



Internal Use Only

ZZ26-3947-1

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Research Triangel Park, NC 27709**

Preface

This users guide is primarily for customer engineers experienced in communication network systems and is not intended to take the place of the formal product and tool documentation. The guide was authored by FE Region 13, in collaboration with Field Technical Operations, FEHO. Publishing arrangements were handled by the FE Maintenance Tools Department, Research Triangle Park, N.C.

While this guide has been edited from a technical standpoint, it has not had the thorough editorial review normally provided for IBM's formal tool literature.

Second Edition (May 1981)

This is a minor revision of ZZ26-3947-0 containing no technical changes or additions.

This users guide may be updated from time to time by Technical Newsletters or by major revision. However the basic tool and product documentation from which much of the contents of this guide has been drawn will be the first to reflect changes.

Binders for this users guide are available from the IBM Distribution Center under Part Number 453559 or Order Number S229-4124.

A form is provided at the back of this guide for reader's comments and your input is encouraged. If the form has been removed, comments may be sent to the address given on the front cover. Comments will be reviewed by the FE Maintenance Tools Department and then forwarded to Field Technical Operations for consideration. Comments become the property of IBM.

SAFETY

Work on any electrical, electronic, or electromechanical equipment carries with it the potential for injuring one's self and/or damaging the equipment. IBM is especially concerned that persons who work on IBM equipment be aware of and exercise proper safety precautions. For this reason, any user of this manual is cautioned to first read the booklet Electrical Safety for IBM Customer Engineers, S229-8124, available through your local IBM branch office.

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DB Adapter

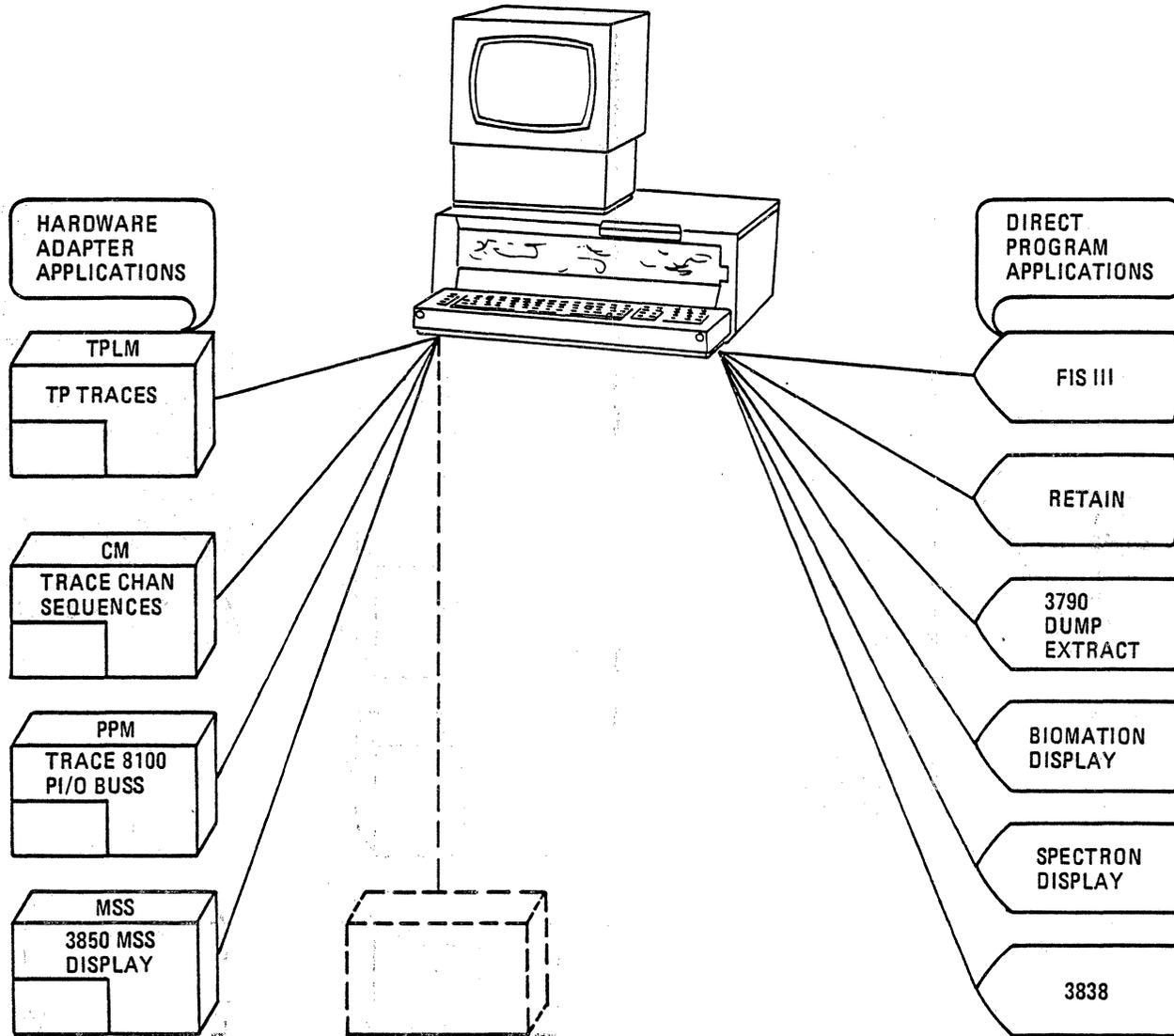
EIA Interface Monitor

Holly Monitor

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CURRENT PT 02 APPLICATIONS



DESCRIPTION

The PT-2 is a portable F.E. tool which provides the field the capability of a service system for an on-site and remote use in servicing IBM products. When used with teleprocessing products, a TP LINE MONITOR (TPLM) is attached to the PT-2. The TPLM is then connected to the product by means of an EIA cable or by means of technology probes for integrated modems.

The transmit and/or receive data leads, along with the control leads are monitored and recorded on tape under control of a PT-2 program called "TPTOOL". The recorded tape can then be replayed and analyzed by the on-site CE, or a remote site person.

The PT-2 along with the TPLM EXERCISE feature (B/M 1770107) can exercise the various Start-stop, BI-sync, and SDLC products. This can be accomplished by either a pre-recorded tape, or by hand keying data via the keyboard for exercising the product.

Some of the possible uses of the PT-2 are:

1. Trace TP lines (EIA or integrated modem).
2. Analyze trace tape data.
3. Exercise terminals.
4. Transmit tape from one PT-2 to another PT-2.
5. Transmit 3790 dump to the Field Support Center.
6. High Speed Trace (HIBSTR, HISDTR).
7. Spectron T-611 (record high speed lines on T-611 and play back to PT-2).
8. PT-2/Biomation application (allows collected data stored by Biomation to be written on PT-2 tape).
9. Trace 360/370 Channel Data.
10. Trace 8100 PI/O Buss Data.
11. Retain terminal with limited access.

PT2 Documentation

- Operation Maintenance and Parts S226-3928
- TP Line Monitor SR31-0786
- Program Distribution System Z226-3907
- PT2 Diagnostic Tape Cartridge P/N 1753847

Note: TPTOOL Program Tape (PN 1650888, EC Level 1800) now provides "HOT" PF Keys; depression of the Enter Key is no longer required.

PT2 Program Distribution Center

800-525-2800 - Wats Lines.

8-347-2153 - Tie Line.

303-441-2153 - Long Distance.

PT-2/TPLM TO TRACE TP LINE AND ANALYZE USING EIA CONNECTIONS

PT-2/TPLM Set-up: Teleprocessing Line Monitor

1. Plug in PT-2 display, TPLM, and power cables.

Note: To verify connection and operation of TPLM Adapter, run program TPLMFT before connection to modem/or business machine.

2. Set both switches on TPLM to up position (SLT/VTL EIA).
3. Remove machine EIA cable from the modem and plug it into the TPLM.
4. Using the EIA jumper cable supplied with the PT-2, plug one end into the TPLM, and the other end into the modem.
5. Put the "TPTOOL" cartridge into the PT-2 (P/N 1650888).
6. Press "SYS RESET" key on PT-2.
7. Press "LCL IPL" key on PT-2.
8. After IPL, the screen displays:

Enter CE Serial, Branch Office, Security

9. Key in your serial number, branch office number, and security code, then press the "enter" key.
i.e.: 123456,123,ABC

Note: Commas must be included as in example.

10. The screen then displays "Tape Mounted".
11. Key in: L TPTOOL
Press the "SYS FUNC" key
Press the "Enter" key

Note: If the TPTOOL tape is at EC 1800 or higher, it is possible to have a auto load program which is selected by the user. This auto load program can be created by using the PF4 function key of UTIL program.

12. The display will then give two options:
 1. Tracing line
 2. Analyzing tape
13. After keying a "1" and then the enter key (to trace the line) the PT-2 will display a series of self-explanatory

questions which enables the PT-2 to load the appropriate trace or analysis program.

Example: What type of line control?, which clock do you want to use?, do you want to display only, record only, or both?, etc.

14. One of the option displays will show the polarities of the lines. Enter a "1" if all are correct. To invert any line, key in that line number and then press the enter key. Once you have selected all the proper polarities, key in a "1", then enter.
 15. All options may be entered at one time without having the questions prompted. This would be done in step 13.
Example: 11121111 "Enter".
 16. The display will prompt you to identify for future reference the tape you are making. Suggested format is:
Customer name, Machine type and serial, Date and time.
 17. After entering this information and depressing the "enter" key, the options selected will be displayed.
 18. At this time the PT-2 will check and display the speed of both the Receive and Transmit clocks.
(RC=xxxxx TC=xxxxx)
- Note:** If clocks are not active RC=0000 or TC=0000.
19. If you are monitoring a line of less than 10,000 bps, only the enter key is needed after the speed check to load the trace program.
 20. If you are tracing a highspeed line, to load the Highspeed Trace program key in "High" and "Enter". (See instruction page 6-2.)
 21. If you did key in a "High" (H), the display will show, "Loading HISPTR".
 22. The screen will then display: "Mount a non-file protected scratch tape".
 23. The cartridge has a slot that can be turned with a small screwdriver to either protect or non-protect the tape.
 24. After mounting the scratch tape, the trace will start. A message will appear at the bottom of the screen "LINE TRACE RUNNING".
 25. The data will be displayed on the screen in hex format. The receive data will be underlined. If High speed trace option was chosen, data will not be displayed.

26. By depressing the "menu" key, the display will show the options available during the recording of the trace. The "Next Display" key continues normal display of the trace data. The options are:

- PF1 — Terminate line trace.
- PF2 — Start or stop display (tape recording continues).
- PF3 — Load analysis program.
- PF4 — Write event mark (sequentially numbered event marks (0-99) to aid in finding error on tape).
- PF5 — Transmit display on/off.
- PF6 — Receive display on/off.
- PF8 — Stop on optional probe (option must be selected during loading of TPTOOL program).
- PF10 — Change EBCDIC/ASCII.
- PF11 — HEX/TEXT display.

USE PF1 TO STOP THE TRACE — THIS WILL CLOSE THE TAPE FILE WITH AN END OF FILE RECORD.

To Analyze Tape:

1. If the PT-2 is in trace Mode, the PF3 key allows you to load the Scan Program. If you are analyzing a previously recorded tape, and the TPTOOL program has not been loaded, you should go back to step 12, page 1-2 to load the Scan Program, or use the mnemonic for the program module.
2. After mounting a trace tape to be analyzed, and pressing enter, the PT-2 will start the tape scan. Continuing to press the "ENTER" key will display a line at a time. Automatic scan of the tape is accomplished by pressing the PF1 key.
3. The "Menu" key will display the options available while the Analyzer Program is being used:
 - PF1 — Start automatic scan of the tape (each subsequent depression of this key will speed up the scan).
 - PF2 — Causes display of data only (no control lines or pads).
 - PF3 — Search for a record number or "A" for alternate trace.

- ST/SP**
 PF4 — Stop scanning.
 PF5 — Causes display of data framed (with syn chars. or flag) or unframed.
 PF5 — VRC yes or no EVEN/ODD.
 PF6 — Causes data displayed to be bit shifted. Each depression of the enter key will shift the data one bit. To return to original data, depress PF6 again.
- SDLC**
ST/SP
 PF7 — Non NRZ1/NRZ1.
 PF7 — Start/stop type 1,2,3,0.
 PF8 — Cause data to be displayed with pads and control leads.
 PF9 — Allows you to search data for hex data pattern, event mark, optional probe change, count FCS errors, or stop on FCS error/abort.
- BSC**
SDLC
ST/SP
 PF10 — EBCDIC/ASCII.
 PF10 — Deserialize 0-7/serialize 7-0.
 PF10 — Text code.
 PF11 — Causes data to be displayed in hex or text mode.
 PF12 — Print screen.
 Allows screen to be printed on a start/stop hard copy device.
 See page 2-9 for connections.

USING PT-2/TPLM TO TRACE TP LINE AND ANALYZE USING LOGIC PROBES

PT-2/TPLM Set-up: Teleprocessing Line Monitor

1. Plug in PT-2 display, TPLM, and power cables.
Note: To verify connection and operation of TPLM adapter, run program, TPLMFT before connection to modem/or business machine.
2. Set both switches on TPLM to proper level (most integrated modems will use the up position – SLT/VTL).
3. Connect the technology probes to the pins desired (see attached list of probe points for some of the machines using integrated modems).
4. The following items will be the same as for EIA machines.
5. Put the "TPTOOL" cartridge into the PT-2 (P/N 1650888).
6. Press "SYS RESET" key on PT-2.
7. Press "LCL IPL" key on PT-2.
8. After IPL, the screen displays:
Enter CE Serial, Branch Office, Security
9. Key in your serial number, branch office number, and security code, then press the "enter" key.
i.e.: 123456,123,ABC
Note: Commas must be included as in example.
10. The screen then displays "Tape Mounted".
11. Key in: L TPTOOL
Press the "SYS FUNC" key
Press the "Enter" key
Note: If the TPTOOL key is at EC 1800 or higher, it is possible to have a automatic load program which is selected by the user. This auto load program can be created by using the PF4 function key of UTIL program.
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Example: 11121111 "Enter".

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18. At this time the PT-2 will check and display the speed of both the Receive and Transmit clocks.
(RC=xxxxx TC=xxxxx)

Note: If clocks are not active, RC=0000 or TC=0000.

19. If you are monitoring a line of less than 10,000 bps, only the enter key is needed after the speed check to load the trace program.
20. If you are tracing a highspeed line, to load the Highspeed Trace program key in "High" and "Enter". (See instruction page 6-2.)
21. If you did key in a "High" (H), the display will show, "Loading HISPTR".
22. The screen will then display: "Mount a non-file protected scratch tape".
23. The cartridge has a slot that can be turned with a small screwdriver to either protect or non-protect the tape.
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- PF5 — Transmit display on/off.
- PF6 — Receive display on/off.
- PF8 — Stop on optional probe (option must be selected during loading of TPTOOL program).
- PF10 — Change EBCDIC/ASCII.
- PF11 — HEX/TEXT display.

USE PF1 TO STOP THE TRACE — THIS WILL CLOSE THE TAPE FILE WITH AN END OF FILE RECORD.

To Analyze Tape:

1. If the PT-2 is in trace Mode, the PF3 key allows you to load the Scan Program. If you are analyzing a previously recorded tape, and the TPTOOL program has not been loaded, you should go back to step 12 to load the Scan Program, or use the mnemonic for the program module.
2. After mounting a trace tape to be analyzed, and pressing enter, the PT-2 will start the tape scan. Continuing to press the "ENTER" key will display a line at a time. Automatic scan of the tape is accomplished by pressing the PF1 key.
3. The "Menu" key will display the options available while the Analyzer Program is being used:
 - PF1 — Start automatic scan of the tape (each subsequent depression of this key will speed up the scan).
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 - PF3 — Search for a record number or "A" for alternate trace.

- PF4 – Stop scanning.
- PF5 – Causes display of data framed (with syn chars. or flag) or unframed.
- ST/SP PF5 – VRC yes or no EVEN/ODD.
- PF6 – Causes data displayed to be bit shifted. Each depression of the enter key will shift the data one bit. To return to original data, depress PF6 again.
- SDLC PF7 – Non NRZ1/NRZ1.
- ST/SP PF7 – Start/stop type 1,2,3,0.
- PF8 – Cause data to be displayed with pads and control leads.
- PF9 – Allows you to search data for hex data pattern, event mark, optional probe change, count FCS errors, or stop on FCS error/abort.
- BSC PF10 – EBCDIC/ASCII.
- SDLC PF10 – Deserialize 0-7/serialize 7-0.
- ST/SP PF10 – Text code.
- PF11 – Causes data to be displayed in hex or text mode.
- PF12 – Print screen.
Allows screen to be printed on a start/stop hard copy device.
See page 2-9 for connections.

PROBE POINTS FOR USING LOGIC PROBES ON MACHINES WITH INTEGRATED MODEMS.

Note: If you have any trouble using the logic probes, verify these points with your machine documentation of the Field Support Center.

3767

Signal Name	Location	Polarity
TSET	A7B03T	-
RSET	A7B03T	-
SD	A5D08	+
RD	A6D11	+
CD	A6D03	-
RTS	A6D07	-
CTS	A5B13	-

3601

Signal Name	Card #	Pin	Polarity
SD	#1	D09	+
RD	#2	D13	+
RTS	#1	J07	-
CTS	#1	B13	-
CD	#2	D09	-
TSET	#3	U06	-
RSET	#3	P12	-

Model 1**Models 2 & 3**

Card #1 (XMIT)	01A2A4	01A1B2
Card #2 (REC.)	01A2A2	01A1B4
Card #3 (CGA)	01A2C2	01A1C2

3614

Signal Name	Location	Polarity
SD	01A1U2D09	+
RD	01A1U4D13	+
RTS	01A1U2J07	-
CTS	01A1U2B13	-
CD	01A1U4D09	-
RSET	01A1R2P12	-
TSET	01A1R2U02	-

3624 (WITH 38LS INTEGRATED MODEM)

Signal Name	Location	Polarity
RD	A2B10	+
SD	A2D04	+
RTS	A2D02	-
CD	A2B12	-
CTS	A2D13	-

3770 (ALL)

Signal Name	Location	Polarity
SD	01AC1-E2U04	+
RD	01AC1-E2U13	+
RTS	01AC1-E2S10	-
CTS	01AC1-E2S12	-
CD	01AC1-E2S04	-
RSET	01AC1-E2P12	-
TSET	01AC1-E2U02	-

3791

Signal Name	Loc (Remote Adapt.)	Loc (Data Link Adapt.)	Polarity
SD	01AA2-E2D09	01AB2-XXD04	+
RD	01AA2-E4D13	01AB2-XXB10	+
RTS	01AA2-E2J07	01AB2-XXD02	-
CTS	01AA2-E2B13	01AB2-XXD13	-
CD	01AA2-E4D09	01AB2-XXB12	-
TSET	01AA2-F2U06	01AB2-YYU06	-
RSET	01AA2-F2P12	01AB2-YYP12	-

XX = B2, C2, D2, E2, or D4

YY = F2, G2, H2, J2, or K2

3659 (3651-50 or 7480 REMOTE LOOPS)

Signal Name	Location	Polarity
RD	D2M03	-
SD	D2D12	-
RSET	D2J13	+
XSET	D2G08	+

3651-50 (3651-60 or 7480 LOCAL LOOPS)

Signal Name	Locations			Polarity
	Loop 1	Loop 2	Loop 3	
SD	A1E2B13	A1F2B13	A2N2B13	-
RD	A1E2U13	A1F2U13	A2N2U13	-
XSET	A1E2B03	A1F2B03	A2N2B03	+
RSET	A1E2D06	A1F2D06	A2N2D06	+

8100 LOOP CONNECTIONS

8130

Address	Location	21obe
81	01A-A1Q4	=
82	01A-A1Q2	=
83	01A-A3K4	=
84	01A-A3E4	A3C4
85	01A-A3H4	A3H2
86	01A-A3A4	A3C3

8130/with 2 board chg

Address	Location	21obe
81	01A-A2J4	=
82	01A-A2J2	=
83	01A-A2N4	=
84	01A-A2Q4	A2Q2
85	01A-A2S4	A2S2
86	01A-A2U4	A2U2

8140

Address	Location	21obe
81	01A-A2F2	F4
82	01A-A2H2	H4
83	01A-A2K2	=

8101

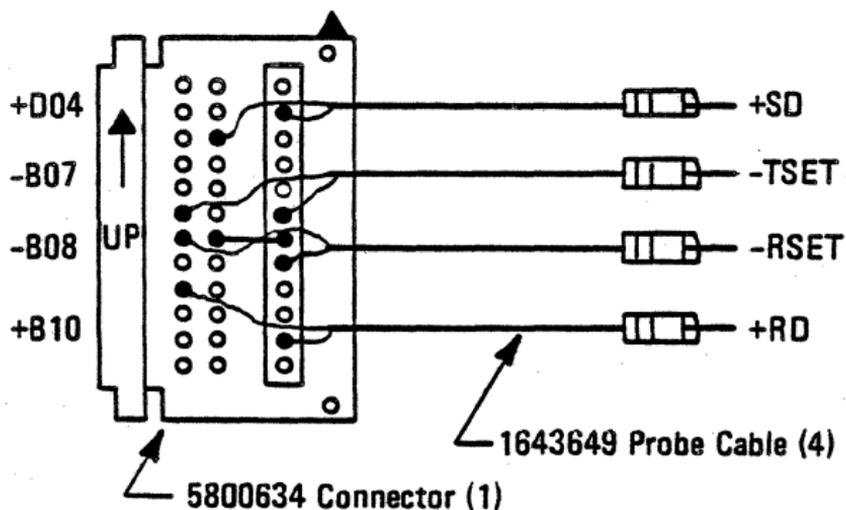
Address	Location	21obe
X0	01A-A1J2	J4
X1	01A-A1G2	=
X2	01A-A1E2	=
X3	01A-A1C2	=
XC	01A-B1J2	J4
XD	01A-B1G2	=
XE	01A-B1E2	=
XF	01A-B1C2	=

38.4 KB Loops may be traced on tape with the high speed trace program. See Hi Speed trace section in this manual.

To be able to see all data, inbound and outbound, recording should be done at the host controller if possible.

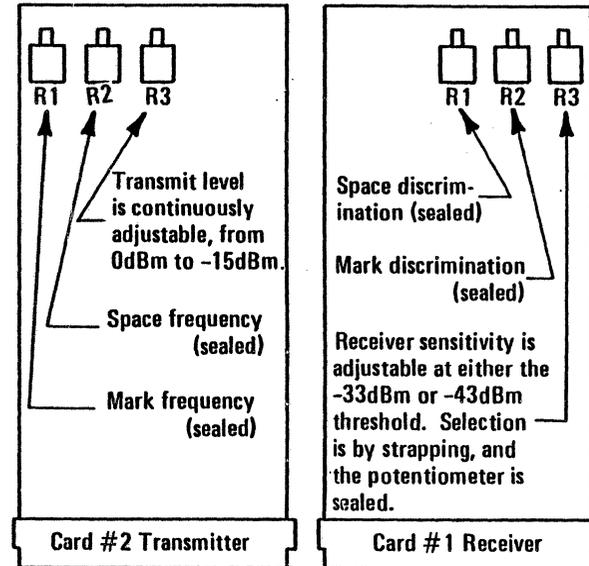
SD	D04	+
RD	B10	+
TSET	B07	-
RSET	B08	-

To provide a quick and safe way to connect the TPTOOL adapter to the loop, A cable can be made by modifying 4 TPTOOL tech probes and adding a connector that allows fast connection to the backpanel pins. Be sure to connect the grounds on the probes.



**IBM 1200 BPS OR 600 BPS INTEGRATED MODE
(MINI 6) (MINI 12)**

CARD IDENTIFICATION & PIN LOCATIONS



Card #2 Transmitter
 P/N 5863763 – 1200
 P/N 5863764 – 600
 P/N 5864374 – 600/1200

Card #1 Receiver
 P/N 5862859 – 1200
 P/N 5862861 – 600
 P/N 5864331 – 600/1200

IBM INTEGRATED MODEMS CAN BE CONNECTED FOR EIA OR SLT/SLD LEVELS. THE PINS ARE SHOWN FOR BOTH LEVELS – TO ALLOW CONNECTION OF PROBES FROM THE TPLM TO THE MODEM.

	<u>SIGNAL NAME</u>	<u>EIA</u>	<u>SLT/SLD +</u>
<u>REC CARD</u>	CD	D02	D09
	RD	J02	D13
	DSR without AA/ACO	B02	B02
	DSR with AA/ACO	D06	B02
<u>XMIT CARD</u>	RTS	D04	J0J
	CTS	D13	B13
	SD	J04	D09

38LS MODEM CARD IDENTIFICATION

PART NO.	United States and Canada 8564508	United States and Canada 8564509	United States and Canada 8564510
	Switched Network	Nonswitched Network with SNBU (with auto-answer)	Nonswitched Network with SNBU (with manual answer)
Frequencies			
Mark (1)	1300 Hz	1300 Hz	1300 Hz
Space (0)	2100 Hz	2100 Hz	2100 Hz
Answer**	2100 Hz (V23 mode)	2100 Hz (V23 mode)	
Line Termination	600 ohms	600 ohms	600 ohms
Levels			
Transmit	Adjustable (0 dBm* to -15 dBm* both data and answer**)	0 dBm SNBU adjustable (0 dBm* to -15 dBm* for both data and answer)	0 dBm SNBU adjustable (0 dBm* to -15 dBm* for data)
Receive Threshold on/off	-43 dBm/-48 dBm	-33 dBm/-38 dBm -43 dBm/-48 dBm (SNBU)	-33 dBm/-38 dBm -43 dBm/-48 dBm (SNBU)
2-wire or 4-wire	2-wire	Selectable SNBU 2-wire	Selectable SNBU 2-wire
Timings			
Answer Tone Duration**	3.5 seconds	3.5 seconds (SNBU)	3.5 seconds (SNBU)
Clear-to-Send Delay	230 milliseconds	Adjustable (30, 80, or 230 milliseconds) 230 milliseconds (SNBU)	Adjustable (30, 80, or 230 milliseconds) 230 milliseconds (SNBU)
Echo Clamp	150 milliseconds	Adjustable (0, 50, or 150 milliseconds) 150 milliseconds (SNBU)	Adjustable (0, 50, or 150 milliseconds) 150 milliseconds (SNBU)
Equalization	None	None	None
Wrap Test Propagation Delay	1.2 milliseconds	1.2 milliseconds	1.2 milliseconds

SIGNAL NAME

CARD PIN

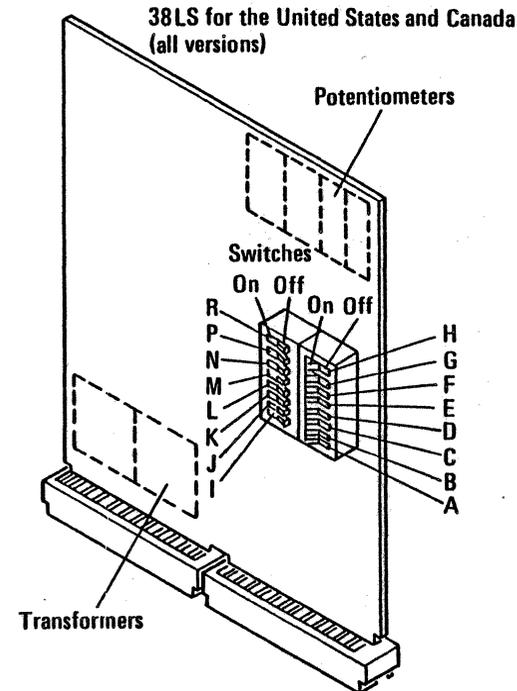
VTL levels

RD	B10	+
SD	D04	+
RTS	D02	+
CTS	D13	+
CD	B12	+
DSR	B13	+
DTR	B02	+

38LS CARD IDENTIFICATION

To aid you in determining which 38LS card is installed, the following figure shows the approximate component arrangement on the different cards for United States.

