2 Post-Processing Output

All requested data will have been printed on the GSMF hardware configuration printer. This output can be compared to the Mitra printer listing for validation.

3.6 PPI LOOPBACK

PPI LOOPBACK is a means of rapidly verifying the hardware interconnect to an SDF and running tests of various transmitted/echoed patterns through the PPI drivers in each computer.

3.6.1 Hardware/Software

The physical interconnection between the GSMF and the SDF must be installed and operative. The operating systems must include the PPI drivers. On the GSMF end of the link, the application software must be running and the

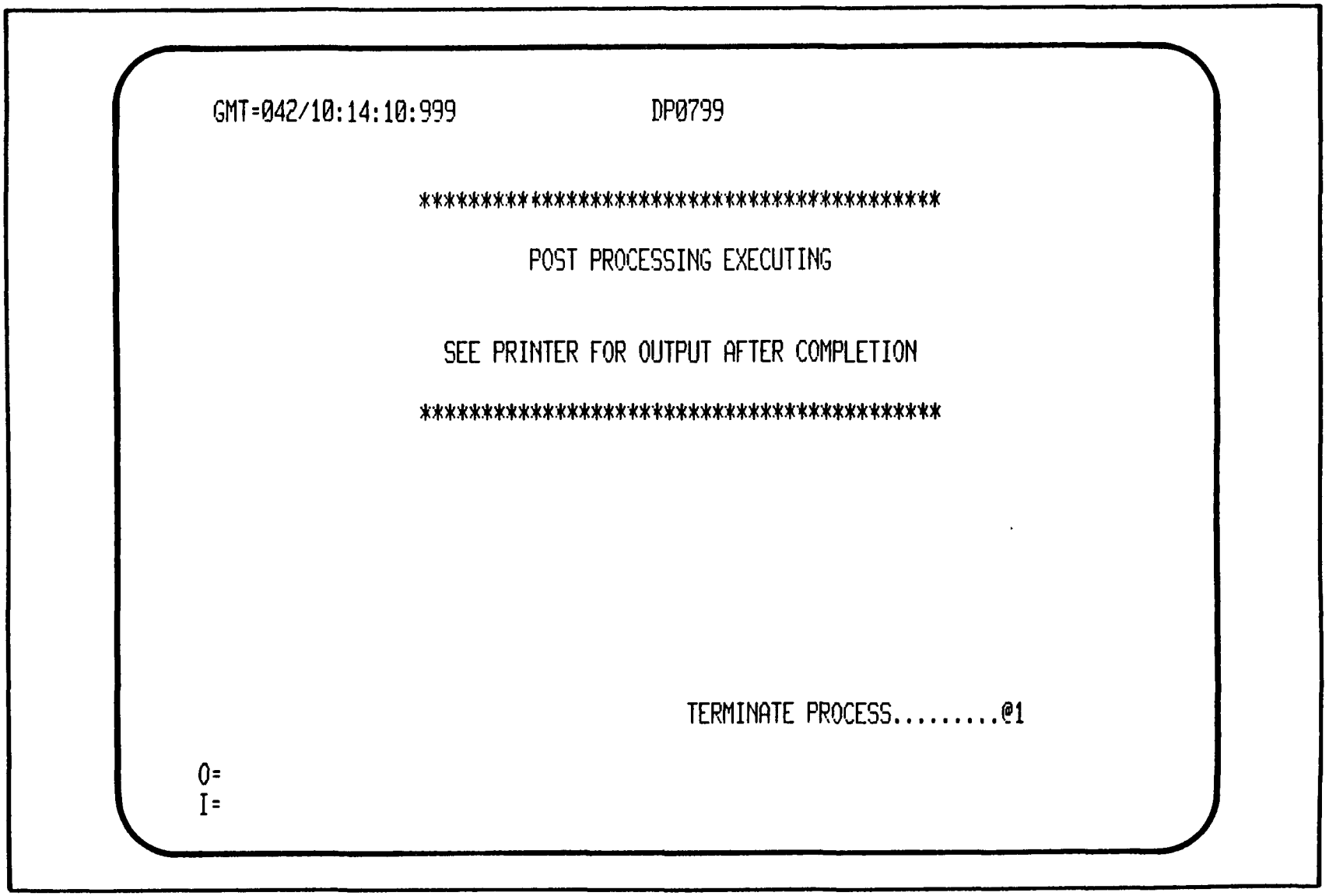

Figure 3.5-6. Post Processing Executing Display

operator must have display DP#0010 on the screen. The GSMF MODE SELECTION menu must be on the terminal. On the SDF, Task (will be provided during sustaining effort) must be loaded and started prior to initiating the test on the GSMF from Display DP#0210.

