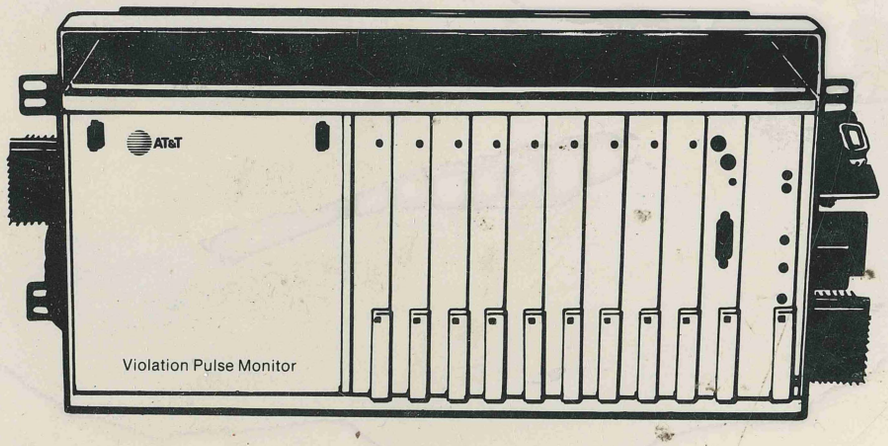
AT&T

Violation Pulse Monitor User's Manual

Description, Operation, Maintenance, and Acceptance



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USER'S MANUAL

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1. INTRODUCTION

1.1 PURPOSE

This document, AT&T Practice 422-600-100AC, provides extensive information on the Violation Pulse Monitor (VPM).

The VPM is a single shelf unit that remotely monitors DS3 parity information generated by the VMR (Violation Monitor and Remover) circuit pack. The VMR uses DS3 parity as a basis for detecting block errors. The DS3 parity information is processed by the VPM into DS3 sectional performance data. The DS3 performance data is transmitted to an FMAC (Facility Maintenance and Administrative Center) via a GTP (General Telemetry Processor).

The VPM provides facility performance monitoring information to FMAS (Facility Maintenance Administrative System) on DR6/11-135 and DR4/TD-90 radio and FT3C and FTX-180 fiber technologies at the 45-Mb/s (DS3) rate. The performance data for a DS3 section includes the performance of the multiplex equipment that converts to the DS3 rate as well as the performance of the intermediate transmission system. The DS3 section PM (performance monitoring) is used to find problems in the multiplex equipment not detected by line performance monitoring and to sectionalize transmission path problems.

Implementing the VPM into the DS3 maintenance plan provides FMAS with centralized acceptance testing of DS3 facilities, in-service sectionalization of DS3 problems, and performance monitoring to locate impaired DS3 facilities.

1.2 UPDATE INFORMATION

Each page of this manual and the cover sheet is assigned Issue 1.00, indicating that this is the first issue. The manual will be updated by issuing only those pages affected. If a page is updated, the page will be issued as Issue 1.01, and subsequent updates will be labeled Issue 1.02, 1.03,..., 1.xx (x= any number 0-9). The issue number will only appear on the reissued (or added) pages. If there are enough changes (or updates) to warrant complete reissue of a tab, each page of that tab will be issued as Issue 2.00 and subsequent updates will be Issue 2.01, 2.02, etc., as necessary.

Inserting or deleting material may affect the number sequence of pages as new material is added and old pages deleted. Pages that have been added within a tab will be given a lettered page designator to prevent page number conflicts (e.g., 3-1a, 3-1b, etc.). These lettered page numbers will be used until the entire tab section is reissued.

Collating instructions, an issue index, and a new cover sheet will be distributed to the user with each update. The collating instructions will indicate the placement of the updated pages and the removal of the deleted pages. The issue index (not necessary for issue 1.00) will grow with each update and list all updated pages in the manual and the correct issue. The new cover sheet will reflect the date of issue.

1.3 ORGANIZATION

For ease of access, this manual is organized by functional subjects and packaged into loose-leaf binders divided logically by tab separators. A table of contents listing the tab names appears in the front of the binder. Each tab is numbered and contains a detailed table of contents. Pages are numbered consecutively within a tab and carry the tab number designator as part of the page number (e.g., Page 3-1 is page 1 of tab 3). The table of contents carries the tab number, a dash, and lower case Roman numerals as the page number (e.g., Page 3-i). The information in a tab may be subdivided into subtabs in some instances to enhance access to critical information or to break up bulky tabs into more manageable units.

Text headings are numbered in a standard hierarchical decimal numbering scheme (e.g., 1.1, 1.2, 1.2.1, etc.). The page header contains the document number (AT&T Manual number), the tab title, and date of issue. The page number is displayed at the bottom of the page. Each major tab heading is listed below with a brief summary of that tab's contents.

- DESCRIPTION: Contains the physical and functional descriptions of the VPM shelf and its overall operating environment.
- OPERATION: Contains the information and instructions necessary to operate the VPM once it is installed. This tab also contains a section that provides information and instructions on how to locally acquire the DS3 performance data using a PC (personal computer).
- MAINTENANCE: Contains the information and instructions necessary to maintain the VPM. Also included are repair and replacement procedures as well as a telephone number to call for technical assistance.
- INSTALLATION ENGINEERING: Contains the application and engineering requirements necessary to install the VPM. The ordering information for the VPM shelf and required accessories, such as the interfacing cable, is also provided.
- ACCEPTANCE PROCEDURES: Contains the information and instructions on the acceptance of a new VPM shelf and telemetry verification to FMAS.
- DOCUMENTATION ORDERING: Contains the information to order additional VPM documents as well as a list of related documentation.
- SD, CPS, ED, and J-DRAWINGS: Contain the respective drawings associated with each tab.
- APPENDIX: Contains related documents.

1.4 DISTRIBUTION

The latest issue of this manual will automatically be distributed with each VPM shelf ordered from the manufacturer. To obtain automatic updates, the user must obtain "Standing Order" status for this manual at AT&T Customer Information Center. Refer to the DOCUMENTATION ORDERING tab for further details on distribution and how to order additional manuals.

1.5 USER FEEDBACK

To assist in our efforts to improve the quality and usefulness of our documentation, we have included at the back of this section a user comment form. This form is the preferred method of communicating with AT&T about this manual. Comments received from other means cannot be guaranteed to be acted upon.

If the comment form is missing or your comments are too detailed to fit on it, you may write us at the following address:

AT&T NETWORK SYSTEMS
ATTN: Radio Department
2400 Reynolda Road
Winston-Salem, NC 27106

When comments are received at the above address, they will be acknowledged and responded to within 30 days. Individuals making the comments will be notified as to what type of action is being taken or will be taken as a result of the comment(s).

1.5.1 COMMENT FORM

Comments concerning any problems with the content, usability, and adequacy of this manual would be appreciated. Please give specific part/section identification, paragraph reference, or problem area, as applicable, and the correction or suggested improvement.

Comments submitted by:_____ Date:_____
Location:_____

Send to:

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Winston-Salem, NC 27106
ATTN: Radio Department

TAB	SECTION NUMBER	PARAGRAPH REFERENCE OR PROBLEM AREA	CORRECTION OR SUGGESTED IMPROVEMENT
			Comment(s) continued on reverse side.

TAB	SECTION NUMBER	PARAGRAPH REFERENCE OR PROBLEM AREA	CORRECTION OR SUGGESTED IMPROVEMENT

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LIST OF TABLES

2. DESCRIPTION

2.1 GENERAL

The VPM (Violation Pulse Monitor) is a miscellaneously-mounted shelf that monitors DS3 section performance for compatible communication systems. By monitoring the DS3 signal after error correction, the VPM provides an actual representation of the DS3 signal quality received by the customer. It also provides a telemetry interface for the transmission of DS3 performance data to a GTP (General Telemetry Processor). The VPM does this by monitoring, collecting, and processing data representing PE (parity error) and OOF (out-of-frame) information generated by an AMR72B VMR (Violation Monitor/Remover). This information is generated in response to P-Bit violations in the DS3 M-frame.

There are three primary components to the VPM monitoring system:

- AMR72B Violation Monitor/Remover
- VPM shelf
- GTP.

Located in the receive half of each channel in the 90C, 135A, and 135EC terminal bays, the AMR72B VMR circuit packs output a D3P (DS3 parity error) signal in response to parity-error and/or frame-loss. The D3P signal, representative of one DS3 rail, is connected to the VPM via a connectorized cable assembly. The VPM processes the information received from the D3P and CSRVS (span service status) signals in the following parameters, which provide DS3 section performance monitoring in compliance with CB149, Issue 3.

- DSP (digital signal parameters) P0 through P5
- PSI (protection switch indicators) P6 through P7
- PSD (protection switch durations) P10 through P11.

The CSRVS signal originating from the control/service channel shelf of the monitored equipment informs the VPM if the associated channel is carrying service. This signal supports the PSI and PSD parameters when the channel being monitored may have been span-switched to protection or the exerciser was invoked.

The GTP requests the DS3 performance data from the VPM once every SYNC measurement interval. The VPM then transmits this data over a TABS (Telemetry Asynchronous Block Serial) compatible link to the GTP. The GTP transmits the data to an FMAC (Facilities Maintenance and Administrative Center), where the data is used to evaluate the quality of and, if necessary, improve the DS3 signal.

The VPM only monitors the quality of the DS3 signal(s) and is nonintrusive.

The VPM is compatible with lightwave systems if a compatible D3P signal is provided.

A simplified functional block diagram of the overall system is in Figure 2-1. A detailed interconnect diagram of the overall system is in Figure 2-2. The information shown on this diagram is discussed in detail in Part 2.2, VPM SHELF.

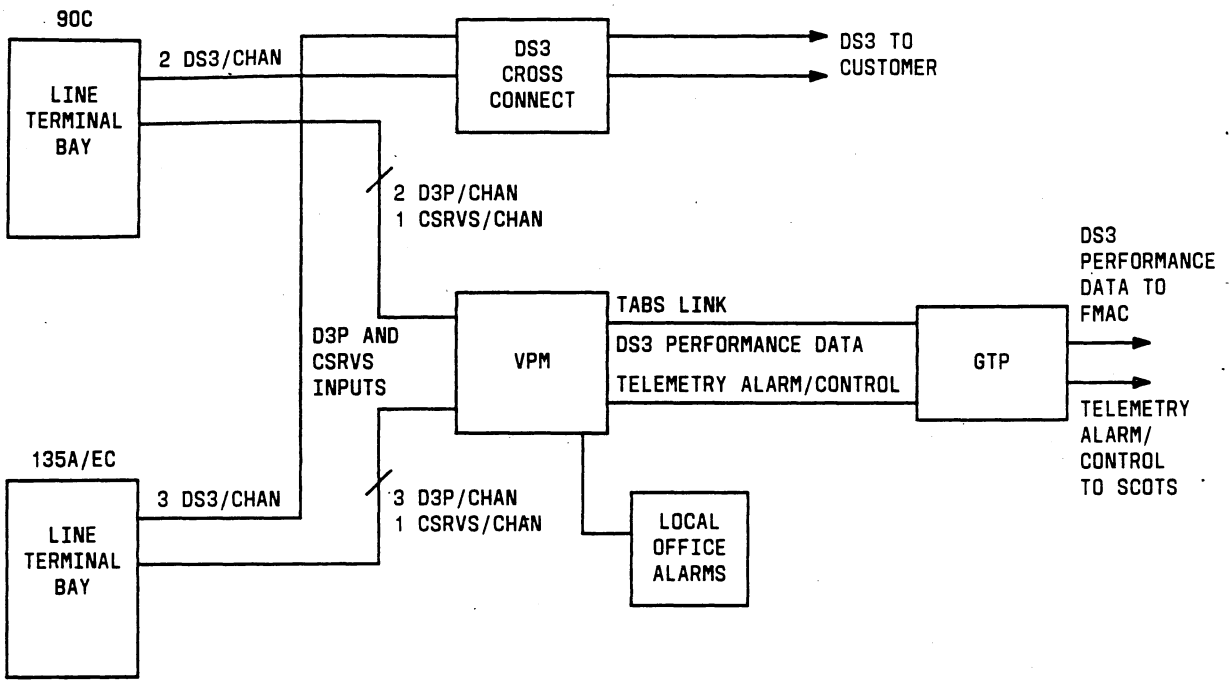

Figure 2-1 — System Functional Block Diagram

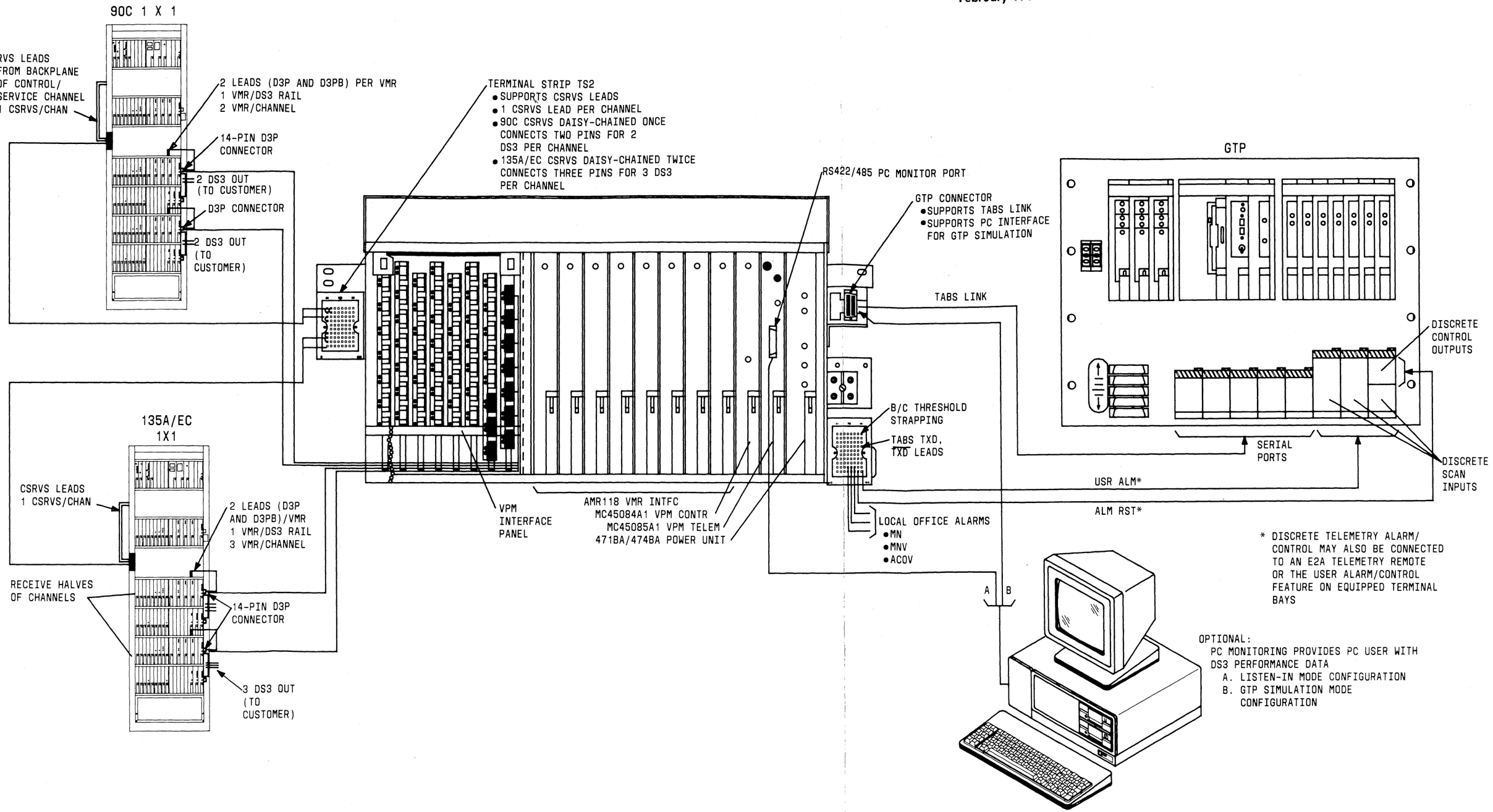

Figure 2-2 — VPM System Interconnect Diagram

2.2 VPM SHELF

2.2.1 GENERAL

A functional diagram and a picture of the VPM shelf are in Figures 2-3 and 2-4, respectively. The VPM shelf is 19½ inches wide, 10⅓ inches high (including heat baffle), and 9½ inches deep. It can be miscellaneously-mounted in a world class bay framework or a 23-inch unequal flange bay framework.

The VPM is arranged to accommodate a total of 11 circuits packs. The circuit packs fit into slots that are interconnected by a printed wire backplane. The circuit packs are separated as follows:

- 8 — AMR118 VMR INTFCs (Pulse Interfaces)
- 1 — MC45084A1 VPM CONTR (Main Controller)
- 1 — MC45085A1 VPM TELEM (Alarm/Telemetry Processor)
- 1 — 471BA/474BA POWER UNIT.

For minimal operation, the VPM must be equipped with one of each circuit pack, and a VMR INTFC circuit pack must occupy slot A. Additional VMR INTFC circuit packs may be used as needed.

In addition to the circuit packs, five other major components are with each VPM:

- Terminal strip TS2
- VPM INTERFACE panel
- GTP connector P1
- Power terminal block TB1
- Terminal strip TS1.

Terminal strip TS2 is located on the upper left side of the VPM shelf. TS2 is part of the monitored equipment interface and supports the CSRVS leads. A 64-wire harness is wire-wrapped from the back of TS2 to the backplane of the corresponding VMR INTFC circuit packs.

The VPM INTERFACE panel is a front-accessible 64-port panel arranged in an 8X8 matrix labeled [A-H] [1-8]. Each DS3 Port is a 6-pin male socket that supports the D3P plug-in connectors. The D3P inputs enter the VPM through the entry point located on the lower left side of the VPM and plug into their assigned DS3 Ports. Located on the inside of the VPM INTERFACE panel door is the DS3 rail/channel/system assignment chart known as the DS3 PORT ASSIGNMENT chart.

The VPM INTERFACE panel interfaces directly with the VMR INTFC circuit packs via printed wire paths on the backplane. Each VMR INTFC circuit pack supports up to eight D3P signals and, depending on the circuit pack's slot location [A-H] as designated on the label beneath the circuit pack, has a corresponding column of DS3 Ports [A-H]. The MC45084A1 VPM CONTR circuit pack is the main data processing and collection agent for DSP, PSD, and PSI parameters from the VMR INTFC circuit packs. The DSP, PSD, and PSI parameters are transferred to the MC45085A1 VPM TELEM circuit pack, then formatted and transmitted over the TABS link in response to requests by a GTP.

The 14-pin GTP connector P1, the power terminal block TB1, and the terminal strip TS1 are located on the right side of the VPM. The GTP connector supports the TABS link to

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The 14-pin GTP connector P1, the power terminal block TB1, and the terminal strip TS1 are located on the right side of the VPM. The GTP connector supports the TABS link to

the GTP and the PC (personal computer) interface when the PC is operating in the GTP Simulation mode.

The VPM power terminal block is located beneath the P1 connector. The VPM can be supplied with either a –24 V or –48 V dc source.

Terminal strip TS1 is located beneath the power terminal block; supports the local-alarm relay contact closures, discrete remote alarm/control contacts, and B/C errored-second threshold straps for the individual VMR INTFC circuit packs; and provides access to the +TXD and –TXD leads of the TABS link to the GTP.

The discrete alarm/control contacts are explained in detail in Part 2.2.4, DISCRETE ALARM/CONTROL INTERFACE. The B/C errored-second threshold strapping is explained in detail in Part 2.2.2.1, Digital Radio/Lightwave Compatibility Strapping.

The monitor jack that allows the connection of a PC is located on the faceplate of the MC45085A1 VPM TELEM circuit pack. The monitor jack is RS-422/485-compatible and supports the PC interface when the PC is operating in the "Listen-In" mode.