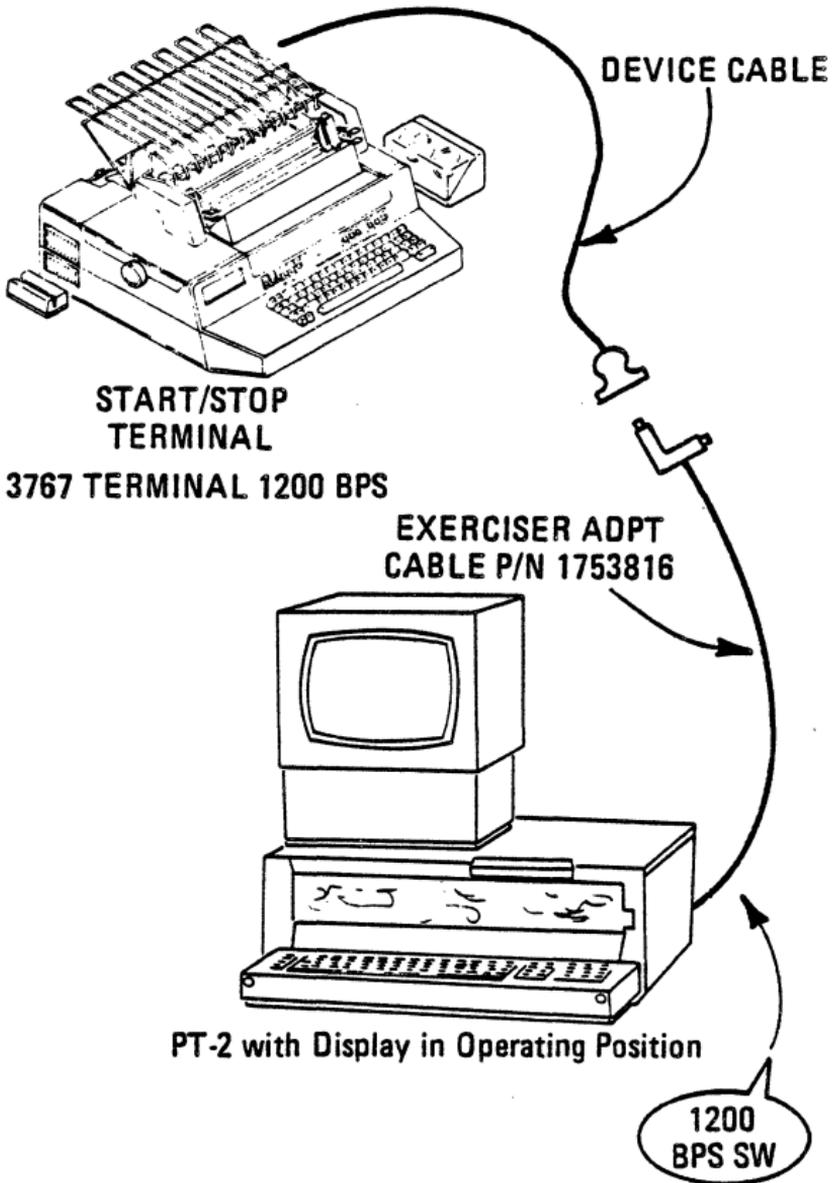
- The switched network modem for the United States and Canada has four potentiometers in the upper right corner.



PRINT SCREEN

PF12

THIS FUNCTION WILL ALLOW PRINTING OF THE TPTOOL SCREENS ON A HARD COPY PRINTER, PF12 FUNCTION.



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EXERCISE DEVICES USING THE PT-2/TPLM

A program (TPEXER), resides on the TPTOOL Tape at EC 1800 or higher. After IPL'ing and loading this program, it presents the CE with a set of instructions and prompts to determine which of the Exercise Programs to load:

EXMBSC: Bi-Sync Manual Exercise
EXTBSC: Bi-Sync Tape Exercise
EXSTSP: S/S Manual Exercise
ETSTSP: S/S Tape Exercise
EMSDLC: SDLC Manual Exercise
ETSDLC: SDLC Tape Exercise

These program are capable of driving the EIA interface or a phone line using the Mini-12 in the PT-2. A special local exercise cable P/N 1753816 provides for the connections required for a non-modem operation. The DAA cable is used to drive the Mini-12.

The TPEXER Program will provide a schematic overview of proper installation of cables between the PT-2/TPLM and the DTE. (See page 3-2)

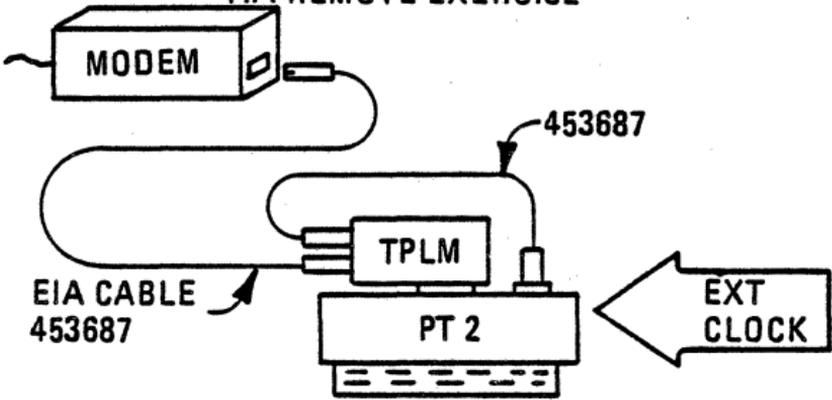
There are two modes of operation to exercise the DTE:

1. Manual: Exercise data is entered via the keyboard of the PT-2. All activity is displayed and written on tape. The tape can then be reviewed using TPTOOL or can be used with the same DTE in Tape Exercise Mode.
2. Tape: Exercise data is contained on pre-recorded tape which is transmitted by the PT-2 to the DTE. The PT-2 monitors transmit and receive data and the current responses. The PF2 key is used to control the PT-2 to either stop or continue when a mismatch occurs between the receive data on the tape and the current receive data from the DTE.

The following pages are taken from the PT-2 Line Monitor Operations manual, SR31-0786. Complete information, procedures and flow charts are contained in this manual.

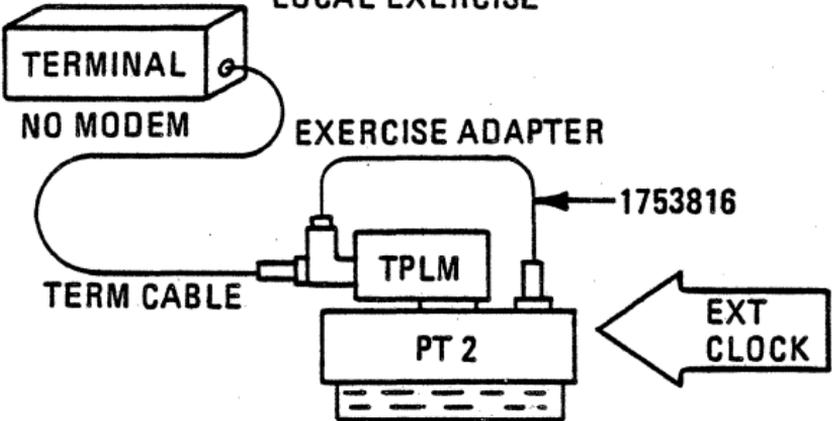
PT2 EXERCISER CONNECTIONS

T.P. REMOTE EXERCISE

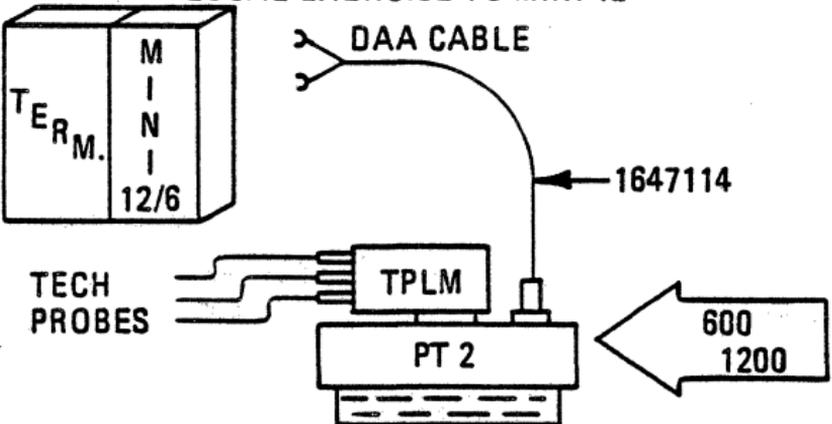


INTERNAL/EXTERNAL CLOCK

LOCAL EXERCISE



LOCAL EXERCISE TO MINI 12



MANUAL EXERCISE (EMSDLC)

SDLC TYPE TERMINALS

This program allows the PT2 to simulate a SDLC type network using CE entered data streams. A trace of the operation is run to provide visibility of the operational sequences on the line.

The following is a sample operation to verify terminal address and then exercise the terminal at the SDLC link level.

1. IPL TPTOOL program tape P/N 1650888.
2. Load TPEXER.
3. Select mode of operation.
 1. Remote exercise with modems and clock.
 2. Remote exercise with modems without clock.
 3. Local – no modems.
 4. Local – IBM integrated modems.
4. Type of exercise.
 1. BSC Manual 4-BSC Tapes
 2. SDLC Manual 5-SDLC Tapes
 3. ST/SP Manual 6-ST/SP Tapes
5. Type of clock of required.
 1. 600 Baud
 2. 1200 Baud
 3. 2400 Baud
 4. 4800 Baud
 5. 9600 Baud

Set Switch at rear of PT 2 to match clock speed for "1 or 2" (DAA Cable – IBM Modems only).

6. Select Probe Levels if using technology Probe's. For tracing enter a "1" when they are correct.
7. Enter identifying header information.
8. "Trace check out" of TPLM Connections and Clocks. Trace function is now complete. Data will be written on ALT TRACK.
9. "ENTER" will load exercise program.
10. PF9 – will allow entering manual data.

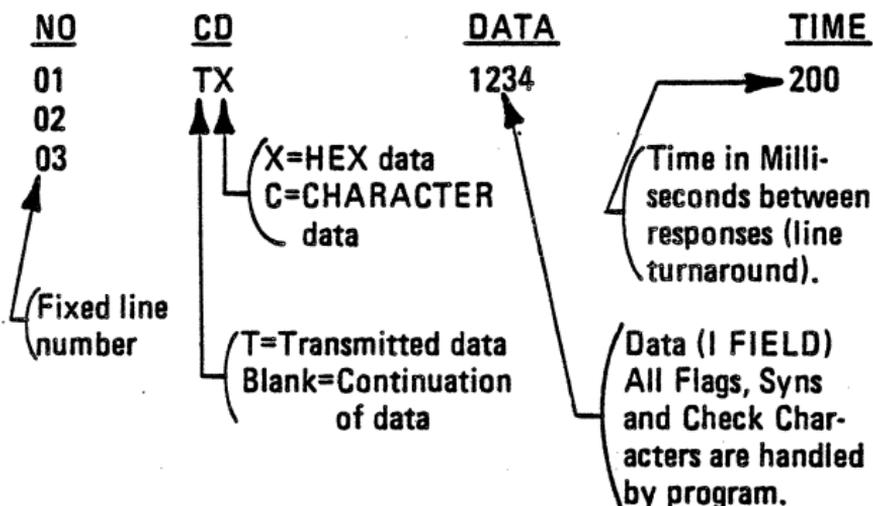
N=New data – allows new data to be entered.

R=Review data – to view existing data.

11. "N", ENTER will display a sample 3270 SDLC data stream to address "01"; ENTER key will allow entry of your data.

"R", ENTER will display current data and allow entry of data without sample display.

FORMAT OF DATA TO BE ENTERED

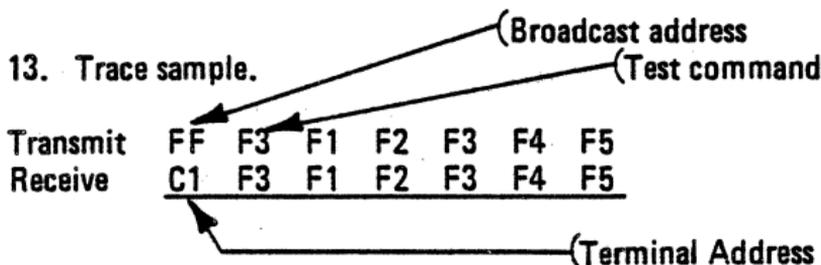


SDLC data links and terminals can be tested with a single command called a test command "F3". A broadcast address "FF" will select all SDLC terminals, if used with the test command — the terminal should answer with its address.

12. Format for SDLC test.

<u>NO</u>	<u>CD</u>	<u>DATA</u>	<u>TIME</u>
01	TX	FF F3 F1 F2 F3 F4 F5	200
02	TX		200

"T" to transmit the test command with a broadcast address, and trace the response.



14. Format for SDLC test – set normal response mode (SNRM). Terminal address is known ("C1").

<u>NO</u>	<u>CD</u>	<u>DATA</u>	<u>TIME</u>
01	TX	C193	200

"T" to transmit "set normal response mode" (SNRM) to terminal and receive a non sequenced acknowledgement. Terminal address "C1"

15. Trace sample.

Transmit C193 – SNRM
 Receive C173 – NSA

**TERMINAL RESPONSES FOR TEST
 COMMAND "F3"**

SDLC Terminal	Data I Field	Response Comments
3270	256 Bytes	Returns command only, no data.
3600	256 Bytes	Returns data.
3614	256 Bytes	Returns data, FRMR if over 256.
3650	256 Bytes	Returns data, FRMR if over 256.
3660	256 Bytes	Returns data, TEST CMD only if over 256.
3767	31 Bytes	Returns data, TEST CMD only if over 31.
3770	24 Bytes or 256 Bytes	Depends which buffer is available, returns UA if no buffer, returns data. FRMR if over buffer.
3790	9 Bytes	Returns data, FRMR if over 9.

FRMR – Frame Reject Response (CMDR)

UA – Unnumbered Acknowledgement (NSA)

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TAPE TRANSFER PROGRAM

GENERAL DESCRIPTION

The PT-2 can send data recorded on tape to a remote site by means of its communication adapter. The remote site can be either another PT-2 or a computer system which has the PT-2 program distribution system installed. When the data which needs to be sent is trace information, recorded by the line monitor trace programs, the tape transfer (TAPETR) program should be used. Each record recorded on the tape is sent across the communication link and written on the receiving PT-2 tape drive. Transmission errors caused by the communication link are automatically handled by PT-2 error recovery routines. These error recovery routines ensure the integrity of the data being written on tape. If a tape read error occurs on the original trace tape e.g. tape CRC error, then that record will be created at the remote site as an unreadable record also. Because of these two safeguards no misleading information can be recorded at the remote site. The data recorded on tape at the remote site will be an exact copy of the original trace data.

The TAPETR program can use the remote control capability of the PT-2. The reason for implementing this capability is to allow users who are unfamiliar with TAPETR operations to give control of their PT-2 to the receiving PT-2. The receiving PT-2 user should, in most cases, be more familiar with the tape transfer program than the sending PT-2 user.

The tape transfer program will allow the user to cause transmission of either an entire trace tape or certain selected records. For example, it is possible to transfer data from record two, only, or from record four to record six, or selected groups of records may be sent. If this option is chosen the new trace tape will not be a duplicate of the original. Record numbers will not be the same as on the original trace tape.

OPERATION

The tape transfer program resides on the TPLM application program tape. To load the program:

1. IPL the PT-2 by mounting tape P/N 1650888 and pressing the "LCL IPL" key.

2. Enter requested security information.
3. Key in "L TAPETR".
4. Press "SYS FUNC" key and ENTER.

At this time you should establish contact by telephone with the other PT-2 user. You should instruct the remote PT-2 user to load the TAPETR program into his PT-2.

Both PT-2's should now have the TAPETR program loaded.

Establishing TP Between Two PT-2's

The next step which has to be taken is to make sure that the two PT-2's can communicate with each other using the acoustic coupler. It is advisable at this stage to ask the remote PT-2 user if they can be contacted at a different phone number, should anything go wrong with the transmission.

1. Plug the acoustic coupler into the socket at the back of the PT-2.
2. Select the speed of transmission (600 or 1200 bps). Start with 1200 bps.
3. Press S/S TP key.
4. Listen to your coupler. It should be sending a short burst of data every three seconds. The coupler should be silent between these data bursts. If the coupler is not performing as has been described there is not point in going any further. There is something wrong with the PT-2 or acoustic coupler which must be fixed.
5. Ask the remote user to perform the previous four steps.
6. Ask the remote user to put his telephone handset into the acoustic coupler for 30 seconds only. Listen to the data bursts, they should sound very similar to the data bursts coming from your coupler. If not ask the remote user to fix the PT-2 or acoustic coupler.
7. After the 30 seconds are up and you believe that both PT-2's are performing correctly, ask the remote user to replace the telephone handset in the coupler. You should also ask the remote user to check the "TP RUN" indication on the PT-2 screen. If "TP=LN ERR" is shown on the screen for more than 30 seconds ask him to reestablish voice communication. As soon as you can hear the remote PT-2 place your telephone handset in the acoustic coupler.

8. Observe the "TP=LN ERR" condition on your screen. It should go to "TP=RUN". If not, pick up your phone, because something has gone wrong.
9. If the TP=RUN condition is shown on your screen, both PT-2's are communicating correctly.
10. You must now decide who is going to control the tape transfer operation. If the sender is going to control the operation, then follow section I below. If the receiver is going to control the tape transfer operation, then follow section II below.
 - I. If SENDING PT-2 is to control the transfer.
(RECOMMENDED)
 - a. The receiving PT-2 follows the prompting messages (He does not press any keys).
 - b. The sending PT-2 will press the PF1 key, then enter.
 - c. When prompted, "MOUNT LINE TRACE TAPE", mount the tape you wish to send.
ENTER 2 READ TRACK 2 DEFAULT IS TRACK 0. This allows selection of track 0 or 2 (Alternate), enter 0 or 2 to select track for transmission.
 - d. A message should now display, "IF THIS IS THE TAPE YOU WISH TO SEND, ENTER ALL OR FIRST RECORD NUMBER FOR TRANSFER". You would usually enter, "ALL", but if you wanted to send only part of a tape, you would enter the first record number to be sent. After entering the first record, you would be asked to enter the last record number.
 - e. As soon as you have entered your requests, a message will appear on the remote PT-2 screen, "REQUEST RECEIVED FROM SENDING PT-2 TO START TAPE TRANSFER". "MOUNT SCRATCH TAPE FOR FILE TRANSFER FROM SEND PT-2". Remote PT-2 user would then mount scratch tape to receive with.
 - II. If the RECEIVING PT-2 is to control the transfer.
 - a. The sending PT-2 follows prompting messages. He does not press any keys.
 - b. The RECEIVING PT-2 will press PF5 and then enter.

- c. Receiving PT-2 will press PF1 and then enter.
- d. Receiving PT-2 enters "ALL, or FIRST RECORD".
- e. Receiving PT-2 enters last record (if full transfer is not done).
- f. The Sending PT-2 will be prompted to put in the line trace tape to send.
- g. The RECEIVING PT-2 will be prompted to put in a scratch tape to receive with.

Once the transfer has begun, it will continue until all the tape, or records designated have been sent. Following are the possible messages that may be seen on the display, and the meanings of these messages.

MESSAGES:

"PROGRAM INITIALIZED AND READY FOR TRANSFER"

This message is posted after the program is loaded, whenever a tape transfer is completed, and after the PROG INIT key is pressed.

"WAITING FOR TAPE MOUNT ON RECEIVE PT-2"

Posted after the Send PT-2 has initiated transfer and is waiting response of Receive PT-2.

"SENDING DATA RECORDS TO RECEIVE PT-2"

Send PT-2 is in process of transferring records to Receive PT-2.

"REQUEST SENT TO SEND PT-2 FOR TRACE TRANSFER"

Receive PT-2 has received initial transfer request and has sent request for header to Send PT-2.

"RECEIVE PT-2 HAS COMPLETED TRANSFER"

Send PT-2 has received indication from Receive PT-2 that transfer is complete.

"RECEIVING DATA FROM SEND PT-2"

Receive PT-2 is in process of sending data from Send PT-2.

MESSAGES (Continued):

"TP NOT RUNNING, START TP AND REENTER REQUEST"

TP has not been started in the PT-2. TP must be started and operation begun again.

"TAPE EOF WRITTEN, WAIT FOR NEXT TRANSFER COMPLETE"

Receive PT-2 has received EOF from Send PT-2 and is waiting for transfer of another block of records or signal that transfer is complete.

"TAPE EOY WRITTEN, TRANSFER COMPLETE"

Either end of volume was set from Send PT-2 indicating full tape was transferred or block transfer was completed by use of PF3 in Send PT-2.

"NO TRACE DATA FOUND ON THIS TAPE"

Tape mounted contains no TPLM trace data.

"TAPE ERROR-READING CONFIGURATION RECORD"

Configuration record has a tape error. Transfer will occur anyway.

"RECORD NUMBER PAST EOY, PRESS "PROG INIT" KEY"

A record number was entered which was not found on this tape. Operation should be restarted and a lower record number must be entered.

"UNRECOVERABLE TAPE ERROR, PRESS "PROG INIT" KEY"

Unrecoverable tape error while reading. Operation should be restarted.

"END-OF-FILE (EOF) FOUND ON TAPE"

First EOF found on tape. If next record is also EOF transfer is complete. If data, transfer will continue.

MESSAGES (Continued):

"SELECTED RECORDS SENT. USE PF3 TO COMPLETE TRANSFER, OR"

A block of records has been sent and PT-2 is waiting for entry of additional record numbers or use of PF3 to terminate transfer.

"IF THIS IS THE TAPE YOU WISH TO SEND, ENTER "ALL", -OR-"

This message is used in conjunction with following message the first time a tape is mounted to allow user to check if correct tape is mounted and then to transfer complete tape or record blocks. PROG INIT should be used if wrong tape mounted.

"ENTER FIRST RECORD NUMBER FOR THIS TRANSFER"

This message occurs each time a new transfer is started to allow user to enter starting record of block.

"ENTER LAST RECORD NUMBER FOR THIS TRANSFER"

Message posted after first entry in response to previous message to allow ending record of block to be entered.

"TAPE FILE PROTECTED"

Scratch tape mounted for transfer is file protected and needs to be readied for write.

"NO TAPE MOUNTED, OPERATION TERMINATED"

Tape has been removed during a write operation and run has been aborted.

"END OF TAPE"

Track has been transferred and program is rewinding.

MESSAGES (Continued):

"UNRECOVERABLE WRITE ERROR"

Tape has experienced write error which will not allow transfer to continue. Operation must be restarted.

"TAPE REMOVED"

Tape was removed during a read operation. Transfer is aborted.

"ROUTE CODE NOT ACTIVE AT THIS TIME"

PT-2 has received a record from remote PT-2 and program is gotten out of step. Probably occurs because PROG INIT key pressed while transferring tape. Both PT-2's must be initialized with PROG INIT and transfer started over.

"RECEIVE TAPE RECORD IN ERROR"

or

"TRANSMIT TAPE RECORD IN ERROR"

Indicated record was found to be in error on a read operation. Transfer will continue with record flagged for Receive PT-2.

"SEARCHING TAPE FOR REQUESTED RECORD"

Program in Send PT-2 is searching for record requested before block transfer begins.

"INVALID ENTRY, ENTER ONE TO FIVE DIGITS"

Record number entered was in error. Number must be 1-5 numeric digits.

"END OF TRACE TAPE, ALL RECORDS TRANSFERRED"

End-of-volume found on trace tape in Send PT-2. User must wait for transfer complete before starting another operation.

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3790 DUMP EXTRACT PROGRAM (DE3790)

Note: This section contains operating instructions for transmitting 3790 Dumps to the Product Support Center via the PT-2.

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Dump Transmission Procedure	5-5
Operating Instructions	5-5

PURPOSE

To enhance Remote Support of the 3790 by using the PT-2/TP Line Monitor (TPLM) as the data collection and transmission vehicle.

DESCRIPTION

The PT-2, utilizing the TPLM, is used to extract 3790 dump data from a 3790 dump diskette and copy it to a PT-2 cartridge.

The PT-2 replaces today's TDAT-Controller/Host communication. The controller under test is disconnected from the Host communication network and connected via its EIA interface (LULA for LCA machines) to the TPLM on the PT-2. The PT-2 then issues the necessary commands to cause the controller to transfer the contents of the dump diskette to the PT-2 cartridge. Upon completion of the data transfer, the controller is restored to its operational state and returned to the customer.

The PT-2 can then be moved (if necessary) to a location suitable for establishing communication with the 3790 Product Support Center (PSC) to transfer the data with no further disruption to customer operation.

PROCEDURE OVERVIEW

The procedure is:

1. Take a 3790 dump
 - use existing procedures
2. Transfer from 3790 dump diskette to PT-2 cartridge
 - use PT-2 Program DE3790
3. Restore 3790 to operational state
4. Transmit PT-2 cartridge to the 3790 Product Support Center
 - use PT-2 Program UTIL

Note: Program Cartridge P/N 1650888 contains the following programs:

CLP (Operating System)
DE3790 (Dump Extract Program)
UTIL (Transmission Program)
TPLMFT (Diagnostics)
DD3790 (Dump Display)

All programs are self-prompting.

DUMP EXTRACTION PROCEDURE

1. Install TPLM on PT-2 service interface.

Note: Ensure that acoustic coupler is not installed during dump extraction procedure.

2. Power on PT-2.
3. Mount program tape P/N 1650888.
4. Press LCL IPL key.
5. When security information is requested, key in your CE serial number, branch office, and security code in the following format:

XXXXXX,YYY,ZZZ

CE serial number is important because it is used in identifying information for the dump file. Press ENTER key.

6. The SYS Control Load Program (SYSCLP) will now load automatically into the PT-2.
7. At this point, you should run the diagnostic on the TPLM adapter. The diagnostic program is TPLMFT. Load the program by keying in L TPLMFT then press SYS FUNC and ENTER keys. After TPLMFT is loaded, press PF9 and ENTER keys to start test.
8. If the diagnostic runs error free (no asterisks in the left-margin), load the dump extract program by keying in L DE3790 then press SYS FUNC and ENTER keys.

9. After DE3790 is loaded, enter incident number, customer name, your name, date, reason for dump and then press ENTER key. This data will be used as identifying information on the dump listing at PSC.
10. Using the menu provided, select the appropriate PF key option for the communication features on your 3790. Press appropriate PF key and ENTER key.
11. The PT-2 will show a schematic diagram which guides you through the physical connection to the 3790.

Notes:

- A. The jumper, if referenced, is to be installed on the PT-2.
 - B. The probes, if referenced, are to be installed on the PT-2.
 - C. For other than LCA machines, the cable, which goes from the 3790 to the modem, should be disconnected at the modem end and plugged into cable PN 1753816 on the TPLM. Do not plug the 3790 cable directly into the TPLM.
 - D. For LCA machines, install the LULA as described in 3791 Maintenance Information Chapter 2. The cable from the LULA is then plugged into P/N 1753816 on the TPLM. Do not plug the LULA cable directly into the TPLM.
12. When you have completed the installation, press ENTER key.
 13. Mount a non-file protected cartridge. The dump will be written onto this cartridge.
 14. Once the cartridge is mounted and rewound, you will see the message

START DUMP TRANSMISSION AT 3790

and the PT-2 display will contain a series of F's.

At this time, initiate the dump transmission at the 3790. Follow the Dump Transmission Function in 3791 Maintenance Information Chapter 3.

At Step 4, enter Data 1, Function B

At Step 5, enter Function B only.