3.6.2 Selection

PPI LOOPBACK is initiated from Display DP#0210 (see Figure 3.6-1) which may be selected from the GSMF MODE SELECTION menu. Selection of function key 3 returns the user to that menu.

3.6.3 Operation

The operator may select the PPI to test. Default is PPI-1, connected to SDF1. PPI-2 is connected to SDF2.

A test pattern may be selected, or a default pattern may be used. If the default is used, or if a pattern of all Hex 0,s is entered (which resets the default) a variant test pattern is used. It begins by setting the first byte of the first pattern to Hex 00, the second to Hex 01, etc., until the 68-byte pattern is built. On SEND/ECHO of the pattern successfully, the pattern is advanced one byte and the last byte incremented, in effect, "walking" the pattern forward. In this manner, assuming a test of sufficient duration, all bits of all bytes will be tested in all possible combinations. When Hex FF is reached, the pattern recycles to Hex 00. This "walking" continues until terminated. If the SEND/ECHO is unsuccessful, the pattern is not incremented and is reused until compared successfully.

If a particular pattern is to be tested, the operator may enter it and it will be repeated continually during the test.

To initiate a test, the operator will depress function key 1. To terminate the test, function key 2 is depressed.

3.6.4 Results

When the test is activated, a running report of the results is displayed. The fields "Last Result" and "Prior Result" will show "PASS" or "FAIL" for the most recent test and the one prior to it. The fields "Passed" and "Failed" will maintain a cumulative count of the individual results during any given test cycle. If a fixed pattern is being tested, it will be displayed constantly. If the variant form is selected, the display reflects the current test pattern, and the operator can watch the progression of the "walking" test pattern.