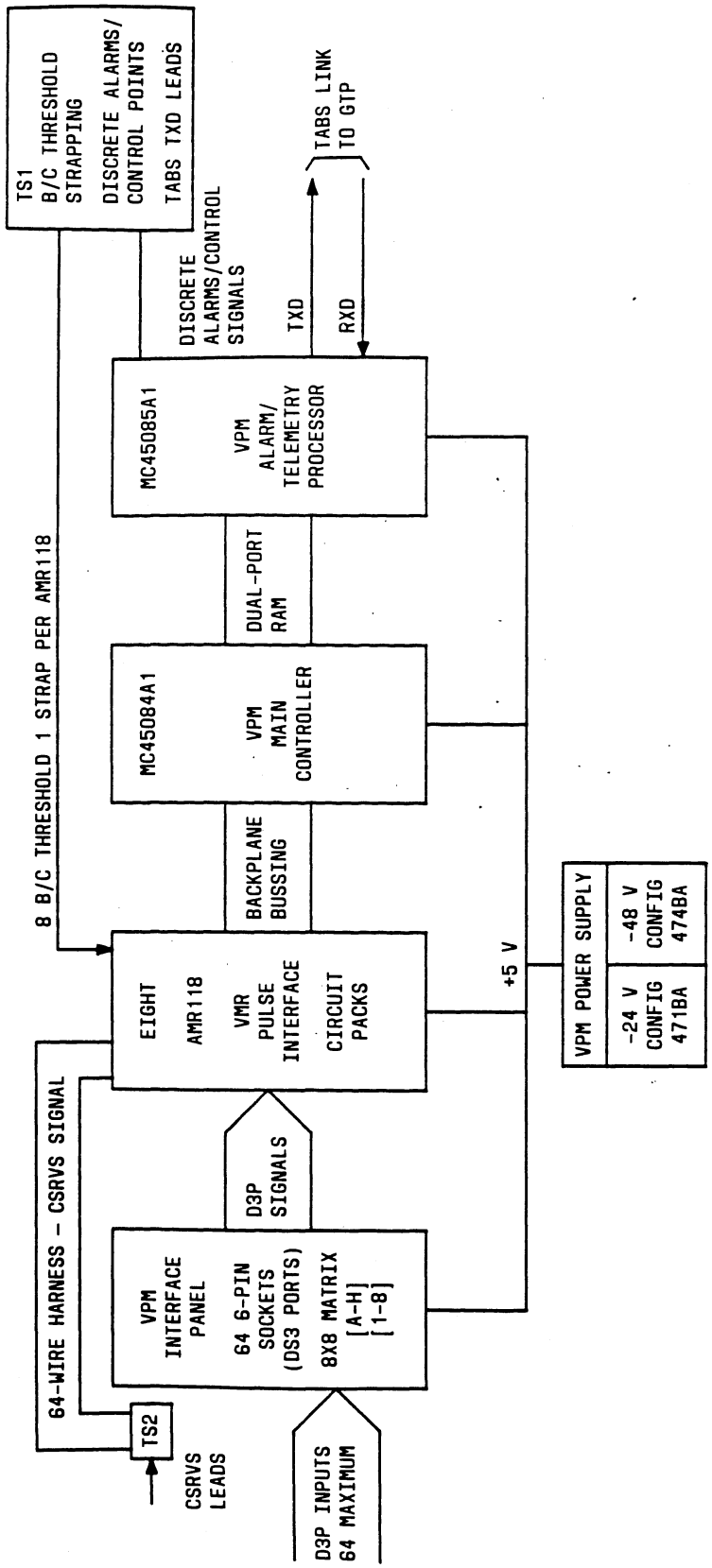


Figure 2-3 — VPM Block Diagram

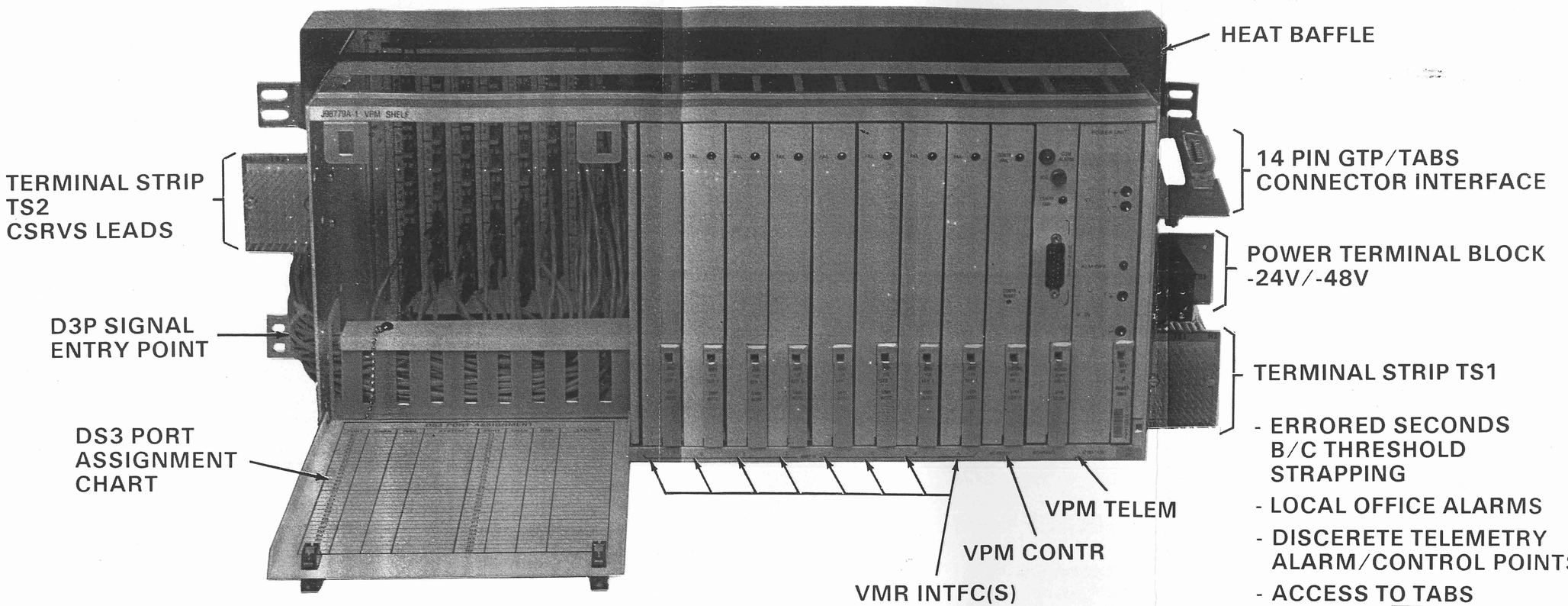


Figure 2-4 — VPM Shelf

2.2.2 MONITORED EQUIPMENT INTERFACE

The monitored equipment interface involves three components of the VPM:

- Terminal block TS2
- VPM INTERFACE panel
- AMR118 VMR Pulse Interface circuit packs.

The monitored equipment interface is responsible for supporting the D3P (DS3 parity error) cables and the CSRVS leads originating from the monitored equipment. A block diagram of the monitored equipment interface supporting a 90C or 135A/EC terminal bay is in Figure 2-5. Figure 2-6 illustrates a 135 line terminal bay monitored by a VPM.

The VPM is compatible with digital radio systems equipped with the AMR72B VMR circuit packs. The AMR72B circuit packs are located in the receive half of each channel in the 90C, 135A, and 135EC terminal bays. For each DS3 rail, there is a corresponding AMR72B circuit pack. This circuit pack is responsible for performing B3ZS coding equipment protection switching and for monitoring the received DS3 signal for DS3 frame with correct parity. Upon detection of parity error and/or frame loss, the AMR72B circuit pack will output an RS-422-compatible signal at its D3P complementary output. When the AMR72B circuit pack is in-frame, the D3P output is held high except when parity errors are detected. In the event of detected DS3 parity errors, this signal has low-going pulses, either 60.8 μs or 76 μs, depending on whether the first or second parity bit is incorrect. When DS3 frame is lost, this signal goes low for a minimum duration of 150 μs and remains low until frame is restored.

Each D3P output (of the AMR72B circuit pack) is accessed on the terminal bay's backplane and is wire-wrapped to the D3P 14-pin connector located on the right side of each receive channel shelf (Figure 2-6). The D3P connector is designated PC1E for the protection channel and PC2D for regular channels for the 90C, 135A, and 135EC terminal bays. The D3P signals are connected to the VPM shelf by the D3P cable assembly at the VPM INTERFACE panel. The number of D3P inputs depends upon the monitored equipment that the D3P inputs originated from, i.e., two D3P inputs per channel for 90C terminal bays and three D3P inputs per channel for 135A/EC terminal bays. At the VPM side of the D3P cable assembly, each of the individual D3P signals is separated into independent D3P inputs. As illustrated in ED-8C681-20 (see J/ED DRAWINGS tab), Group 1 cable assembly is used with 90C bays and Group 2 is used with 135A/EC bays.

The VPM INTERFACE panel is arranged in an 8X8 matrix of 6-pin male sockets, known as DS3 Ports, labeled [A-H] [1-8]. Each column [A-H] of DS3 Ports is interfaced via printed wire paths on the backplane to the corresponding VMR INTFC circuit pack slot. Each circuit pack is capable of supporting a maximum of eight D3P inputs. Each VPM shelf can support a maximum of 64 D3P signals when fully equipped with 8 VMR INTFC circuit packs. A chart for D3P rail/channel/system assignments is located on the inside of the VPM INTERFACE panel door.

Each D3P input is a 6-pin female plug that connects to an assigned DS3 Port located on the VPM INTERFACE panel. A label for recording the D3P signal's associated rail and channel is located on each D3P input plug.

For proper installation of D3P inputs, refer to the D3P Assignment/Removal Procedures in the OPERATION tab.

When the D3P input is plugged into the VPM INTERFACE panel, an internal jumper wire located in the D3P plug shorts a +5 V signal to ground through a 10K ohm resistor on the

respective VMR INTFC circuit pack. This signal, known as SUPRT [1-8], indicates that the respective D3P signal is supported and initiates the monitoring process for that particular DS3 port location on the VPM INTERFACE panel.

As shown in Figure 2-6, the 15-pin CSRVS connector is located on the left side of the fan shelf. For frequency diversity, the CSRVS connector is designated JC3H for the 90C, 135A, and 135EC terminal bays. For hot standby, the CSRVS signal is accessible at punching C8 of the Control and Service Channel shelf's terminal strip TS1. The CSRVS leads originate from the backplane of the Control and Service Channel shelf located in the monitored terminal bays and are wire-wrapped to the CSRVS connector. Table 2-A provides the circuit pack, slot, and pin numbers where the CSRVS leads originate from for frequency diversity and hot standby system configurations.

TABLE 2-A

CSRVS LEADS, FREQUENCY DIVERSITY

LEAD DESIGNATION	ORIGINATING TERMINAL UNIT	SLOT/PIN NUMBER	NORMAL STATE
CSRVS1	AMR114	04-070/148	1
CSRVS2	AMR114	04-070/129	1
CSRVS3	AMR114	04-078/148	1
CSRVS4	AMR114	04-078/129	1
CSRVS5	AMR114	04-086/148	1
CSRVS6	AMR114	04-086/129	1
CSRVS7	AMR114	04-096/148	1
CSRVS8	AMR114	04-096/129	1
CSRVS9	AMR114	04-104/148	1
CSRVS10	AMR114	04-104/129	1
CSRVS11	AMR114	04-112/148*	1
CSRVSP	AMR115	04-054/151	0

*90C system only.

TABLE 2-B

CSRVS LEADS, HOT STANDBY

LEAD DESIGNATION	ORIGINATING TERMINAL UNIT	SLOT/PIN NUMBER	NORMAL STATE
CSRVS1	AMR102	04-022/035	1

The CSRVS cable transports the individual CSRVS leads to the terminal strip TS2 of the VPM. At the TS2 end, the CSRVS cable is separated into color-coded wires, with each

wire representing a specified CSRVS lead. Each CSRVS lead, representative of a VPM-monitored channel, is wire-wrapped to a corresponding pin on TS2 and daisy-chained to additional corresponding TS2 pins the number of times equal to the number of DS3 rails of the respective channel, i.e., a CSRVS lead representative of a 90C channel with two DS3 rails per channel will be daisy-chained to an additional TS2 pin. Terminal strip TS-2 is interfaced with the corresponding VMR INTFC circuit packs via a 64-wire harness. The TS2 pins correspond to specific VPM INTERFACE panel DS3 Ports and are supported by the associated VMR INTFC circuit packs.

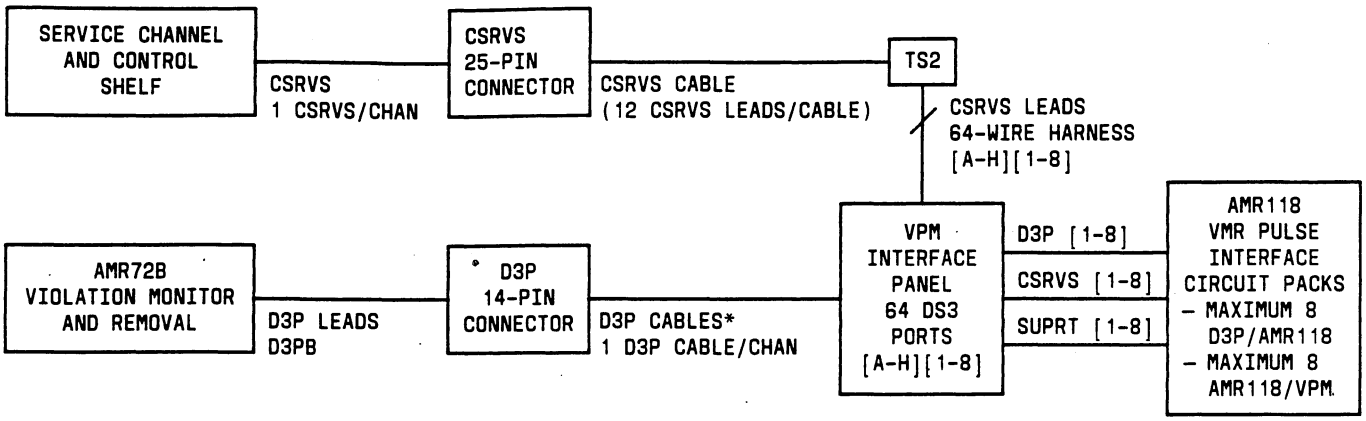
The signal on the CSRVS lead informs the VPM if that monitored channel is carrying service during the SYNC measurement interval. A logic 1 on the CSRVS lead indicates that the monitored channel is carrying service, and a logic 0 indicates that it is not carrying service. This information is used by the VPM to determine if the D3P signal is an accurate representation of the actual data received by the customer.

The VMR INTFC circuit pack receives the D3P signal from the VPM INTERFACE panel and determines from the D3P signal the DSP, P1 through P5 (number of detected errors, out-of-frame indicator, errored-seconds type A, B, and C), as specified in CB149, Issue 3.

The PSI (P6 through P7) and PSD (P10 through P11) parameters are derived from the DSP parameters and the CSRVS leads state. The DSP, PSI, and PSD data, also known as DS3 performance data, is transmitted to the VPM TELEM circuit pack upon request.

2.2.2.1 Digital Radio/Lightwave Compatibility Strapping

The VPM is capable of supporting both digital radio and lightwave communication systems with compatible interface circuitry. Each VMR INTFC circuit pack has a strapping option that allows for the different errored-second B/C threshold value of each system. The errored-second B/C threshold value is 10^{-6} (44 parity errors/second) for digital radio and 10^{-7} (5 parity errors/second) for lightwave. The strapping for this option is done on terminal strip TS1. Each VMR INTFC circuit pack is configured for digital radio monitoring. Strapping the corresponding pin on TS1 to ground will configure the respective VMR INTFC circuit pack for lightwave system compatibility. Figure 2-7 illustrates TS1 strapping for the errored-second B/C threshold for each equipped VMR INTFC circuit pack.



* 2 D3P INPUTS PER D3P CABLE FOR 90C DIGITAL TERMINAL BAY
3 D3P INPUTS PER D3P CABLE FOR 135A/EC DIGITAL TERMINAL BAY

Figure 2-5 — Monitored Equipment Interface Block Diagram

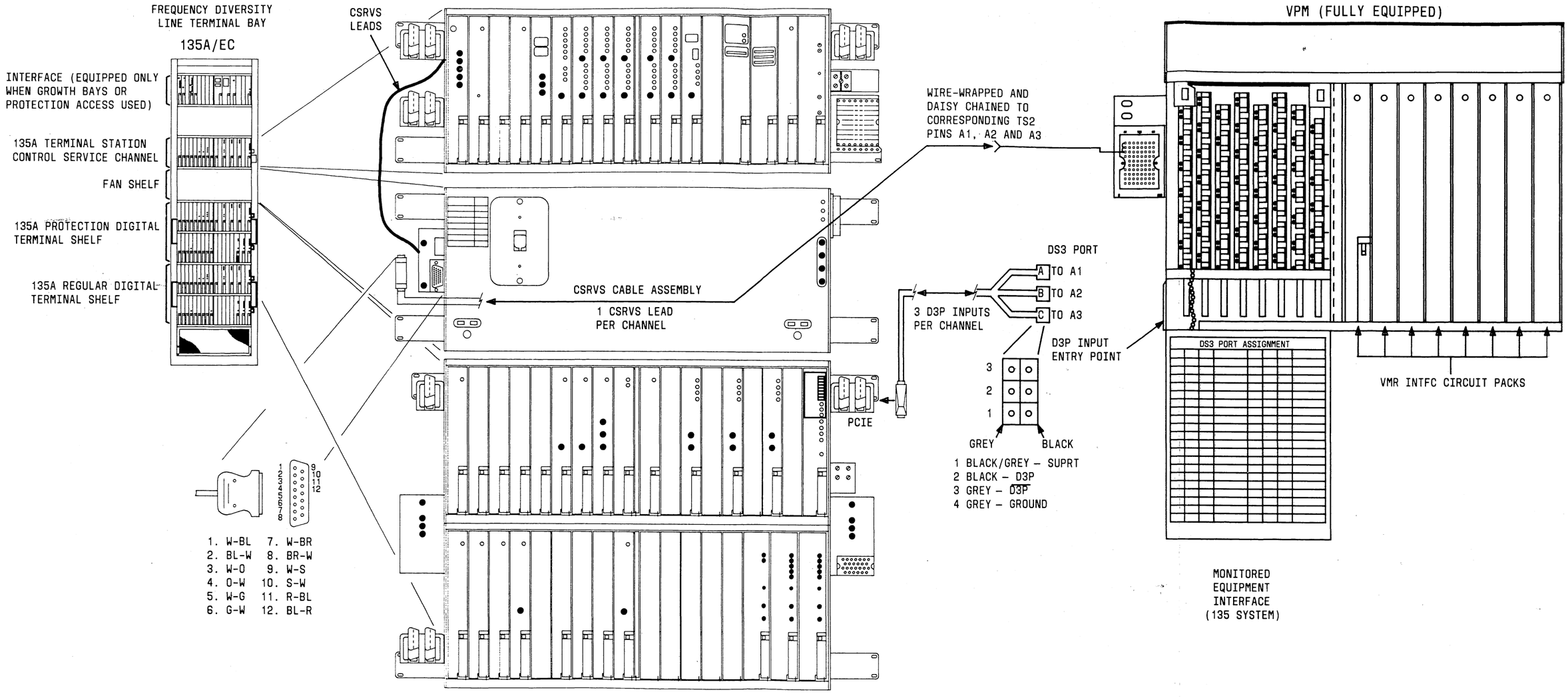
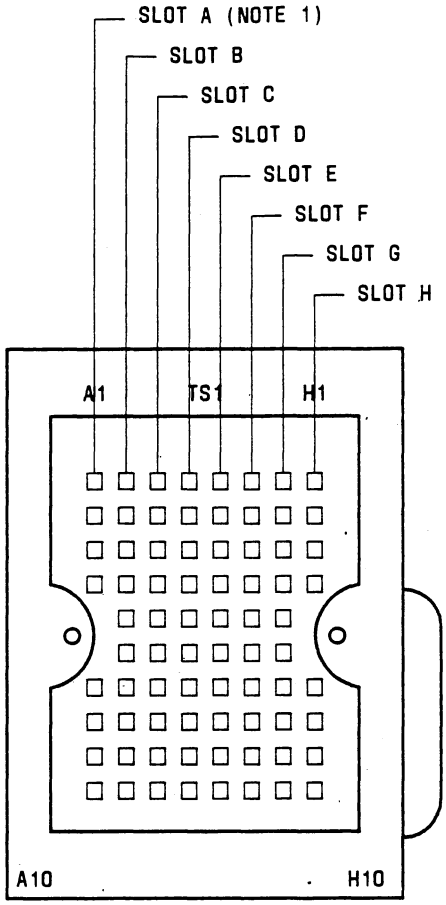


Figure 2-6 — Monitored Equipment Interface



NOTE:
1. Slot designation (i.e. Slot A) corresponds to AMR118 CP slot location in VPM shelf

Figure 2-7 — Errored-Second B/C Threshold Strapping

2.2.3 GTP INTERFACE

A block diagram of the GTP interface is shown in Figure 2-8. The GTP interface supports the communication link between the VPM and the GTP and consists of three primary components:

- MC45085A1 VPM Alarm/Telemetry Processor
- TABS link
- Discrete alarm/control contact points.