15. If the dump transmission is proceeding, you will see the count in the 3791 LED stepping down by 4 every 3-4 seconds and the actual dump data being displayed on the PT-2.
16. When the 3791 LED reaches D000, the dump extract program will terminate automatically and you will receive the message

**DUMP ENDED. PRESS ENTER TO START
ANOTHER DUMP**

17. File protect the cartridge containing the dump.
18. The dump extraction is now complete. Restore the 3790 to its operational state and return to customer.
19. Remove any jumpers/probes installed on PT-2.
20. If moving PT-2 to another location for the transmission process, power off and remove TPLM.
21. Otherwise, mount the program cartridge, and go to Step 7 of Dump Transmission Procedure.

DUMP TRANSMISSION PROCEDURE (PT-2 to PSC)

1. Move PT-2 to a location suitable for establishing communication with 3790 PSC.
2. Power on PT-2.
3. Mount program tape P/N 1650888.
4. Press LCL IPL key.
5. When security information is requested, key in your CE serial number, branch office number, and security code in the following format:

XXXXXX,YYY,ZZZ

Press ENTER key.

6. The SYS Control Load Program (SYSCLP) will now load automatically into the PT-2.
7. Set speed switch to 1200.
8. Install and turn ON acoustic coupler.
9. Load the dump transmission program (UTIL) by keying in L UTIL then press SYS FUNC and ENTER keys.
10. After UTIL is loaded, mount the file protected cartridge containing the dump.

11. Press PF1 and ENTER keys. This selects the 'Send Tape Track to TP' option.
12. Enter the track # and press ENTER key. This specifies track to transmit from the cartridge.
13. Press the S/S TP key. The message TP=START should appear. This enables the PT-2 for TP operation. TP=START will change to TP=LN ERR after 5-8 seconds and remain in this mode until the TP connection is established.
14. Press ENTER key.
15. At this point, contact the Field Support Center (FSC) and tell FSC that you are ready to transmit a requested 3790 dump to PSC using a PT-2.
16. FSC will transfer your call to PSC. PSC will instruct you when to place the telephone handset in the acoustic coupler. Be certain to insert the handset firmly and in the direction shown on the acoustic coupler cover.
17. The message TP=LN ERR will change to TP=RUN and dump transmission will begin. The message

'CCCC RECORDS OF (DPEX,XXXXXX,000)
REMAIN TO BE TRANSFERRED'

will appear. CCCC is the count of records transmitted (disregard the portion of the message 'REMAIN TO BE TRANSFERRED') and XXXXXX is CE serial number. If transmission does not begin or the record count does not change for five minutes, notify PSC.

18. Upon completion of the dump transmission, you will receive two messages:

U041 EOVS SENT. WAIT FOR 'FILE TRANSFER COMPLETE' MSG.

U040 FILE TRANSFER COMPLETED FOR (DPEX).

HIGH SPEED TRACE (HIBSTR/HISDTR)

HIBSTR/HISDTR are programs which reside on the TPTOOL tape at EC 1800 or higher. It is used to monitor high speed data streams with the EDF (Cartridge) PT-2. Depending on line speed, load factors, and recording modes, the PT-2 will record continuously, or take windows out of the data stream.

Example:

- A. CONTINUOUS (PF9): Up to 38.4 KBIT/SEC, BSC or SDLC trace data is buffered and written to tape in parallel. Depending on line speed and load factors (repetitive characters between frames which will be compressed) the PT2 will either record continuously, or take windows out of the data stream which contain a minimum of 50 K Bytes of trace data. (RCV. TRANSM. and CTRL.)

Note: SDLC data above 38.4 KB may cause PT2 overruns.

- B. SNAPSHOT (PF10): Up to 56 KBIT/SEC. Trace data is wrapped through a 40 K buffer. PF Key 7 or an optional probe change (if selected) stops tracing and starts writing the buffer to tape. Trace tapes should be analyzed with the scan programs at EC 1800. A buffer, full condition during tracing, will be indicated in PF8 mode by the char's '#BF' in SDLCAN and BSCANR.

R-LOOP terminals or controllers can be monitored with the PT-2 by connecting the TPLM via the probes to the LSA card. Set the TPLM technology switches to STL/VTL. For full set up to the PT-2 for using the technology probes. Reference Page 2-6 for connections.

Recording transmit and receive above 38.4 KB may cause PT-2 overruns. Tapes recorded using HIBSTR/HISDTR can then be analyzed using the TPTOOL program or SNAPED program.

PROCEDURE

1. Load the standard TPTOOL program and select options.

Note: See section on using PT-2 for tracing lines.

2. After the speed check (RC=XXXX TC=XXXX), you will be prompted to hit the enter key to load the trace program, or to key in "HIGH" (H) and then enter to load the HIBSTR/HISDTR program.
3. The HIBSTR/HISDTR program will now load and prompt you to select the options (continuous or snap shot). In continuous mode (38.4 or below), all data is recorded on tape. In snap shot mode, you have to hit the PF7 key to write approximately 40 K bytes of compressed data to tape. During the time the record is being written to tape, tracing of the line ceases. In snap shot mode, you must be aware of when an error occurs, so you can hit the PF7 key and write the error record to tape before it is overlaid with new data.
4. When finished tracing, you MUST USE the PF1 key to terminate the tracing. After the tape rewinds, remove the trace tape, hit SYS RESET key on the PT-2 and put in the TPTOOL tape to load TPTOOL or SNAPED to analyze the tape just made.

SPECTRON[®] T-611 FOR HIGH SPEED LINES

The Spectron T-611 is available through Region Support for tracing high speed lines up to 56 kbps. This device is used for recording and playback only. It has no display from which to view the data. When the data is trapped, the tape can be played back to the PT-2 for creating a tape which can be viewed on the PT-2.

After the tape was first recorded on the T-611, you would set up the PT-2 as for monitoring high speed lines (see section on HSPT-2).

After the error is played to the PT-2, it can be analyzed using TPTOOL or SNAPED.

Note: While recording you have only two minutes to stop the tape on the T-611 after an error occurs.

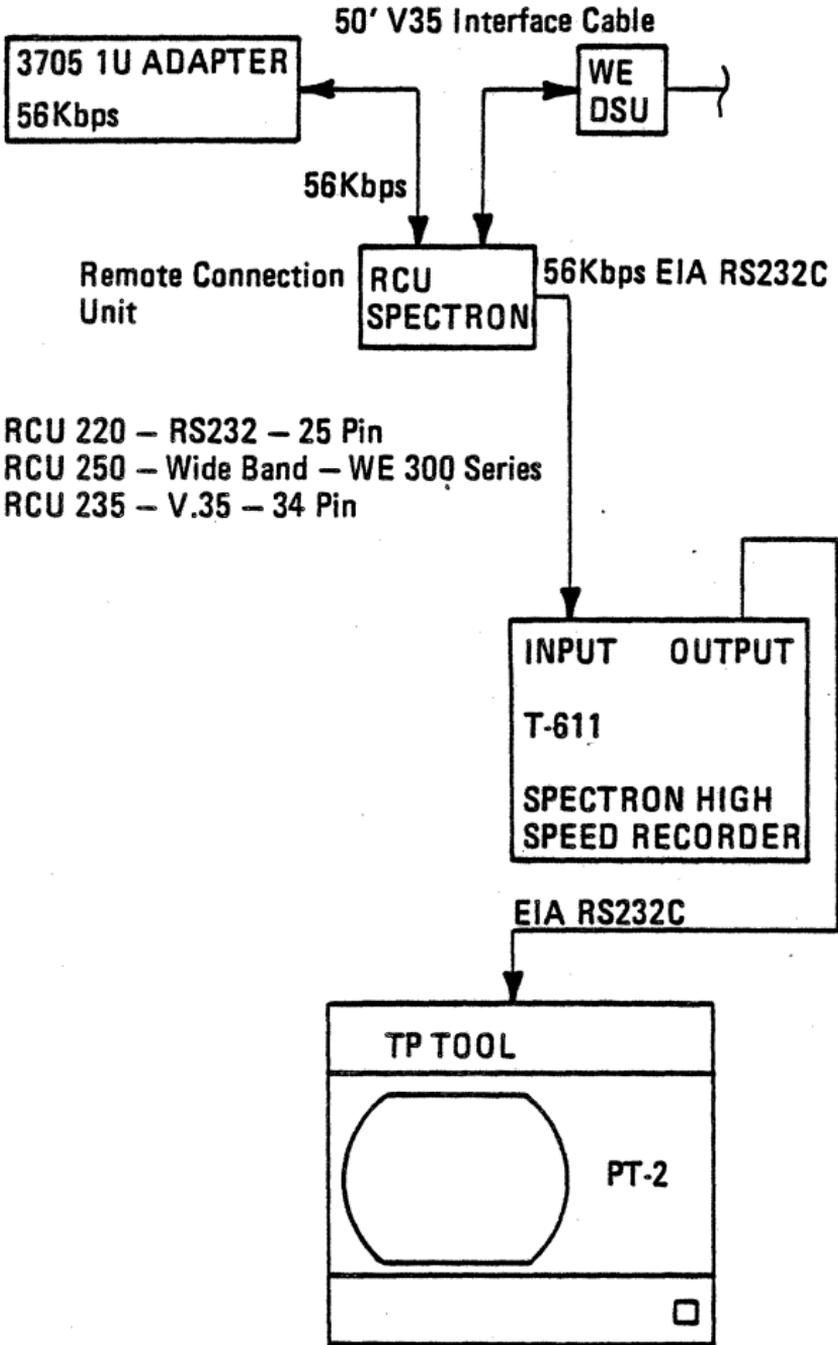
An instruction manual is sent with the Spectron T-611 to give you complete instructions for using it. The manual sent with the T-611 should be used when operating the T-611, however, the following will show some of the basic switches and indicators, and how to hook up the T-611 for monitoring and playing back to the PT-2.

REMOTE CONNECTION UNIT (RCU)

The RCU provides isolation and amplification for the leads in the interface specified on the reverse side. The remaining leads are forwarded through the RCU by direct metallic connections. Each RCU required dc power at ± 10 to 15 volts and draws a maximum of 60 milliamperes from each polarity. This power may be obtained at the user's option from the associated modem (if available), from the associated business machine or monitoring device (DATASCOPE), or from a separate power supply. The usual arrangement is to obtain power from an associated monitoring device and all DATASCOPIES are equipped to supply it. Each RCU is housed in a cast aluminum case which is electrically connected to Frame Ground, but not to Signal Ground. Three interface connectors provide for connection to the modem, the business machine and a monitoring device. The monitoring connector is a DB-25S in every instance.

[®] Trademark of Spectron Corporation

The connection is as follows:



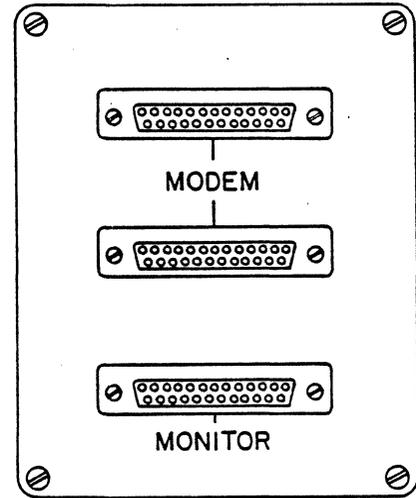
RCU-220*

INTERFACE: EIA RS-232

CONNECTORS: 3 DB-25S

DB-25S Pin No.	Name	Mnemonic	Isolated or Direct
1	Frame Ground	FG	D
2	Send Data	SD	I
3	Receive Data	RD	I
4	Request to Send	RS	I
5	Clear to Send	CS	I
6	Data Set Ready	DSR	I
7	Signal Ground	SG	D
8	Carrier On	CO	I
11	Supervisory Transmitted Data	SDT	I
12	Supervisory Received Data	SRD	I
14	New Sync	NS	I
15	Serial Clock Transmitter	SCT	I
17	Serial Clock Receiver	SCR	I
20	Data Terminal Ready	DTR	I
22	Ring Indicator	RI	I
24	Serial Clock Transmitter External	SCTE	I
9, 10, 13, 16, 18, 19, 21, 23, 25	Unassigned	-	D

*1650 Gould, Inc. trademark of Gould, Inc.
Spectron Corp. trademark of Spectron Corp.



RCU-235 *

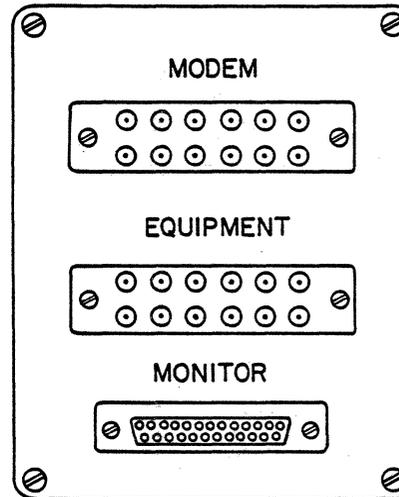
INTERFACE: CCITT v.35

CONNECTORS: Winchester MRA 34SJ602

Winchester Pin No.	DB-25S Pin No.	Name	Mnemonic	Isolated or Direct
A	1	Frame Ground	FG	D
B	7	Signal Ground	SG	D
C	4	Request to Send	RTS	I
D	5	Clear to Send	CTS	I
E	6	Data Set Ready	DSR	I
F	8	Carrier Detect	CD	I
H	20	Data Terminal Ready	DTR	I
J	22	Ring Indicator	RI	I
R, T	3	Receive Data	RD	I
V, X	17	Serial Clock Receive	SCR	I
P, S	2	Send Data	SD	I
Y, a	15	Serial Clock Transmit	SCT	I
U, W	24	Serial Clock Transmit External	SCTL	I
K, L, M, N, Z, b, c, d, f, g, h, i, j, k, m, n		Unassigned	-	D

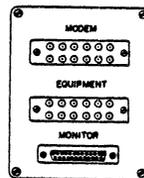
*1650 Gould, Inc. trademark of Gould, Inc.

Spectron Corp. trademark of Spectron Corp.

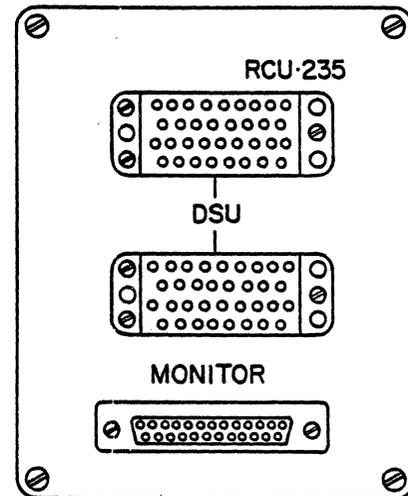


RCU-250*

**INTERFACE: Wideband (Current)
WE Type 303 or Equiv.
CONNECTORS: Burndy MD12-MXR-8
(Coaxial)**



Burndy Pin No.	DB-25S Pin No.	Name	Mnemonic	Isolated or Direct
A	16	Dibit Clock Transmit	DCT	I
B	-	Dibit Clock Transmit, External	DCTE	D
C	5	Clear to Send	CS	I
D	4	Request to Send	RS	I
E	2	Send Data	SD	I
F	6	Data Set Ready	DSR	I
G	18	Dibit Clock Receive	DCR	I
H	24	Serial Clock Transmit, External	SCTE	I
J	15	Serial Clock Transmit	SCT	I
K	3	Receive Data	RD	I
L	17	Serial Clock Receive	SCR	I
M	8	Carrier Detect	CD	I
F (outer)		Ring Indicator	RI	I
M (outer)		Data Terminal Ready	DTR	I
-	1	Frame Ground	FG	D
C,D,E,G,H J,K & L (outer)	7	Signal Ground	SG	D
	9-14, 19-23, 25		Unterminated	



*1650 Gould, Inc. trademark of Gould, Inc.
Spectron Corp. trademark of Spectron Corp.

3.0 CONTROLS AND INDICATORS

3.01 TAPE CONTROLS

- 3.01.1 **RECORD** — Initiates record operation; light indicates recording in progress. (Tape must be idle to initiate Record; cartridge write lockout must not be in the "SAFE" position.)

Moves tape at high speed to its physical beginning; writes Tape Mark; begins recording from line; when Record operation terminates, another Tape Mark is written.

- 3.01.2 **RECORD OVERRIDE** — Eliminates rewind prior to record if held depressed while record button is operated.

- 3.01.3 **REWIND** — Positions tape at the beginning of recorded information; light indicates rewind in progress. (Tape must be idle or in Replay to initiate Rewind.)

Moves tape at high speed to its physical beginning; reads forward to first Tape Mark, stops and returns to Replay.

- 3.01.4 **REPLAY** — Breaks connection between input and output, connects tape unit to output interface and initiates replay operation; light indicates replay in progress. (Tape must be idle to initiate Replay.)

Reads forward to next Event Mark and stops. While reading, tape buffer unloads to the output interface at rate set by Replay Speed. New block is read from tape when tape buffer is empty.

- 3.01.5 **IDLE** — Terminates Record, Replay or Rewind operations and restores connection between input and output. Light indicates tape idle.

Note: The connection between input and output remains at all times except when replay is in progress. This allows a DATASCOPE connected to the output interface of the T-611, to display from line or from tape in a normal manner.

- 3.01.6** **EVENT MARK** – Records Event Mark on tape while button is held down and activates the tape save feature (See 3.01.9 and 3.01.11). (Functions only in Record mode.)
- 3.01.7** **FAST FWD** – Moves tape forward at high speed while button is held; resumes replay when button is released. (Functions only in Replay.)
- 3.01.8** **FAST REV** – Moves tape backward at high speed while button is held; resumes replay when button is released. (Functions only in Replay.)
- 3.01.9** **BACK STEP** – Moves tape backward slightly more than two screens and resumes reading. (Functions only in Replay.)
- 3.01.10** **EVENT (light)** – Indicates when an Event Mark is being recorded or replayed from tape.
- During a record operation, this light comes on when the **EVENT MARK** button is depressed or when an external event signal occurs. If the **SAVE/CONT** switch is in the **SAVE** position, the light goes out at once. In the **CONT** position, the light remains on until reset by downward depression of the **SAVE/CONT** switch.
- During Replay, the light indicates that an Event Mark has been read from tape.
- 3.01.11** **READY (light)** – Indicates when the tape cartridge is fully inserted to permit record or replay function.
- Note: This indicator does not indicate the status of the cartridge write lockout feature.
- 3.01.12** **TRACK (4 lights)** – Indicates which of the four tape tracks is currently active for record or replay.
- 3.01.13** **SAVE/CONT** – Selects either fixed length or continuous recording. (Functions only in Record.)
- In the **SAVE** position, record operations always terminate at the end of Track 4.

In the **CONT** position an endless loop format is used with recording alternating among the four tracks to retain a "moving history" of line activity.

When an event mark signal is received, either through manual operation of the **EVENT MARK** button or from an external source, the record operation is terminated after completing the track being recorded plus two more full tracks of data. Further downward movement of the switch past its center position, resets the event mark and allows recording to continue in endless loop fashion.

3.01.14 EJECT — Releases tape cartridge. (Functions only when tape is idle.)

3.02 LINE SPEED

3.02.1 KBPS — Determines the range of line speeds that can be recorded. Select the range within the limits indicated.

0 - 11 Kbps

11 - 44 Kbps

44 - 56 Kbps

Note: The **KBPS** switch determines tape velocity and recorded block length only. It must be set to the correct range whether modem or internal clock is used.

3.02.2 TOO FAST (light) — Indicates line speed is faster than the maximum selected by the **KBPS** switch.

3.02.3 INTERNAL/MODEM — Selects source of clock.

MODEM position selects serial clock signals from modem (EIA pins 15 and 17) for bit synchronization.

INTERNAL position selects internal clock recovery circuits for bit synchronization. Input bit rate is determined by setting of thumbwheel switch.

3.02.4 THUMBWHEEL SWITCH — Determines internal clock rate. Standard speeds are: A-50; B-74.2; C-110; D-134.5; E-150; F-300; G-600; H-1050; I-1200; J-1800; K-2000; L-2400; M-3600; N-4800; O-7200; P-9600.

- 3.03** **REPLAY SPEED** – Controls the rate at which data is read from tape and thus the speed at which the data is presented to the output for display on a DATASCOPE. (See 4.02.)
- 3.04** **RUN/STOP** – Controls flow of data to the output interface and thus to the external DATASCOPE display. When display is on-line (T-611 input connected to its output), **STOP** freezes the display without interrupting data recording in the T-611; **RUN** restarts the display without clearing the screen. (This will produce a discontinuity in the display because of the time difference between "old" and "new" data. Using the **RUN/STOP** switch on the DATASCOPE avoids this problem by clearing the screen on **RUN**.)
- In Replay, (T-611 output connected to tape) **STOP** freezes the display and stops the tape; **RUN** restarts the display and resumes reading from tape without display discontinuity or loss of data.
- After detection of an Event Mark or a Tape Mark, or when returning to Replay after the tape has been moving at high speed, the display will freeze and the tape will stop. To resume reading from tape the **RUN/STOP** switch must be moved to **STOP** and back to **RUN**.
- 3.05** **LAMP DISPLAY** – Light Emitting Diodes (LED's) display all primary leads (15) of the RS-232 interface. Pins 1, 7, 9, 10, 11, 12, 13, 18 and 19 are omitted. Light ON indicates RS-232 signal is positive.
- 3.06** **TEST JACKS** – Test Jacks on the rear of the unit allow direct oscilloscope monitoring of all interface signals displayed. One additional jack provides Signal Ground (EIA pin 7), marked **GND**.
- 3.07** **EVENT** – Two additional jacks are provided to the right of the interface display to accept external EIA signals to record Event Marks on either rising (+) or falling (-) edges of the external signal.

3.08 **POWER** – Switch controls AC power; light indicates when power is on.

4.0 INPUTS AND OUTPUTS

4.01 EIA Bridging Connections

Two 25-pin female connectors (DB-25S) wired in tandem pin-for-pin (except pins 9 and 10) for routing the business machine-to-modem connection through the Tape Unit. A high impedance bridging tap is connected to each lead of the interface (except pins 1, 7, 9, 10, 11, 12, 13, 18 and 19) for monitoring without adding electrical loading.

Pin 7 is used as a signal ground reference and is connected to pin 1 and to the Tape Unit frame. Pins 9 and 10 have no connection on one of the tandem connectors (marked MODEM). On the other (marked BUS MACH/RCU) they are connected respectively to ± 12 volts from within the Tape Unit. This connector is also used for input from a Remote Connection Unit (RCU) and provides the power necessary for RCU operation.

Note: Although operation on RS-232 signals without an RCU is possible, it requires that the cable from business machine to modem be routed through the Tape Unit. An RCU avoids this necessity and makes use of the T-611 more convenient. Of course, for signals other than EIA, an RCU is required for conversion to RS-232 standards.

4.02 Output Connector

A 25-pin female connector (DB-25S) is provided for connection to the EIA input of a DATASCOPE, Model D-600 or D-601. The following signals are present: SD (2), RD (3), RTS (4), CD (8), SCT (15), and SCR (17). Signal Ground (7) and Frame Ground (1) are connected the same as described in 4.01 above.

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PT-2/BIOMATION
APPLICATION PROGRAM
DESCRIPTION AND OPERATING
INSTRUCTIONS

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PT-2/BIOMATION[®] 1650 APPLICATION

1. INTRODUCTION

This application assumes a prior knowledge of PT-2 operation and of the Biomation 1650 Logic-Recorder.

There are two documents which are used with this publication and should be readily available. They are:

PT-2 Operation, Maintenance, and Parts Manual
Form S226-3928, and
Biomation Operating Manual

2. OBJECTIVES

This application of the PT-2 allows a Biomation 1650 Logic-Recorder to connect to the PT-2 SIFC. With this arrangement, all recordings taken by the Biomation can be stored on the PT-2 tape. The PT-2 can then "re-arm" the Biomation to make it ready to record further events. In this way, the Biomation can be left attached to a system having highly intermittent failures, without requiring constant intervention by a qualified CE specialist. All recordings stored on tape can be used at a later time under control of the LR1650 application program. The TP capability of the PT-2 will allow remote analysis of tape recordings and remote operation of the PT-2/Biomation set-up. All recordings can be time-stamped by a time of day clock provided in the program.

3. EQUIPMENT AND PROGRAM REQUIREMENTS

3.1 Hardware

1. PT-2
2. Biomation 1650
3. Connection cable (for layout see appendix)

3.2 Software PART #1650897

1. TABOOT - level 240 or higher
2. SYSCLP - level 240 or higher
3. LR1650 - level 241 or higher
4. UTIL - level 240 or higher (if TP is required)

4. INITIAL SET UP

- 4.1 Install the Biomation 1650 and the PT-2. The distance between the units is not to exceed 8 feet.

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- 4.2** Install the Biomation probes as required. As an initial setting for the Biomation, the following switch settings can be used:

For both channels 1-9 and 9-16 set –
Input Mode switches to LATCH
Threshold switches to X10TTL.

For the rest of the switches set –
Trig Source to INT(T)
Record Mode to PRE TRIG
PRE TRIG Memory/TRIG Delay to 0250
Horizontal to X1
Internal Clock to rotary switch to .02
Internal Clock to micro sec
Channel Switches 1-16 to ON
Clock Source to INT
Combinational Trigger switches 1-16 to 'X'
AC power to ON.

Observe that all of the channel lights are on. Momentarily move the Manual switch (top row) down to the ARM position and observe that the TRIG READY light comes on. Momentarily move the Manual switch up to the TRIGGER position and note that the TRIG READY light goes off. If a scope is hooked up to the Biomation, check that there are 16 horizontal lines on the display. (Cabling of the Biomation to a scope is shown in Figure 1.)

- 4.3** Install connecting cable between the PT-2 SIFC Connector 1 and the Biomation Digital Interface connector on the back panel. (See Figure 1 for locations.)
- 4.4** IPL the PT-2, enter the required security information, and load the application program LR1650 by typing, L LR1650 and pressing SYS FUNC and ENTER.
- 4.5** Set auto-arming by pressing PF1 and ENTER keys or set not auto-arming by pressing PF2 and ENTER keys as required. This sets a program switch in routine 'Read Biomation Memory, Record on Tape' (PF3), section 5.5, and must be done prior to selection of that routine.

This completes the initial set-up of equipment. For selection of the options contained in LR1650 application and proper usage of the PT-2/Biomation combination, refer to Section 5.

It is recommended that a check of the hardware and PT-2/Biomation be made prior to each installation. Use routine 'Scope Biomation Memory and Display' (PF6) described in Section 5.3.