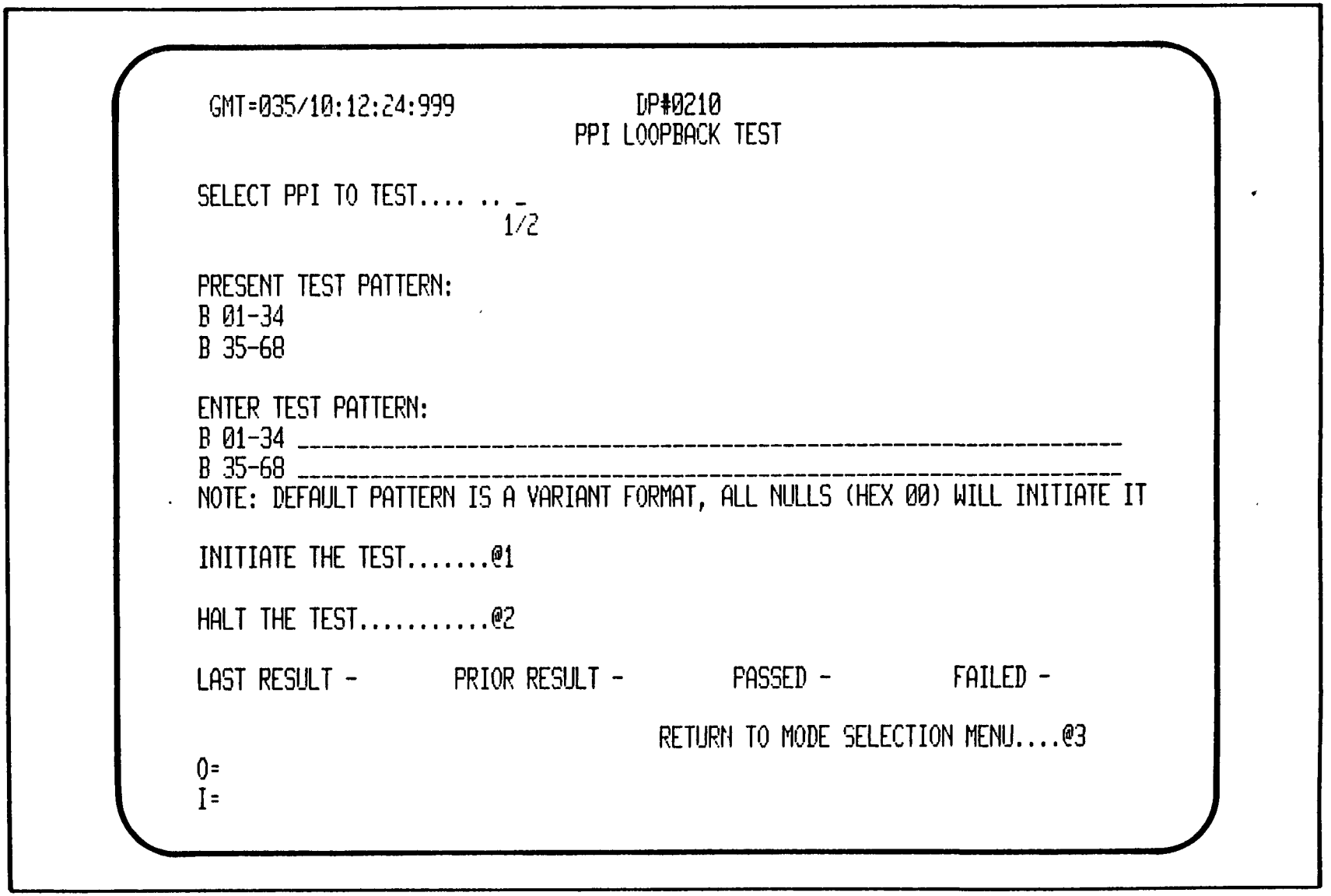

Figure 3.6-1. PPI Loopback Test Menu

3.7 OFFLINE FILE BUILD MODE

OFFLINE FILE Build mode supports the options that allow the user to build required GSMF files offline prior to running Simulation mode. The following files can be created by OFFLINE FILE Build:

- Build data display file(s) (SWID)
- Build command sequence file
- Build TLC response file
- Build initial Behavior Function file
- Read/Create GCID operating software files from tape to disk
- Read/Create setup tape to disk files.

3.7.1 OFFLINE FILE Build Mode Equipment Configuration

All disk files shall be created on the GSMF host computer. The GCID operating software files and setup files shall be created from magnetic tapes that are provided by Intergraph and from the IBM 4341, respectively.

All files shall be created off-line (separate or display control) interactively on a P-E terminal. The program is menu driven and responds to all user input. No special equipment is necessary.

3.7.2 OFFLINE FILE Build Input Materials

3.7.2.1 Magnetic Tapes

Setup mode creates a tape with eight files from the SLDB. This tape will be transported to the GSMF host and these files copied to disk. Intergraph shall provide a tape that contains the GCID operating software tape that will be copied to host disk files. This is a one time function.

3.7.2.2 User Interface

OFFLINE FILE Build is a menu driven task that requires user input. This program is executed independently of display control in that all input data will be read directly from the screen by the program. The user shall select from the menu the respective number for the files to build.

3.7.3 OFFLINE FILE Build Output Materials

3.7.3.1 SWID Data Display Files

The user can create many SWID ID files with this option. A total of 16 entries per file is the maximum that the user can enter.

3.7.3.2 Command Sequence File

This allows the user to build the command sequence file interactively. Appendix A describes the sequence to create this file.

3.7.3.3 TLC Response File

This allows the user to build a file of predefined TLC responses. The responses, ordered by response ID, are returned to the GCID in the standalone mode. Appendix A details the user responses required to build the file.

3.7.3.4 Initial Behavior Tasks File

This allows the user to specify the names of behavior functions to be activated upon initiation of the simulation mode. Appendix A details the user responses required to build the file.

3.7.3.5 GCID Software Files

These five disk files shall be created from the Intergraph-provided magnetic tape. These files will contain the operating software for the GCID MC68000 microprocessors (TLM, MSE, TLC, SCCD, and MSU).

3.7.3.6 Setup Tape Disk Files

These eight files shall be created from the setup Tape that was created on the IBM 4341/4381. These files are discussed in Section 3.2 of this document, and are used exclusively by SIMULATION MODE for getting SWID related data.

3.7.4 OFFLINE FILE Build Procedures

From the system console (A1), the user enters 'BLDOFFLN'. This is a .CSS procedure which will execute the OFFLINE FILE BUILD programs and assigns them to terminal A19. Once in execution, the user simply responds to terminal requests.