The MC45085A1 VPM TELEM circuit pack is responsible for supporting and processing telemetry between the GTP and the VPM as well as all VPM subsystem alarms. The GTP requests DS3 performance data from the VPM over the TABS link. The VPM TELEM circuit pack processes the request and commands the MC45084A1 VPM CONTR circuit pack to collect DSP, PSI, and PSD data for the monitored DS3 rails. After collecting the DSP, PSI, and PSD data, also known as DS3 performance data, from the VPM CONTR circuit pack through the dual-port RAM (random access memory) channel, the VPM TELEM circuit pack formats and serially transmits the DS3 performance data to the GTP over the TABS link. The GTP interface interconnect equipment diagram is in Figure 2-9.

Located on the upper right side of the VPM (Figure 2-9) is the 14-pin GTP connector P1, which supports the TABS-compatible link. The TABS-compatible link conforms to the standards specified in the CB149, Issue 3 and is the Group 4 cable group illustrated in ED-8C681-20 (refer to J/ED DRAWINGS tab).

The VPM TELEM circuit pack supports two discrete remote telemetry alarm and control signals. The USR ALM (user alarm) signal is transmitted to an available GTP discrete scan input and notifies the GTP of a VPM subsystem alarm condition. The ALM RST (alarm reset) signal is transmitted from an available GTP relay control output and provides the GTP with alarm reset capabilities for VPM subsystem alarms. Figure 2-9 illustrates the access points on TS1 for the USR ALM and ALM RST signals. The discrete remote telemetry alarm and control signals may also be interfaced with an E2A telemetry remote or the user alarm/control feature on terminal bays, if equipped.

Upon detection of a subsystem alarm condition, the VPM TELEM circuit pack activates the USR ALM output signal. Certain alarm conditions can be corrected remotely using the ALM RST control. This should always be tried before initiating on-site maintenance procedures. The three possible alarm conditions that can be corrected are:

- If one or more VMR INTFC circuit packs have failed, invoking the ALM RST initiates a procedure that executes a hardware self-test for the VMR INTFC circuit pack. The VMR INTFC circuit pack hardware self-test verifies the circuit pack's operation.
- If the VPM TELEM circuit pack has lost software sanity, invoking the ALM RST initiates a hard reset on the VPM TELEM circuit pack.
- If the VPM CONTR circuit pack has lost software sanity, invoking the ALM RST initiates a hard reset that, in effect, will reset the entire VPM shelf. The resetting of the entire VPM shelf initiates a self-test of all the VMR INTFC circuit packs, and all alarm conditions will be cleared. If the cause is still present, the USR ALM will reactivate; therefore, on-site maintenance will be necessary.

Additional details on the operation of the GTP are available in AT&T Practice 201-653-011.

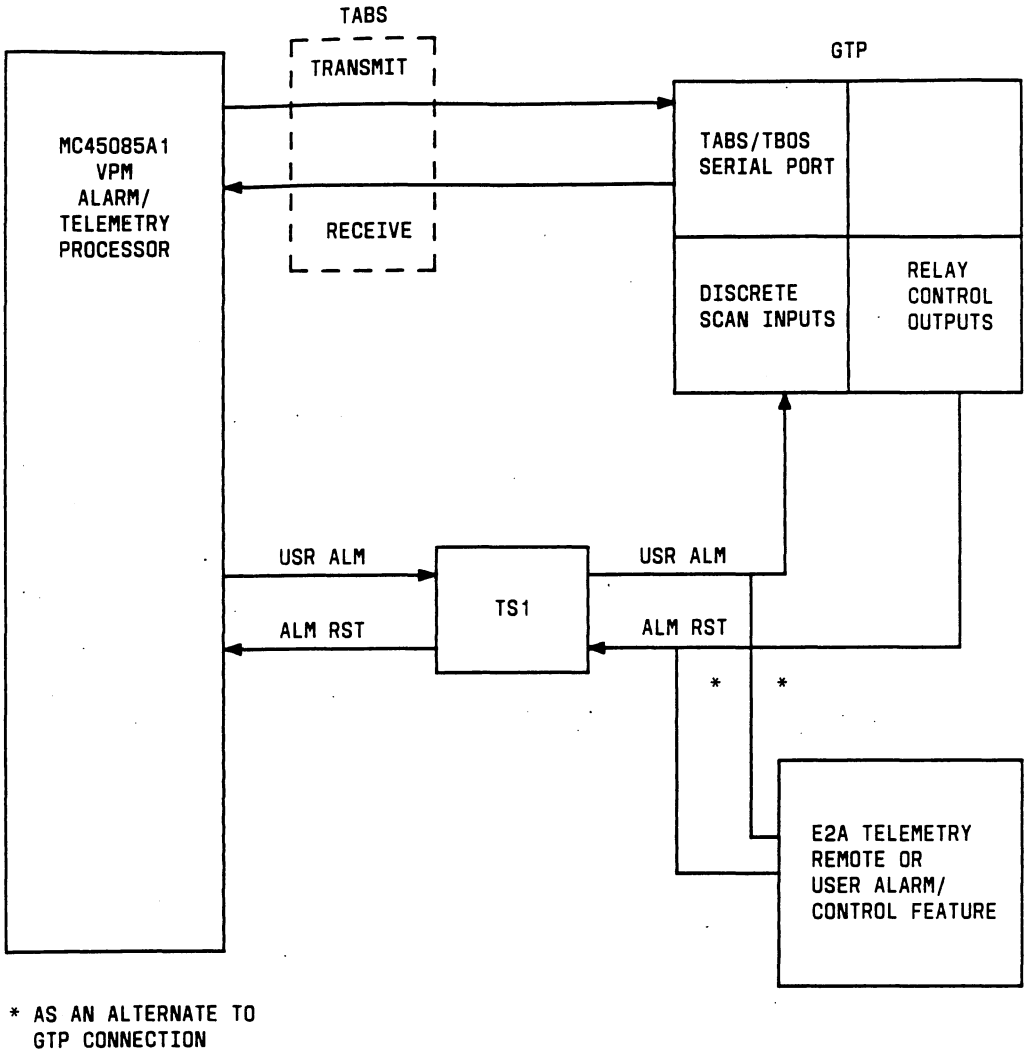


Figure 2-8 — GTP Interface Block Diagram

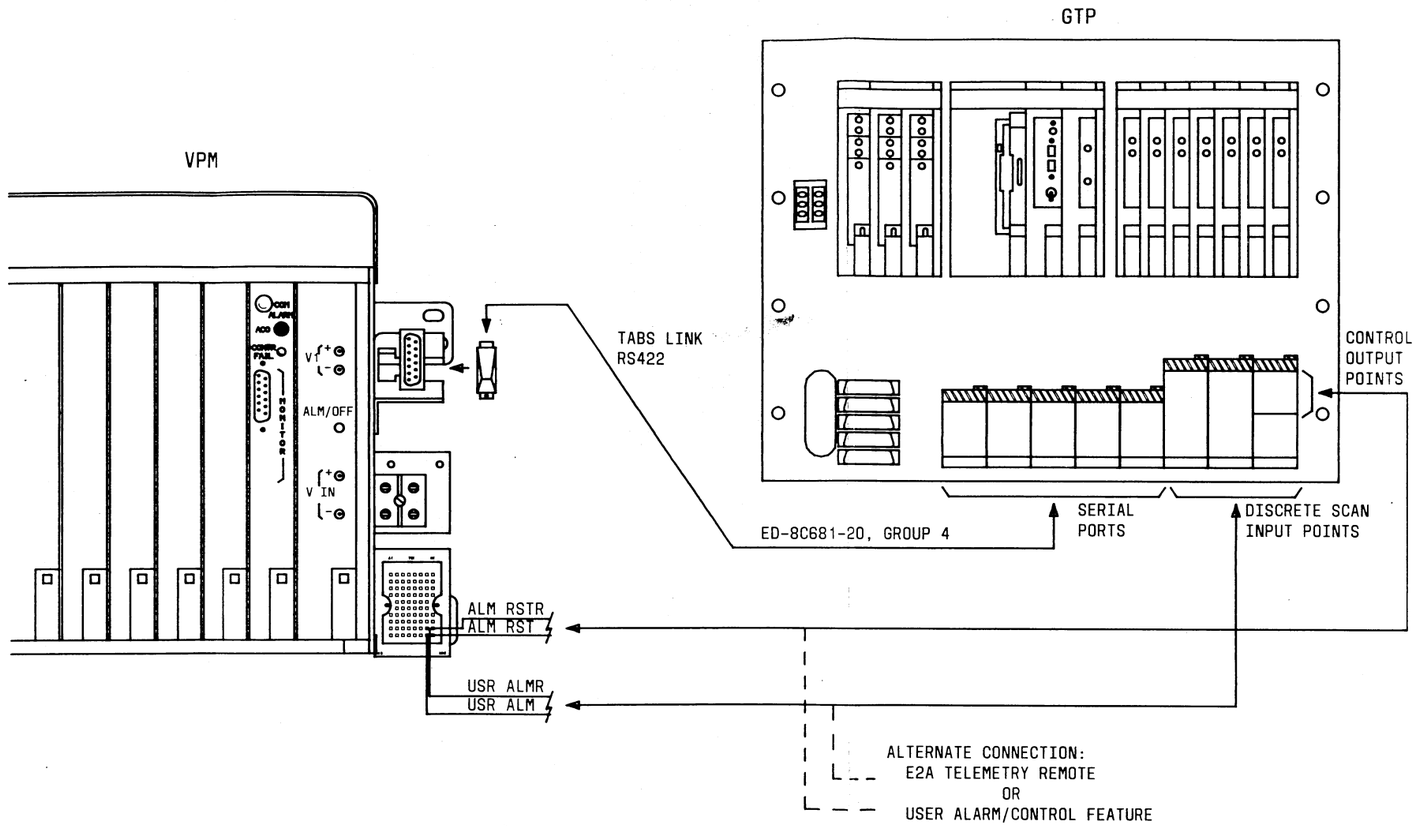


Figure 2-9 — GTP Interface

2.2.4 DISCRETE ALARM/CONTROL INTERFACE

The VPM is equipped with four discrete alarms and one discrete control. These alarms and control are discrete contact points and are accessible via terminal strip TS1 (Figure 2-10). Supported by the MC45085A1 VPM Alarm/Telemetry Processor circuit pack, the discrete alarms and control are functionally divided into local office alarms and a remote telemetry alarm and control.

Each discrete alarm and control of the VPM is equipped with a return lead.

There are three discrete local office alarms:

- MN (MNR)—Minor
- MNV (MNVR)—Minor Visual
- ACOV (ACOVR)—Alarm Cutoff Visual.

The MN and MNV alarms are activated simultaneously whenever one or more of the following VPM subsystem alarms are flagged:

- VMR INTFC circuit pack(s) self-test failure
- VPM CONTR microprocessor sanity failure
- VPM TELEM microprocessor sanity failure
- VPM power failure.

The MN alarm provides an audible alarm signal. The MNV alarm provides a visual alarm access signal. Both the MN and MNV alarms deactivate whenever the responsible subsystem alarm(s) has been cleared. The ACOV alarm is used to activate a visual alarm, indicating that the manual ACO button has been pressed. Operating the manual ACO button clears the MN and MNV alarms while activating the ACOV alarm. The manual ACO button has no effect on the USR ALM discrete alarm described in Part 2.2.3, GTP INTERFACE.

The two other discrete points, USR ALM and ALM RST, support the remote telemetry alarm and control signals. These signals are described in detail in Part 2.2.3, GTP INTERFACE.

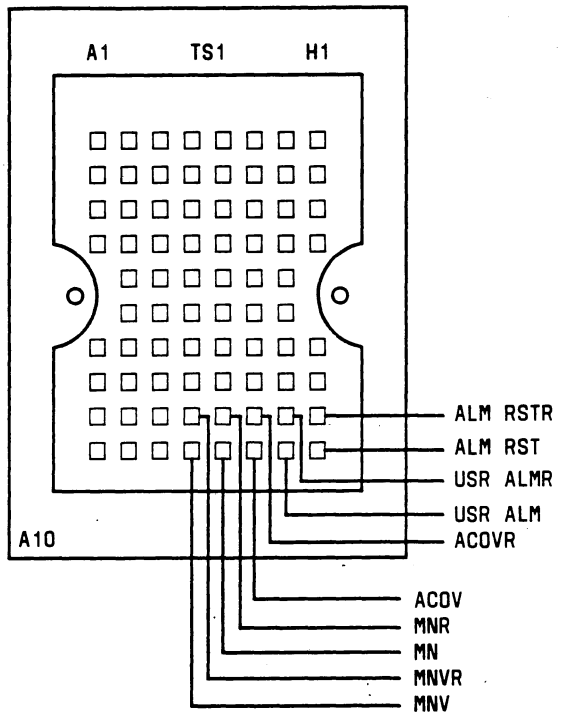


Figure 2-10 — Discrete Alarm/Control Points

2.2.5 PC INTERFACE

The DS3 performance data collected by the VPM can be accessed by a PC. The PC can either monitor the VPM's response to the GTP's data collection requests on the TABS link (Listen-In mode) or can simulate the function of the GTP (GTP Simulation mode). The Listen-In and GTP Simulation modes provide the PC user with the capability of acquiring near real-time data on the quality of the DS3 signal(s) for the monitored DS3 sections.

The PC used with the VPM must be AT&T PC 6300-compatible and must be equipped with the GTPSIM software program. Additional details, including instructions on operating the PC for VPM monitoring, are in Part 3.5, PC OPERATION in the MAINTENANCE tab.

The Listen-In mode allows the PC user to access data transmission on the TABS link. In this mode the PC is interfaced with the VPM via the MONITOR jack, located on the MC45085A1 VPM TELEM circuit pack faceplate, or the -TXD (pin G4) and +TXD (pin H4) leads made available on the TS1 block.

The GTP Simulation mode allows the PC user to specify how often the PC will poll the VPM for DS3 performance data. In this mode the PC is interfaced with the VPM via the GTP connector P1 located on the right side of the VPM. It is necessary to disconnect the GTP from the VPM for this configuration.

Each PC interface configuration requires an RS-422/485 interface for both the MONITOR jack and the GTP connector P1. Since most PCs are equipped with an RS-232 communication port, the PC interface configuration will have to convert RS-232 to RS-422/485 to properly interface the PC with the VPM. This conversion can be accomplished in several ways; the PC user should refer to AT&T Practice 104-600-002 for the recommended method.

Each operational mode requires a different cable assembly to allow for proper communication between the VPM and the PC. Drawing ED-8C681-20 ("J/ED DRAWINGS" tab) illustrates cable configuration, with cable group 5 used for the GTP Simulation mode and cable group 6 used for the Listen-In mode.

2.2.6 POWER

As shown in Figure 2-4, the VPM power terminal block TB1 is located on the right side of the VPM. The VPM can be operated with either a –24 V or –48 V dc power source. The power source for the VPM determines whether the VPM is equipped with a 471BA POWER UNIT for a –24 V source or a 474BA POWER UNIT for a –48 V source.

The individual circuit packs of the VPM, as well as the individual DS3 Ports of the VPM INTERFACE panel, require a +5 V dc power source. The necessary strapping on the power unit for this requirement was performed prior to the VPM installation.

Should a power failure occur, the VPM has contact closures that automatically close. This power fail alarm condition invokes the discrete local office alarms (MN and MNV) and the remote telemetry alarm (USR ALM).

The VPM current requirements for fusing are:

- 10 amps when VPM is supplied by –24 V
- 5 amps when VPM is supplied by –48 V.

2.3 CIRCUIT PACKS

2.3.1 AMR118 VMR PULSE INTERFACE

The AMR118 VMR Pulse Interface circuit pack monitors and counts the D3P (DS3 parity error) pulses generated by the AMR72B Violation Monitor/Remover circuit pack in response to parity errors and DS3 frame loss. The data collected by the VMR INTFC circuit pack is used to generate the DS3 performance data that will be transmitted to a GTP.

Each VMR INTFC circuit pack is capable of supporting a maximum of eight D3P signals. A strapping option, available at the TS1 block, changes the errored second C threshold value from an error count of 45 errors per second (digital radio specification) to an error count of 5 errors per second (lightwave specification). This allows the VMR INTFC circuit pack to be compatible with either digital radio or lightwave systems.

The VMR INTFC circuit pack faceplate is illustrated in Figure 2-11. The red LED FAIL is activated for the following reasons:

- The VMR INTFC circuit pack has failed a hardware self-test.
- There are no D3P inputs plugged into the associated DS3 ports and the VPM is in its minimum configuration (only one VMR INTFC circuit pack plugged into slot A). The red LED indicator will flash at a one second rate.

The CPS drawing for the AMR118 VMR INTFC circuit pack is in the "CPS DRAWING" tab.

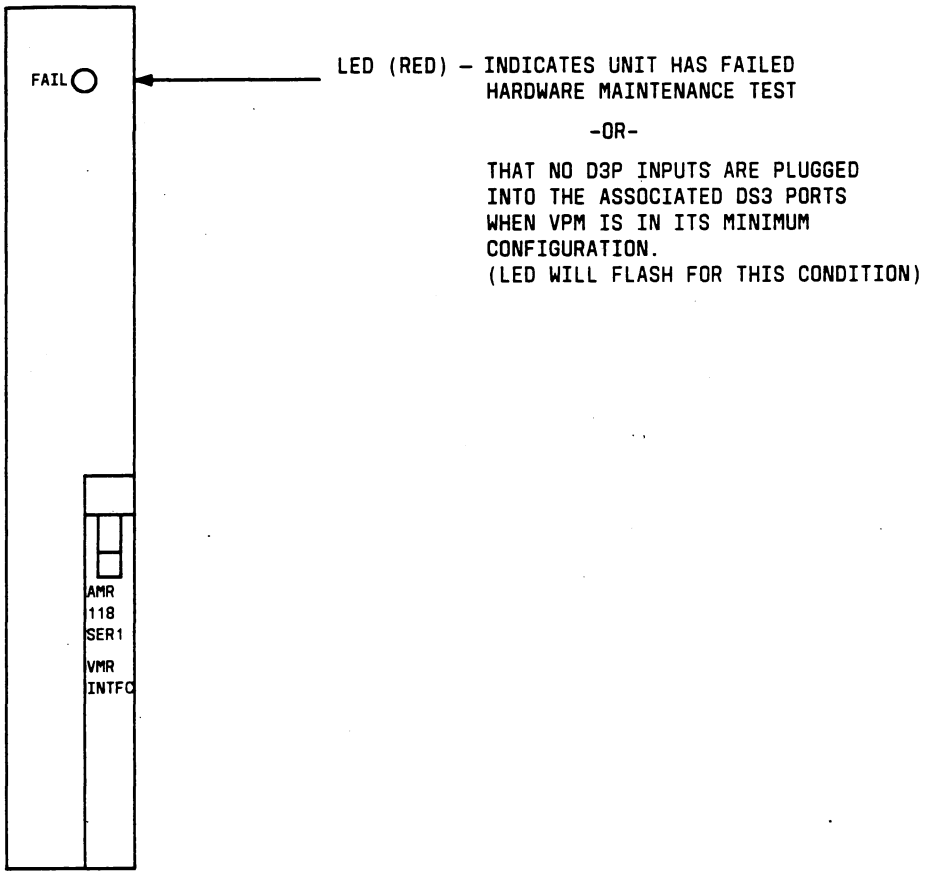


Figure 2-11 — AMR118 VMR INTFC Circuit Pack Faceplate

2.3.2 MC45084A1 (AMR110B) VPM MAIN CONTROLLER

The MC45084A1 VPM Main Controller monitors and controls all initialization and test sequencing for the VMR INTFC circuit packs and the transfer of DS3 performance data to the VPM TELEM circuit pack over the dual-port RAM channel. The VPM CONTR responds to the VPM TELEM circuit pack's requests for data collection.