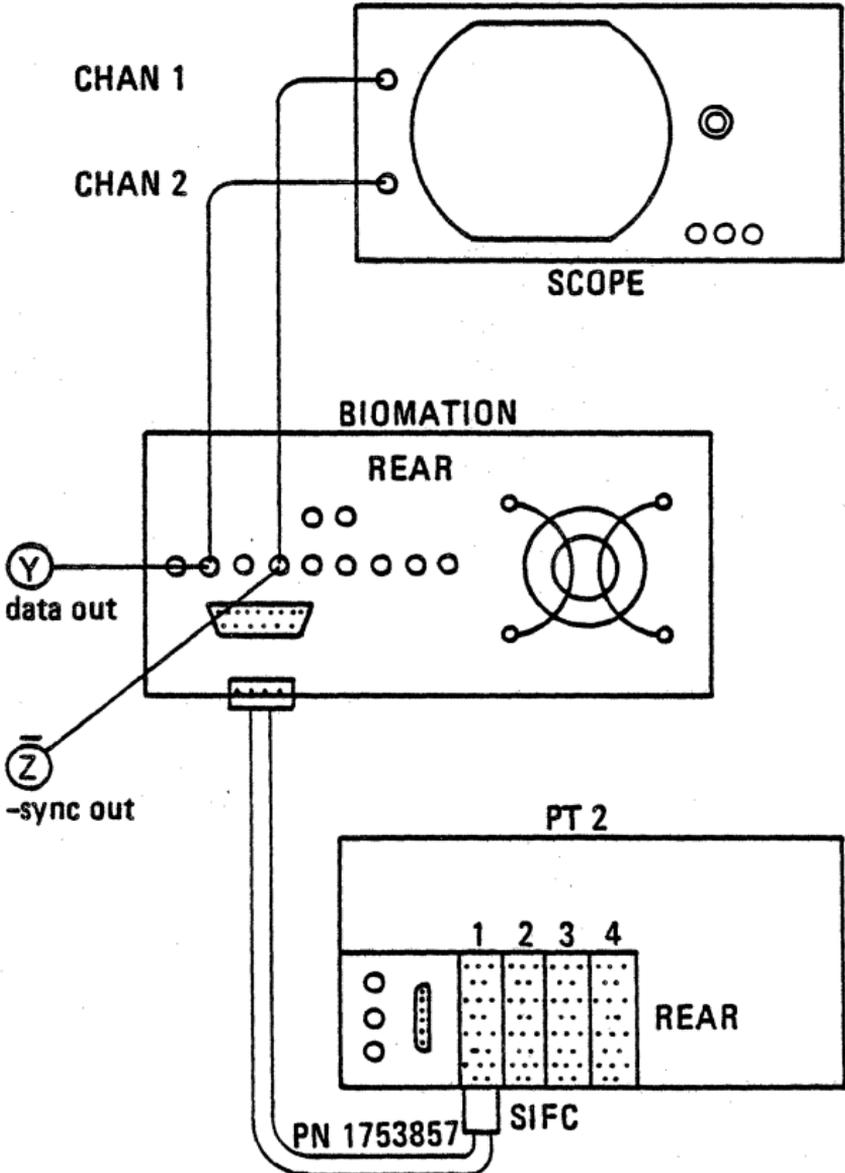


Figure 1. PT 2 to Biomation Connections

5. OPTIONS AND OPERATING INSTRUCTIONS

5.1 General Description

Application program LR1650 offers six options available by depressing the appropriate PF key. They will be listed below and described in the order in which they are generally used. They are:

PF1 – Set Auto-arming

PF2 – Set Not Auto-arming

PF6 – Scope Biomation Memory and Display

PF5 – Set Time and Date

PF3 – Read Biomation Memory, Record on Tape

PF4 – Display Tape Record

These options are displayed in numerical order on the PT-2 display after LR1650 is loaded. At any later time they can be re-displayed by use of the "MENU" key.

5.2 Set Auto-arming (PF1) and Set Not Auto-arming (PF2)

These keys are self-explanatory. They set a program switch in the routine 'Read Biomation Memory, Record on Tape' (PF3) and must be used prior to the selection of that routine.

5.3 Scope Biomation Memory and Display (PF6)

This routine is a link of routine (PF3) 'Read Biomation Memory, Record on Tape' and (PF4) 'Display Tape Record', bypassing the tape operations. It will display the Biomation data directly on the PT-2 display without writing on tape. This routine can be used to check the PT-2/Biomation hookup. After PF6 and ENTER are pressed, the following message is displayed;

**ENTER (G)O AFTER BIOMATION SET UP, OR
(A)LTER.**

This allows time to set up the Biomation if this is not already done. The 'G' and the ENTER keys are pressed.

Then the message is displayed;

BIOMATION RECORD TRANSFER IN PROCESS

followed by;

ENTER CHANNEL DISPLAY SEQUENCE (6,11,2,16).

A response of the sequence desired can be entered or if the sequence 1-12 is appropriate, just the ENTER key can be pressed. The next message displayed is;

ENTER MODE (A) = 1:1, (B) = 1:10.

If 'B' is selected, the entire 500 bits of a Biomation line can be displayed at one time. If just the ENTER key is processed, the default 'A' will be taken. After the selection is made, 12 lines of Biomation data will be displayed on the PT-2 screen.

5.4 Set Time and Date (PF5)

This routine sets and updates a 'Time of Day Clock'.

When the PF5 and ENTER keys are pressed, the message is displayed;

ENTER TIME AND DATE (HH,MM,SS,MO,DD).

Entering this information caused the following message to be displayed;

TYPE (G)O TO START TIMER, OR REENTER.

Pressing 'G' and the ENTER key will start the timer incrementing at one second intervals. Be aware that it does not do month changes. It will count the 'day' up to 99, so it should be set up again on the first day of the month.

5.5 Read Biomation Memory, Record on Tape (PF3)

A 'Set Time and Date' (PF5) should be done prior to executing this routine to insure that a proper time stamp is available.

This routine will read the data stored in the Biomation storage and record it on the PT-2 tape. When the PF3 and ENTER keys are pressed, the message is displayed;

IF YOU DO NOT WANT TO ADD A FILE ENTER (N)O.

By entering 'N', a new tape will be created and will start with file name BI0001. Each file is given a unique file name from BI0001 to BI0999, which will be used as a search argument for addition of files and by the (PF4) 'Display Tape Record' routine. If just the ENTER key is

pressed, you will be able to add a file to an existing tape and will get the message;

ENTER NAME (BIO...) THAT NEW FILE SHOULD BE RECORDED AFTER.

The response to this message is either a file name or just the ENTER key. If just the ENTER key is pressed, a file will be added to the end of the existing file(s). The new file name will be displayed on the PT-2 screen. The routine will now prompt you to enter text for the information record. Up to 8 lines of text (line 2 through line 9 of the information record) with a maximum of 60 characters per line can be entered.

Each tape file created has a 32 byte header and can contain up to 100 Logical Biomation records. Each logical record is made up of two physical records; an information record and a 1024 byte data record. The 100 logical records are numbered from 00 to 99. It is the CE Specialist's responsibility to make the text of the information record as meaningful as possible. The recommended text would contain the probe points for all channels, the trigger, type of failure, and other information that may be required for analysis at a later time. It should contain the internal time base setting and the trigger (internal or external) data. The information record also contains the time of day and date.

After the CE Specialist has entered all the required text information, the message is displayed;

ENTER (G)O AFTER BIOMATION SET UP, OR (A)LTER.

'A' is entered, the test for the information record can be changed or completely set-up again. For any text line to be left unchanged, just press the ENTER key when that line number is displayed. At this time the opportunity is given to make sure that the Biomation is set-up. When 'G' is entered, the program goes into a loop, polling for keyboard entries and 1650 status indicating that a recording into its memory has taken place. As soon as the program finds the latter condition, it starts to read out the 1024 bytes of stored data. It creates a logical "Biomation Record", writes the record on tape, and re-arms the Biomation (if Auto-arming is set - PF1). The Record No. in

the middle of the PT-2 screen will be updated to show the record count.

The program goes back to its polling loop, waiting for another recording to be done. All recordings done by the Biomation are time stamped and saved on the PT-2 tape for later analysis. This enables unattended operation on highly intermittent problems. The time stamp provided allows easy correlation to the error recording entries taken by the Operating System. The PT-2 will continue recording until (H)ALT or (A)LTER is entered or until the record count reaches 99 (100 records).

5.6 Display Tape Record (PF4)

This routine will search the tape for the record to be displayed and then display it on the PT-2 screen. When the PF4 and ENTER keys are pressed, the following message will be displayed;

ENTER FILE NAME (BIO. . .).

At this time the specific file name will be searched for or, if only the ENTER key is pressed, the tape will be positioned to read the first file on the tape. Then the message will be displayed;

ENTER RECORD NO (. .).

The response to this message can be the exact record number within the file or just the ENTER key, which will cause the first record on the file to be read. The next message will be;

IF YOU WANT THIS RECORD, TYPE (Y)ES OR FILE NAME OR RECORD NO.

The information record, time stamp, file name, and record number will be displayed. The CE Specialist can now decide whether he wants to see this record or wants to search for a different file or record. If 'Y' is entered, the following message will be displayed;

ENTER CHANNEL DISPLAY SEQUENCE (6,11,2,16).

The CE Specialist may enter which twelve out of the sixteen 'channels' he wants to be displayed. The channel number is chosen in sequence from top to bottom. Multiples of the same channel number are possible. If only the ENTER key is pressed, the program uses the last entry

or, if there was none, the default of 1 to 12. The next message to be displayed will be;

ENTER MODE (A) = 1:1, (B) = 1:10.

After either 'A' or 'B' is entered, the data record will be displayed.

Mode A (1:1) represents every storage bit with one display character. Logical zeroes (down level) are represented by a dash (—), logical ones (up level) by a numeric one (1). In addition to the twelve lines, there is a line labeled 'Clock' which is numbered to give the relative position of each bit in the display. The CE Specialist may enter the clock reference number at which the displayed portion of the recorded data is to start. Each successive depression of the ENTER key advances this starting position by thirty, thus providing easy browsing of the record.

Mode B (1:10) displays 10 storage bits in one display character. A one is displayed if any or all of the condensed bits are ones. A zero is only displayed if all condensed bits are zero. In Mode B, the entire storage content is displayed at one time. This enables easy selection of the area of interest for expanded display by use of the numbered 'Clock' line. Pulse length calculations can be done by multiplying the number of clock times read out from the clock line by the Biomation time base that was used.

The information record can be reviewed any time by depression of the NEXT DISP key. If the Menu is displayed instead of the information record, press the Menu key to redisplay the information record. To display the previous screen, press the NEXT DISP key again. To end the display of the current record and eventually switch to another one, the CE Specialist can enter 'E' at any time. This will again give the option to select a file and/or record.

6. REMOTE SUPPORT (TP) APPLICATION

By use of the TP capability of the PT-2, remote support of the on-site CE Specialist by a remote specialist is possible in two ways: The remote specialist takes full control of the PT-2/Biomation set up after the TP link is established, or the data recorded on the local PT-2's tape is transmitted to the remote locations PT-2 and recorded on

the support location's tapes. It can then be analyzed at the support location using the LR1650 application program without the need of a permanent TP link and a Biomatron. Details of how to establish remote control and transfer tape data using the "UTIL" program are given in the PT-2 "Operation, Maintenance, and Parts" Manual, supplied with each PT-2, starting on page 1-35.

After the TP link is established, the operation of the LR1650 program from the remote location is the same as for local operation. However, the response time at the remote site is much slower due to the relative slow TP data transfer. An on-site CE Specialist will be needed to make the necessary switch settings, cabling, and probe hook-up.

7.

LAYOUT OF PT-2/BIOMATION 1650 CONNECTION CABLE

PN 1753857

<u>PT-2</u>		<u>BIOMATION</u>		
<u>PIN #</u>	<u>LINE NAME</u>	<u>PIN #</u>	<u>LINE NAME</u>	
32	DIW1-B0	21	Data Out 8	
31	S			
34	DIW1-B1	24	Data Out 7	
33	S			
36	DIW1-B2	23	Data Out 6	Data
35	S			
38	DIW1-B3	22	Data Out 5	Biomation
37	S			
40	DIW1-B4	17	Data Out 4	TO
39	S			
42	DIW1-B5	16	Data Out 3	PT-2
41	S			
44	DIW1-B6	19	Data Out 2	
43	S			
46	DIW1-B7	18	Data Out 1	
45	S			
48	DOW0-B0	3	Output Request	
47	S			
50	DOW0-B1	10	Remote Arm	
49	S			Control
52	DOW0-B2	11	Trigger	
51	S			Lines
54	DOW0-B3	2	Command	
53	S			
15	DIW0-B0	12	Record	Sense
14	S			
17	DIW0-B1	5	Trigger Ready	Lines
16	S			

Connectors: A. On PT-2 end – P/N 2127355 with 28 pins P/N 2122259

B. On Biomation end – Amphenol P/N 57-30240 (No IBM P/N)

PTZ Program Tape PN 1650897

TABOOT	0240
INDEX	0240
SYSCLP	0240
UTIL	0240
LR1650	0241
LR8200	0241

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PT 2 CHANNEL MONITOR

The Channel Monitor (CM) is an adapter designed for the PT 2 to allow monitoring the 360/370 channel, and the CTLI dasd interface. It can store and write to tape, tag changes, buss data and error indications. It has the ability to rearm and start recording without any manual intervention. The tape can be read and examined with a hi level editor program, that allows varied search arguments and display options.

The Channel Monitor is a region tool and should be used with the help and guidance of a CE who is trained on its use.

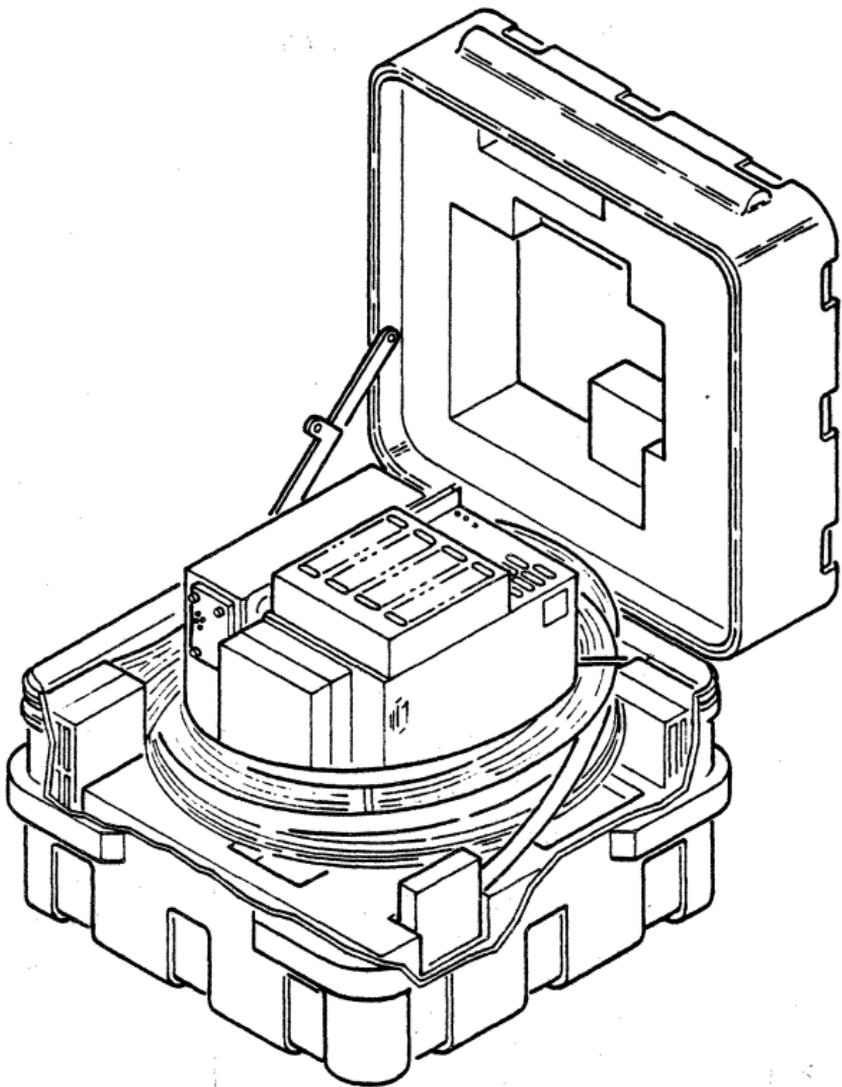
CHANNEL MONITOR PARTS LIST

<u>Item</u>	<u>P/N</u>	<u>Quantity</u>
Channel Monitor (110V)	1762911 }	1
Channel Monitor (220V)	1762912 }	
Channel Interface Unit	1753372	1
Application Tape	1857013	1
Blank Tape	1753847	1
Instruction/Parts Manual	No Number	1
Bus/Tag Cables	1857018	2

The Channel Monitor (CM), when connected to the PT-2 Service Processor, will allow the PT-2 to record signal transactions on the 360/370/4300 I/O Channel Interfaces and the Direct Access Storage Device CTL-1. Data recorded include the status of all tag and control lines; data on bus in, bus out or tag bus; a 16-bit time-stamp; error/exceptional conditions; and indicators as to what event caused the store cycle to be taken. All of the data is transferred simultaneously into the PT-2 as one 64-bit SIFC word for each store cycle taken by the CM. CM store cycles are normally taken each time a tag or control line on the monitored interface becomes active.

PT-2/Channel Requirements

The CM will function with all PT-2's that have Extended Display Feature (EDF) and with all announced channels except the 370 two-byte-wide channel.



PT-2 Limitations

Because the data transfer speed of the monitored channels often equals or exceeds the speed of the PT-2 SIFC interface, the PT-2 cannot run any user programs concurrent with CM operation.

HARDWARE OVERVIEW

Physical Description

The CM consists of two cable-connected units, the Adapter box and the Tee-Connector box.

The Adapter box (9" x 9" x 5", 12 lbs.) physically and logically attaches to PT-2 at the SIFC connectors. Permanently attached to the Adapter box is a twelve (12) foot cable with a plug on the far end to mate with the Tee-Connector box.

The Tee-Connector box (11" x 8" x 3", 3 lbs.) is a minimum cost unit that connects directly into the bus and tag cables of a channel string (bus and control cables of a DASD interface).

Circuit Overview

The CM Adapter basically consists of an Input Register, a Queue Register, a Timestamp Counter, Allow Store Controls, a First-In-First-Out (FIFO) buffer array, Stop Controls, and clock circuits. The Tee-Connector box contains NPL-to-TTL level converters and diagnostic circuitry.

SWITCH, INDICATORS, AND STOP HUB DESCRIPTION

ON/OFF SWITCH – Controls the supply of AC power to the Channel Monitor.

POWER ON INDICATOR (RED) – This LED will light when D.C. voltage is present in the Channel Monitor.

RECORDING INDICATOR (GREEN) – This LED will light each time a trace or snapshot occurs on the CM during a channel trace. This indicator may be ON or OFF when power is first applied to the CM.

Note: During periods of low CM trace activity the indicator may appear to be off.

STOP DETECTION (YELLOW) – This LED will light each time a stop condition occurs on the CM during a channel trace. This indicator may be ON or OFF when power is first applied to the CM.

STOP HUB (BLUE CONNECTORS ABOVE THE POWER CORD) – These hubs are common and are used as a stop control when more than one Channel Monitor is used. The occurrence of a stop condition on one Channel Monitor will cause all other Channel Monitors, with stop hubs connected, to stop at the same time. The following CM lines are connected to the stop hubs:

<u>CONNECTOR POSITION</u>	<u>CM LINE NAME</u>
A . . . . .	.Ground
C . . . . .	.Master reset
D . . . . .	.Stop latch input
E . . . . .	.Stop latch output

Note: The stop hub lines are unloaded and should only be used to connect Channel Monitors together.

INITIALIZATION

1. Insert tape cartridge P/N 1857013 into the PT-2.
2. Do a local IPL by depressing the "LCL/IPL" key.
3. Load SYS CLP by entering the requested security information. The format is: "SSSSSS,BBB,CCC" (ENTER).
(SSSSSS = employee serial number, BBB = branch office number, CCC = security code)
4. After SYS CLP has loaded a "TAPE MOUNTED", message will display. If the CHTOOL program is specified and the self-loading program option is active, no additional key entries are necessary to load the program.
5. If the CHTOOL program does not self load, use the following procedure:
 - a. Key "L CHTOOL"
 - b. Depress the "SYS FUNC" key, then ENTER.
 - c. The PT-2 will read from tape and load the requested program.
 - d. When the program is loaded, the following menu will display.

CHANNEL MONITORING APPLICATIONS

****360/370 TYPE CHANNELS****

PF 1 – CAPTURE AND SCOPE

PF 2 – EDIT AND SEARCH

****CONTROL INTERFACE CHANNELS****

PF 4 – CAPTURE AND SCOPE

PF 5 – EDT AND SEARCH

PF 7 – DIAGNOSTIC

SERV-LOC CHTOOL/0010/0000

3I SEARCHING TAPE FOR (CHTOOL)

4I LOADING

5I LOAD COMPLETE

6R R01 PRESS THE PF KEY FOR THE FUNCTION TO PERFORM

L CHTOOL

6. Select one of the five channel monitoring applications displayed by depressing the appropriate PF key, then ENTER.

Note: Loading a capture program will cause an adapter checking to be run on the Channel Monitor. This diagnostic will insure that the main hardware circuits are working properly.

CHANNEL MONITOR INITIALIZATION/CAPTURE PROGRAM (360/370 TYPE CHANNELS)

DESCRIPTION

The Initialization/Capture Program is used to select the options the user wishes to trace and stop on. The Channel Monitor hardware is then initialized with the selected options and tracing will occur until either a stop condition is encountered or the user manually stops the trace. The data can be displayed on the screen or recorded on tape.

The Initialization/Capture Program is limited in the amount of storage available for its use. Therefore, some options, when used after tracing 4096 events, may require reloading part of the application program. If this becomes necessary, a message will display requesting the user to remount the application program tape.

Separate routines, within the Initialization/Capture Program allows the user the following major functions:

- a. Build trace/stop tables of up to ten masks for each table.
- b. Alter the currently loaded trace/stop table.
- c. Load a trace/stop table from tape.
- d. Store trace/stop tables onto tape.
- e. Trace a channel and record the data on tape.
- f. Initiate a manual trace stop.
- g. Search and list the names and descriptions of all trace/stop tables stored on a tape.
- h. Trace a channel and display the trace data.

OPERATION AND PF KEY ASSIGNMENT

At the completion of the Initialization/Capture Program load, a warning will display informing the user that sensitive data could be recorded and that the customer should be informed. At the same time, the user will be requested to enter time and date information. The time and date information will be used to timestamp the recorded data. The following format must be used to enter the time and date information: HH, MN, SS, MO, DD (ENTER key).

(HH = current hour, MN = current minute, SS = Current second, MO = current month, DD = current day).

A second depression of the ENTER key will be used to verify that the displayed time and date are correct.

The following Initialization/Capture Program menu should now display.

CHANNEL MONITOR CAPTURE

PF 1	Build Trace/Stop Table	PF 6	List Tape Trace/Stop Tables
PF 2	Load T/S Table From Tape	PF 7	Trace and Display on Screen
PF 3	Store T/S Table on Tape	PF 10	Cancel Operation
PF 4	Trace and Record on Tape	PF 12	End of Job
PF 5	Stop Trace		

SERV-LOC CHMCAP/0010/0000
2R TO3. REENTER IF NOT CORRECT. PRESS ENTER TO START TIMER
3I TO4. TIMER STARTED
4I C36. MOUNT TAPE TO BE USED
5I C80. SELECT FUNCTION
10,24,00,02,28

PF1 KEY

A screen will display showing the current trace conditions for the selected trace entry. Following is an example of a trace option screen.

TRACE CONDITIONS

(ENTER Y-YES, N-NO, → CURSOR RIGHT, ENTER-END)

Y ADR IN	RISE	Y STA IN	RISE	Y SRV IN	RISE
Y DAT IN	RISE	Y ADR OUT	RISE	Y CMD OUT	RISE
Y SRV OUT	RISE	Y DAT OUT	RISE	Y OPL OUT	RISE
Y OPL IN	RISE	Y SEL OUT	RISE	Y SEL IN	RISE
Y HLD OUT	RISE	Y REQ IN	RISE	Y SUP OUT	RISE
Y DIS IN	RISE	Y OPL OUT	FALL	Y OPL IN	FALL
Y EXT SYNC	RISE	Y EXT SYNC	FALL	N RESET	TIMESTAMP
Y TIMESTAMP	OVERFL	Y BYTE	COUNT		
N TRACE	DEVICES	N TRACE	INIT SEL		

WARNING

- TRACE ON devices: ADR OUT, ADR IN and OP IN FALL must be traced. (Traces only the selected dev. from ADIN or ADOUT to OPIN FALL.)
- TRACE INIT SEL:TR DEV",ADR OUT AND OP IN FALL must be selected.

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A screen will now display showing the current stop trace conditions for the selected trace entry. Following is an example of a trace stop condition screen.

STOP CONDITIONS

(ENTER Y-YES, N-NO, → CURSOR RIGHT, ENTER-END)

Y ADR IN GLITCH	Y STA IN GLITCH	Y SRV IN GLITCH
Y DAT IN GLITCH	Y MULTI OUT TAGS	Y MULTI IN TAGS
Y SYSTEM RESET	Y SELECTIVE RESET	Y HALT I/O
Y SEL IN ERROR	Y OPL IN ERROR	Y COMMAND RETRY
Y DISC IN RISE	Y EXT SYNC SHIFT	N EVENT MARK
Y BUS OUT PARITY	Y BUS IN PARITY	
Y PT-2 OVERRUN	N BUFFER FULL	

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CHANNEL MONITOR EDIT PROGRAM (360/370 TYPE CHANNELS)

DESCRIPTION

The Edit Program provides the user with the capability to read recorded trace data from tape and display it in formats which are meaningful, using the least possible number of displays.

The user can view the data in either horizontal or vertical display mode. In horizontal mode the up and down levels of the channel lines are presented in oscilloscope fashion (left to right) across the screen. The trace events will be displayed with older events on the left and newer on the right. Using a scrolling option, it is possible for the user to view all recorded events. Vertical mode offers the user reduced capability because only eight lines and their corresponding bus values are shown. Vertical mode presents the data on the screen from top to bottom with older trace events on the top.

A search facility gives the user the ability to quickly and easily find, within a file, a specific bit combination in an event or a sequence of bit combinations. The search function is divided into two main groups, basic and high level searches. The basic search allows the user to define a sequence of up to five search arguments. The high level search has search sequences already defined for very common operations.

The user can manually view the trace data by using a number of scrolling options. Forward and backward scrolling can be used in either horizontal or vertical display modes. In horizontal mode, up and down scrolling is available because all lines cannot be displayed on the same screen. The amount of scrolling is determined by a user controlled scroll value.

OPERATION AND PF KEY ASSIGNMENT

At the completion of the Edit Program load, a menu will display. The menu display provides the user with a list of available functions. Enabled functions will have PF key numbers which are intensified. Displayed in the bottom right corner of all displays will either be the word WAIT or the word RUN. Whenever the word WAIT is displayed, the user may enter commands. The word RUN is used to indicate a PT-2 system busy condition. Following is an example of an edit program menu display.

CHANNEL MONITOR EDIT

PF 1— Set Data Display Model and Options
PF 2— Display Descriptor Records
PF 3— Select A New Track, File or Event Number
PF 4— High Level Search PF 5— Basic Search
PF 6— Display Next Event Found By The Search Facility
PF 7— Scroll Up PF 8— Scroll Down
PF10— Scroll Backward PF11— Scroll Forward
PF 9— Tape Table Of Contents PF12— End Of Job
PROG INIT— File Selection
SERVC—LOC CHMED /0010/0000
3I Loading
4I Load Complete
5I E00. File Selection
6R E01. Enter Track Number (1,2,3)
L CHMED

WAIT

CHM.EDIT

(TRACK 3 STOPOO)

	1	23	45																	
			+10		+20		+30		+40		+50									
01 BUS	3	0	3 0		3 0		3	0 0	0 0		3	0 0 0	0							
IN	9	0	2 C		2 0		2	0 0	0 0		2	0 0 0	0							
02 ADR	IN	---	<u>11</u>	---	<u>11</u>	---	<u>11</u>	---	<u>11</u>	---	<u>11</u>	---	<u>11</u>	---	<u>11</u>	---	<u>11</u>	---	<u>11</u>	---
03 STA	IN	---	<u>11</u>	---	<u>11</u>	1	---	<u>11</u>	---	---	---	---	---	---	---	---	---	---	---	---
04 SRV	IN	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05 DAT	IN	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06 OPL	IN	---	<u>111</u>	11	---	<u>11111</u>	1	---	<u>11111</u>	---	<u>11111</u>	11111	---	<u>111</u>	11111	11111	---	<u>111</u>	11111	11111
07 SEL	IN	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
08 REQ	IN	---	---	<u>11</u>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
09 DIS	IN	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10 BUS		3	1	1	0	0	3	0 0		0 4 4	7 7		0	2 0	3 3					
OUT	9	E	E	0	0	2	9 9		0 0 0	F F		0	D 0	7 7						
11 ADR	OUT	<u>111</u>	---	---	---	<u>11</u>	1	---	---	---	---	---	---	---	---	---	---	---	---	---
12 CMD	OUT	---	<u>1</u>	---	---	<u>1</u>	---	---	<u>1</u>	---	---	---	---	---	---	---	---	---	---	---
13 SRV	OUT	---	---	<u>11</u>	---	<u>1</u>	1	---	<u>1</u>	---	<u>1</u>	---	<u>1</u>	---	<u>1</u>	---	<u>1</u>	---	<u>1</u>	---
14 DAT	OUT	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15 OPL	OUT	11111	11111	11111	11111	1	111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111
16 SEL	OUT	11111	11111	11111	11111	1	111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111
17 HLD	OUT	---	<u>111</u>	---	<u>1</u>	11	---	---	<u>111</u>	---	---	---	---	---	---	---	---	---	---	---

PRESS MENU KEY FOR HELP OR TYPE S TO LOOK AT THE SEARCH MENU.