The VPM CONTR circuit pack faceplate is shown in Figure 2-12. The red CONTR FAIL LED indicates that the microprocessor has lost software sanity. Upon failure, the VPM CONTR circuit pack internal circuitry activates the CONTR FAIL LED and sends a signal on its CPUF output to the VPM TELEM circuit pack. The recessed manual button CONTR RESET, when pressed, attempts to initiate a VPM system reset by invoking a self-test and attempting to reset all VPM alarms. However, if the cause of the alarm(s) still exists, the alarm(s) will be reactivated.

The VPM CONTR can also be reset remotely by the GTP via discrete control contact point ALM RST, thereby initiating a VPM system reset.

The CPS drawing for the MC45084A1 VPM CONTR circuit pack is in the CPS DRAWING tab.

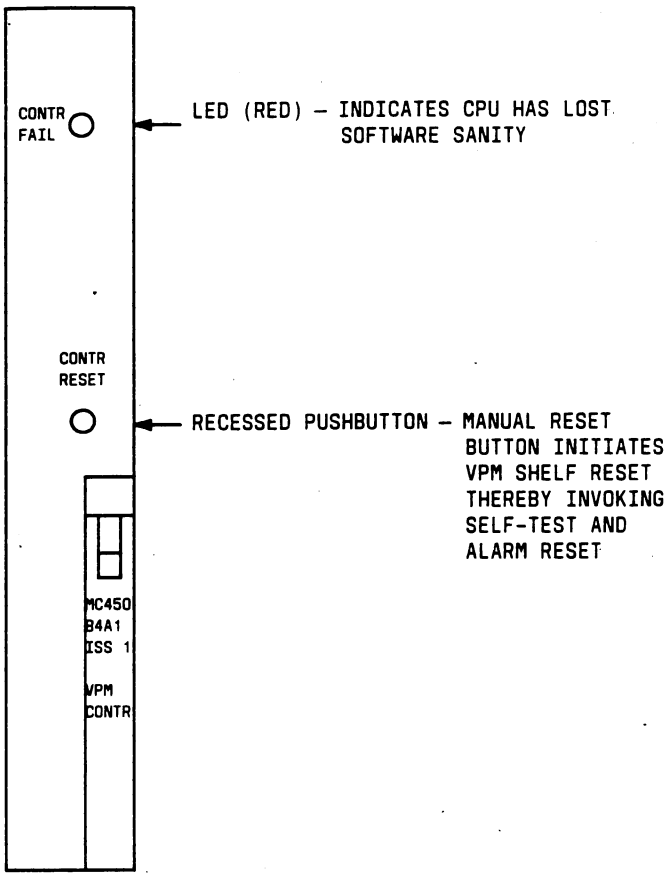


Figure 2-12 — MC45084A1 VPM CONTR Faceplate

2.3.3 MC45085A1 (AMR124) VPM ALARM/TELEMETRY PROCESSOR

The MC45085A1 VPM Alarm/Telemetry Processor performs three major functions:

— Supports TABS link between the VPM and GTP/FMAC

— Processes all VPM subsystem alarms

— Supports PC monitoring of the VPM.

Upon request for DS3 performance data, the VPM TELEM circuit pack collects DSP, PSI and PSD data from the VPM CONTR circuit pack and formats the data for serial transmission to the GTP over a TAB link.

As the primary alarm processor for the subsystem alarms, the VPM TELEM processes the following alarms/controls:

— VMR INTFC circuit pack self-test failure

— MC45084A1 VPM CONTR microprocessor sanity failure

— MC45085A1 VPM TELEM microprocessor sanity failure

— VPM power failure

— Discrete alarms/controls

- MNV (minor visual)
- MN (minor)
- ACOV (alarm cutoff visual)
- USR ALM (user alarm)
- ALM RST (alarm reset).

The VPM TELEM faceplate is illustrated in Figure 2-13. The CPS drawing for the AMR124 VPM TELEM is in the "CPS DRAWING" tab.

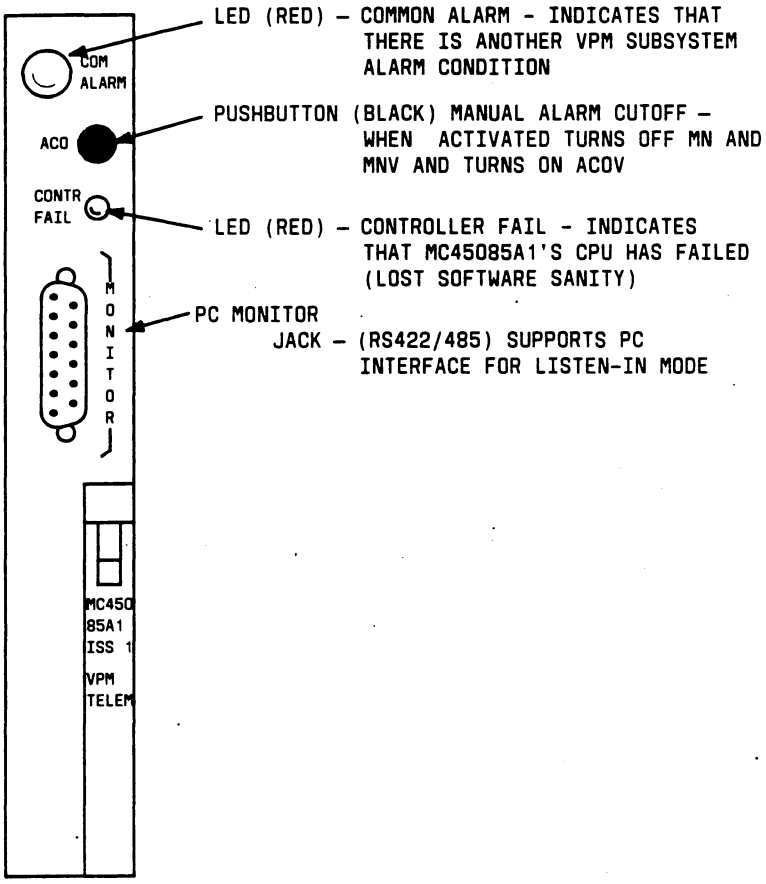


Figure 2-13 — MC45085A1 VPM TELEM Faceplate

2.3.4 471BA/474BA POWER UNIT

The 471BA/474BA POWER UNIT is a single circuit pack that can be configured to supply either a +5 V or –5 V source. In VPM application, the power unit is strapped to provide a +5 V source. The 471BA unit is fed by a –24 V supply, and the 474BA unit is fed by a –48 V supply.

Both the 471BA and 474BA units consist of an inrush current limiter, an input filter, a switching pulse-width-controlled power amplifier, output filters, and control circuits. The power unit latch contains an on/off switch that provides inrush protection and resets any latched protective shutdowns.

The 471BA/474BA POWER UNIT faceplate is shown in Figure 2-14.

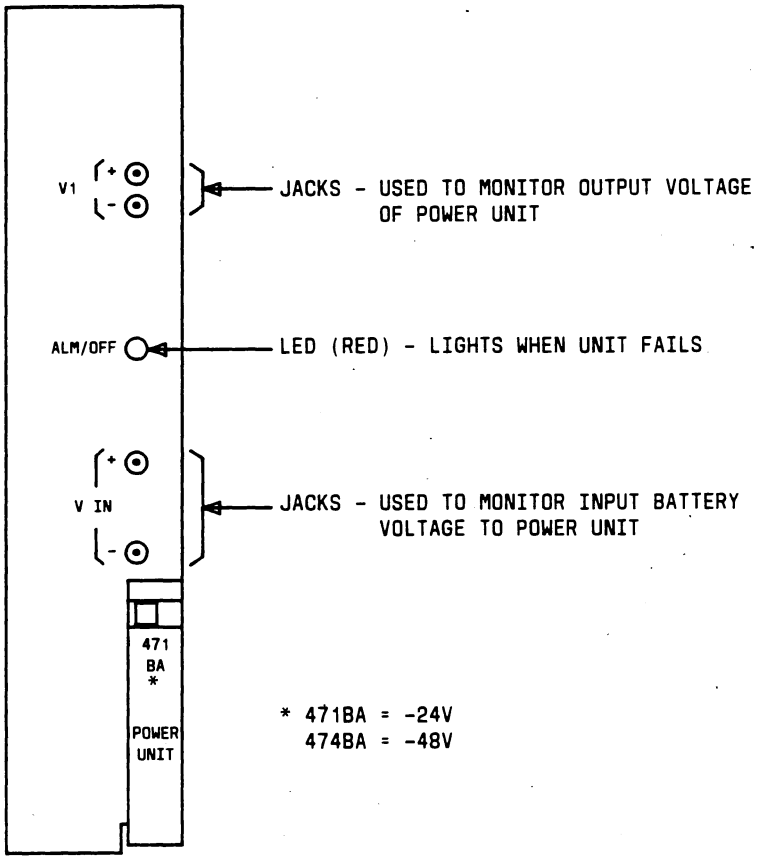


Figure 2-14 — 471BA/474BA POWER UNIT Faceplate

VIOLATION PULSE MONITOR
USER'S MANUAL

CONTENTS PAGE

LIST OF FIGURES

LIST OF TABLES

3. OPERATION

3.1 GENERAL

This tab provides the information and instructions required to operate the VPM. When properly installed, the VPM does not require additional operative steps except when adding, removing, and reassigning D3P inputs or when monitoring the VPM with a PC.

This tab's individual parts are as follows:

- *Part 3.2* provides a consolidated description of each VPM component and the associated controls and indications.
- *Part 3.3* provides information and examples that explain the requirements for assigning DS3 Ports.
- *Part 3.4* provides the procedures for adding, removing, or reassigning the D3P inputs.
- *Part 3.5* provides the information and procedures needed to operate a PC for VPM monitoring.
- *Parts 3.6 and 3.7* provide the procedures for powering-up and powering-down an installed VPM.

3.2 LOCAL CONTROLS AND INDICATIONS

A brief, consolidated description of each VPM component and any associated controls and indications is provided in Tables 3-A and 3-B. Table 3-A has the information on the VPM's controls and indications, and Table 3-B has the information on the VPM's interfacing components. Figure 3-1 references the location of the components listed in the tables.

TABLE 3-A

VPM CONTROLS AND INDICATIONS

REFERENCE NUMBER	UNIT CODE	FACEPLATE DESIGNATION	TYPE	EXPLANATION/FUNCTION
1	AMR118 VMR INTFC	FAIL	Light emitting diode (red)	When lighted, indicates that the VMR INTFC has failed a hardware self-test
2	MC45084A1 VPM CONTR	CONTR FAIL	Light emitting diode (red)	When lighted, indicates that the VPM CONTR's CPU has lost software sanity
		CONTR RESET	Recessed momentary push switch	When operated, initiates a VPM shelf reset, thereby invoking each circuit pack to perform a self-test and an alarm reset
3	MC45085A1 VPM TELEM	COM ALARM	Light emitting diode (red)	When lighted, indicates that one or more subsystem alarms on the VPM shelf have been activated
		ACO	Momentary Push button (black)	When operated, deactivates MN (Minor) and MNV (Minor Visual) alarms and activates ACOV (Alarm Cutoff Visual)
		CONTR FAIL	Light emitting diode (red)	When lighted, indicates that the VPM TELEM's CPU has lost software sanity
		MONITOR	RS-422/485 PC monitor jack	Supports the PC interface for Listen-In mode
4	471BA/474BA POWER UNIT	V1 ±	Test points (black)	Provides test points to measure the output (+5 V) voltage of the power unit
		ALM/OFF	Light emitting diode (red)	When lighted, indicates that unit has failed or is disengaged
		V IN ±	Test points (black)	Provides test points to measure the input voltage (–24 V or –48 V) to the power unit

TABLE 3-B

VPM INTERFACING COMPONENTS

REFERENCE NUMBER	COMPONENT DESIGNATION	COMPONENT DESCRIPTION	EXPLANATION/FUNCTION
5	TS2	Terminal Strip	Provides VPM connection for span service status (CSRVS) leads
6	VPM INTERFACE	VPM INTERFACE Panel	8X8 matrix of 6-pin DS3 ports labeled (A-H) (1-8) that provides VPM interface for DS3 parity error (D3P) signals
7	DS3 PORT ASSIGNMENT	Assignment Chart	Provides a chart to record monitored system, channel, and DS3 rail
8	P1	14-pin GTP Interface Connector	Supports the TABS link between the VPM and the GTP
9	TB1	Power Terminal Block	Supports the VPM power source connection (–24 V or –48 V direct current)
10	TS1	Terminal Strip	Provides Errored-Second B/C threshold strapping and access to the discrete alarm and control contact points. Also provides access points to the TXD leads of the TABS link
11	ESD GRD	ESD Ground Point	Provides point to connect ESD wrist strap

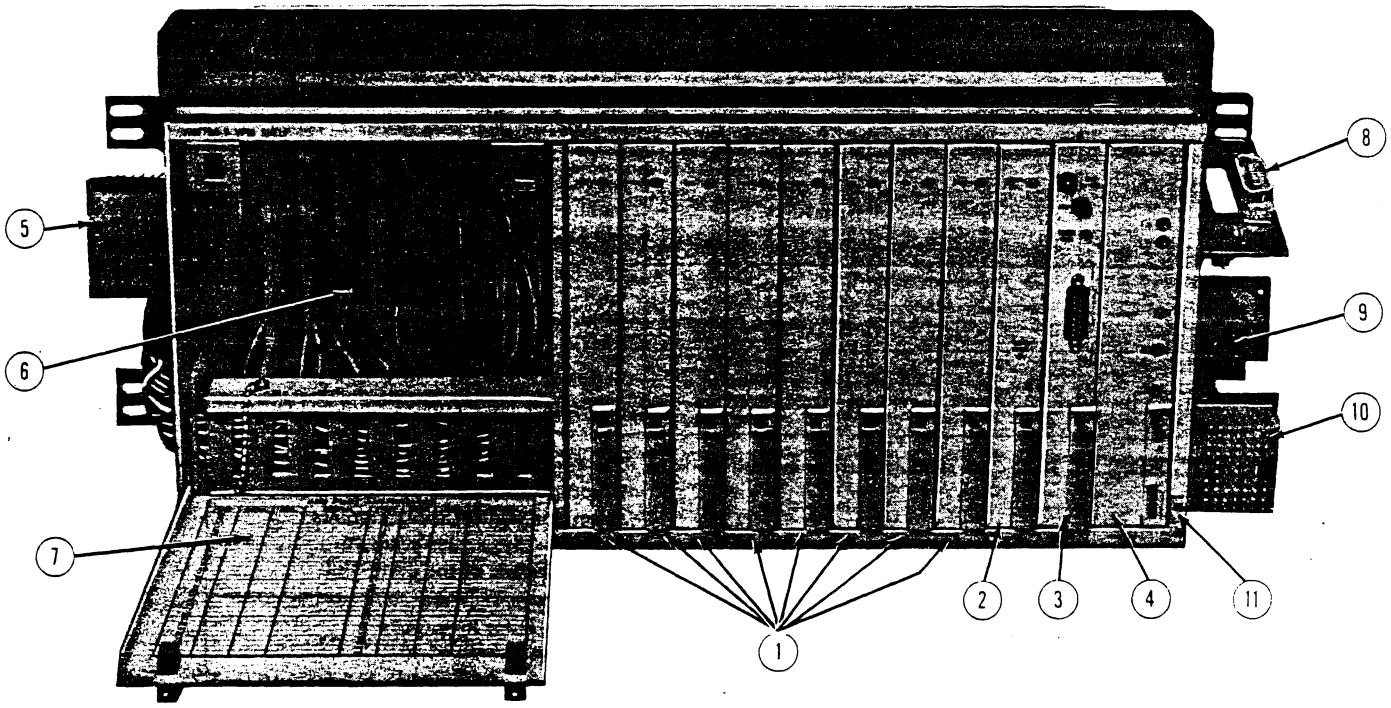


Figure 3-1 — Local Controls and Indications

3.3 ASSIGNING DS3 PORTS

3.3.1 GENERAL

This section describes how the monitored equipment, which transmits D3P and CSRVS signals, interfaces with the VPM. Tables identify the interconnecting points and circuit packs required to support the signals. The tables show the relationship between the components of the monitored equipment interface and support the procedures in Part 3.4, D3P INPUT PROCEDURES. DS3 Port assignments and required connections and strapping are described.

3.3.2 REQUIRED EQUIPMENT AND CONNECTIONS

The D3P inputs are connected to assigned DS3 Ports on the VPM INTERFACE panel. Each column of DS3 Ports [A-H] is supported by a VMR INTFC circuit pack occupying the associated slot [A-H]. Each DS3 Port has a PC identification number assigned to it by the GTPSIM program. (See Part 3.5.3, DS3 PERFORMANCE REPORT for further details.)

Table 3-C identifies the connections and strapping for each VMR INTFC circuit pack based on its slot location.

One CSRVS cable (ED-8C681-20, Group 3) interfaces the CSRVS signal from the 90C, 135A, and 135EC terminal bays to the VPM shelf. The CSRVS cable is separated at the VPM end into individual CSRVS leads. The CSRVS leads, each representing one channel and color-coded as such, are connected to assigned TS2 pins. Since there is only one CSRVS lead per channel, it is necessary to strap the other TS2 pins associated with the channel to the TS2 pin supporting the CSRVS lead. The color codes for the CSRVS leads and their respective channels are in Table 3-D.

The basic VPM configuration is equipped with one VMR INTFC circuit pack. This allows the VPM to monitor eight D3P inputs. If additional D3P (DS3) monitoring is required, the VPM must be equipped with additional VMR INTFC circuit packs. Table 3-E identifies the number of VMR INTFC circuit packs required to support the DS3 monitoring requirements.

Each VMR INTFC circuit pack has a strapping option that configures the circuit pack for digital radio or lightwave capability by changing the errored-second C threshold value. This strapping option is located on TS1. Table 3-C identifies the TS1 punching for each VMR INTFC circuit pack based on the slot location of the circuit pack.