WAIT

HORIZONTAL DISPLAY MODE – General information.

Each vertical column on the data screen represents an entry. The entry numbers are displayed every ten entries (the sign is over the "ten entry") and a dot is written for each "five". In order to facilitate reading, a blank column is inserted every five entries. Minus entries occur before and plus after the stop condition.

An active line is represented by a "1" (vertical bar), an inactive line by a "-" (minus). For each entry, the line that caused the trace will be underscored.

L

PT/2 PROGRAMMABLE MONITOR

PPM

The Programmable Monitor (PM) is an adapter designed for use with the PT/2 to monitor the 8100 controller I/O buss. The monitor output is an event driven trace format, of the tags and data on the I/O buss.

Connection to the 8100 is via the logic attachment card that comes with the monitor and requires the PT/2 program tape PN 1762872 to run.

General instructions for use and testing are included with this description. There is one adapter per region, and detailed instructions are with the adapter. The 8100 support center can also provide help and assistance to the 8100 RDS using the PPM.

PM DESCRIPTION

The Programmable Monitor (PM) is an adapter designed for use with a cartridge drive PT-2 with EDF (brightness and contrast controls on display). The Programmable Monitor's primary use is as a Universal Controller I/O bus monitor. The PM consists of two (4W x 3H) logic cards, a 5 volt supply and cables for connection to the PT-2 and the LAC, Logic Attachment Card. The PM has the following major sections:

- FIFO Buffer (First-In First-Out)

The FIFO is a temporary buffer for the trace data prior to being saved in the PT-2. The FIFO is 64 bits wide, 64 positions deep. It can accept data every 100 nanoseconds (until all 64 positions are full). As data enter the FIFO, the PT-2 is emptying the last position every 550 nanoseconds (until the FIFO is empty). Should a FIFO overrun occur, a hardware indication will be posted so that appropriate notification can be performed.

- Time Stamp Counters

The timer is a 16 bit hexadecimal counter that increments every microsecond. The timer is asynchronous to the events being traced. The timer is run accumulatively (constantly incrementing until overflow at 65.535 milliseconds). The timer is reset to zero when tracing is begun.

● FIFO Store Cycle Start Controls

The user selected options to control which events are to be traced are maintained by a series of edge triggered latches. Multiple events occurring within a 100 nanosecond period will be traced as a single entry as 100 ns is the minimum cycle time of the FIFO buffer.

By varying the store cycle start controls, the user can make optimum use of the trace buffers. Events that cause machine checks require close scrutinization of the relationship between tags and data lines. Events that cause "soft" errors and may be retryable require selected parameters to be traced for extended periods. The start controls allow flexibility in both these areas.

● Stop Controls

There are four ways available for the user to terminate a trace. The stop conditions may be used separately or in any combination.

Stop on Halt — Halt is a tag raised by the engine when a machine check condition occurs.

Stop on Buffer Full — The trace buffers normally wrap, and this option will stop trace when the buffer is full.

Stop on External Sync — The external sync is 24 switches that can be set to compare against the I/O bus.

PF5 Key — The user can terminate trace via the keyboard.

LAC DESCRIPTION

The LAC (Logic Attachment Card) is the means by which the PM is connected to the device under test. It is a 4 wide 4 high card with three signal planes. Power for the LAC card is supplied by the PM. The LAC contains the following major sections:

● On-Card-Cable

The 96 tab pins associated with the LAC card are connected to four connectors. A personalization cable is plugged into the four connectors, and the I/O bus lines are carried over to a fifth connector. A number of On-Card-Cables may be made to provide personalization to different foot-prints of the I/O bus.

- Extender Capability

The middle plane of the LAC card connects all 96 board side pins to all 96 top connector pins. The LAC card may thus be used to extend a logic card or to be placed between cables that are connected to a logic card. The LAC card may be used as an extender without the PM connecting cable.

- Compare Switches

The LAC card contains 24 switches that the user may set to compare against specific conditions on the I/O bus. Above each switch is an indicator so that the user may verify proper switch setting.

- Hexadecimal Display

The LAC contains a 5 digit hex character display. The first 20 lines of the On-Card-Cable are connected to this indicator display. These hex displays are for future expansion of debug functions.

- Line Drivers/Receivers

The LAC has the ability to receive 34 lines (VTL levels) and redrive them to the PM for tracing. The LAC can also drive one line from the PM to the Device-Under-Test. When attached to an 8100 I/O bus, this line is connected to Channel Request and used for "soft" stopping the engine.

PROGRAM OPTIONS

- Horizontal Formatted Display

The horizontal format allows the user to read events from top to bottom. The events at the top of the display represent "older" trace information than data at the bottom. A maximum of 22 events can simultaneously be displayed with this format.

- Scrolling Options

The user may scroll forwards or backwards through the trace by entering a scrolling number and depressing the appropriate Program Function key. The user may also scroll to the beginning of the trace. Scrolling past the End

of Trace will bring the user to the Beginning of Trace. The end of trace event number is always "0000". The entry prior to the end of trace is "9999". The first entry number (if the trace buffer is full) is "5905".

● Condition Search

The user may search through a trace for a particular condition. Bits within events may be specified as on, off or don't care. The search may be performed from the beginning of trace or from the current event that is the "oldest" entry on the display.

● Tape Operation

The user may save a trace on the PT-2 resident tape. He may also recall from tape previously recorded traces.

● Remote Trace Support

All functions that can be performed locally can also be performed by a remote PT-2 by using the acoustic coupler and a standard telephone connection. The PM hardware is not necessary at the remote site. Information that is viewed at the remote site will also be viewed at the local site. Messages between the PT-2 operators may be sent even during active tracing.

INITIALIZATION

1. Insert tape cartridge P/N 1762872 into the PT-2.
2. Do a local IPL by depressing the "LCL/IPL" key.
3. Load SYS CLP by entering the requested security information. The format is: "SSSSSS,BBB,CCC" (enter).
(SSSSSS = employee serial number, BBB = branch office number, CCC = security code)
4. After SYS CLP has loaded a "TAPE MOUNTED", message will display. If the PPMTR1 program is specified and the self-loading program option is active, no additional key entries are necessary to load the program.
5. If the PPMTR2 program does not self load, use the following procedure:
 - a. Key "L PPMTR2"
 - b. Depress the "SYS FUNC" key.
 - c. Depress the "ENTER" key.

- d. The PT-2 will read from tape and load the requested program.
- e. When the program is loaded, the following menu will display.

```
-PPMTR1 - UC CHANNEL MONITOR      EC = 250  11/15/79  13.26
-PF01 - SET TRACE CONTROLS        -PF03 - WRITE OR INITIALIZE TAPE
-PF07 - SET SEARCH ARGUMENT       -PF06 - READ TAPE

-PF04 - START CHANNEL TRACE       -PF05 - TERMINATE TRACE

-PF10 - SCROLL BKWD N (X=MAX)     -PF09 - SEARCH FROM START
-PF11 - SCROLL FWD N (T=AUTO)    -PF12 - CONTINUE SEARCH
      (PF10 or 11 TO END AUTO)
SERVC - LOC PPMTR1/0250/0000
1I  TAPE MOUNTED
2I  SEARCHING TAPE FOR (PPMTR1)
3I  LOADING
4I  LOAD COMPLETE
L   PPMTR1
```

MENU DISPLAY FOR PPMTR1 PROGRAM

PF KEY ASSIGNMENT BY OPERATION

1. Channel Trace

PF01 — Causes the current trace controls to display. The recommended trace controls will initially be set "on". The recommended trace controls are shown in the following example:

The controls are set up as follows.

--SAMPLE CHANNEL ON-----	--- SAMPLE CHANNEL ON ---
* TA	. IO RISE
. TC	. IO FALL
* TC.IO.(VB+VH)	. CR RISE
. TD	. CR FALL
. TD.IO	. IRR RISE
* TD.IO.(VB+VH+ECO)	. IRR FALL
. IGNORE CS OPS ON ABOVE	. MOD RISE
. CG	. MOD FALL
* CG.IO.(VB+VH+EOC)	. TIME STAMP OVERFLOW
* HALT	
* RESET	
. 1 MHZ OSC SAMPLE	
---END TRACE ON-----	
. HALT TAG	
. EXTERNAL SYNC	- PF01—TO SET CONTROL ON = "*"
. BUFFER FULL	- PF02—TO SET CONTROL OFF = "."
--- STOP 8100 -----	- PF04—TO STEP BKWD
. ON END CONDITION	- PF05—TO STEP FWD
. ON END OF TRACE	- PF06—END SETUP
--- MISC CONTROLS -----	
. RESERVED	
* BLOCK SAMPLE 64 AFTER END CONDITION	

The symbol to the left of the trace control indicated its state.

Asterisk = "ON", Period = "OFF"

To change a trace control, use PF01 to turn it "ON" or PF02 to turn it "OFF".

To step the cursor, use PF04 to go backwards or PF05 to go forward.

Depressing PF06 will end trace control setup.

Following is a brief description of the trace controls.

TA – Adapter address time, entry does not require valid from adapter.

TC – Command time, entry does not require valid from adapter.

TC,IO(VB+VH+EOC) – Command time requiring adapter valid.

TD – Data time, entry does not require IO activity.

TD,IO – IO data time, entry does not require valid from adapter.

TD,IO,(VB+VH+EOC) – Data time requiring adapter valid.

IGNORE CS OPS ON ABOVE – Inhibit tracing AIO data sequences.

CG – AIO channel grant time, entry does not require adapter valid.

CG,IO,(VB+VH+EOC) – Channel grant time requiring adapter valid.

HALT – Entry indicating a machine check.

RESET – Entry indicating a reset function.

1MHZ OSC SAMPLE – Forces trace entries every microsecond.

IO RISE – Trace entry made when IO tag becomes active.

IO FALL – Trace entry made when IO tag becomes inactive.

CR RISE – TRACE entry made when channel request becomes active.

CR FALL – Trace entry made when channel request becomes inactive.

IRR RISE – Trace entry made when IRR becomes active.

IRR FALL – Trace entry made when IRR becomes inactive.

MOD RISE – Trace entry made when modifier TAG becomes active.

MOD FALL – Trace entry made when modifier TAG becomes inactive.

TIME STAMP OVERFLOW – Entry made every 65 milliseconds.

END TRACE ON HALT TAG – Inhibits further tracing when the halt tag is detected.

END TRACE ON EXTERNAL SYNC – Inhibits further tracing when a compare is signaled by the switches on the LAC.

END TRACE ON BUFFER FULL – Inhibits further tracing when 4096 events have been saved.

STOP 8100 ON END CONDITION – Soft stops the 8100 when an "END TRACE ON" condition has been satisfied.

STOP 8100 ON END OF TRACE – Soft stops the 8100 any time trace is terminated.

MISC. CONTROLS-BLOCK SAMPLE 64

AFTER END CONDITION – This option allows an extra 64 entries after an end condition occurs.

PF04 – Causes channel trace to begin. The following message will be displayed "TRACE STARTED". A character cycling, in the right center portion of the display, indicates the trace is active.

PF05 – Causes channel trace to stop. The last page of trace data will be displayed.

2. Search and Display of Trace Data

PF07 – Causes the "SET SEARCH ARGUMENT" menu to display. The search argument may be set up to search for a condition suspected to be in the trace buffer. Data bits and tags may be set up for an "ON", "OFF" OR "DON'T CARE" condition. The following PF keys are used to set up the search argument.

PF07 sets the option "ON" and displays a "1".

PF08 sets the option "OFF" and displays a "0".

PF09 sets the option to "DON'T CARE" and displays a "-".

PF10 steps the cursor backwards.
 PF11 steps the cursor forwards.
 PF12 causes "Set Search Argument" mode to terminate.

The following is an example of a "SET SEARCH ARGUMENT" display.

SEARCH MASK	-PF07-	ON="1"	-PF08-	OFF="0"	-PF09-	DON'T CARE="."
IS AS FOLLOWS	-PF10-	STEP BKWD	-PF11-	STEP FWD	-PF12-	END SETUP
DATA BUS BYTES	TAGS	T T C I	V V E C I	H R B	P E M	E
0123 4567 8901 2345		A C D G O	B H C R R	L S T	V X D	S
....	

PF09 – Causes a search of the trace buffer, from the oldest event (5905), using the current search argument options.

PF12 – Causes the search of the trace buffer to resume using the current search argument options.

3. Scrolling Trace Data

PF10 – Causes a backward scroll towards the first event of trace data.

PF11 – Causes a forward scroll towards the last event of trace data.

The amount of scrolling is determined by the value of the scrolling number. The scrolling number is initially set to 0020 and is displayed at the top right portion of the trace display.

The following scrolling options are available.

- a. To change the scrolling number value, enter a new scrolling number (from one to four digits).

The new scrolling number will display after either PF10 or PF11 is depressed.

- b. To scroll to the first trace event, key an "X" and then PF10.
- c. To scroll to the last trace event, key an "X" and then PF11.
- d. To auto scroll, key a "T" and then either PF10 or PF11. The trace will be automatically scrolled by the value of the scrolling number about every second.
- e. To stop automatic scrolling, depress either PF10 or PF11.

Following is an example of the trace format.

TIME	EVENT	BUS	T A	T C	T D	C G	I O	V B	V H	E C	C R	I R	H L	R S	B T	P V	E X	M D	E S	SCROLL BY	0020
0	5905	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5906	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5907	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5908	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5909	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5910	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5911	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5912	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5913	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5914	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5915	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5916	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5917	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5918	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5919	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5920	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5921	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5922	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5923	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5924	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5925	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	5926	00 00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

- Time — Represents the value of PT-2 timer when the event occurred. The timer increments every microsecond. Time value at wrap is 65,535 microseconds.
- Event — The PT-2 software assigns an event number to each entry. The last traced event number is 0000. The next to the last event is 9999. The first or oldest event number, if the trace buffer is full, is 5905.
- Bus . — Represents the data present on the IO bus at the time of the entry. An underscore represents the byte that contains even parity.
- TA — Address Time
- TC — Command Time
- TD — Data Time
- CG — AIO Channel Grant Time
- IO — IO Tag
- VB — Valid Byte Tag
- VH — Valid Halfword Tag
- EC — End of Chain Tag
- IR — Interrupts Request Removed Tag
- HL — Halt Tag
- RS — Reset Line
- BT — Byte Tag
- PV — Parity Valid Line
- EX — Exception Line
- MD — Modifier Line
- ES — External Sync (LAC Card Compare)

4. Write or Initialize the Tape

PF03 — Causes the following message to display. "ENTER BLOCK NUMBER (00-36), TEXT TO WRITE". Any time 00 is entered, the presently mounted tape will be initialized. All data on that tape will be destroyed. All tapes must be initialized before trace data can be written on them.

Use the following procedure to initialize a tape:

- a. Insert the tape to be initialized.
- b. Depress PF03.

- c. When "ENTER BLOCK NUMBER (00-36), TEXT TO WRITE" message displays, key 00 then (enter).
- d. When "PRESS ENTER TO INITIALIZE TAPE" message displays, depress (enter).

Use the following procedure to write the contents of the trace buffer to tape:

- a. Insert tape to be written.
- b. Depress PF03.
- c. When "ENTER BLOCK NUMBER (00-36), TEST TO WRITE" message displays, enter a two-digit block number (01-36), do not depress "ENTER".
- d. Key in up to 58 characters of optional identifying information. Suggested format would be customer name, machine type, time, date and symptom. Then depress (enter).
- e. The following messages will display:

"BLOCK XX BEING WRITTEN"
XX=BLOCK NUMBER ENTERED
"WRITE COMPLETE"
"(BLOCK NUMBER AND IDENTIFYING
INFORMATION WILL DISPLAY)."

Note: Block numbers must be entered in sequence. Out-of-sequence block numbering will cause a "POSITIONING ERROR" message to display. Rewriting a block will cause all subsequent blocks to be invalid.

5. Read Tape

PF06 – Causes the following message to display **“ENTER BLOCK NUMBER TO READ (01-36)”**. When the desired block number is entered, the requested trace data will be read from tape and loaded into the trace buffer, including trace controls. The following messages will display during tape read.

“BLOCK XX BEING READ” XX=Block number entered.

“(BLOCK number and identifying information will display)”. First page oldest events, of requested trace will display.

Note: Menu displays and PF key assignments, as described in this document, are subject to change. If changes become necessary, they will be documented in the latest level of the 8100 channel operation manual.

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PROGRAM DISTRIBUTION SYSTEM

BOULDER

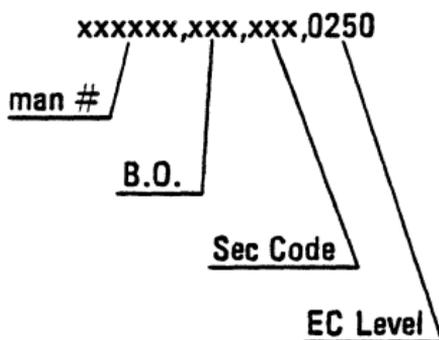
PDS PHONE NO. 800-525-2800

8/347-2153

The Program Distribution System is a collection of PT/2 programs maintained in Boulder. These programs will be at the latest level and may be accessed with the PT/2 via the dial phone network.

The UTIL program is used to interface with the Boulder system via local or remote IPL. Programs can be remote IPLed from Boulder via the PT/2 remote IPL key. The correct SYSCLP program is selected at sign-on time, by specifying the EC with the security entry at IPL time.

For cartridge tape drives:



A master list of all programs in the Boulder system can be selected by loading program named:

PARTNO, EC 0000

and then loading program PARTNO to display an index of all program part numbers in the Boulder System.

A SAMPLE OF THIS DISPLAY IS ON PAGE 11-3

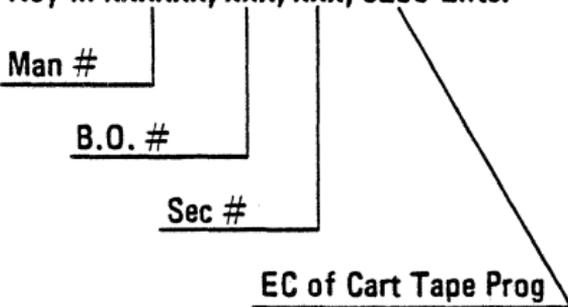
Contents of different program tapes can be displayed by loading the contents file called "INDEX". This will list all the programs by name and EC Level on the screen.

REMOTE IPL FROM P.D.S.

No Program Tape Available

**PDS PHONE NO. 800-525-2800
8/347-2153**

1. Power on PT/2, acoustical coupler connected and on, line speed switch to 1200.
2. Press remote IPL key. Coupler should start to ENQ. the line.
3. Call Boulder P.D.S., at end of tone put hand set in coupler.
4. Bootstrap (TABOOT) loader should load and display IPL screen for log on.
5. Key in xxxxxx, xxx, xxx, 0250 Enter



6. SYSCLP will now load into PT/2 storage.

TO CREATE A PROGRAM TAPE FOR LOCAL IPL:

7. Request the UTIL program from Boulder to create a program tape.

L UTIL 0250 TP Enter

8. PT/2 now should have SYSCLP and UTIL loaded.
9. Use UTIL function, PF2 to create a tape from TP and request programs or part number of program tapes needed.

PROGRAM DISTRIBUTION SYSTEM (PDS)

PROGRAM LISTINGS

PARTNO 0000

<u>P/N</u>	<u>APPLICATION</u>	<u>PT2 MODEL</u>	<u>REL</u>	<u>UPDATE</u>
1749275	PT2 SYS TAPE/DIAGS.	CASSETTE	5	01/24/80
1749276	PT2 SYS TAPE/DIAGS.	CART W/O EDF	6	01/28/80
1749277	PT2 SYS TAPE/DIAGS.	CART EDF	7	08/21/80
1749278	PT2 SYS TAPE/DIAGS.	CART EDF	8	08/22/80
1650783	TPTOOL	CASSETTE	5	01/24/80
1753842	DUMP EXTRACT/EXERCISER	CASSETTE	5	01/24/80
1650880	TPTOOL	CART W/O EDF	6	01/28/80
1753840	DUMP EXTRACT/EXERCISER	CART W/O EDF	6	01/28/80
1650888	TPTOOL/DUMP EXTR/EXER	CART EDF	8	11/17/80
1650895	BIOMATION 1650D	CASSETTE	5	01/24/80
1650896	BIOMATION 1650D	CART W/O EDF	7	08/21/80
1650897	BIOMATION 1650D-8200	CART EDF	7	08/21/80
1753734	RETAIN	CASSETTE	5	01/24/80
1753735	RETAIN	CART W/O EDF	6	01/28/80
1753736	RETAIN	CART EDF	7	08/22/80
2743302	MSS 3850 SYS	CASSETTE	5	01/24/80
2743303	MSS 3850 SYS	CART W/O EDF	6	01/28/80
2743304	MSS 3850 SYS	CART EDF	7	08/22/80
1762872	PROC MONITOR PPM	CART	8	09/23/80
1857013	CHANNEL MONITOR	CART	8	09/29/80
1857014	CHANNEL MONITOR	CART	8	02/05/81

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RETAIN ACCESS VIA PT-2

Connect coupler and screen to PT-2. Set line speed switch on rear of PT-2 to 1200.

Insert tape cartridge with PN 1753846, or PROG R370XX.

Hit LCL/IPL button. Bootstrap program will load and display log on screen.

Enter "employee number, B.Q., 3 digit monthly FTSC security code"

Hit enter

SYSCLP will now load onto PT2 memory.

After msg "tape mounted" enter:

"L R370XX" – hit SYS/FUNC key and hit enter

Message will state "searching tape"

When "load complete" message appears enter:

Retain program is now loaded: Respond to: "xxx/R370/R/1/CENUM/key" with R37/R370/R/1/xxxxxx/key (employee's Retain key) hit enter.

When message "call the Retain system" appears, turn coupler off, dial 800-525-2858; when you hear the tone, put the handset in the coupler and turn it on.

A message should appear telling you to "hit enter". After doing this you will get the Retain menu screen (in approx. 30 seconds). Coupler should be sending ENQ's to the phone line.

Files/Libraries available are:

Component ID – C
SRCH – 4 – V1 only
DLL
Default – M
SSF

Note: Use colon in place of semi-colon in your searches.

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TAPE TRANSFER UTILITY – UTIL

A Tape Transfer Utility Program (UTIL) is included on the system cartridge tape. It is used to create tapes, to transfer dumps for printing and analysis and to tension or erase tape.

The following menu of the PF keys indicates the functions the utility can perform:

PF1 – Send tape track to TP

PF2 – Create tape from TP

PF3 – Verify any track

PF4 – Write search table

PF5 – Tension/erase tape

PF6 – Display search table

PF12– End of job

Send Tape Track to TP – PF1

Any of the four tracks (0-3) can be sent from a cartridge to another PT-2 via TP. The track transfer operation starts at the beginning of the selected track, and terminates when an end-of-volume is detected. All files within these boundaries will be written to TP.

Single files may be selected by name from any track and transferred to another PT-2.

Create a Tape from TP – PF2

Any of the four tracks can be copied from another PT-2 or single files can be requested by name from another PT-2 and written onto any of the tape tracks. Programs are to be written onto track 0 unless specific directions are given to use another track. These files can:

- Be added to the tape using the Extend option.
- Replace an existing file on tape using the Replace option.
- Start at the beginning of a new tape using the New option.

When the entire track is copied, the New option is forced. If the Replace option is used, the files following the replaced file are lost.

Verify Tape — Any Track — PF3

After a tape is written, it can be verified. Verify checks the selected track to determine:

- The records can be read back with no permanent errors.
- The files begin with a valid header record and end with a valid EOF record.
- The number of records on the tape agree with the record count in the header, unless the count is zero or flagged as uncheckable.
- The record lengths of all tape records in defined files are correct.
- The volume is terminated by a valid EOVS record.

This is also a convenient means of determining the files contained on the tape. The file names, EC numbers, and REA numbers will be displayed. Each file name is read from its position on tape, not from the content record. Therefore, using verify will show changes made to the tape which the content file may not show. See Figure 1-21.

Write Search Table — PF4

The system search table presently in core can be written on tape using this function. A self loading program can also be specified when this PF key is used.

(TABOOT,0240,9999)	(INDEX ,0240,9999)	(0000123456)
(SYSCLP,0240,9999)	(UTIL ,0240,9999)	(CHKOUT,0240,9999)
(DIAGOP,0240,9999)	(KYBDSP,0240,9999)	(TIMER ,0240,9999)
(SINTST ,0240,9999)	(TAPTST ,0240,9999)	(TPTEST ,0240,9999)
(D2TEST,0240,9999)		

```
SUPPT-LOC UTIL /0240/9999
9I U108 VERIFY OPERATION COMPLETE.
1I U105 0013 FILES FOUND ON THIS TAPE.
2I U106 0000 FILES ARE UNREADABLE 'E' (READ ERRORS).
3I U107 0000 FILES ARE UNLOADABLE 'U' (RECORD COUNT INCORRECT)
Q
```

Figure 1-21. Example of Tape Verify

Tension/Erase Tape — PF5

It may be desirable to ensure proper tension on a new tape cartridge. This is accomplished by pressing the PF5 and Enter keys and inserting the tape cartridge. The tape is run completely forward and then rewound.

The erase operation is performed in a similar manner except that tape is erased during tape motion. Follow the directions displayed on the screen when the PF5 key is depressed. Ensure that the track protect switches are set to Write/Erase only for those tracks to be erased. Use a pencil or small tool to depress the erase Start button as the tape cartridge is inserted. The erase Active light will come on when tape begins to move.

CAUTION

Erase remains active until the cartridge is removed.

Display System Search Table — PF6

The contents of the system search table presently in core will be displayed on the primary screen one track at a time. If any self-loading program was specified, it will be displayed.

UTIL Displays

The Primary and Alternate display areas are used with the utility. The Primary area display shows the menu and the prompting messages. See Figure 1-22. The Alternate area displays terms used in the prompting messages with respect to the different operations that can be performed. See Figure 1-23.

TAPE TRANSFER UTILITY

*PF1 - SEND TAPE TRACK TO TP. PF4 - WRITE SEARCH TABLE.
*PF2 - CREATE A TAPE FROM TP. PF5 - TENSION/ERASE TAPE.
*PF3 - VERIFY ANY TRACK. PF6 - DISPLAY SEARCH TABLE.
PF12- END OF JOB. PROG. INIT. - RESTART UTIL.
*SEE ALTERNATE DISPLAY

SUPPT-LOC UTIL /0250/9999

2I SEARCHING TAPE FOR (UTIL)

3I LOADING

4I LOAD COMPLETE

5R U018 MOUNT TAPE YOU WISH TO PROCESS.