TABLE 3-C

VMR INTFC ASSOCIATED CONNECTIONS AND STRAPPING

SLOT LOCATION VMR INTFC CIRCUIT PACK	TS1 PUNCHING LOCATION ERRORED-SECONDS B/C THRESHOLD STRAPPING	VPM INTERFACE PANEL DS3 PORTS	TS2 PUNCHING LOCATION CSRVS LEADS
A	A1	A1	A1
		A2	A2
		A3	A3
		A4	A4
		A5	A7
		A6	A8
		A7	A9
		A8	A10
B	B1	B1	B1
		B2	B2
		B3	B3
		B4	B4
		B5	B7
		B6	B8
		B7	B9
		B8	B10
C	C1	C1	C1
		C2	C2
		C3	C3
		C4	C4
		C5	C7
		C6	C8
		C7	C9
		C8	C10
D	D1	D1	D1
		D2	D2
		D3	D3
		D4	D4
		D5	D7
		D6	D8
		D7	D9
		D8	D10

TABLE 3-C (Contd)

VMR INTFC ASSOCIATED CONNECTIONS AND STRAPPING

SLOT LOCATION VMR INTFC CIRCUIT PACK	TS1 PUNCHING LOCATION ERRORED-SECONDS B/C THRESHOLD STRAPPING	VPM INTERFACE PANEL DS3 PORTS	TS2 PUNCHING LOCATION CSRVS LEADS
E	E1	E1 E2 E3 E4 E5 E6 E7 E8	E1 E2 E3 E4 E7 E8 E9 E10
F	F1	F1 F2 F3 F4 F5 F6 F7 F8	F1 F2 F3 F4 F7 F8 F9 F10
G	G1	G1 G2 G3 G4 G5 G6 G7 G8	G1 G2 G3 G4 G7 G8 G9 G10
H	H1	H1 H2 H3 H4 H5 H6 H7 H8	H1 H2 H3 H4 H7 H8 H9 H10

TABLE 3-D
CSRVS COLOR CODES

CHANNEL	LEAD COLORS	
	BODY	STRIPE
Protection	Blue	Red
1	White	Blue
2	Blue	White
3	White	Orange
4	Orange	White
5	White	Green
6	Green	White
7	White	Brown
8	Brown	White
9	White	Silver
10	Silver	White
11	Red	Blue

TABLE 3-E

VMR INTFC CIRCUIT PACK REQUIREMENTS

DS3 MONITORING REQUIREMENTS	NUMBER OF VMR INTFC CIRCUIT PACKS REQUIRED
8 or less	1
9-16	2
17-24	3
25-32	4
33-40	5
41-48	6
49-56	7
57-64	8

3.3.3 DS3 PORT REQUIREMENTS

The requirements and recommendations listed below are guidelines for assigning DS3 Ports. The responsibility for assigning the DS3 Ports, as well as other interconnecting points for the VPM, will vary from station to station. If FMAC personnel are not responsible for assigning DS3 Ports in a station, they should be notified as soon as possible about any assignments or changes.

Table 3-F shows the connections and strapping needed to support the monitored transmission system described below. Figure 3-2 illustrates how the DS3 PORT ASSIGNMENT chart would be used with the connections and strapping in Table 3-F.

1. When assigning the DS3 Ports for a newly installed VPM shelf, always begin with DS3 Port A1.
2. Assign/reserve DS3 Ports according to:
   - Type of monitored equipment used
   - Number of channels used
   - Expected growth of the monitored equipment's configuration.

   Example 1: If the monitored equipment is a 135A bay in a 1X1 configuration and is expected to grow to a 1X2 configuration, nine DS3 Ports (three D3P inputs X three channels) would be required.

   Example 2: If the monitored equipment is a 90C bay in a 1X3 configuration with the B rail of channel 3 reserved for growth, eight DS3 Ports (two D3P inputs X four channels) would be required.

3. Assign the D3P inputs of the protection channel rail to the first DS3 Ports assigned to the monitored equipment. Then sequentially assign the regular channel rails' inputs (1 through N) thereafter.

   Example: If the monitored equipment is a 135A bay, assign protection channel rails A, B, and C to DS3 Ports A1, A2, and A3; channel 1 rails A, B, and C to DS3 Ports A4, A5, and A6; and all other channels in that order.

4. Assign the next D3P inputs to the next available block of DS3 Ports.

   Example: One monitored equipment's D3P inputs are assigned to DS3 Ports B2 through C1; the second monitored equipment's D3P inputs are assigned to the next DS3 Ports, beginning with C2.

Each DS3 Port has a PC identification number assigned to it by the GTPSIM program (refer to Part 3.5.3, DS3 PERFORMANCE REPORT for further details).

TABLE 3-F
VPM CONNECTION AND STRAPPING

MONITORED EQUIPMENT			DS3 PORT ASSIGNMENT			CSRVS CABLING (NOTE)		B/C THRESHOLD	
SYSTEM	CHANNEL	RAIL	PORT	PC ID NO	VMR INTFC POSITION	TS2 PIN	COLOR CODE	TS1 PIN	CONDITION
135A-1	P	A	A1	0	A	A1	BL-R	A1	No Strap
	P	B	A2	1		A2			
	P	C	A3	2		A3			
	1	A	A4	3		A4	W-BL		
	1	B	A5	4		A7			
	1	C	A6	5		A8			
	Reserved		A7	6		A9			
	Reserved		A8	7		A10			
	Reserved		B1	8	B	B1		B1	No Strap
90C-1	P	A	B2	9		B2	BL-R		
	P	B	B3	10		B3			
	1	A	B4	11		B4	W-BL		
	1	B	B5	12		B7			
	2	A	B6	13		B8	BL-W		
	2	B	B7	14		B9			
	3	A	B8	15		B10	W-O		
	Reserved		C1	16	C	C1		C1	No Strap
90C-2	P	A	C2	17		C2	BL-R		
	P	B	C3	18		C3			
	1	A	C4	19		C4	W-BL		
	1	B	C5	20		C7			
	2	A	C6	21		C8	BL-W		
	2	B	C7	22		C9			
	3	A	C8	23		C10	W-O		
	3	B	D1	24	D	D1		D1	No Strap

Note

The CSRVS lead (one per channel) is connected to an assigned TS2 pin and strapped with the other associated TS2 pins.

DS3 PORT ASSIGNMENT

PORT	CHAN	RAIL	SYSTEM	PORT	CHAN	RAIL	SYSTEM
A1	P	A	135A-1	E1			
A2	P	B	135A-1	E2			
A3	P	C	135A-1	E3			
A4	1	A	135A-1	E4			
A5	1	B	135A-1	E5			
A6	1	C	135A-1	E6			
A7				E7			
A8				E8			
B1				F1			
B2	P	A	90C-1	F2			
B3	P	B	90C-1	F3			
B4	1	A	90C-1	F4			
B5	1	B	90C-1	F5			
B6	2	A	90C-1	F6			
B7	2	B	90C-1	F7			
B8	3	A	90C-1	F8			
C1				G1			
C2	P	A	90C-2	G2			
C3	P	B	90C-2	G3			
C4	1	A	90C-2	G4			
C5	1	B	90C-2	G5			
C6	2	A	90C-2	G6			
C7	2	B	90C-2	G7			
C8	3	A	90C-2	G8			
D1	3	B	90C-2	H1			
D2				H2			
D3				H3			
D4				H4			
D5				H5			
D6				H6			
D7				H7			
D8				H8			

CAUTION RELEASE CABLE BY PLACING THIN BLADE SCREWDRIVER BETWEEN BLACK PORTION OF CONNECTOR AND RETAINER THEN TURN SCREWDRIVER GENTLY AND REMOVE CABLE.

Figure 3-2 — DS3 PORT ASSIGNMENT Chart

3.4 D3P INPUT PROCEDURES

3.4.1 GENERAL

This section explains how to add, remove, and reassign D3P inputs to an in-service VPM shelf.

FMAC personnel should be notified immediately whenever any changes are made to the assignments of the DS3 Ports and their associated D3P inputs. The FMAC personnel should then modify the data base.

3.4.2 ADDING NEW D3P INPUTS

This procedure is used to add new D3P inputs to an in-service VPM shelf.

The following equipment, or equivalent, is required:

1 - Wire-wrap tool

1 - Controller reset tool.

Warning: To prevent ESD (electrostatic discharge) damage to a plug-in unit, ensure that all ESD precautions in the MAINTENANCE tab have been followed.

PROCEDURE

1. Obtain DS3 Port assignments.

   Note: If the new DS3 Ports are not assigned, refer to Part 3.3.3, DS3 PORT REQUIREMENTS.

2. Inform FMAC and station manager of new assignments.
3. Determine the number of VMR INTFC circuit packs required (Table 3-D).
4. Disengage VPM CONTR circuit pack from backplane.
5. If required, plug-in additional VMR INTFC circuit pack(s).
6. Plug-in the new D3P inputs into assigned DS3 Ports on VPM INTERFACE panel.

   Note: When connecting a D3P input to the VPM INTERFACE panel, connect the grey portion of the D3P input so that it faces the right.

7. ***Warning: Using an electric wire-wrap tool may cause damage to engaged circuit packs.***

   Connect corresponding CSRVS leads to assigned pins on TS2 (Table 3-C for TS2-DS3 Port association and Table 3-E for CSRVS color codes).

8. Reengage VPM CONTR circuit pack into backplane.
9. Operate CONTR RESET button on VPM CONTR faceplate.

   Requirement: All LEDs will light and then extinguish. If any LEDs fail to extinguish, consult Part 4.3, CORRECTIVE MAINTENANCE in the MAINTENANCE tab.

10. Record new assignments on DS3 PORT ASSIGNMENT chart.
11. Perform acceptance procedure for new inputs. (Refer to Part 6.5, TELEMETRY LINK VERIFICATION TO FMAS in ACCEPTANCE PROCEDURES tab.)

This procedure is complete.

3.4.3 REMOVING D3P INPUTS

This procedure is used to remove D3P inputs from an in-service VPM shelf.

The following equipment, or equivalent, is required:

1 - Wire-wrap tool

1 - Small straight-slot screwdriver

1 - Controller reset tool.

Warning: To prevent ESD damage to plug-in units, ensure that all ESD precautions in the MAINTENANCE tab have been followed.

PROCEDURE

1. Disengage VPM CONTR circuit pack from backplane.
2. Remove D3P input(s) from VPM INTERFACE panel.

   Note: To disconnect the D3P input plug from the VPM INTERFACE panel, insert a thin blade screwdriver between the black portion of the D3P input plug and the VPM INTERFACE panel connector and turn the screwdriver gently to release the plug (Figure 3-3).
3. ***Warning: Using an electric wire-wrap tool may cause damage to engaged circuit packs.***

   Disconnect the corresponding CSRVS lead(s) from TS2 (Table 3-C).
4. Disengage and remove any VMR INTFC circuit pack(s) not being used.
5. Reengage VPM CONTR circuit pack into backplane.
6. Operate the CONTR RESET button on VPM CONTR faceplate.

   Requirement: All LEDs will light and then extinguish. If any LEDs fail to extinguish, consult Part 4.3, CORRECTIVE MAINTENANCE in the MAINTENANCE tab.
7. Record changes on DS3 PORT ASSIGNMENT chart.
8. Inform FMAC and station manager of changes.

This procedure is complete.

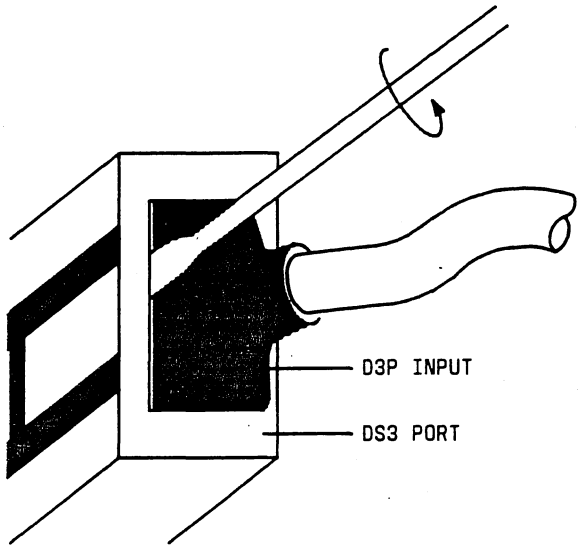


Figure 3-3 — Removing D3P Input

3.4.4 REASSIGNING D3P INPUTS

This procedure is used to reassign D3P inputs to an in-service VPM shelf.

The following equipment, or equivalent, is required:

1 - Wire-wrap tool

1 - Small straight-slot screwdriver

1 - Controller reset tool.

Warning: To prevent ESD damage to plug-in units, ensure that all ESD precautions in the MAINTENANCE tab have been followed.

PROCEDURE

1. Obtain DS3 Port assignments.

   Note: If the new DS3 Ports are not assigned, refer to Part 3.3.3, DS3 PORT REQUIREMENTS.

2. Disengage VPM CONTR circuit pack from backplane.

3. Disconnect D3P input(s) from VPM INTERFACE panel.

   Note: To disconnect the D3P input plug from the VPM INTERFACE panel, insert a thin blade screwdriver between the black portion of the D3P input plug and the VPM interface connector and turn the screwdriver gently to release the plug (Figure 3-3).

4. *Warning: Using an electric wire-wrap tool may cause damage to engaged circuit packs.*

   Disconnect the corresponding CSRVS lead(s) from TS2 (Table 3-C).

5. Connect the D3P input(s) into the new DS3 Port(s) on the VPM INTERFACE panel.
6. See ***Warning*** in Step 4. Connect associated CSRVS lead(s) onto corresponding punchings on TS2 (Tables 3-C and 3-E).
7. Disengage and remove any VMR INTFC circuit pack not being used.
8. Reengage VPM CONTR circuit pack into backplane.
9. Operate the CONTR RESET switch on the VPM CONTR faceplate.

   Requirement: All LEDs will light and then extinguish. If any LEDs fail to extinguish, consult Part 4.3, CORRECTIVE MAINTENANCE in the MAINTENANCE tab.
10. Record changes on DS3 PORT ASSIGNMENT chart.
11. Inform FMAC and station manager of changes.
12. Perform acceptance procedure for reassigned inputs. (Refer to Part 6.5, TELEMETRY LINK VERIFICATION TO FMAS in ACCEPTANCE PROCEDURES tab.)

This procedure is complete.

3.5 PC OPERATION

3.5.1 GENERAL

The VPM can be monitored for DS3 performance data by a compatible PC. This feature allows for the on-site acquisition of the DS3 performance data, thus providing the PC user with near real-time data on the quality of the received DS3 signal(s). Any PC that is AT&T PC 6300-compatible and equipped with the GTPSIM software program can be used with the VPM. The GTPSIM program allows the PC user to operate in two modes: "Listen-In" and "GTP Simulation." These modes are described in Parts 3.5.4, LISTEN-IN MODE and 3.5.5, GTP SIMULATION MODE. Use GTPSIM version 1.005b with the procedures in this part.

While operating in either mode, the PC will output a table of information known as a DS3 performance report. This report is illustrated and explained in Part 3.5.3, DS3 PERFORMANCE REPORT. Part 3.5.2, HARDWARE CONFIGURATION provides information and instructions on the hardware configuration of each mode.

3.5.2 HARDWARE CONFIGURATION

Before monitoring the VPM with the PC, satisfy the following conditions:

- The PC must be AT&T PC 6300-compatible, equipped with MS-DOS* 2.11 (or higher version), and loaded with the GTPSIM software program.
- The PC interface must be configured in the desired mode of operation.

Each mode of operation has its own hardware configuration with each configuration using a different PC interfacing cable. Both cable types are RS-422/485 and can be ordered as accessories. (See Part 4.6, RECOMMENDED TEST EQUIPMENT in the MAINTENANCE tab.) The GTP Simulation mode cable is ED-8C681-20, Group 5 and the Listen-In mode cable is ED-8C681-20, Group 6.

Figure 3-4 illustrates a PC configured in the "Listen-In" mode. In this mode, the PC is connected to the jack labeled MONITOR located on the faceplate of the VPM TELEM circuit pack. This jack is RS-422/485; thus if the communication port on the PC is not RS-422/485, the communication link from the PC must be converted to properly interface with the VPM.

Figure 3-5 illustrates a PC configured in the "GTP Simulation" mode. In this mode, the PC is connected to the GTP connector (P1) located on the right side of the VPM shelf. The GTP connector is RS-422/485; thus if the communication link from the PC is not compatible, it must be converted to properly interface with the VPM. Disconnect the GTP for this configuration.

Many of the compatible PCs are equipped with RS-232C-compatible communication ports, and as stated previously, the PC/VPM communication link must be RS-422/485. Since there are several ways in which the RS-232C-to-RS-422/485 conversion may be accomplished, the recommended conversion methods are described in the APPENDIX tab. (See AT&T Practice 104-600-002, CB149 Serial Telemetry Monitor and Test Set).

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* Registered trademark and Microsoft is a registered trademark of Microsoft Corporation.