L UTIL

Figure 1-22. UTIL Primary Display

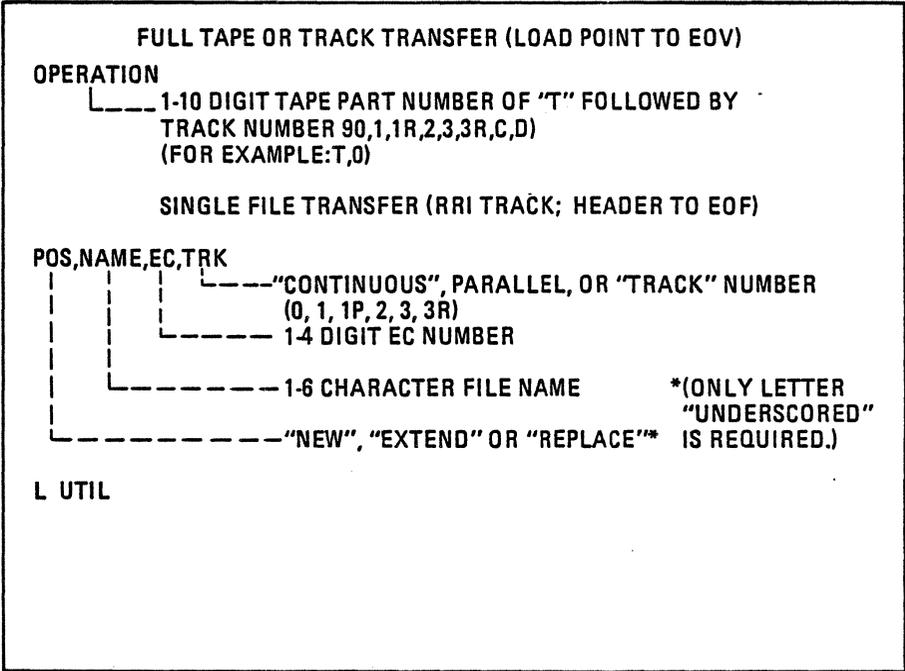


Figure 1-23. UTIL Alternate Display

FULL TAPE OR TRACK TRANSFER (LOAD POINT TO EOVS)

OPERATION

1 --- 1-10 DIGIT TAPE PART NUMBER OF "T" FOLLOWED BY TRACK NUMBER

(0, 1, 1R, 2, 3, 3R)
(For example: T, 0)

When requesting a tape from another PT-2 or sending a tape to a PT-2, a part number is not used. Enter T,n to specify the track involved. A part number is used when requesting a systems tape from Program Distribution.

SINGLE FILE TRANSFER (PRI TRACK; HEADER TO EOF)

POS, NAME, EC, TRK

```
1 1 1 1 -- "CONTINUOUS", "PARALLEL", OR TRACK NUMBER
1 1 1 (0, 1, 1R, 2, 3, 3R)
1 1 1 ---- 1-4 DIGIT EC NUMBER *(ONLY LETTER
1 1 ---- 1-6 CHARACTER FILE NAME "UNDERLINED"
1 ---- "NEW", "EXTEND", OR "REPLACE"* IS REQUIRED)
```

On a single file transfer, specific information is required to select the specific program (file) from the volume. First the position is indicated by either N, E, or R. Then the file name must be entered to obtain the desired file. A four-digit EC number can also be entered to obtain the desired level. A track number is specified. This will normally be T0 for programs.

Figure 1-24. UTIL Alternate Display Explanation

PT-2 to PT-2

- 1. Locally load UTIL in each PT-2-type UTIL and depress the SYS FUNC and ENTER keys.**
- 2. UTIL sets status to Support/Local.**
- 3. Start TP in each PT-2 (see PF1 or PF2 operation for details).**
- 4. Establish the communication connection.**
- 5. Enter the UTIL function desired in the PT-2 that is to initiate the tape transfer. This can be done at either PT-2.**
- 6. Respond to the messages that follow at both PT-2s.**
- 7. Communicate completion via the ATTN key and the message feature. Only the initiating PT-2 will receive an automatic message indicating completion of the function.**
- 8. The new tape should be verified before the communication connection is broken. In case of errors, repeat the original operation.**

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SNA EDIT PROGRAM

General Description

The SNA Edit Program (SNAPED) formats and edits SDLC/SNA data recorded on tape by the SDLC trace program SDLCR. The SNAPED program provides a display of data more suitable for SNA/SDLC debugging operations than is available with the SDLC scan program. Two basic modes of display are available; SDLC mode which displays SDLC commands and SNA mode which displays only Information (I) frames. Various controls are provided such as record searching, event mark searching, etc., which are identical to the facilities available with the SDLC scan program.

The SNAPED program is basically a selective display facility with which the user can choose to display only that information which is necessary for debugging. For example, if the line trace tape had data on it which had been sent or received from several different terminals, then the program could, as an option, selectively display only the data being sent to or received from one of the terminals.

The SNAPED program supports devices on loops which do not use the normal SDLC/SNA protocol. For example, the 3289-3 printer which attaches to the 8100 system does not use normal link/loop protocol.

The SNAPED program has a facility under PF key control for printing screens of data on a 3767 if it is available (PF12).

All mnemonics used by the SNAPED program are standard and are referenced by the following two manuals:

- SDLC General Information Manual (GA27-3093)
- SNA Format and Protocol Reference Manual (SC30-3112)
- SNA Reference Summary Handbook (GA27-3136)

A list of the mnemonics used by SNAPED is provided as reference material in this manual.

Note: No attempt is made by the program to verify that SNA or SDLC architecture has been violated. All decisions as to whether the data displayed is correct or not are made by the user.

Operation

1. Power on the PT-2.
2. IPL the PT-2.
 - a. Mount a PT-2 program tape and press the "LCL IPL" key.
Use P/N 1650888 if you have cartridge w/EDF*.
*EDF is Expanded Display Feature.
 - b. Enter the requested security information and wait for the "TAPE MOUNTED" message to appear on the display.
3. Load the application program.
 - a. Enter "L SNAPED".
 - b. Press the "SYS FUNC" and "ENTER" keys.

The program tape will then be searched for the SNAPED program.

When SNAPED has been loaded, the MENU frame will be displayed along with the following messages:

"SET NRZI/NON-NRZI OPTION IF NECESSARY.
USE PF KEY 7"

"MOUNT LINE TRACE TAPE"

4. The default option for PF Key 7 is NON-NRZI. If the trace tape you are going to playback has NRZI data, you must press "PF7" and "ENTER". Incorrect or no data will be displayed if the incorrect option is chosen.
5. Mount the line trace tape.

PF KEY ASSIGNMENT FOR "SNAPED" PROGRAM

Controls for Scanning;

PF1	START/SPEED UP	PF4	DEACTIVATE SCAN OPTIONS
	Display modes; <u>XXX</u>		=Current Mode
PF2	SDLC MODE	PF8	SNA MODE
PF5	SET DISPLAY OPTIONS	PF6	DISPLAY COMPLETE FRAME
PF7	NON NRZI/NRZI	PF11	HEX/TEXT TRANSLATION
		PF12	PRINT SCREEN

Miscellaneous controls;

PF3	SEARCH RECORD NO.	PF9	SEARCH EVM NO OPT HEX
PF10	SAVE SCREEN		PROG INIT - RESET PROGRAM

Automatic Scanning

PF1 — Use this key in conjunction with the "ENTER" key. The first depression of this key will cause the automatic playback of the trace tape to start, one frame at a time. A frame is a block of SDLC data enclosed by 'flag' characters. Each subsequent depression will cause the scan rate to increase until maximum speed is reached.

PF4 — Use this key in conjunction with the "ENTER" key. Depression of this key will cause the automatic scan to stop and will reset the scan speed to its minimum.

Note: Use of PF4 will also reset the display options to the default. The default option is to display all frames. To set or change display options, see the section titled "Changing the Display Options with PF5 Key".

Display Modes

PF2 — Use of this key will cause the data recorded on tape to be formatted and displayed in SDLC mode. See Figure 4.2 for an illustration of this mode of display. Each time this key is pressed, the record currently being displayed will be re-read.

Receive data is underscored, transmit is not. Leading and trailing characters (7E) are not shown.

SDLC commands are shown in mnemonic form. SDLC addresses are shown in hexadecimal.

The Poll/Final bit is shown as a binary 0 or 1. The NS and NR counts for sequenced frames are shown as 0 through 7.

The FCS characters (frame check sequence) are shown in hex. The data field shown is all data in the SDLC frame after the command byte. Data is considered to start with the third byte after the flag character. A maximum of 16 bytes of data are shown. If it is necessary to see the rest of the data field, use PF6.

PF8 — Use of this key will cause the data recorded on tape to be formatted and displayed in SNA mode.

Each time this key is pressed, the record currently being displayed will be re-read.

Receive data is underscored, transmit is not. Leading and trailing flag characters (7E) are not shown. All bits or, when appropriate, bytes are decoded into a standard mnemonic form.

The following example illustrates how to interpret the data:

```
C1 FID=2,MPF=3,DAF=01,OAF=01,SNF=1629
  REQ FMD,BCI,ECI,DRI,ERI,PI
  RU=DATA=40F5F240F04040F6F5F3F2C1C2C440F9
```

Line 1: The first byte shown on the first line is the SDLC address (first byte after the flag character). The rest of line 1 is a decode of transmission header (TH) field. The TH field can vary in length from 2 bytes long to 10 bytes long depending on what kind of format identification (FID) is indicated in bits 0-3 of byte 0 in the TH field. There are four types of FID, FID0, FID1, FID2, and FID3. The program will vary the format of line 1 depending on the type of FID being displayed.

Line 2: When an RH field is present the decoded bits are shown on this line in mnemonic form.

Line 3: This line shows the decoded SNA command, if present, and the data which is present in the RU field.

Miscellaneous Controls

PF3 — Causes the tape to be searched for a record number which is entered from the keyboard. Record numbers are searched in pairs.

The record numbering scheme is for cartridge PT-2's.

	<u>Cartridge</u>	
Track 0 1st Record	0002	} Primary
Track 1 1st Record	1002	
Track 2 1st Record	2002	} ALT
Track 3 1st Record	3002	

PF9 — Causes the tape to be searched for an event mark number, optional lead change, or a hex data argument depending on the data entered from the keyboard. It will also search or count frame check sequence (FCS) errors and search for abort sequences.

Event mark searches are made by entering any number from 1 to 99.

A search for an optional lead change is made by entering "OPT" (the optional lead will be whatever was chosen during the dialogue with TPTOOL).

These data searches are made by first entering "T" for transmit data, "R" for receive data, or "B" for both, followed by 1 to 59 hex characters.

A search for an "ABORT" sequence is caused by entering the character "S".

A search for an "FCS" error is caused by entering the character "S".

A count of all "FCS" errors is caused by entering the character "C".

Note: For a more complete description of the search facilities, see the section in TPTOOL manual titled "Expanded Search Capabilities".

PF10 — Use this key to save the currently displayed screen of data. Ten screens of data can be saved before the first one is overwritten. This PF key is also used to retrieve saved screens.

PF5 — Use this key to change the selective display options. When you press this key and the "ENTER" key, you will be prompted to enter your display options. See the section titled "Changing the Display Options with PF5 Key" for a more complete description.

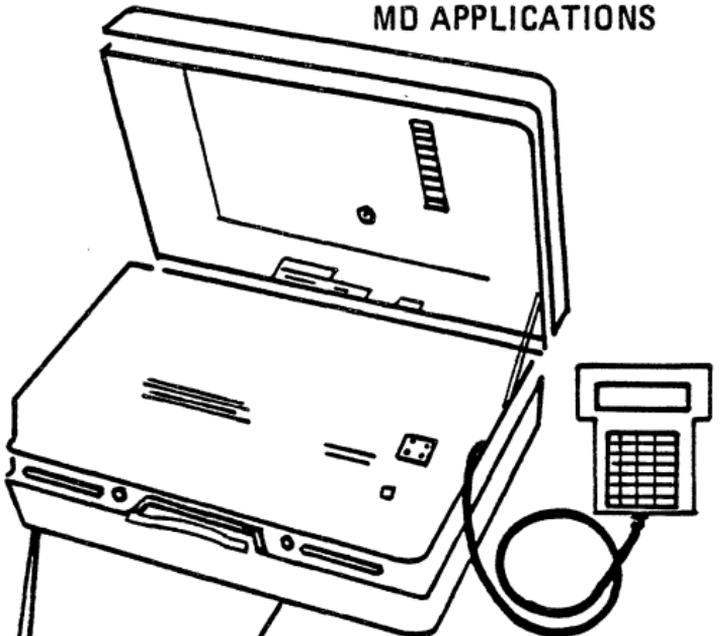
PF11 — Use this key to translate hexadecimal data to alphanumeric characters. "Flag" characters are not translated.

PF7 — Causes NRZI or NON/NRZI data recorded on tape to be decoded correctly.

PF12 — Will cause screens of data to be printed on a 3767 if available.

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MD APPLICATIONS



DISKETTE SUPPORT APPLICATIONS



3274
DUMPS

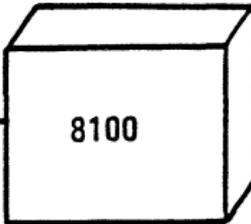
8100
DPCX
DUMPS

COPY
DISKETTE

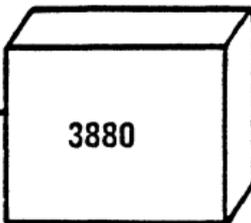
3730
3790
REA/DUMPS

DISPLAY
DISKETTE
DATA

DIRECT
CONNECTION
APPLICATIONS



8100



3880

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GENERAL MD/DISKETTE INFORMATION

The MD will only read or write IBM diskette types listed below:

<u>PN</u>	<u>TYPE</u>	<u>SECTOR/ LGTH</u>	<u>ADDRESS LOGICAL SECTORS</u>	<u>SECTORS PER TRACK</u>	<u>BYTES PER DISKETTE</u>
2305830	1	128	01 - 1A	26	242,944
2305845	1	256	01 - 0F	15	284,160
1766870	2	128	01 - 34	26	492,544
2736700	2	256	01 - 1E	15	568,320

INDEX Track 00 is used for the index cylinder and it is always formatted, 26 Sectors of 128 Bytes.

EXTENT The remaining tracks 1 to 74 (01 to 4A) are used for Data Storage. Data files are defined with a 4 Byte Diskette address called an 'EXTENT'.

- Byte 1. Starting Cylinder in HEX
- Byte 2. Starting Logical Sector in HEX
- Byte 3. End Cylinder in HEX
- Byte 4. End Logical Sector in HEX.

The transmission of diskettes usually requires the entry of the extents to define to the MD what data to select and send.

The MD will only IPL from a Diskette 2 with 256 Sector Format.

Maintenance device copy utilities request the entry of diskette extents which are not given in the MD mim.

When using MD utilities such as Copy 1 and Copy 2 to reproduce an MD Diskette P/N 8547642, enter the following extents, when requested.

- MD Diskette EC 320111, Extents are 01010E1E
- MD Diskette EC 320159, Extents are 0101161E
- MD Diskette EC 320160, Extents are 01014A1E

If the index track is needed, only EC 320160 can be used. Using one MD, enter extents 0001001A. When that finishes, do second copy with extents of 01014A1E to copy the remainder of the diskette.

Note: Enter the same from and to extents. Using two MD's, answer "YES" to the question, "Do you want to copy the entire diskette" this will copy track zero too.

EC 320159

MAINTENANCE DEVICE

The Maintenance Device (MD) is a portable tool that contains a programmable controller, diskette drive, keyboard/display (K/D), and a standard interface to IBM products, i.e.; 8100, 3880, 3370 and future products.

Attached to a product being serviced, the MD allows the CE to load diagnostics and execute MAPS used for FRU isolation. It presents the CE with the maintenance procedures and control via the hand held keyboard/display (K/D). These procedures are stored on diskettes shipped with the product, and are read by the MD. In addition, when connected to a remote support facility by means of an acoustic coupler, the MD provides the capability for remote control and down line transfer of logs and dump diskettes.

In addition to the diskettes shipped with the products, a Utility diskette is shipped with the MD to allow the CE to use the MD for various other operations. The diskette at EC 320159 has ten Utility programs on it. They are as follows:

1. EXTENTS — Display the user directory on a diskette.
2. PELOG — Display the pelog data.
3. SPELOG — Display the step text using step entries in the pelog.
4. DIRECTORY — Display the system directory.
5. D/ALTER — Display/alter diskette data.
6. DUMP ANALYZER — Analyze the data from a program check dump.
7. PRINT DISKETTE — Print data from a diskette in hex to a given vnet node and id.

8. **COPY** – Copy data from diskette to diskette or from extent to extent on the same MD, or copy data from diskette to diskette using two MD's.
9. **DTP** – Transmit dump data from diskette to a given vnet node and id (DPCX software only).
10. **RCP** – An application that allows remote maintenance to the device under test via retain or the debug facility.

Note: These application/utility programs should be used only at the request of maintenance support groups.

EC 320160

MAINTENANCE DEVICE

The Maintenance Device (MD) is a portable tool that contains a programmable controller, diskette drive, keyboard/display (K/D), and a standard interface to IBM products, i.e.; 8100, 3880, 3370 and future products.

Attached to a product being serviced, the MD allows the CE to load diagnostics and execute MAPS used for FRU isolation. It presents the CE with the maintenance procedures and control via the hand held keyboard/display (K/D). These procedures are stored on diskettes shipped with the product, and are read by the MD. In addition, when connected to a remote support facility by means of an acoustic coupler, the MD provides the capability for remote control and down line transfer of logs and dump diskettes.

In addition to the diskettes shipped with the products, a Utility diskette is shipped with the MD to allow the CE to use the MD for various other operations. The Utility diskette at EC 320160 has the following application programs on it:

1. **DISPLAY**
 1. **LIST VTOC** – Lists the directory of a diskette.
 2. **RULE LOG** – Display the log.
 3. **STEP LOG** – Step the log.
 4. **DUMP ANALYZER** – Program check dump analyzer.

2. REMOTE

1. REMOTE PROCESSOR – RCP, allows T.P. connection to the M.D. for remote maintenance.
2. DUMP XMIT PROGRAM – DPT allows sending a DPCX dump to the VNET system.
3. PRINT DISKETTE – Allows formatting and transmission of a diskette to the T.P. port for printing at a support site.
4. BISYNC RFT TEST – Allows RFT testing with RAL test center. Supports tests 1, 14, and 19.

3. DISKETTE

1. DISPLAY ALTER – Allows display and altering of data from the diskette.
2. COPY – Allows transmission of data to and from MD's.
3. DISK – Diskette surface analysis.

**SET UP PROCEDURE OF MD TO TRANSMIT A
3274 DUMP DISKETTE (using copy)**

1. Plug in MD and IPL the Application/Utility diskette (EC 320160 or higher).
2. The following steps will show the messages and action/responses required to be entered via the MD K/D.

Notes:

1. See Page 2-3 if your 3274 has FC 1801 Control Storage Expansion Feature.
2. Responses such as "YES", "NO", "FWD", do not require the enter key to be pressed. Responses such as alpha/numeric responses do require the enter key to be pressed.

<u>MD MESSAGE</u>	<u>ACTION/RESPONSE</u>
3. "MAINTENANCE DEVICE, MAINTENANCE AND APPLI- CATION DISKETTE"	FWD
4. "DO YOU WISH TO REPAIR/ TEST THIS MD"	NO
5. "DO YOU WANT TO RUN THE MD EDUCATION MODULE?"	NO
6. "SELECT ACTIVITY" 1=Map Exercise 2=Applications 3=End	2 ENTER
7. "SELECT UTILITY TYPE" 1=Display 2=Remote 3=Diskette	3 ENTER
8. 1=Display Alter 2=Copy Diskettes 3=Disk Analysis	2 ENTER
9. "ARE YOU USING TWO MD's?"	YES
9a. "DISK HAS BEEN IPLED FOR MD1 COPY 2 PROGRAM"	FWD
10. "ARE YOU USING EITHER AN ACOUSTIC COUPLER OR A MODEM?"	YES

MD MESSAGEACTION/RESPONSE

- | | |
|--|---|
| 11. "IS BUSINESS MACHINE
CLOCKING REQUIRED?" | YES
(using U-PAC with
SW in 0-1200 (NO
EIA)
NO
(using U-PAC with
SW in 1200 EIA
clock) |
| 11a. "IF USING AN ACOUSTIC
AND USING COUPLER
CLOCKING-i.e.; SW IN
1200 (EIA CLOCK)
POSITION" | FWD |
| 11b. "SELECT CLOCK SPEED"
1=600 BPS OR
2=1200 BPS | 2 ENTER |
| 12. "ARE YOU THE SENDER?" | YES |
| 13. "DO YOU WISH TO CHANGE
DISKETTES?" | YES |
| 14. "INSERT NEW DISKETTE" | Change diskette (3274
dump diskette) |
| 14a. "ENTER DISK TYPE"
1=Diskette 1 33FD
2=Diskette 2 43FD | SELECT
TYPE |
| 14b. "IS RECORD LENGTH 128
BYTES?" | YES/NO |
| Note: At this time you should have MD and U-PAC or other
acoustic coupler set up as per diagram A-1 or A-2. | |
| 15. "CONNECT EIA CABLE TO
COUPLER OR MODEM AND
DIAL UP OTHER END" | FWD when done |
| 15a. "DO YOU WANT TO COPY
ENTIRE DISKETTE?" | NO |
| 16. "ENTER DISK EXTENTS" | 0F010F08 |

MD MESSAGEACTION/RESPONSE

- | | |
|---|--|
| 17. "MAKE RECEIVING MD
READY TO RECEIVE.
PRESS FWD" | a) Make sure Engr. is
rdy to receive
b) give Engr. another
phone number for
voice
communication
c) place phone on
U-PAC and then
press FWD |
| 18. "OPENING EIA PORT" | wait |
| 19. "SENDING EXTENTS
OF010F08 TO RECEIVING
MD" | wait |
| 20. "DISKETTE COPIED. DO
YOU WANT TO COPY
ANOTHER DISKETTE?" | YES |
| 21. "DO YOU WISH TO CHANGE
DISKETTE?" | NO |
| 22. "CONNECT EIA CABLE TO
COUPLER OR MODEM AND
DIAL UP OTHER MD. FWD
WHEN DONE." | FWD |
| 23. "ENTER DISK EXTENTS TO
COPY" | 11042001 |
| 24. "MAKE RECEIVING MD
READY TO RECEIVE.
PRESS FWD." | FWD |
| 25. "OPENING EIA PORT" | wait |
| 26. "SENDING EXTENTS" | wait |
| 27. "TRANSMIT OF EXTENTS
COMPLETED. DO YOU WISH
TO TRANSMIT MORE?" | YES |
| 28. "DO YOU WISH TO CHANGE
DISKETTES?" | NO |
| 29. "ENTER DISK EXTENTS" | 48014A0F |
| 30. "MAKE RECEIVING MD
READY TO REC." | FWD |

<u>MD MESSAGE</u>	<u>ACTION/RESPONSE</u>
31. "OPENING EIA PORT"	wait
32. "SENDING EXTENTS"	wait
33. "DISKETTE COPIED. DO YOU WANT TO COPY ANOTHER DISKETTE?"	NO
34. END OF UTILITY—IPL TO CONTINUE	Hang up phone

END OF OPERATION

Extents required for dump diskettes from 3274's with FC 1801, CTL storage expansions are:

0F01	0F08
1104	1B0C
2004	2C0D
4801	480F

**SET UP PROCEDURE TO TRANSMIT AN 8100
DPCX DUMP DISKETTE USING THE DUMP
PROGRAM**

1. Plug in MD and IPL the Application/Utility diskette (320160 or higher).
2. The following steps will show the messages and action/responses required to be entered via the MD K/D.

Note: Responses such as "YES", "NO", "FWD", do not require the enter key to be pressed. Responses such as alpha/numeric responses do require the enter key to be pressed.

<u>MD MESSAGE</u>	<u>ACTION/RESPONSE</u>
3. "MAINTENANCE DEVICE, MAINTENANCE AND APPLI- CATION DISKETTE"	FWD
4. "DO YOU WISH TO REPAIR/ TEST THIS MD"	NO
5. "DO YOU WANT TO RUN THE MD EDUCATION MODULE?"	NO
6. "SELECT ACTIVITY" 1=Map Exercise 2=Applications 3=End	2
7. "SELECT UTILITY" 1=Display 2=Remote 3=Diskette	2
8. "SELECT OPTIONS" 1=Remote Processor 2=Dump XMIT Prog 3=Print Diskette 4=BISYNC RFT Test	2
9. "LCLMD1=MDNODE ID RALCM8 RG66ABCD=DEST IS THIS DATA VALID?"	If yes, hit YES key. If no, hit NO key for MD prompt, enter node and user ID.

MD MESSAGE

ACTION/RESPONSE

- | | |
|--|---|
| 10. "DISKETTE DUMP PGM
PASSWORD= " | Key in 1 to 8 char.
password or ENTER
to bypass. |
| 11. "DISKETTE DUMP PROGRAM
INSERT DUMP DISKETTE." | Insert the dump
diskette to be trans-
mitted. Press Enter
key when done. |
| 12. "VOLUMN=XXXXXXX
IS THIS CORRECT?" | If the vol. ID is
different answer NO.
(The MD will then
prompt to enter the
VOL. ID). |
| 13. "ENTER 5 CHAR OF YOUR
SERIAL NUMBER" | Enter serial number. |
| 14. "ENTER COMMENTS." | Enter 1 to 80 char-
acter comment. |
| 15. "DOES YOUR MODEM
REQUIRE BUSINESS
MACHINE CLOCKING" | YES/NO |
| 16. "PLUG THE MD's EIA CABLE
INTO THE MODEM. PRESS
ENTER TO CONTINUE." | Attach the cable from
the MD to the coupler.
(see diag. A-1) DIAL
the remote end, and
after making connec-
tion, press Enter key to
continue. |
| 17. The MD will start transmitting
the dump and will display the
following: | |
| 18. "DSKT DUMP SENDING VM
SIGN ON
"PROCESSING DATA SET
LABELS"
"SENDING ID CARD" | No action required.

No action required.
No action required. |

MD MESSAGE

"SENDING COMMENTS"
"SENDING EOF SEQUENCE"
"SENDING DMPEND FILE"

19. "DO YOU WISH TO SEND
ANOTHER DUMP?"

ACTION/RESPONSE

No action required.
No action required.
No action required.

Key in YES and load
another disk if you
have another to send.
If not, key in NO to
terminate.

Note: If there is a problem, the MD will give the option to either restart the dump transmission, or to terminate it.

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SET UP PROCEDURES FOR MD USING REMOTE COMMAND PROCESSOR (RCP)

1. Plug in MD and IPL the Application/Utility diskette (EC 320160 or higher).
2. The following steps will show the messages and action/responses required to be entered via the MD K/D.

Note: Responses such as "YES", "NO", "FWD", do not require the enter key to be pressed. Responses such as alpha/numeric responses do require the enter key to be pressed.

<u>MD MESSAGE</u>	<u>ACTION/RESPONSE</u>
3. "MAINTENANCE DEVICE, MAINTENANCE AND APPLI- CATION DISKETTE"	FWD
4. "DO YOU WISH TO REPAIR/ TEST THIS MD"	NO
5. "DO YOU WANT TO RUN THE MD EDUCATION MODULE?"	NO
6. "SELECT ACTIVITY" 1=Map Exercise 2=Applications 3=End	2
7. "SELECT UTILITY TYPE" 1=Display 2=Remote 3=Diskette	2
8. 1=Remote Processor 2=Dump XMII Program 3=Print Diskette 4=BISYNC RFT Test	1
9. "LOADING RCP IPL LOADER"	wait
10. "RCP IS NOW LOADED. PRESS ENTER TO START."	enter
11. "ENTER REQUIRED SYSTEM SIGN-ON INFORMATION"	
12. "IS BUSINESS MACHINE CLOCK- ING REQ (NO IF UPAC)"	

MD MESSAGE**ACTION/RESPONSE**

13. "CONNECT EIA CABLE TO
ACOUSTIC COUPLER. PRESS
ENTER WHEN DONE."

Connect cable P/N
8547668 then enter
(see diag. A-1)

14. "WAITING FOR DIAL-UP.
PRESS ENTER WHEN
COMPLETE."

Call number given you
by FSC & put phone in
coupler. Press enter
when done.

**AFTER YOU HAVE SUCCESSFULLY CONNECTED, THE
FSC REPRESENTATIVE WILL NOW CONTROL THE OPER-
ATION. YOU WILL BE GUIDED WHAT TO DO BY THE MD
DISPLAY.**

**Note: The MD will start bidding for the line as soon as you
press the enter key in step 13. It tries only five times before
timing out. Make sure you have the phone secured in the
coupler, and are ready to go before hitting the enter key. If
the MD does time out, you will be able to restart the operation
by following the prompts on the MD. As long as you do not
hang up the phone, you should not lose the connection to the
system.**

SET UP PROCEDURE TO USE MD FOR 3790, 3730 DISKETTES

Before any diskette can be sent or received the extents must be known.

EOD = END OF DATA

3730 Archive diskette is a one sided (1D) 128 byte diskette P/N 2305830. EOD is track 0 sector 8 byte 74, 75, EOD to extents is located using chart "A".

3730/3790 Dump diskette is a one sided (2) 256 byte diskette. EOD is track 2 sector 1 byte 0, 1, 2, 3. EOD to extent is located using Chart "B".

3730/3790 REA diskette is a one sided (2) 256 byte diskette. EOD is track 0 sector 10 byte 74, 75. EOD to extents is located using chart "A".

To display EOD extents:

<u>MD MESSAGE</u>	<u>ACTION/RESPONSE</u>
1. "IPL MD UTILITY DISKETTE AT EC 320160"	
2. "MAINTENANCE DEVICE APPLICATION DISKETTE"	FWD/ENTER
3. "DO YOU WANT TO REPAIR MD"	NO
4. "DO YOU WANT TO RUN EDUCATION MODULE"	NO
5. "SELECT ACTIVITY" 1=Map Exercise 2=Applications 3=End	2
6. "SELECT UTILITY TYPE" 1=Display 2=Remote 3=Diskette	3
7. 1=Display Alter 2=Copy Diskette 3=Disk Analysis	1
8. "DO YOU WANT TO CHANGE DISKETTE"	YES
9. "INSTALL NEW DISKETTE"	Install diskette you want to display.

TO SEND OR RECEIVE 3730/3790 DISKETTE WITH MD (COPY)

<u>MD MESSAGE</u>	<u>ACTION/RESPONSE</u>
1. "IPL THE MD UTILITY DISKETTE AT EC 320160"	
2. "MAINTENANCE DEVICE APPLICATION DISKETTE"	FWD
3. "DO YOU WANT TO REPAIR THE MD"	NO
4. "DO YOU WANT TO RUN EDUCATION MODULE"	NO
5. "SELECT ACTIVITY" 1=Map Exercise 2=Applications 3=End	2
6. "SELECT UTILITY TYPE" 1=Display 2=Remote 3=Diskette	3
7. 1=Display Alter 2=Copy Diskette 3=Disk Analysis	2
8. "ARE YOU USING 2 MDS" LOADING COPY IPL LOADER	YES
9. "DISK HAS BEEN IPLED FOR MD1 COPY2 PROGRAM"	FWD/ENTER
10. "ARE YOU USING EITHER AN ACOUSTIC COUPLER OR MODEM"	YES
11. "IS BUSINESS MACHINE CLOCK REQUIRED"	NO
12. "IF USING FE UPAC SET MODE SW TO EITHER 600 OR 1200 EIA CLOCK"	FWD
13. "ARE YOU THE SENDER"	YES
14. "DO YOU WISH TO CHANGE DISKETTE"	YES

<u>MD MESSAGE</u>	<u>ACTION/RESPONSE</u>
15. "INSERT NEW DISKETTE"	INSTALL DISKETTE TO BE SENT
16. "ENTER DISK TYPE" 1=DISKETTE 1 33FD 2=DISKETTE 2 43FD	1/2
16a. "IS RECORD LENGTH 128 BYTES"	YES/NO
17. "CONNECT EIA CABLE TO COUPLER OR MODEM AND DIAL OTHER END"	FWD
18. "DO YOU WANT TO COPY ENTIRE DISKETTE"	NO
19. "ENTER EXTENTS IN HEX"	ENTER DATA FROM CHART A OR B
20. "MAKE RECEIVE MD READY"	FWD
21. "OPENING EIA PORT"	CONNECT COUPLER TO PHONE
22. "SENDING EXTENDS"	-

(REA Diskette)
CHART A (Archive Diskette)

Byte 74	Byte 75	Value to Be Entered	Byte 74	Byte 75	Value to Be Entered	Byte 74	Byte 75	Value to Be Entered
F0	F1	00010201	F2	F6	00011801	F5	F1	00013401
F0	F2	00010301	F2	F7	00011C01	F5	F2	00013501
F0	F3	00010401	F2	F8	00011D01	F5	F3	00013601
F0	F4	00010501	F2	F9	00011E01	F5	F4	00013701
F0	F5	00010601	F3	F0	00011F01	F5	F5	00013801
F0	F6	00010701	F3	F1	00012001	F5	F6	00013901
F0	F7	00010801	F3	F2	00012101	F5	F7	00013A01
F0	F8	00010901	F3	F3	00012201	F5	F8	00013B01
F0	F9	00010A01	F3	F4	00012301	F5	F9	00013C01
F1	F0	00010B01	F3	F5	00012401	F6	F0	00013D01
F1	F1	00010C01	F3	F6	00012501	F6	F1	00013E01
F1	F2	00010D01	F3	F7	00012601	F6	F2	00013F01
F1	F3	00010E01	F3	F8	00012701	F6	F3	00014001
F1	F4	00010F01	F3	F9	00012801	F6	F4	00014101
F1	F5	00011001	F4	F0	00012901	F6	F5	00014201
F1	F6	00011101	F4	F1	00012A01	F6	F6	00014301
F1	F7	00011201	F4	F2	00012B01	F6	F7	00014401
F1	F8	00011301	F4	F3	00012C01	F6	F8	00014501
F1	F9	00011401	F4	F4	00012D01	F6	F9	00014601
F2	F0	00011501	F4	F5	00012E01	F7	F0	00014701
F2	F1	00011601	F4	F6	00012F01	F7	F1	00014801
F2	F2	00011701	F4	F7	00013001	F7	F2	00014901
F2	F3	00011801	F4	F8	00013101	F7	F3	00014A01
F2	F4	00011901	F4	F9	00013201	F7	F4	00014B01
F2	F5	00011A01	F5	F0	00013301	F7	F5	00014C01
						F7	F6	00014D01

CHART B (Dump Diskette)

Byte 0	Byte 1	Byte 2	Byte 3	Value to Be Entered	Apprx. Trans. Time
00	01	01	01	02011401	18 min.
00	20	01	01	02011701	21 min.
00	40	01	01	02011901	23 min.
00	60	01	01	02011B01	25 min.
00	80	01	01	02011D01	27 min.
00	A0	01	01	02011F01	29 min.
00	C0	01	01	02012101	31 min.
00	E0	01	01	02012301	33 min.
00	00	01	01	02012501	35 min.
00	XX	20	01	02012801	38 min.
00	XX	40	01	02012A01	40 min.
00	XX	60	01	02012C01	42 min.
00	XX	80	01	02012E01	44 min.
00	XX	A0	01	02013001	46 min.
00	XX	C0	01	02013201	48 min.
00	XX	E0	01	02013401	50 min.
00	XX	00	01	02013601	52 min.
00	XX	XX	20	02013901	55 min.
00	XX	XX	40	02013801	57 min.
00	XX	XX	60	02013D01	59 min.
00	XX	XX	80	02013F01	61 min.
00	XX	XX	A0	02014101	63 min.
00	XX	XX	C0	02014301	65 min.
00	XX	XX	E0	02014501	67 min.
00	XX	XX	00	02014701	69 min.

SET UP FOR COPY – MD TO MD

This procedure will copy diskette using the MD Utility at EC 320160 – One MD can be used, however, it is a very tedious process – Two MD's – connected via the EIA Ports will allow copying diskette with minimum of intervention.

1. Load MD Utility EC 320160 in both MD's.

<u>MD MESSAGE</u>	<u>ACTION/RESPONSE</u>
2. "MAINTENANCE DEVICE, MAINTENANCE AND APPLICATION DISKETTE"	FWD
3. "DO YOU WISH TO REPAIR MD?"	NO
4. "DO YOU WANT TO RUN EDUCATION MODULE?"	NO
5. "SELECT ACTIVITY" 1=Map Exercise 2=Applications 3=End	2
6. "SELECT UTILITY" 1=Display 2=Remote 3=Diskette	3
7. "DISKETTE" 1=Display Action 2=Copy 3=Disk	2
8. "ARE YOU USING TWO MDS?"	YES
9. "LOADING COPY"	–
10. "DISK HAS BEEN IPL WITH MD1 COPY2 PROGRAM"	FWD
11. "ARE YOU USING EITHER AN ACOUSTIC COUPLER OR A MODEM?"	NO
12. "ARE YOU THE SENDER?"	YES – on the from MD NO – on the to MD
13. "DO YOU WISH TO CHANGE DISKETTE?"	YES

MD MESSAGEACTION/RESPONSE

14a. "INSERT NEW DISKETTE"	Insert from Diskette
14b. "INSERT NEW DISKETTE"	Insert to Diskette
15. "ENTER DISKETTE TYPE"	
1=DSKT 1-33FE	
2=DSKT 2-43FD	1/2
16. "IS RECORD LENGTH 128"	YES/NO
(NO=256 Bytes)	
17a. "FROM MD"	
Connect EIA cable (PN 8547668	
with MD) From sender <u>DTE</u> to	
receiver <u>DCE</u> , FWD when done	FWD
17b. "TO MD"	
Opening EIA Port	
Time out, will display an error,	
operation will retry	-
18. "DO YOU WANT TO COPY	
THIS ENTIRE DISKETTE"	YES
NO - will require entry of	
EXTENTS (See page 1.0 for	
EXTENTS info.)	
19. "MAKE RECEIVING MD	
READY"	FWD
20. "OPENING EIA PORTS"	-
21a. "SENDING DATA FOR	
EXTENTS X--X"	-
21b. "WAITING FOR DATA FOR	
EXTENTS X--X"	-
22. "COPY COMPLETE"	
Do you want to copy another	
diskette?	YES/NO

Appendix A. Setup Diagrams

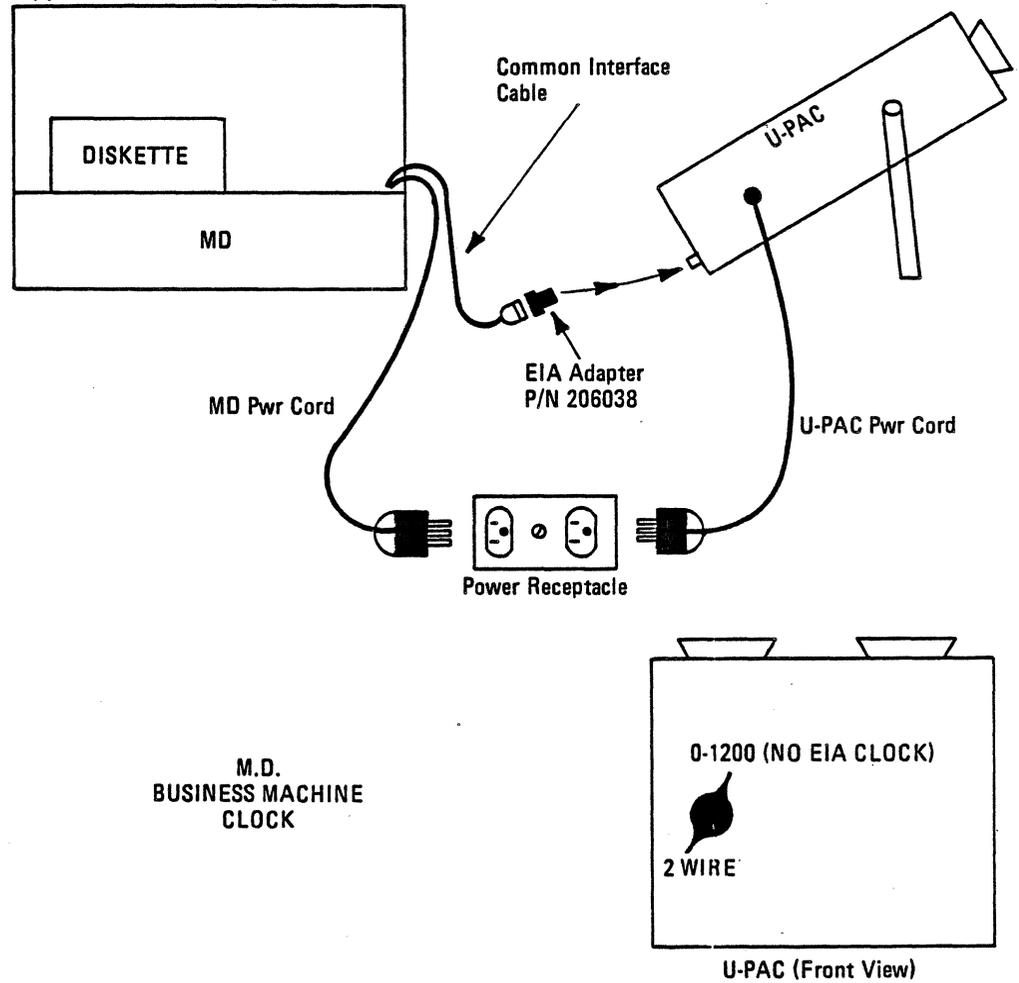


Diagram A-1. MD/U-PAC Setup Diagram Using Old Style MD

Appendix A. Setup Diagrams (Continued)

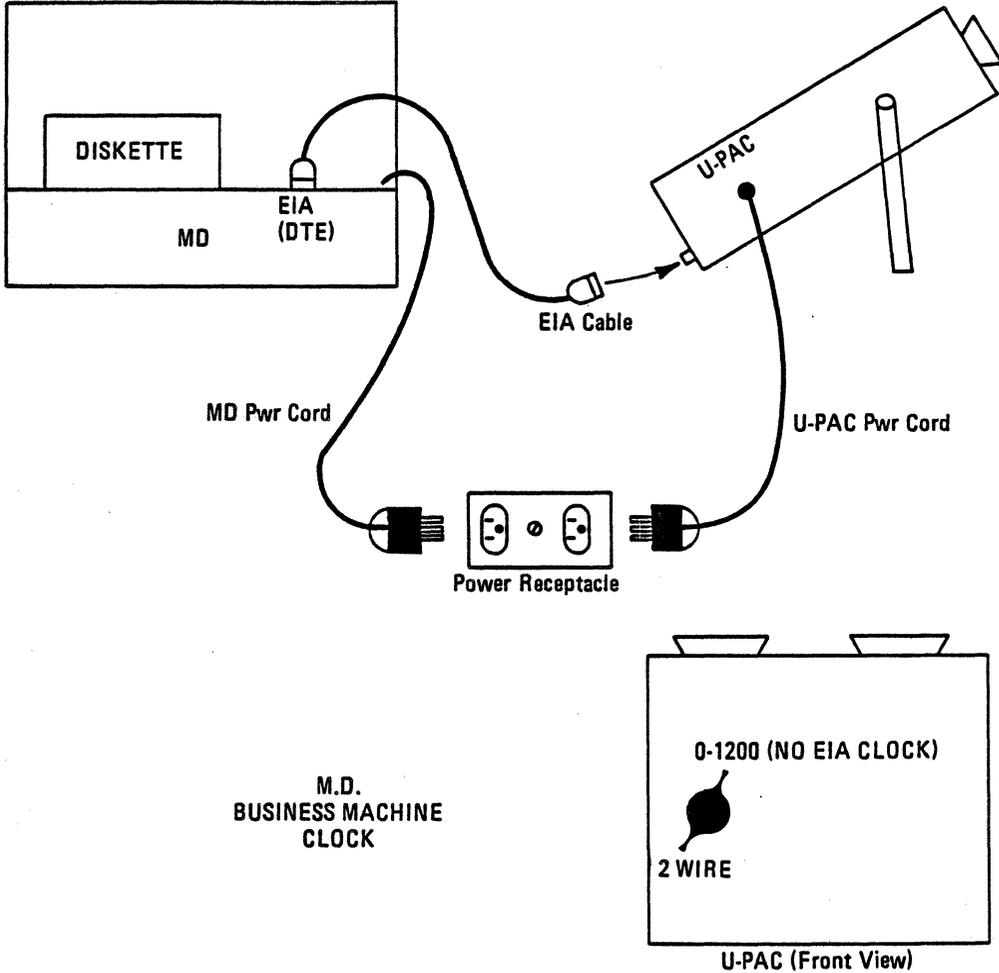


Diagram A-2. MD/U-PAC Setup Diagram Using New Tyle MD

Appendix A. Setup Diagrams (Continued)

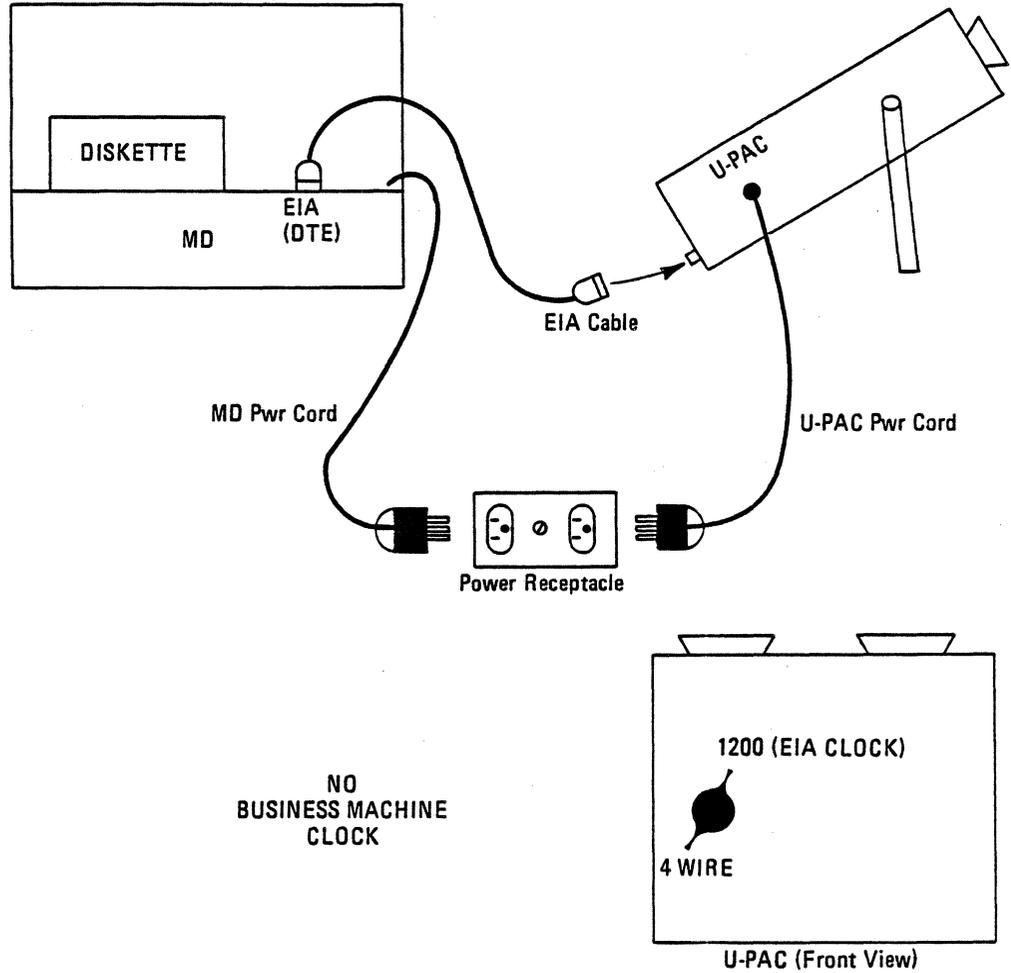


Diagram A-3. MD/U-PAC Setup Diagram Using RCP or DTP Program

Appendix A. Setup Diagrams (Continued)

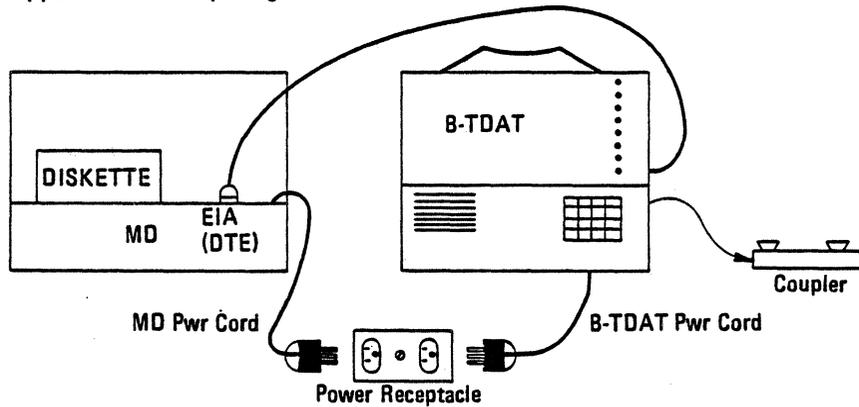


Diagram A-4. Using B-TDAT to Acoustic Couple MD to FSC
(Using B-TDAT CLOCKING)

IV. ACOUSTIC COUPLER TO FSC

A. SET SWITCHES

1. MONITOR = OFF
2. SPEED = 1200
3. CLOCK = 1 (OFF)*
4. MODE = 0-1200
5. SD/RD = SD
6. EXERCISE = TERM
7. TAPE I/O = XMIT
8. MODEM = 4W
9. DATA = NORMAL
10. COUPLER = OFF, then ON after going to data
11. TAPE POWER & LIGHT INPUT = DOESN'T MATTER

B. SET PLUG PANEL

1. Plug FREE RUN

C. PLUG EIA CABLE FROM MD. INTO BACK OF BTDAT

D. PLUG COUPLER CABLE INTO BACK OF THE BTDAT AND INTO THE COUPLER

E. BTDAT IS NOW READY TO COUPLE TO FSC

*CLOCK = OFF when (using MD CLOCKING)

Appendix A. Setup Diagrams (Continued)

BUFFER TDAT SWITCH SETTINGS

SD/RD	-	SD
TERM/DS	-	TERM
RCV/XMIT	-	XMIT
4W/2X	-	2W
INV/NORM	-	NORM
ON/OFF	-	ON
T-ON/T-OFF	-	T-OFF
MONITOR	-	OFF
SPEED	-	1200
CLOCK	-	1
MODE	-	0-1200
POWER ON/OFF	-	ON

Note: Be sure to put 'FREE RUN' plug in TDAT panel.

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NOTES

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U-PAC

A new Portable Acoustic Coupler (P/N 1753805) is available from Mechanicsburg. The PAC (more commonly called the U-PAC in the U.S., and the E-PAC in World Trade) is a device which provides access to the TPSC or FSC using standard telephone lines. The U-PAC has two interfaces available; EIA and 2W/4W modem.

A mode switch on the U-PAC is used to determine which type of TP device is used. The modes are as follows:

0-1200 (NO EIA CLOCK):

Mini-12 compatible.

DTE must have internal clock.

Similar to WE 202 R, S, & T Data Sets.

Example: 2740 M2, 3767, 2770, 2780, 3275, 3757 with internal clock.

1200 (EIA CLOCK)

Any TP product supported by the TPSC which normally operates in customer locations at speeds up to 19.2 Kbps can operate with the TPSC in this mode.

Example: 2770, 2780, 3270, 3757.

600 (EIA CLOCK)

Same as 1200 EIA clock.

0-300 ORIGINATE

Operates similar to a WE 103A2 Data Set.

TP product must have internal clock.

Must be operated only with 103A2 answer modems.

Example: 2740 M1, 2741, 3767 with S/S at speeds of 134.5 and 300 Bps.

TEST

When placed in TEST mode, the U-PAC will test transmit, receive, and clock functions.

Maintenance is performed by the CE using the Maintenance Manual, S226-3920. Also available is the U-Pac Operators Guide, S226-3917. Both manuals are included with the U-Pac unit. Complete operation and set-up procedures are included in the Operators Guide.

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U-PAC OPERATING PROCEDURES

I. EIA OPERATION

0-1200 (NO EIA CLOCK)

1. Plug EIA cable from TP device to U-PAC.
2. Set U-PAC switch to 0-1200 (NO EIA CLOCK) position.
3. Place U-PAC in operating position (see diag. A-1).
4. Make sure machine is set up properly for the transmission or testing to be done.
5. Call remote site, and when ready to go to data, place handset onto U-PAC using strap to hold it in place. Place plastic cover over handset and snap it in place.

1200 (EIA CLOCK) – For machines that normally use data set clocking.

1. Plug EIA cable from TP device to U-PAC.
2. Set U-PAC switch to 1200 (EIA CLOCK) position.
3. Place U-PAC in operating position (see diag. A-1).
4. Make sure machine is set up properly for the transmission or testing to be done.
5. Call remote site, and when ready to go to data, place handset onto the U-PAC using strap to hold it in place. Place plastic cover over handset and snap it in place.

600 (EIA CLOCK)

1. Set-up is the same as 1200 (EIA CLOCK), but clocking is at 600 Bps.

0-300 ORIGINATE

1. In this mode, the U-PAC will operate similar to a WE 103A2 data set. The TP product is required to have an internal clock.
2. Plug EIA cable from TP device to U-PAC.
3. Set U-PAC switch to 0-300 ORIGINATE position.
4. Place U-PAC in operating position (see diag. A-1).
5. Make sure machine is set up properly for the transmission or testing to be done.
6. Call remote site, and when ready to go to data, place handset onto the U-PAC using strap to hold it in place. Place plastic cover over handset and snap it in place.

II. MODEM OPERATION

2 WIRE

1. Place the switch to the 2-wire position. (The TP product is a physical 2-wire modem. Both transmit and receive signals will appear on the transmit pair (wide pair).
2. See TP product considerations to be satisfied to acoustic couple the modem signal using the U-PAC (page 2-4).
3. Plug the modem plug (4 prong plug) into the U-PAC's modem jack.
4. Place the U-PAC in operating position (see diag. A-1).
5. Make sure machine is set up properly for the transmission or testing to be done.
6. Call remote site, and when ready to go to data, place handset onto the U-PAC using strap to hold it in place. Place plastic cover over handset and snap it in place.

4 WIRE

1. Place the switch to the 4-wire position. (The TP product is a physical 4-wire modem. The transmit signal will appear on the transmit pair (wide pair), and the receive signal will appear on the receive pair (narrow pair).
2. See TP product considerations to be satisfied to acoustic couple the modem signal using the U-PAC (page 2-4).
3. Plug the modem plug (4 prong plug) into the U-PAC's modem jack.
4. Place the U-PAC in operating position (see diag. A-1).
5. Make sure machine is set up properly for the transmission or testing to be done.
6. Call remote site, and when ready to go to data, place the handset onto the U-PAC using strap to hold it in place. Place the plastic cover over handset and snap it in place.

TP PRODUCT CONSIDERATIONS WHEN USING MODEM INTERFACE OF U-PAC

The following product controls and/or timings may have to be altered to operate using the U-PAC modem interface (all modes except 0-300). The CE must have a knowledge of what options are used, or check the options to ensure they are dial-network oriented to permit the desired operations. The options may be controlled by card or board jumpering and/or software selection during system generation.

1. The products' Request-to-send, Clear-to-send timing should be set for 2-wire operation (approx. 200ms).
2. The products' Echo Clamp timing should be set for 2-wire dial operation (approx. 180ms).
3. Change from continuous carrier (i.e.: RTS always active) to intermittent carrier (activate RTS only when in transmit mode).

Example: 3271's with leased line feature will run switched without any changes.

3767's with leased line feature (4-wire), will require changes to acoustic couple with U-PAC.