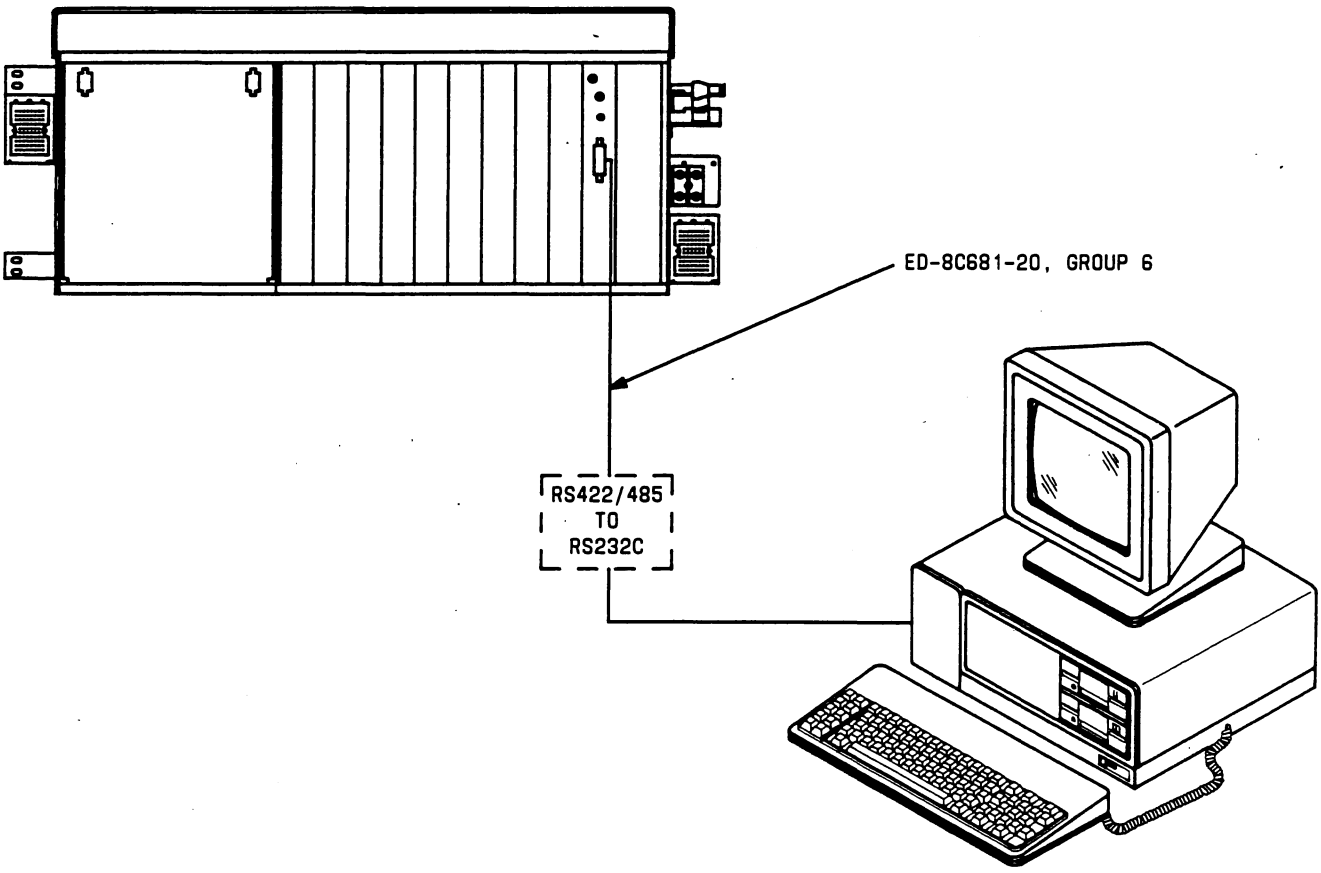

Figure 3-4 — Listen-In Configuration

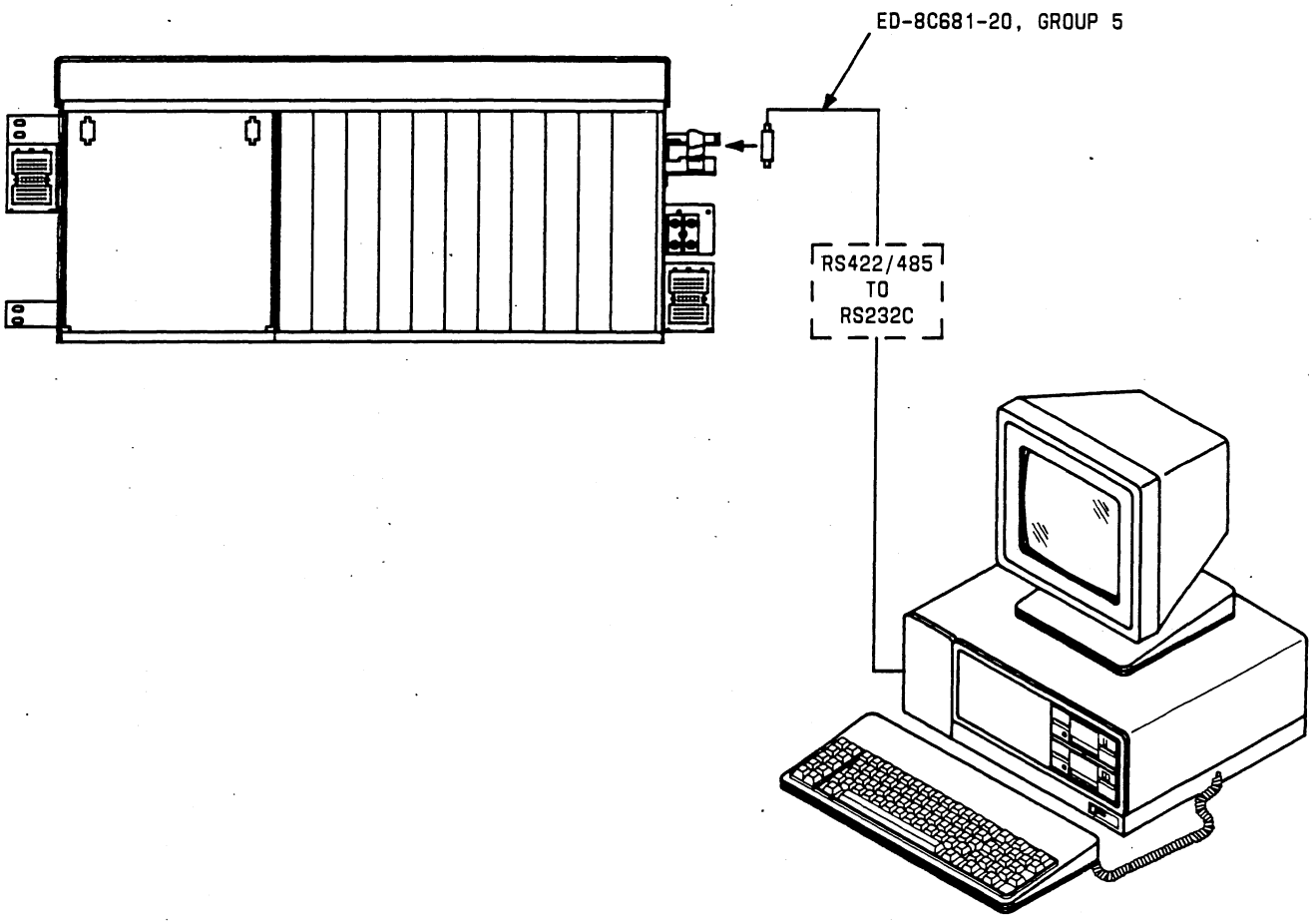

Figure 3-5 — GTP Simulation Configuration

3.5.3 DS3 PERFORMANCE REPORT

Upon request, the VPM provides the GTP DS3 performance data. The PC user, using the GTPSIM program in either the Listen-In or GTP Simulation mode, can acquire this DS3 performance data in a table known as the DS3 performance report. This data can be used to determine the quality of the DS3 signal(s) at the receive end of a communication route.

There are two types of DS3 performance reports: the regular and the exception. The two types are essentially the same except in the the number of times that each one is generated. The regular DS3 report is generated once every SYNC measurement interval, whether there were any error or OOF events or not.

The exception report will be generated only if any of the monitored DS3 rails have a greater number of parity errors than the threshold selected by the PC user or an OOF occurs during the SYNC measurement interval. In the exception report, only the DS3 rails that exceed the parity error threshold will be reported. If there are no error and/or OOF events in the SYNC measurement interval, the following display will appear:

all returned DS3 data is zero

If there is an error and/or OOF event, a report similar to the example in Figure 3-6 will be displayed.

Each column in the DS3 performance report represents a VPM-monitored DS3 rail and therefore corresponds to a DS3 port on the VPM INTERFACE panel. Column 0 is associated with DS3 Port A1, column 1 with DS3 Port A2; and this continues sequentially to column 63, which is associated with DS3 Port H8. Table 3-G lists each DS3 port with its associated DS3 performance report's column number (PC identification number).

Described below are the parameters that appear in a DS3 performance report. The DS3 performance report's parameters are further explained in CB149, Issue 3, Pages A2-1 through A2-6.

- ***dsp dmi*** — Digital signal parameter data missing indicator: This parameter is normally a "0," which indicates the VPM is receiving DSP data from the monitored equipment. A "1" indicates that the VPM CONTR unit's CONTR RESET has been operated or the VMR INTFC unit associated with the DS3 Port(s) has failed a hardware self-test. Once every 8 hours, each DS3 Port will indicate a "1" because every VMR INTFC unit performs an automatic hardware self-test.
- ***quan det err*** — Quantity of detected errors: This parameter is the count of parity error pulses detected during the SYNC measurement interval.
- ***dsp oof state*** — Digital signal parameter out-of-frame state: This parameter is the out-of-frame state at the end of the SYNC measurement interval. A "0" indicates an in-frame state; a "1" indicates an out-of-frame state.
- ***dsp oof count*** — Digital signal parameter out-of-frame count: This parameter is the count of transitions between the in-frame and out-of-frame states that occur during the SYNC measurement interval.
- ***err sec a*** — Errored-second Type A: This parameter is the count of Type A errored-second(s) that occur during the SYNC measurement interval. A Type A errored-second is a second in which exactly one error occurs.
- ***err sec b*** — Errored-second Type B: This parameter is the count of Type B errored-second(s) that occur during the SYNC measurement interval. A Type B errored-second

is a second in which more than one error occurs but not enough to cause protection switching.

- ***err sec c*** — Errored-second Type C: This parameter is the count of Type C errored-second(s) that occur during the SYNC measurement interval. A Type C errored-second is a second in which there is a severe signal impairment (e.g., out-of-frame) or at least enough errors to cause protection switching.
- ***psi miss data*** — Protection switch indicator missing data: This parameter indicates if the VPM is receiving protection switching information. A "0" indicates that the associated DS3 report is valid; a "1" indicates the report is invalid.
- ***Not in service*** — DS3 rail service indicator: This parameter indicates whether the associated DS3 rail was carrying service at the end of the SYNC measurement interval. A "0" indicates carrying service; a "1" indicates not carrying service.
- ***NSA switch count*** — Nonservice-affecting switching count: This parameter is the count of protection transitions (on/off) that occur during the SYNC measurement interval.
- ***dur of switch*** — Duration of switch: This parameter is the number of seconds that the channel was not carrying service during the SYNC measurement interval.
- ***SA fail state*** — Service-affecting signal failure state: This parameter is the state of the DS3 signal at the end of the SYNC measurement interval. A service-affecting failure is a severe signal impairment (including out-of-frame or Type C errored-seconds) lasting longer than the usual time required to switch to protection. A "0" indicates that the signal is normal; a "1" indicates that the signal has failed.
- ***SA fail count*** — Service-affecting signal failure count: This parameter is the count of service-affecting signal failures and restorals that occurred during the SYNC measurement interval.
- ***dur of SA fail*** — Duration of service-affecting signal failure: This parameter is the number of seconds that a service-affecting signal failure was active during the SYNC measurement interval.

TABLE 3-G

PC IDENTIFICATION OF DS3 PORTS

DS3 PORT	PC ID#	DS3 PORT	PC ID#	DS3 PORT	PC ID#	DS3 PORT	PC ID#
A1	0	C1	16	E1	32	G1	48
A2	1	C2	17	E2	33	G2	49
A3	2	C3	18	E3	34	G3	50
A4	3	C4	19	E4	35	G4	51
A5	4	C5	20	E5	36	G5	52
A6	5	C6	21	E6	37	G6	53
A7	6	C7	22	E7	38	G7	54
A8	7	C8	23	E8	39	G8	555
B1	8	D1	24	F1	40	H1	56
B2	9	D2	25	F2	41	H2	57
B3	10	D3	26	F3	42	H3	58
B4	11	D4	27	F4	43	H4	59
B5	12	D5	28	F5	44	H5	60
B6	13	D6	29	F6	45	H6	61
B7	14	D7	30	F7	46	H7	62
B8	15	D8	31	F8	47	H8	63

****

parity threshold is 1 Wed Apr 15 10:52:11 1987
The total lines to report is 6
The DS3s are:
0,1,2,6,7,8

ds3 #	0	1	2	6	7	8
dsp dmi	0	0	0	0	0	0
quan det err	0	0	0	0	0	0
dsp off state	0	0	0	0	0	0
dsp off count	2	2	2	2	2	2
err sec a	0	0	0	0	0	0
err sec b	0	0	0	0	0	0
err sec c	2	2	2	3	3	3
psi miss data	0	0	0	0	0	0
Not in Service	1	1	1	0	0	0
NSA swch count	0	0	0	0	0	0
dur of switch	60	60	60	0	0	0
SA fail state	0	0	0	0	0	0
SA fail count	0	0	0	2	2	2
dur of SA fail	0	0	0	3	3	3

****

Figure 3-6 — DS3 Performance Report

3.5.4 LISTEN-IN MODE

The Listen-In mode allows the PC user to monitor the DS3 performance data being transmitted to the GTP from the VPM shelf. In this mode, the PC user will only receive the DS3 performance report interval once every SYNC measurement interval. This SYNC, determined by the GTP's request, is usually 1 minute in duration.

The following equipment, or equivalent, is required:

- AT&T PC 6300 or compatible PC
- GTPSIM software program
- Small straight-slot screwdriver
- ED-8C681-20, Group 6 Cable Assembly.

The procedure below is used to operate the PC in the Listen-In mode. All of the computer's requests and responses are in bold type and all of the PC user's replys are proceeded by a ">."

PROCEDURE

1. Configure the PC interface for the Listen-In mode. (Refer to Part 3.5.2, HARDWARE CONFIGURATION.)
2. Insert the GTPSIM program disk into the PC, power up the PC, and wait for the following message:

   PLEASE enter the COMM port number you are using (1 or 2)
   Normally a "1" on a portable PC
   or a "1" or "2" on an AT&T 6300.

   > Enter a 1 or 2.

3. Observe the following.

   PC parameter settings: LISTENING, COLOR OFF, COM1, ERROR LOGGING OFF
   ENTER COMMAND:

   "l":ENTER LISTEN IN MODE
   "g":ENTER/EXIT GTP SIMULATION MODE
   "d":DISPLAY DIAGNOSTIC CODE INFORMATION
   "!":RUN AN MS-DOS SYSTEM COMMAND
   "c":TURN ON/OFF COLOR
   "e":TURN ON/OFF ERROR LOGGING
   "b":RUN A PC LOOPBACK TEST
   "q":EXIT GTPSIM PROGRAM

   OPTION?:

   > Enter an "l."

4. **Enter the number of switch sections less than 33.**

   Note: Although this parameter does not apply to the VPM, a value must be entered to proceed in this program.

   > Enter any number less than 33.

5. **Enter the highest service line number less than 21**

   Note: Although this parameter does not apply to the VPM, a value must be entered to proceed in this mode.

   > Enter any number less than 21.

6. **Enter an 'e' if you desire exception reporting or 'n' if you desire normal display updates.**

   Note: Exception and normal reports are explained in Part 3.5.3, DS3 PERFORMANCE REPORTS.

   > Enter an "e" and go to Step 7
   - or -
   enter an "n" and go to Step 10.

7. **Enter the number of parity errors to trigger a report**

   > Enter the desired parity error threshold value.

8. **Enter a 'h' if to turn on logging option or 'n' to skip option**

   > Enter an "h" if logging option desired and go to Step 9
   - or -
   enter an "n" if logging option is not desired and go to Step 12.

9. **Don't use this option with MS-DOS control 'p' or, MS-DOS print screen**

   > Enter "prn" for printer, or complete file name if output is being sent to DISC.

10. **Enter the lowest service line # to be displayed on PM, VPM, or FL output**

    Note: The PC will display DS3 performance data on any seven consecutive DS3 Ports supporting D3P inputs (i.e., A6, A7, A8, B1, B2, B3, B4, B5). Each service line number corresponds to an individual DS3 Port on the VPM INTERFACE panel. Service line number 0 corresponds to DS3 Port A1, line 1 to A2, line 2 to A3, etc.

    > Enter the desired lowest service number to be displayed

11. **Enter 'a' to display maps with active bits or, 'n' to display all the bits maps on output**

    > Enter an "a."

12. **Enter 'v' if you are listening in on a VPM link or 'x' if you are not listening to a VPM link**

    > Enter a "v."

    The PC will then display the following message indicating that the listening-in process has started:

    listen in now going active

This procedure is complete.

3.5.5 GTP SIMULATION MODE

The GTP Simulation mode allows the PC user to act like a GTP and request DS3 performance data from the VPM at the PC user's chosen interval. The GTP Simulation mode provides the PC user with several options; however, only the DS3 Reporting Feature option has VPM applications.

The following equipment, or equivalent, is required:

- AT&T PC 6300 or compatible PC
- GTPSIM software program
- Small straight-slot screwdriver
- ED-8C681-20, Group 5 Cable Assembly.

The procedure below is used to operate the GTP Simulation mode. In this procedure all of the PC's requests and responses are in bold face and all of the PC user's responses are proceeded by a ">."

PROCEDURE

1. Configure the PC interface into the GTP. Simulation mode. (Refer to Part 3.5.2, HARDWARE CONFIGURATION.)
2. Insert the GTPSIM program disk into the PC, power up the PC, and wait for the following message:

   PLEASE enter the COMM port number you are using (1 or 2),
   Normally a '1' on a portable PC
   or a '1' or '2' on an AT&T 6300

   > Enter a 1 or 2.

3. Observe the following.

   PC parameter settings: LISTENING, COLOR OFF, COM1 ERROR LOGGING OFF
   ENTER COMMAND:

   "l":ENTER LISTEN IN MODE
   "g":ENTER/EXIT GTP SIMULATION MODE
   "d":DISPLAY DIAGNOSTIC CODE INFORMATION
   "!":RUN AN MS-DOS SYSTEM COMMAND
   "c":TURN ON/OFF COLOR
   "e":TURN ON/OFF ERROR LOGGING
   "b":RUN A PC LOOPBACK TEST
   "q":EXIT GTPSIM PROGRAM

   OPTION?:

   > Enter a "g."

   Note: The GTP Simulation can be stopped at anytime by entering a "q" whenever the cursor appears.

4. The PC will then display this message:

   WARNING: The GTP must be disconnected in this mode.
   Please enter a '1' when this has been done anything else will abort request

   > Enter a 1.

5. Observe the following:

   PC parameter settings: GTP SIMULATION, COLOR OFF, COM1, ERROR LOGGING OFF
   ENTER COMMAND:

   "l":ENTER LISTEN IN MODE
   "g":ENTER/EXIT GTP SIMULATION MODE
   "d":DISPLAY DIAGNOSTIC CODE INFORMATION
   "!":RUN AN MS-DOS SYSTEM COMMAND
   "c":TURN ON/OFF COLOR
   "b":RUN A PC LOOPBACK TEST
   "x/q":EXIT GTPSIM PROGRAM
   "t":SELECT TBOS FEATURE
   "a":SELECT TABS AS+C OPTION
   "p":SELECT LINE PM OPTION
   "f":SELECT FL OPTION
   "v":SELECT DS3 PM REPORTING OPTION
   "s":ENTER/EXIT SPECIAL TABS TESTING MODE

   OPTION?:

   > Enter a "v."

6. **DS3 PERFORMANCE MONITORING press "m" for the MENU**
   VPM Output logging is Off
   Enter Command:

   > Enter an "m."

   "t":TEST PC DATA LINK
   "d":MONITOR DS3 PM DATA
   "h":TURN ON/OFF PRN OR DISC LOGGING OF
   DS3 PM EXCEPTION REPORT
   "f":RESET THE PC DATA LINK
   "p":RETURN TO THE PREVIOUS MENU
   "m":DISPLAY THE DS3 PM MENU

   Note: If a printout or disc logging of exception report is desired, enter an "h" and follow the PC's displayed instructions. Then continue with Step 7 by entering a "t" to test the PC data link.

7. **DS3 PERFORMANCE MONITORING press "m" for the MENU**
   VPM Output logging is Off
   Enter Command:

   OPTION?:

> Enter a "t."

The PC should reply this message:

TEST DATA LINK SELECTED

GOOD DIALOGUE!

IFRAME:

req_data: 4d 44 53 26 45 46 53 21
resp_data: 4d 44 53 26 45 46 53 21

If the PC returned this message instead:

timeout on receiver on PC error #2 : header_id inconsistent with specs

then check the PC/VPM interface cabling and connections.

8. **DS3 PERFORMANCE MONITORING press "m" for the MENU**
VPM Output logging is off
Enter Command:

> Enter a "d."

configuration being requested

GOOD DIALOGUE!

pm capability 0x1
sync wait timing 20
largest line nbr n
number prot lines 0
first prot line nbr 0

Requirement: The "largest line nbr" parameter should equal the highest DS3 Port occupied. (Refer to Table 3-G for PC identification of DS3 Ports.) If the requirement is not met, refer to Table 6-F in the ACCPETANCE PROCEDURES tab for corrective action.

9. **Please enter SYNC interval greater than 25**

Note: Entering an interval value less than 25 may result in timing problems.

> Enter an interval value.

10. **Enter "e" for exception reports, or "r" for regular reports**

Note: Exception and regular reports are explained in Part 3.5.3, DS3 PERFORMANCE REPORTS

> Enter an "e" and go to Step 11
- or -
enter an "r" and go to Step 12.

11. **Please enter threshold number of errors to trigger a report**

    > Enter the desired number of parity errors to trigger a DS3 performance report and go to Step 13.

12. **ENTER LOWEST service line number to be displayed**

    Note: The PC will display DS3 performance data on any seven consecutive DS3 Ports supporting D3P inputs (i.e., A6, A7, A8, B1, B2, B3, B4, B5). Each service line number corresponds to an individual DS3 Port on the VPM INTERFACE panel. (Refer to Table 3-G.)

    > Enter the lowest of the seven consecutive DS3 Ports to be displayed.

13. Observe that the following information is being displayed; it indicates that the GTP simulation process has begun.

    SYNC MESSAGE being issued — current day,month,date,time,year
    Wait one SYNC period (interval specified in Step 9)
    SYNC MESSAGE being issued —f1 current day,month,date,time,year
    Request for multi-line DSP data
    Request for multi-line PSI data
    Request for multi-line PSD data

This procedure is complete.

3.6 POWER-UP PROCEDURE

This procedure is used to provide the power to the VPM shelf after it has been installed. The VPM is equipped with either a 471BA or 474BA POWER UNIT, depending on the office power supply.

The following equipment, or equivalent, is required:

1 - Controller reset tool

1 - Digital Multimeter.

Prerequisite: All VPM cabling, strapping, and connections have been completed.

DANGER: To prevent electrical shock, follow office safety requirements measuring dc voltage.

Warning: To prevent ESD damage to a plug-in unit, ensure that all ESD precautions in the MAINTENANCE tab have been followed.

PROCEDURE

Note: Disregard any lighted LEDs until Step 9 has been completed.

1. Disengage all circuit packs from the VPM's backplane.
2. Engage the fuse or circuit breaker at the office station that supplies power to the VPM shelf.
3. Plug in the power unit.
4. Check the input voltage to the power unit (test points V IN + -)

   Requirement: 471BA POWER UNIT: (–23 V to –28 V)
   Requirement: 474BA POWER UNIT: (–48 V to –52.5 V).
5. Plug in VPM CONTR unit.
6. Plug in VPM TELEM unit.
7. Plug in VMR INTFC circuit pack(s).

   Note: FAIL LED on faceplate will light.
8. Check the output voltage at the power unit (test points V1 ±).

   Requirement: +5 V ± 0.2 V.

   Note: If the output voltage does not meet the requirement, refer to Part 4.3, CORRECTIVE MAINTENANCE in the MAINTENANCE tab.
9. Operate recessed CONTR RESET pushbutton located on VPM CONTR unit faceplate.

   Requirement: All LEDs should light and then extinguish. If any LEDs fail to extinguish, refer to Part 4.3, CORRECTIVE MAINTENANCE in the MAINTENANCE tab.

This procedure is complete.

3.7 POWER-DOWN PROCEDURE

This procedure is used to power down the VPM shelf. If removal of the VPM shelf for relocation or replacement purposes is desired, refer to Part 4.5, VPM SHELF REPLACEMENT in the MAINTENANCE tab.

DANGER: To prevent electrical shock, follow office safety requirements when measuring dc voltage.

Warning: To prevent ESD damage to a plug-in unit, ensure that all ESD precautions in the MAINTENANCE tab have been followed.

PROCEDURE

1. Notify FMAC/SCOTS personnel of VPM shutdown.
2. Disengage VPM CONTR unit from VPM's backplane.
3. Disengage all circuit packs from the VPM's backplane except for the power unit.
4. Disengage the power unit.
5. If necessary, disconnect fuse in battery distribution fuse bay or activate circuit breaker.

This procedure is complete.

VIOLATION PULSE MONITOR
USER'S MANUAL

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LIST OF FIGURES

LIST OF TABLES

4. MAINTENANCE

4.1 GENERAL

This tab is used to troubleshoot and clear alarm conditions on a VPM (Violation Pulse Monitor) shelf and to verify that a repair was successful. Also included is information for obtaining replacement spares and technical assistance, if required.

4.2 MAINTENANCE PHILOSOPHY

The VPM shelf is designed to operate on a demand maintenance basis. No routine maintenance is necessary. Demand maintenance is the self-checking and alarm-reporting capabilities in the VPM shelf working with an external centralized alarm surveillance system that can process discrete AS&C (alarm status and control) data and serial PM (performance monitoring) data.

With discrete AS&C, monitoring circuits are located in each plug-in unit to continuously check the operational status of the unit. The alarm-reporting circuit (VPM TELEM) processes the status information from the monitoring circuits, activates the appropriate indicator(s) on the VPM shelf, and consolidates all alarms into a single output signal (USR ALM). The alarm output signal activates the local office alarm system and alerts the remote surveillance center operator to a problem at that station.

With serial PM, if the VPM shelf is not communicating, a Data Missing report generated by the monitoring equipment will alert the remote oeprator to a VPM shelf problem. Data reported from the transmission equipment being monitored that is inconsistant with other telemetry system data should also alert the operator to a problem.

In either case, maintenance personnel should use local alarm indications and/or tests, if necessary, to isolate the failure. The failure is cleared by replacing the failed plug-in unit. Verify the repair locally using a PC (personal computer) and/or remotely using the monitoring equipment with the assistance of alarm center personnel.

Figure 4-1 illustrates how the unit alarms are combined, processed, and reported by the VPM shelf. If an alarm occurs, the COM ALM on the VPM shelf will activate and the USR ALM will be sent to the remote surveillance center. Also, the local audible (MN) and visual office (MNV) alarms will activate. The local office alarms can be silenced by operating the ACO (alarm cut-off) pushbutton located on the VPM TELEM unit. The ACOV (alarm cut-off visual) will activate whenever the ACO has been operated.

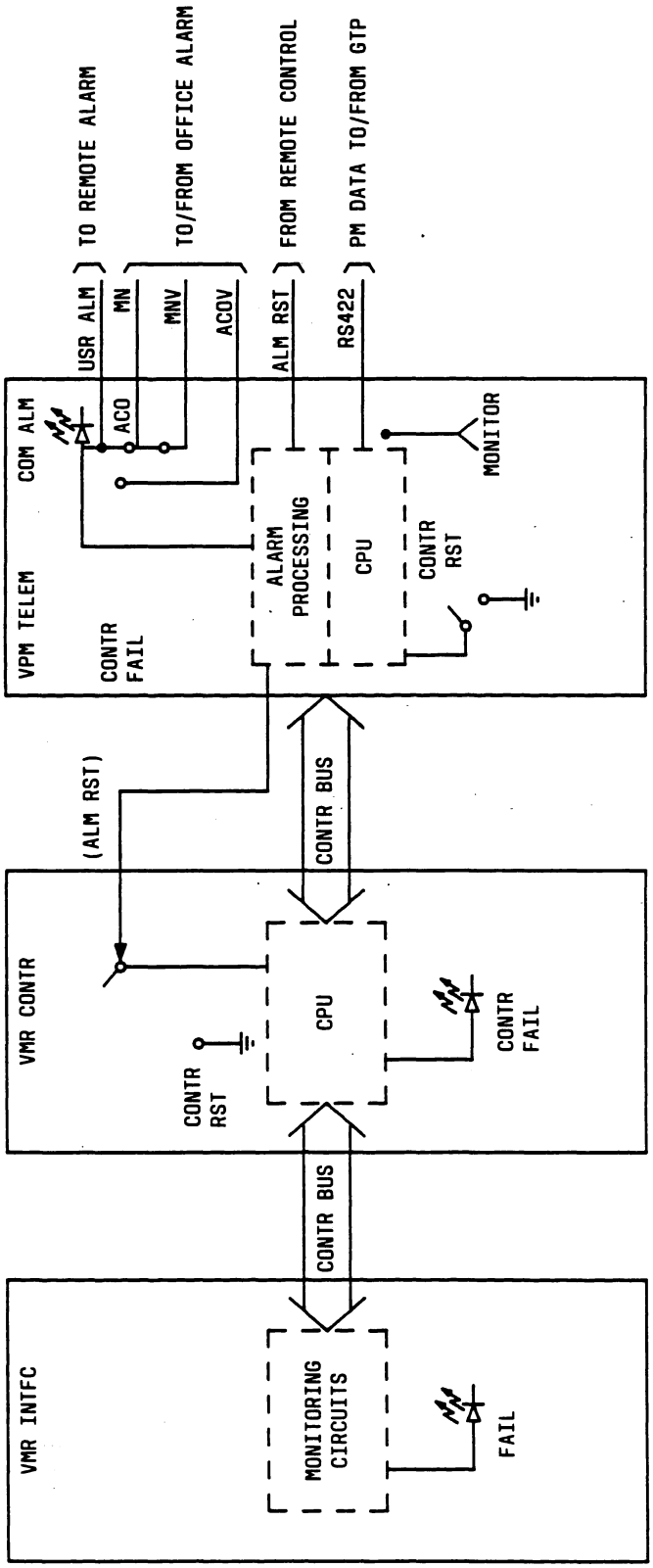

Figure 4-1 — VPM Alarm Consolidation Block Diagram

4.3 CORRECTIVE MAINTENANCE

Corrective maintenance involves using local alarm indications and/or tests, if necessary, to isolate the failure. The failure is cleared by replacing the failed plug-in unit. The repair is then verified locally using a PC and/or remotely using the monitoring equipment with the assistance of alarm center personnel.

If the COM ALM indicator is lighted on the VPM TELEM unit, proceed to Part 4.3.1, RESPONSE TO LOCAL SHELF ALARM to isolate and clear cause of alarm. If not, proceed to Part 4.3.2, RESPONSE TO FMAS TROUBLE REPORT to isolate and clear cause of telemetry malfunction. The 3-digit numbers (i.e., 4.4.5) in the flowcharts refer to parts and/or procedures in this document.

4.3.1 RESPONSE TO LOCAL SHELF ALARM

The flowchart in Figure 4-2 shows the sequence to use when troubleshooting VPM shelf alarms. The flowchart references supporting procedures (found in this section) to isolate and clear the alarm and to verify that the shelf is working properly.

4.3.2 RESPONSE TO FMAS TROUBLE REPORT

The flowchart in Figure 4-3 shows the sequence to use when data is not properly reporting to FMAS and *no* shelf alarms are present.

4.3.3 REPAIR VERIFICATION

The flowchart in Figure 4-4 is used to verify that repair to the VPM shelf was successful and that the telemetry link to FMAS is functioning properly.

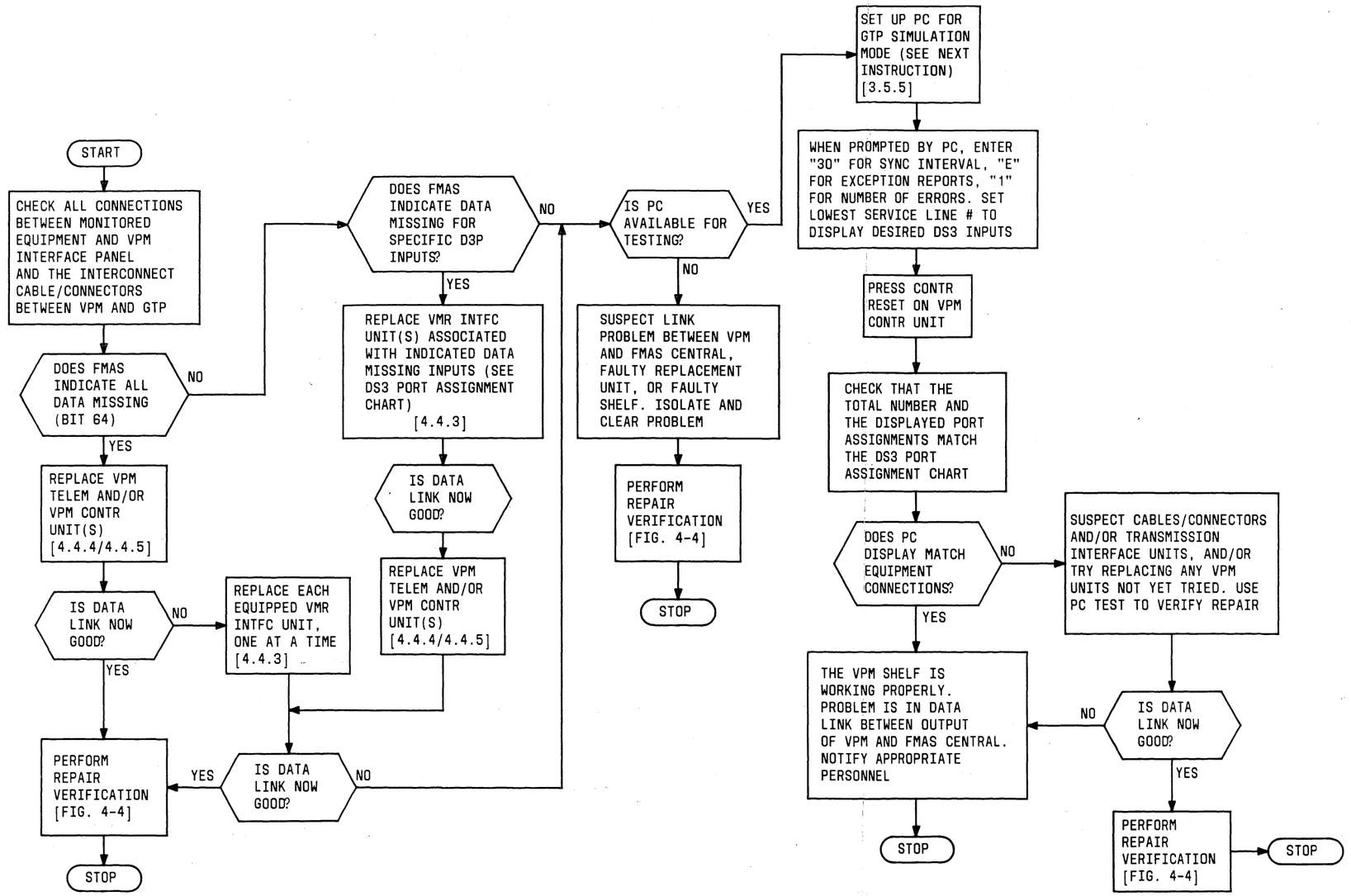

Figure 4-2 — VPM Shelf Alarm Trouble-Clearing Flowchart

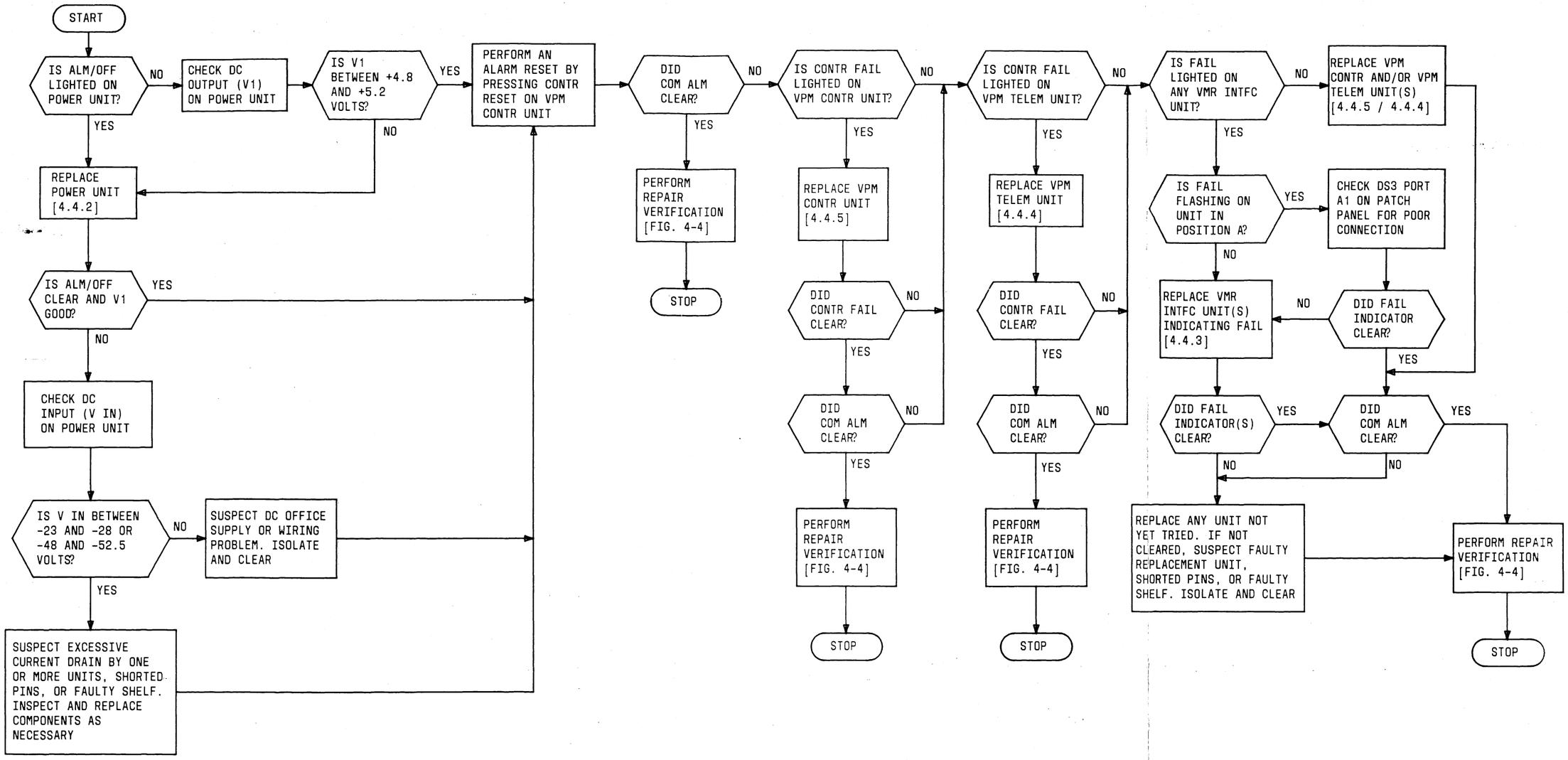

Figure 4-3 — Data-Missing Verification and Trouble Isolation Flowchart

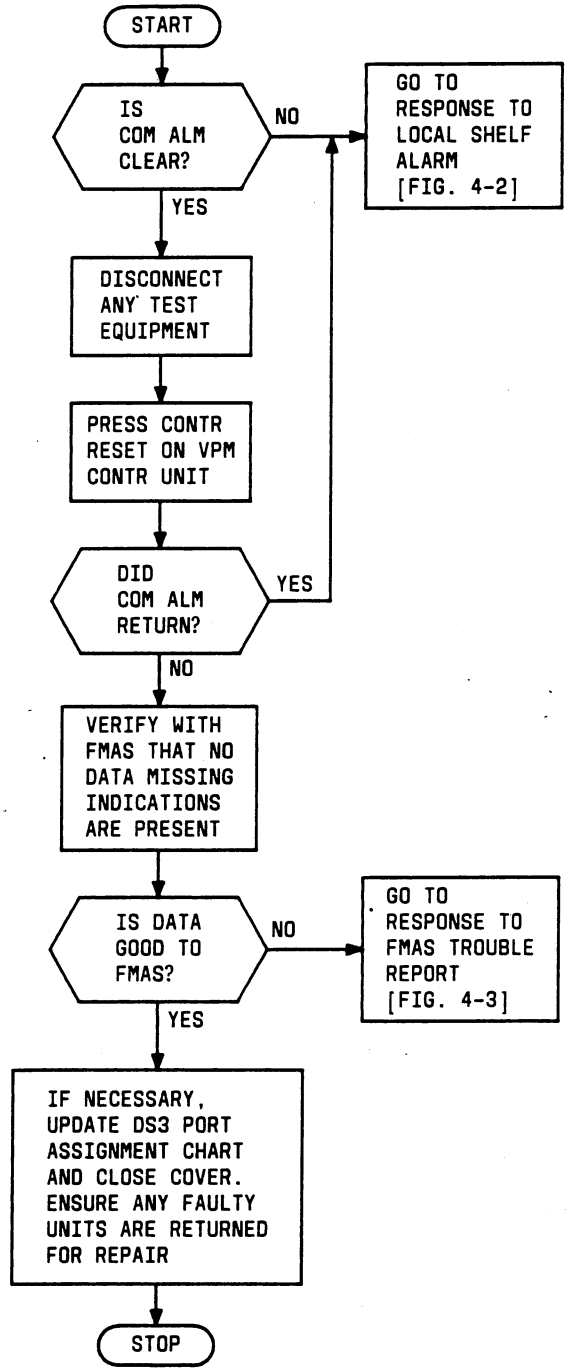

Figure 4-4 — VPM Repair Verification Flowchart

4.4 PLUG-IN UNIT REPLACEMENT

4.4.1 GENERAL PLUG-IN REPLACEMENT

This procedure is used to replace the plug-in unit in the VPM shelf.

Warning: To prevent ESD (electrostatic discharge) damage to a plug-in unit, ensure that all ESD procedures are followed when handling and storing circuit packs.

Warning: Improperly replacing a plug-in unit can cause backplane or circuit pack connector damage.

PROCEDURE

1. Obtain replacement unit.
2. Connect ESD wrist strap to ESD GRD.

Removal

3. On the plug-in unit to be removed, release the latch catch and pull the latch lever out and down until plug-in unit is disengaged from its backplane connector (Figure 4-5).

   Note: When the latch lever is released from the latch catch on the power unit plug-in, the ALM/OFF LED should light, indicating that the power unit has been de-energized. When the power unit is disengaged from the backplane connector, the ALM/OFF LED will go off after approximately 6 seconds.