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CONNECTING CPU WITH DAA TO U-PAC

1. Remove DAA leads from the DAA. White=DT (Tip), and Black=DR (Ring).
2. Using 4-prong plug P/N 341200, connect the two leads removed from the DAA to the wide pair (Transmit) on the plug.
3. Set U-PAC switch to the 2-wire position.
4. Plug the 4-prong plug into the U-PAC's modem jack.
5. Dial the remote end, and when ready to go to data, place the handset onto the U-PAC using strap to hold it in place. Place the plastic cover over handset and snap it in place.

Note: See diagrams A-1 through A-3 for operating position and modem interface jack.

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Appendix A. Operating Diagrams

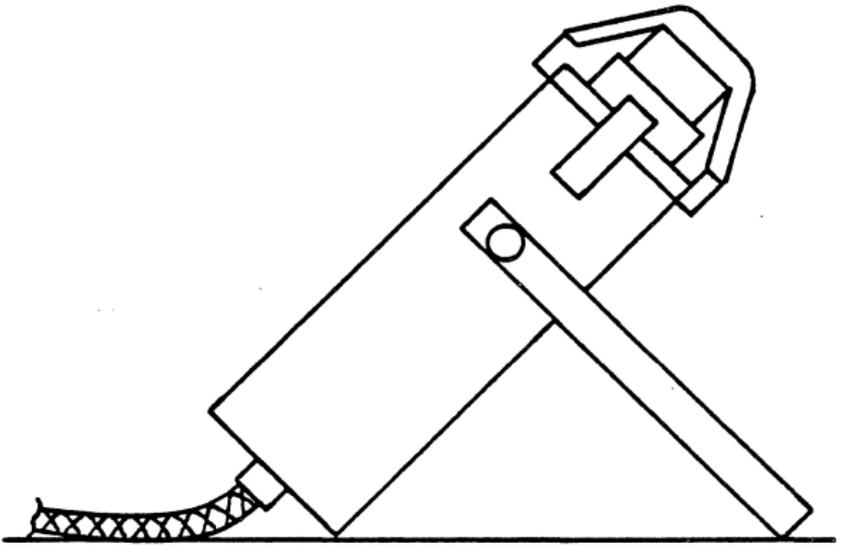


Diagram A-1. U-PAC Operating Position

MODEM
INTERFACE

EIA
INTERFACE

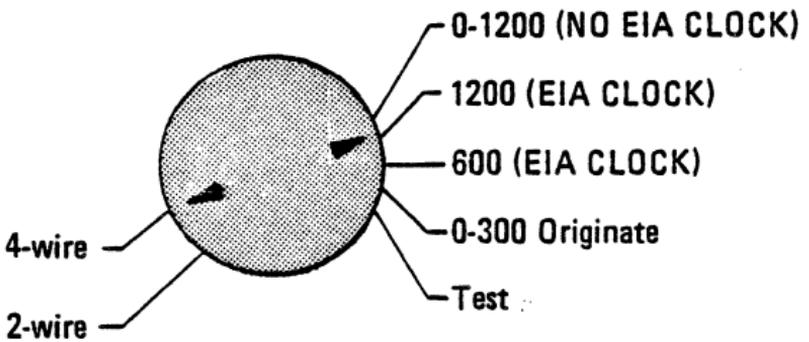


Diagram A-2. U-PAC Switch

Appendix A. Operating Diagrams

EIA
INTERFACE

MODEM
INTERFACE

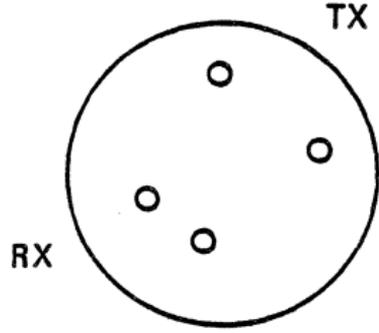
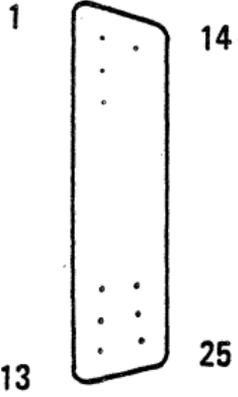


Diagram A-3: Interfaces

NOTES

1. 1970-1971

2. 1972-1973

3. 1974-1975

4. 1976-1977

5. 1978-1979

6. 1980-1981

7. 1982-1983

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BUFFER TDAT

PURPOSE: The BTDAT provides both monitoring and exercising capabilities for a wide range of teleprocessing products with complete transparency to line codes and speeds up to 1.5 Mbps. It provides the user the flexibility to address today's and future problems.

DESCRIPTION: The BTDAT is made up of many functional units which when interconnected will assist the in-depth branch office teleprocessing CE or Specialist to perform trouble analysis and resolution in the systems environment.

Inconvenience to the customer during maintenance is minimized since monitored failure data can be used to exercise and verify repair prior to returning a TP unit to the customer's operation.

Some of the major BTDAT functional units are:

1. Keyboard
Hex and binary input
2. Display Modes
8 hex characters
32 bit serialized hex
CE Mode — current conditions function and status
3. EIA/CCITT Display
LED display of each active interface lead
4. Memories
Two 4K byte memories independently clocked for full duplex or chained for half duplex operations
5. Compare
32 bits — programmable using Mask Register up to 32 bits
6. Technology Probes
accept SLT, SLD, MST-1 and VTL levels
7. Acoustic Coupler
600 and 1200 bps
8. Cassette Tape
used for input and output

Detailed instructions on the use of the BTDAT can be found in the BTDAT Operators Guide, S226-3047. Also on the following pages, you will find basic set up procedures for monitoring Send and Receive data (Bi-Sync), exercising a 3271 control unit, and using the BTDAT to acoustic couple to the TPSC. These procedures are just a few examples of what can be done with the BTDAT. The BTDAT Operators Guide will give you a more detailed set of instructions and operations that can be accomplished with the BTDAT.

**I. BTDAT TO MONITOR SEND & REC. DATA
WITH EIA D/S.**

A. SET SWITCHES AS FOLLOWS:

1. MONITOR = ON
2. SPEED = SELECTED (USING D/S CLOCK)
3. CLOCK = OFF
4. MODE = 0-1200
5. SD/RD = SD
6. EXERCISE = TERM
7. TAPE I/O = XMIT
8. MODEM = 4W
9. DATA = NORMAL
10. COUPLER = OFF
11. TAPE POWER & LIGHT INPUT = DOESN'T
MATTER

B. SET PLUG PANEL AS FOLLOWS:

1. S&RD (MONITOR SECTION)
2. EXT (CLOCK SELECTION SECTION)
3. CD&RS (DATA GATES)
4. 64K (ADDRESS CONTROL SECTION)

- C. Hit reset; then start to begin monitoring data. If you want the BTDAT to stop when both buffers are full, you would plug ADDRESS STOP=B2 in the address compare section. Otherwise the buffers will wrap and monitoring will continue until stop is hit.

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II. DISPLAY DATA IN BUFFERS

A. SET SWITCHES AS FOLLOWS:

1. SAME AS MONITORING (SECTION I)

B. REMOVE ALL PLUG PANEL PINS

C. SET UP COMPARE & MASK REGISTERS

1. PLUG BOTH THE ENTER & COMPARE HUBS
2. KEY IN 32320000 ON THE KEYBOARD
3. HIT THE ENTER SWITCH
4. REMOVE THE COMPARE PIN AND PUT INTO MASK HUB
5. KEY IN FFFF0000 ON THE KEYBOARD
6. HIT THE ENTER SWITCH
7. REMOVE THE ENTER AND MASK PINS

D. SET PLUG PANEL AS FOLLOWS:

1. PLUG B1 and STOP= IN THE COMPARE SECTION
2. PLUG DATA IN THE BUFFER 1 SECTION

E. Hit RESET, then START. The BTDAT will stop with the first 3232 it finds in buffer 1. Example: 323237FF would appear on an EOT.

F. Hitting START again will cause the BTDAT to search for the next two syn characters. Example: If the CPU was polling address 40, you would see - 32324040.

G. Hitting ENTER/DISPLAY will bring the next 8 characters to the display. You would then see 40402DFF in the display. You can recognize the end of data by the trailing pad (HEX FF).

H. TO DISPLAY BUFFER 2

1. PULL PIN OUT OF B1 AND PLUG INTO B2 (COMPARE SECTION)
2. PULL PIN OUT OF DATA IN BUFFER 1 SECTION, AND PLUG IT INTO DATA IN BUFFER 2 SECTION.
3. HIT RESET, THEN START TO DISPLAY DATA IN BUFFER 2. TO CONTINUE TO DISPLAY DATA IN BUFFER 2, DO SAME AS FOR BUFFER 1 (F&G).

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III. EXERCISE TERMINAL

A. SET SWITCHES AS FOLLOWS:

1. MONITOR = OFF
2. SPEED = (WHATEVER SPEED YOU WANT TO RUN)
3. CLOCK = I
4. MODE = 0-1200
5. SD/RD = SD
6. EXERCISE = TERM
7. TAPE I/O = RCV
8. MODEM = 4W
9. DATA = NORMAL
10. COUPLER = OFF
11. TAPE POWER & LIGHT INPUT = (DOESN'T MATTER)

B. ENTER DATA INTO BUFFER

1. Plug ENTER hub.
2. Plug DATA hub in the Buffer 1 section.
3. Hit reset.
4. Key in first 8 characters on the keyboard (323237FF).
5. Hit ENTER switch.
6. Key in the next 8 characters (32324040) for CU ADD.=40.
7. Hit the ENTER switch.
8. Key in the next 8 characters (40402DFF) for DVC ADD.=40.
9. Hit the ENTER switch.
10. Remove the ENTER and DATA pins in Buffer 1 section.
11. Plug a pin into SAR hub in Buffer 1 section (SAR=Storage Add. Reg.).
12. Hit the ENTER/DISPLAY switch (this will display SAR).
13. Move the SAR pin to the SPAR hub (SPAR=Stop Address Reg.).
14. Plug a pin into the ENTER hub and press the ENTER switch.
15. Remove all pins from plug panel.

C. SET PLUG PANEL AS FOLLOWS:

1. Plug TERM (Exercise section)
2. RS (Data Gate section)
3. 1/2 DUPX (next to Data Gate section)
4. Plug LOOP (Address Control section)

D. HIT THE START SWITCH – YOUR TERMINAL SHOULD NOW BE POLLING.

IV. ACOUSTIC COUPLE TO TPSC

A. SET SWITCHES AS FOLLOWS:

1. MONITOR = OFF
2. SPEED = 1200
3. CLOCK = 1
4. MODE = 0-1200
5. SD/RD = SD
6. EXERCISE = TERM
7. TAPE I/O = XMIT
8. MODEM = 4W
9. DATA = NORMAL
10. COUPLER = OFF, THEN ON AFTER GOING TO DATA.
11. TAPE POWER & LIGHT INPUT = (DOESN'T MATTER).

B. SET PLUG PANEL AS FOLLOWS:

1. Plug FREE RUN (UPPER LEFT HAND CORNER OF PANEL)

C. PLUG EIA CABLE FROM TERMINAL INTO BACK OF BTDAT.

D. PLUG COUPLER CABLE INTO BACK OF BTDAT AND INTO THE COUPLER.

E. BTDATA IS NOW READY TO ACOUSTIC COUPLE TO TPSC.

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DB ATTACHMENT

The DB ATTACHMENT (P/N 1749299) is used with the new CE Meter (P/N 1749231), and is intended primarily for adjusting IBM modem transmit levels and checking receive signal strength. The DB adapter has a switch for BRIDGE or 600 OHM termination. When connecting the DB adapter to the circuit with the modem connected, the switch should be set to the BRIDGE position. When adjusting the transmit level of a modem, with the modem disconnected from the line, the switch should be set to 600 OHMS to simulate the impedance of the phone line.

The DB Adapter has the following features:

1. A rotary switch with eight positions; -50, -40, -30, -20, -10, and 0 dB, battery test and off.
2. A slide switch for bridge or 600 OHM operation.
3. A listen jack which permits using an earphone (P/N 2728116), for listening to line signals while in the bridge position.
4. A volume control for use while listening.
5. A light emitting diode which comes on when the rotary switch is in the test position and the battery is good.
6. Power is supplied from a standard 9 volt transistor radio battery.

OPERATION OF DB ADAPTER

1. To operate the DB adapter, the user must first set the CE meter range switch to .6MA DC, then set the DC polarity to +.
2. Place the small ends of the adapter plugs into the adapter output hubs located on the back.
3. Place the adapter on top of the CE meter while inserting the adapter plugs into the red and common input hubs.
4. Select 600 OHM, or bridge position depending upon the operation being attempted (see general desc. page 6-1).
5. The dB level can be measured by then adding the reading on CE meter dB scale to the value selected on the rotary switch.

Example: Meter reads +2, and switch on dB adapter is set to the -10 scale; dB level is +2 added to -10 or -8dB.

6. When finished with dB adapter, do not forget to turn it off to prevent the battery from going dead. Also always check battery level before using dB adapter. (Place switch to test and light should go on if battery is good.)

MODEM INTERFACE TEST SET

The Modem Interface test set (P/N 453637) connects in series with the EIA cable and the 25 pin data set connector. This enables the CE to monitor, measure, and control the EIA interface leads. The Modem Interface test set contains led indicators for quick display of the significant EIA leads. Also there are switches in series with the EIA leads which enable you to open certain leads for testing purposes. You can also tie certain leads together for testing purposes. An example of this would be to tie the Request-to-Send lead to DTR to hold up RTS all the time (this would force the data set to put out constant carrier). Since the RTS lead from the terminal side of the test set would be at a down level, you would have to open the switch for the RTS lead in order to tie it to an up level on the data set side of the test set. The Modem Interface test set uses standard 1.5 volt penlight batteries. If the led's seem to be dim, the most probable cause is weak batteries.

Note: Do not tie up leads on the test set unless you know what the consequences of this will be. This would be especially true if your terminal is on a multi-point line where such actions can take down the whole line.

A reference card (form number S226-3923) which can be used for cross reference between EIA lines, autocal lines, and data coupler lines is now available. This reference card will fit into the Modem Interface test set P/N 453637 currently available in the field. It will allow the user a quick reference of interface line names and pin numbers. To obtain this card order from Mechanicsburg using normal ordering procedures.

PIN	D T E	D C E	EIA INTERFACE
1			AA PROTECTIVE GND
2	→		BA TRANSMIT DATA
3	←		BB RECEIVE DATA
4	→		CA REQUEST TO SEND
5	←		CB CLEAR TO SEND
6	←		CC DATA SET READY
7			AB SIGNAL GND
8	←		CF CARRIER DETECT
9			---
10			---
11			---
12	←		SCF SEC CARRIER DETECT
13	←		SCB SEC CLEAR TO SEND
14	→		SBA SEC TRANSMIT DATA
15	←		DB TRANSMIT CLOCK
16	←		SBB SEC RECEIVE DATA
17	←		DD RECEIVE CLOCK
18			---
19	→		SCA SEC REQUEST TO SEND
20	→		CD DATA TERMINAL READY
21	←		CG SIGNAL QUAL DETECTOR
22	←		CE RING INDICATOR
23	→		CI DATA RATE DETECTOR
24	→		DA TRANSMIT CLOCK
25			---

PIN	D T E	D C E	COUPLER INTERFACE	D T E	D C E	AUTO-CALL INTERFACE
1			---			AA PROTECTIVE GND
2			---	→		DPR DIGIT PRESENT
3	←		CCT COUPLER CUT THRU	←		ACR ABANDON CALL RETRY
4	←		SH SWITCH HOOK	→		CRQ CALL REQUEST
5	←		RI RING INDICATE	←		PND PRESENT NEXT DIGIT
6	→		DA DATA SET READY	←		PWI POWER INDICATION
7			SG SIGNAL GND			AB SIGNAL GND
8	→		OH OFF HOOK			---
9			---			---
10			---			---
11			---			---
12			---			---
13			---	←		COS CALL ORIG STATUS
14			---	→		NB 1
15			---	→		NB 2
16			---	→		NR 4
17			---	→		NB 8
18			---			---
19			---			---
20			---			---
21			---			---
22			---	→		DLO DATA LINE OCCUPIED
23			---			---
24	↔		DT DATA TIP			---
25	↔		DR DATA RING			---

EIA INTERFACE

<u>Pin #</u>	<u>Name</u>	<u>Generated by:</u>	<u>Comments:</u>
1	Frame gnd	both terminal and data set	Pin 1 is protective ground for safety reasons
2	Transmit data	terminal	Is held to a mark level (-) when no data is being sent by terminal. When sending data it will be + (space) for a no bit and - (mark) for a bit condition.
3	Receive data	data set	Signals are generated by data set to terminal depending on what is on phone line. Data set will generate a + voltage for a space and a - voltage for a mark.
4	Request to send	terminal	Signals data set that terminal wants to send data. As soon as data set sees RTS from terminal it puts carrier on line to signal data set at other end to get in sync. After a predetermined delay, data set will turn on clear to send to terminal.
5	Clear to send	data set	Signals terminal that it has had time to get in sync with data set at other end, and that terminal can now start sending data.
6	Data set ready	data set	Indicates that data set is on and usually means that data set is ready to accept data from line or terminal, providing the other control lines are being properly controlled.
7	Signal gnd	both	Provides a dc reference for the signals. It may be tied to frame gnd in the data set.

<u>Pin #</u>	<u>Name</u>	<u>Generated by:</u>	<u>Comments:</u>
8	Carrier detect	data set	Signals the terminal that a signal of good level is being received by the data set from the phone line. If the signal drops below a certain amplitude the data set will turn off carrier detect. Most machines hold serdes reset until carrier detect comes on.
15	Transmit clock	data set	Provides a clock for the terminal to use to put data on the send data lead.
17	Receive clock	data set	Provides a clock for the terminal to use to deserialize the data from the receive data lead.
20	Data terminal ready	terminal	Signals the data set that the terminal is on and ready to communicate. On some terminals it comes on with power on, and with others the input or output devices must be ready.

HOLLY

I/O INTERFACE MONITOR

INTRODUCTION

The I/O Interface Monitor provides extensive on line I/O Interface monitoring capability with minimum installation effort. The Interface Monitor is completely self contained (built in power supplies and monitoring controls) and connects to the I/O interface as a standard control unit, using standard interface connectors.

SCOPE OF THE I/O INTERFACE MONITOR

The Interface Monitor is used to record the following selected events:

1. Addresses, commands, and data on the 'bus out' upon selected event conditions.
2. Addresses, status, sense information and data on the 'bus in' on selected event conditions.
3. I/O interface conditions on the rise of the selected in-tags or out-tags.
4. I/O interface conditions on the rise of the in-tag or out-tag along with a specific data pattern on the associated bus.
5. Coincidence of any two of these in-tags: 'address-in', 'status-in', 'service-in', or 'data-in'.
6. Coincidence of any two of these out-tags: 'command-out', 'service-out', or 'data-out'.
7. Detection of one of above in-tags (item no. 6) which have a duration of 120 ns or less.
8. The coincidence of 'operational-in' and 'select-in'.
9. Detection of 'operational-in' falling before 'select-out'/'hold out'.
10. Detection of 'operational-in' active without 'select-out'/'hold out'.
11. Bad parity on 'bus in' or 'bus out'.
12. An external sync as designed by the Field Engineer.

A 115V ac 50-60 HZ single phase Sentinel fan provides cooling. The air intake is through the back of the case. Air is distributed over the cards and exhausted through perforations in the front of the case. An internal card cover deflects about two-thirds of the incoming air over the cards maintaining a chamber effect to cool the cards and the remaining one-third of the incoming air is used to disperse heat from the power components.

OPERATING CONTROLS

The control panel contains controls and lights which monitor I/O interface logic, display HDB memory, reset control and error detection logic, and provide maintenance facilities for convenient trouble-shooting of the I/O interface or Interface Monitor. Each CE switch function or panel indicator is described below: Figure 5 shows the CE panel with labels for all lights and switches.

SWITCHES

Power ON/OFF Switch

Setting this toggle switch to the up position brings up power to the Interface Monitor. This switch in the down position turns off power to the Monitor. This switch is located outside the case. See Figure 2.

Function Switch

A four position rotary switch selects one of the following functions:

- a. Reset — Resets control and error detection logic, does not reset the HDB memory.
- b. Display — Will display, on the control panel, the memory location loaded in address counter.
- c. Record Mode — Enables the I/O interface monitoring circuitry.
- d. Write Test — Will enable writing the HDB Memory with a one's or zero's pattern.

PHYSICAL DESCRIPTION

The I/O Interface Monitor is constructed of:

1. 17 MST-1 cards specifically designed for the Monitor.
2. A High Density Buffer (HDB) MST-1 memory module.
3. A CE control panel.
4. A ferroresonant regulated power supply providing -4 volts for the MST-1 cards and +6 volts for the light emitting diode (LED) indicators.
5. #24 twisted pair of input-output lines from the MST-1 board connectors to four serpent input-output connector blocks attached to the outside case.
6. #24 Yellow wire cables from the CE panel switches and indicators to MST-1 board connectors.
7. #20 black wire internal cable from the regulated power supply to the board, providing two -4V lines and a ground line and supplying a +6V line to the light emitting diodes.

The Monitor is packaged in an 18" x 12" x 12" aluminum case weighing approximately 47 pounds. Figures 1 through 4 show various views of the Interface Monitor.

The CE panel contains controls for monitoring I/O interface bus and tag signals. The controls aid in evaluation of control units during diagnostic and marginal testing, and provide means for troubleshooting the Monitor itself. The 10-3/4" x 17" CE control panel consists of 51 light emitting diode indicators using several colored lenses, 41 two-position toggle switches, two push-button switches and a rotary switch.

A ferroresonant regulated power supply provides regulated voltage lines to the light emitting diode indicators and the MST-1 board. The power supply uses discrete wiring rather than a cable, and takes approximately one-half the box. A detachable six foot 115 volt line cord is standard with the Monitor. The line cord can be removed and stored in the carrying case.

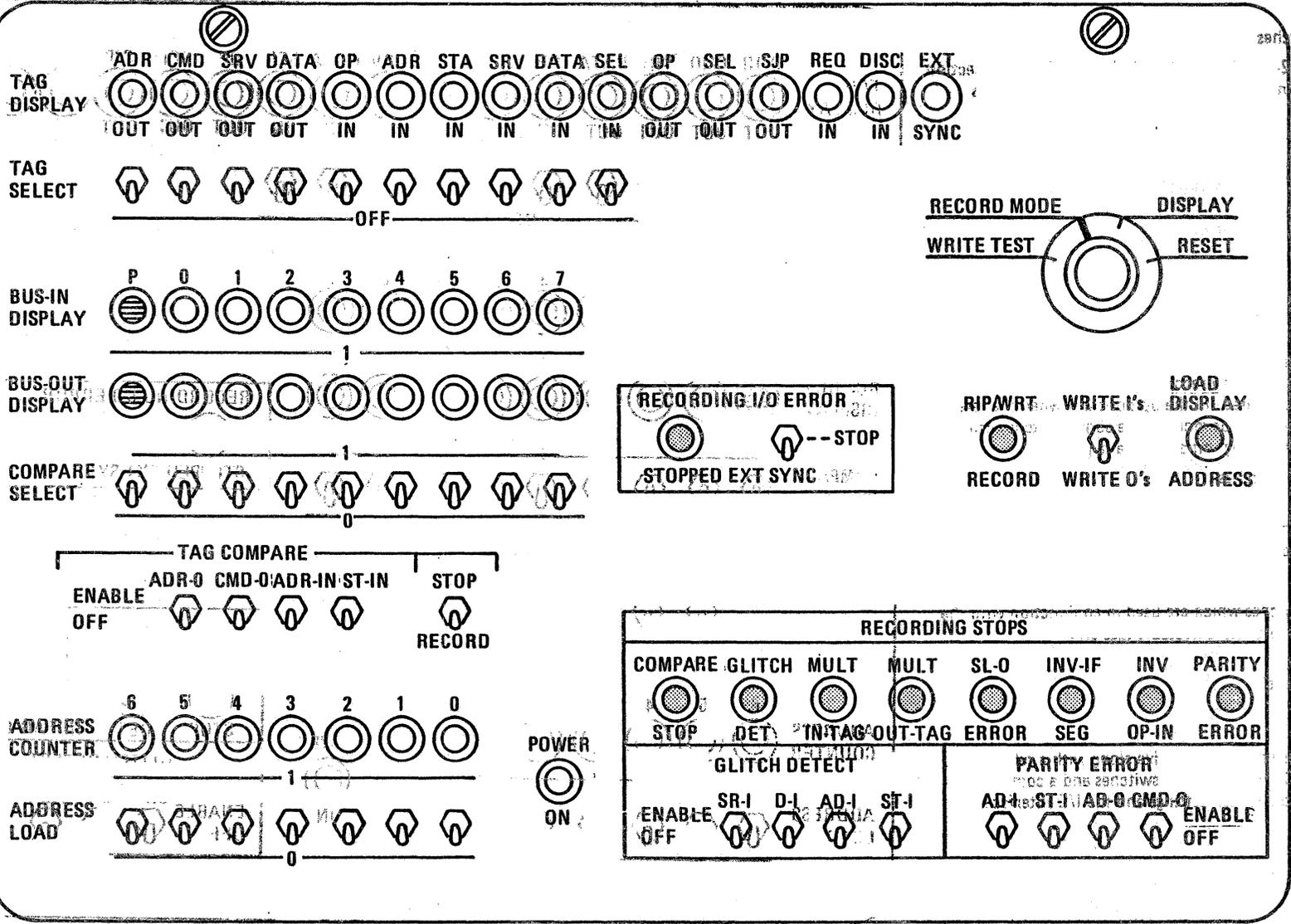


Figure 5. CE Control Panel

Tag Select Switches

A group of 10, 2-position toggle switches, used in the selection of event recording. The tags which can be selected are as follows:

- a. 'Address Out'
- b. 'Command Out'
- c. 'Service Out'
- d. 'Data Out'
- e. 'Operational In'
- f. 'Address In'
- g. 'Status In'
- h. 'Service In'
- i. 'Data In'
- j. 'Select In'

These switches are active only when the "Function" switch is in "Record Mode". For a recording to occur at least one switch must be activated (in the up position) when the selected event occurs. Any one or more of the above switches can be activated for a recording initiated by a tag rise.

Compare Select Switches

A group of 9, 2-position toggle switches used to select a specific bus in/out pattern for event recording or recording stop. Each switch is active in the up position.

Tag Compare

A group of 5 switches which are used in conjunction with the compare select switches. Selectable tags are:

- a. 'Address Out'
- b. 'Command Out'
- c. 'Address In'
- d. 'Status In'

When one of these switches is active along with a selected pattern in the "Compare Select" switches and a comparison occurs between the switch settings and the I/O Interface tag

and corresponding data bus, then one of the following takes place depending upon the position of the "STOP/RECORD" switch:

- a. **STOP POSITION** — The recording of the selected event is stopped when the compare takes place. All the Tag Select switches can be activated when using Tag Compare in the Stop Position.
- b. **RECORD POSITION** — A recording of the selected event on the interface is initiated, and the Tag Select switches are activated for as long as the selected device is on the interface.

Glitch Detect Switches

A group of 4, 2-position toggle switches enable detection of a signal of 120 ns or less in duration. Each switch is active in the up position, but only one of the four switches should be active during "Record Mode". The selectable signals are:

- a. 'Service In'
- b. 'Data In'
- c. 'Address In'
- d. 'Status In'

Parity Error Switches

A group of 4, 2-position toggle switches enable detection of bad parity on the bus in or bus out. Each switch is active in the up position, but only out-tags or in-tags, not both can be active during "Record Mode". The selectable tags are:

- a. 'Address In'
- b. 'Status In'
- c. 'Address Out'
- d. 'Command Out'

Stop Switch

A 2-position toggle switch, in the up position will stop recording when one of the seven checks detected occurs. In the down position, it will stop recording when the external sync is active. The external sync is generated on a spare signal pin on the I/O interface.

Test Equipment Users Guide

READER'S COMMENT FORM

Order No. Z226-3947-0

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