4. *DANGER: Some components may be hot enough to cause burns. Let them cool before placing them in the protective wrapping.*

   Hold the plug-in unit at the top and bottom, and slide it out of the shelf.

5. Remove the replacement plug-in unit from its protective wrapping and put the defective unit in its place.

Installation

6. On the replacement plug-in unit, release the catch and pull the latch lever out.
7. *Carefully* align the replacement plug-in unit in the top and bottom shelf guides to prevent backplane connector damage.
8. With the latch lever pulled out, slide the replacement plug-in into the shelf until the latch is positioned over the groove in the bottom front shelf bracket (Figure 4-5).
9. Seat the plug-in unit by applying light pressure at the top of the unit and pushing up on the latch lever until the latch catch has engaged the latch lever.

   Note: When inserting the power unit plug-in, the ALM/OFF LED will light when the latch lever is pushed up. The LED will go off when the latch lever has engaged the latch catch, indicating that the power unit is energized.

This procedure is complete.

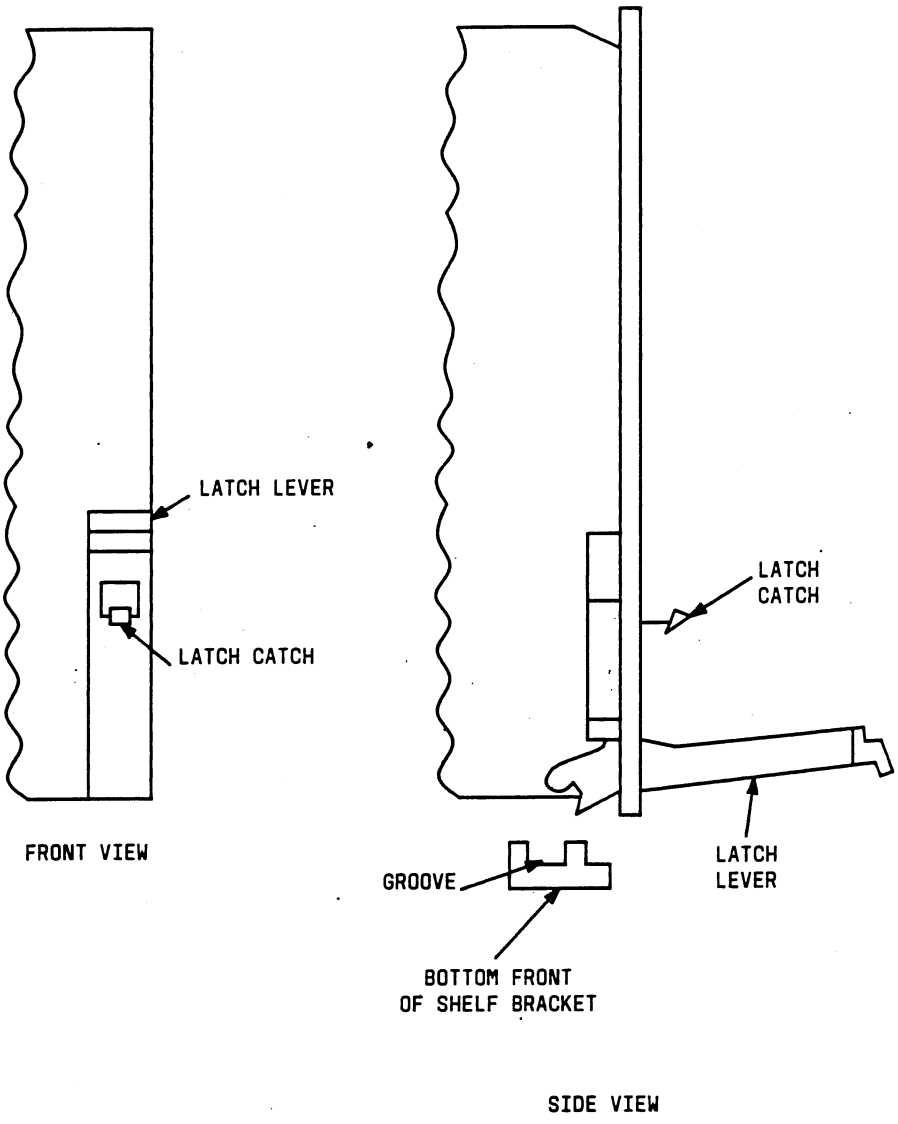

Figure 4-5 — Front and Side View of Typical Plug-In Unit

4.4.2 POWER UNIT REPLACEMENT

This procedure is used to replace the power unit.

The following equipment, or equivalent, is required:

1 - Controller reset tool.

Warning: To prevent ESD damage to a plug-in unit, ensure that all ESD procedures are followed when handling and storing circuit packs.

Warning: Improperly replacing a plug-in unit can cause backplane or circuit pack connector damage.

PROCEDURE

1. Unplug and partially remove the VPM CONTR unit.
2. Unplug and partially remove all other plug-in units, except for the power unit, equipped in shelf.
3. Replace the power unit.
4. Reinsert all plug-in units with the last one being the VPM CONTR unit.
5. On the VPM CONTR unit, press the CONTR RESET switch until the CONTR FAIL indicator lights; then release the switch.

This procedure is complete.

4.4.3 VMR INTFC UNIT

This procedure is used to replace the VMR INTFC unit.

The following equipment, or equivalent, is required:

1 - Controller reset tool.

Warning: To prevent ESD damage to a plug-in unit, ensure that all ESD precautions are followed when handling and storing circuit packs.

Warning: Improperly replacing a plug-in unit can cause backplane or circuit pack connector damage.

PROCEDURE

1. Unplug and partially remove the VPM CONTR unit.
2. Replace the VMR INTFC unit.
3. Reinsert the VPM CONTR unit.
4. On the VPM CONTR unit, press the CONTR RESET control (recessed switch) until the CONTR FAIL indicator lights; then release the switch.

This procedure is complete.

4.4.4 VPM TELEM UNIT

This procedure is used to replace the VPM TELEM unit.

The following equipment, or equivalent, is required:

1 - Controller reset tool.

Warning: To prevent ESD damage to a plug-in unit, ensure that all ESD procedures are followed when handling and storing circuit packs.

Warning: Improperly replacing a plug-in unit can cause backplane or circuit pack connector damage.

PROCEDURE

1. Unplug and partially remove the VPM CONTR unit.
2. Replace the VPM TELEM unit.
3. Reinsert the VPM CONTR unit.
4. On the VPM CONTR unit, press the CONTR RESET control (recessed switch) until the CONTR FAIL indicator lights; then release the switch.

This procedure is complete.

4.4.5 VPM CONTR UNIT

This procedure is used to replace the VPM CONTR unit.

The following equipment, or equivalent, is required.

1 - Controller reset tool.

Warning: To prevent ESD damage to a plug-in unit, ensure that all ESD procedures are followed when handling and storing circuit packs.

Warning: Improperly replacing a plug-in unit can cause backplane or circuit pack connector damage.

PROCEDURE

1. Replace the VPM CONTR unit.
2. On the VPM CONTR unit, press the CONTR RESET control (recessed switch) until the CONTR FAIL indicator lights; then release the switch.

This procedure is complete.

4.5 VPM SHELF REPLACEMENT

This section is used to replace the VPM shelf.

The following equipment, or equivalent, is required:

1 - Small straight-slot screwdriver

1 - Wire-wrap tool

1 - Digital multimeter

1 - Controller reset tool.

DANGER: To prevent electrical shock, follow office safety requirements when measuring dc voltage.

Warning: To prevent ESD damage to a plug-in unit, ensure that all ESD precautions are followed when handling and storing circuit packs.

PROCEDURE

Removal

1. Disengage VPM CONTR unit from VPM backplane.
2. Disengage all other circuit packs from VPM backplane except the power unit.
3. Disengage the power unit.
4. If necessary, disconnect the fuse in the battery distribution fuse bay or activate circuit breaker.
5. Disconnect the power leads from the terminal block (TB1).
6. Remove all the D3P inputs from the VPM INTERFACE panel, marking each D3P input with the DS3 Port it is assigned to.
7. *Warning: Using an electric wire-wrap tool may cause damage to engaged circuit packs.*

   Remove all the CSRVS leads from TS2, marking each lead with its respective TS2 punching location.
8. Disconnect the GTP connector of the ED-8C681-20, Group 4 cable assembly from the GTP connector (P1).
9. Disconnect all the discrete alarm and control leads from TS1, marking each lead with the TS1 punching location it is assigned to.
10. Note all option strapping on TS1, and repeat this strapping on new VPM shelf.
11. Unfasten the mounting screws attaching the VPM to the bay framework, and remove the VPM shelf.

Installation

12. Mount the new VPM shelf on to the bay framework, and fasten the mounting screws.
13. Connect all previously removed D3P inputs to their respective DS3 Ports.

14. See *Warning* in Step 7. Connect all previously removed CSRVS leads to their respective TS2 punching locations.
15. Connect the GTP connector of the GTP cable to the P1 connector of the VPM shelf.
16. See *Warning* in Step 7. Connect the discrete alarm and control leads to their respective TS1 punching locations.
17. Connect dc power leads to terminal block TB1.
18. ***Warning: Improperly connecting power leads may result in damage to engaged circuit pack(s).***

    Verify proper connection of power leads at TB1 by checking the polarity of points E1 and E2.
19. Verify that all circuit packs are disengaged from the VPM backplane, and engage fuse or circuit breaker at the office station to provide power to the VPM shelf.
20. Plug in power unit.
21. Check input voltage to the power unit (test points V IN ±).

    Requirement:

    −23 V to −28.5 V (−24 V)
    −48 V to −52.5 V (−48 V).
22. Plug in VPM CONTR circuit pack.
23. Plug in VPM TELEM circuit pack.
24. Plug in VMR INTFC circuit pack(s).

    Note: COM ALM LED on VPM TELEM circuit packs will light.
25. Check output voltage at power unit.

    Requirement: +5 V ± 0.2 V.
26. Operate recessed CONTR RESET pushbutton located on VPM CONTR unit faceplate.

    Requirement: All LEDs should light for several seconds; then extinguish.

    Note: If any LEDs remain lighted, refer to Part 4.3, CORRECTIVE MAINTENANCE in the MAINTENANCE tab.

This procedure is complete.

4.6 RECOMMENDED TEST EQUIPMENT

The tables in this section show the recommended test equipment, accessories, and tools for use with the VPM.

Table 4-A lists the test equipment that can be used to test the VPM shelf.

Table 4-B lists the cabling and miscellaneous items used with the test equipment.

Table 4-C lists the tools required to perform some of the VPM procedures.

Note: Always follow the manufacturer's setup and/or operation procedure when using test equipment, accessory, or tools.

TABLE 4-A

TEST EQUIPMENT

EQUIPMENT DESCRIPTION	RECOMMENDED MODEL	REQUIRED CAPABILITIES	APPLICATION
Personal Computer	AT&T PC6300	Equipped with MS-DOS 2.11 or higher	When loaded with GTPSIM software program, PC can be operated in GTP Simulation or Listen-in mode to acquire on-site DS3 performance data
Lap-top Personal Computer	Toshiba 1100 Plus	Equipped with MS-DOS 2.11 or higher	When loaded with GTPSIM software program, PC can be operated in GTP Simulation or Listen-in mode to acquire on-site DS3 performance data
GTP SIMULATION software	GTPSIM	Simulate GTP functions	Provides compatible PC with necessary software to be operated in GTP Simulation or Listen-In mode
Digital Multimeter	KS-20599	Measure dc voltage levels	Voltage measurement

TABLE 4-B

TEST CABLES AND ACCESSORIES

EQUIPMENT DESCRIPTION	RECOMMENDED MODEL	REQUIRED CAPABILITIES	APPLICATION
GTP Simulation mode VPM-PC interfacing cable	AT&T ED-8C681-20,G5	RS-422/485 compatible	Supports VPM-PC interfacing link while PC is operating in GTP Simulation mode
Listen-In mode VPM-PC interfacing cable	AT&T ED-8C681-20,G6	RS-422/485 Compatible	Supports VPM-PC interfacing link while PC is operating in Listen-In mode
RS-232C/485 Converter	B&B Electronics Model 485COR	Convert RS-232 to RS-485	Converts RS-232C to RS-485 (RS-422 Compatible) for VPM-PC interfacing
RS-232/485 Converter power supply	B&B Electronics Power Supply Model 485ps		Supplies required power for Model 485COR converter

TABLE 4-C

TOOLS

EQUIPMENT DESCRIPTION	RECOMMENDED MODEL	APPLICATION
Small blade straight-slot screwdriver	KS 6854	D3P input removal from DS3 Port
Large blade straight-slot screwdriver	Jensen 36B566	General use
Wire-wrap tool	635B	General use
ESD Wrist Strap and Cord	2212 (medium) 2213 (large)	ESD Precaution

4.7 RECOMMENDED SPARE PARTS

Table 4-D lists the spare circuit pack recommendations for the VPM circuit packs.

TABLE 4-D

RECOMMENDED SPARE CIRCUIT PACKS

NAME	CODE	COMCODE	RECOMMENDATIONS
VMR INTFC	AMR118	104025622	one for four
VPM CONTR	MC45084A1	105229595	one for one
VPM TELEM	MC45085A1	105229603	one for one
POWER UNIT	471BA(–24 V)	103825345	one for one
POWER UNIT	474BA(–48 V)	103831435	one for one

4.8 UNIT REPAIR AND RETURN PROCEDURES

4.8.1 NORMAL INTERVAL

The normal procedure for repairing or replacing faulty units requires the Service and Return Order form SD-44-326A. The form is used with the following steps to obtain a repaired or replacement unit.

1. Call the regional service supply control center for the location of the responsible repair facility. Have the plug-in code (AMR-, MC-, etc.) available.
2. Complete the SD-44-326A form.
3. Send Part 1 of the form to the regional service supply control center.
4. Send Part 2 of the form with the faulty unit to the repair facility.
5. Retain Part 3 for the station's records.

In most cases, the repaired or replacement unit will be received in 2 to 3 weeks.

4.8.2 EMERGENCY INTERVAL

AT&T has provided a hot line for digital radio products. The "Hot Line" covers digital radio products at three manufacturing locations: Merrimack Valley, Dallas (power supplies), and North Carolina (DR4/TD90 radio bay and kits). The telephone numbers for these hot lines are:

- Merrimack Valley — 617-681-3901
- Dallas — 1-800-637-5338
- North Carolina — 919-784-2223.

The Hot Line should be used only in service-affecting situations when no spare is available locally. As a matter of practicality, exhaust all other sources of spares, up to the regional level, before initiating a Hot Line call. When properly used, the Hot Line will usually have a spare unit shipped within 48 hours after the call.

4.8.2.1 TECHNICIAN REPSONSIBILITY

After exhausting all regional sources for a spare, to avoid a service-affecting situation, contact the appropriate Regional Customer Service representative in Atlanta during normal business hours.

Be prepared to provide the following information to the Customer Service Representative:

— **FOR NEW INSTALLATIONS**

- Equipment order number
- Order number for spares (if different)
- Plug-in code (AMR-, MC-, etc.)
- Ship to address
- Contact telephone number and name (working hours and off hours).

— **FOR EXISTING ROUTES (No open orders)**

- Supplier's Requisition number

- Plug-in code (AMR-, MC-, etc.)
- Ship to address
- Contact telephone number and name (working hours and off hours).

Failure to provide this information can result in longer turnaround time and additional administrative costs. A billing number against which the required plug-in can be shipped must be provided. If no number, determine if a Regional Customer Service requisition can be used to charge the shipment of a new plug-in. During off hours, a direct order will be handled in the most expeditious manner, and the required order numbers and paperwork will follow.

4.8.2.2 FOLLOW-UP RESPONSIBILITY

If a spare is provided against an unfilled spare order number, no additional activity is required.

If a spare is shipped against an open order number, for a unit under warranty, it is the responsibility of the technician to return the defective unit for ***credit*** using an RMN. A unit out of warranty may be either junked locally or returned for repair.

4.9 TECHNICAL ASSISTANCE

In addition to material support, AT&T provides 24-hour customer support on technical matters, if needed. Technical assistance can be obtained by calling 1-800-237-4343.

4.10 ELECTROSTATIC DISCHARGE PRECAUTIONS

A static charge of several thousand volts can be produced by friction and retained by the human body. A person can retain a charge by walking across a carpeted floor during low humidity conditions. The static discharge occurs when the static charged person nearly touches another person, a metal of a different potential, or a grounded object. While static charging is the oldest known and easiest way to produce electricity, it is still considered a natural phenomenon with extremely complex characteristics depending on material composition, reactions on different materials, environment, and conditions of contact. Damage or degradation to electronic equipment by ESD is caused when a statically charged object, predominantly a person, makes direct or near contact (discharge) with the equipment. It can also be caused by noncontact (induction) from a surrounding electric field. Electronic devices can accumulate a static charge while being transported or even while in storage. Total isolation or shielding of people or equipment and circuits to protect against ESD is not yet possible.

Under some circumstances, circuit packs, particularly those containing integrated circuits, can be damaged by the discharge of static electricity. Static electricity also can disrupt the operation of central office equipment and minicomputers.

4.10.1 METHODS FOR PREVENTING CIRCUIT PACK DAMAGE CAUSED BY ESD

Static electricity is not likely to damage circuit packs in operating equipment; however, there is a risk when replacing, shipping, installing, and repairing these circuit packs. Use the following methods to help prevent static electricity damage:

- Immediately before inserting, removing, or handling circuit packs, obtain and wear a conductive wrist strap connected to ground.
- Always hold the circuit pack only by its outermost top and bottom edges and by its faceplate or latch.

- Do not remove the circuit pack from its antistatic container until ready to insert it in a frame.
- Return circuit packs in antistatic protective packaging if circuit packs contain integrated circuits. Packs should be returned in antistatic packaging whether or not spare circuits are packaged in antistatic materials.
- When repairing circuit packs, use a grounded soldering iron and/or soldering tool. The technician should wear a conductive wrist strap connected to ground.
- Keep ordinary plastic away from the immediate vicinity of electronic equipment. Avoid contact of integrated circuits with ungrounded plastics, metals, or human hands.

VIOLATION PULSE MONITOR
USER'S MANUAL

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LIST OF FIGURES

LIST OF TABLES

5. INSTALLATION ENGINEERING

5.1 GENERAL

This tab provides the engineering, ordering, and preinstallation information necessary for using the VPM shelf. The first three parts of this tab identify and describe the requirements that must be met to ensure the successful application of the VPM shelf. Parts 5.6, ENGINEERING CHECKLIST and 5.7, EQUIPMENT ORDERING CHECKLIST provide an item-by-item checklist that ensures all installation engineering requirements have been satisfied.

5.2 ADMINISTRATIVE REQUIREMENTS

The information in this tab is used to satisfy the preinstallation planning and assignments necessary to use the VPM shelf. Each VPM shelf can monitor up to 64 D3P inputs (DS3 rails) from any number of compatible transmission systems. The VPM shelf should be located in a miscellaneous frame in close proximity with the monitored equipment. The following information is required for each VPM shelf to be installed.

5.2.1 MONITORED EQUIPMENT COMPATIBILITY

The VPM is compatible with any communication system that provides the D3P signal. In digital radio systems, the 90C, 135A, and 135EC line terminal bays can currently be configured for VPM compatibility. The terminal bays must be equipped with the following features:

- AMR72B Violation Monitor/Remover circuit packs located in the digital receiver of each VPM monitored channel.
- D3P connectors (located on the right side of each VPM-monitored channel) and associated backplane wiring. The D3P connectors for 90C and 135A/EC terminal bays, frequency diversity and hot standby, are as follows: PC1E for the protection channel and PC2D for the regular channels.
- CSRVS connector (located on the left side of the fan shelf) and associated backplane wiring. For frequency diversity systems, the CSRVS connector for 90C and 135A/EC terminal bays is designated as JC3H. For hot standby systems, the CSRVS signal is accessible at punching C8 of the control and service channel shelf's terminal strip TS1.
- Firmware required to provide the CSRVS signal (see *Note).*

If the terminal bay(s) to be monitored by the VPM is not equipped with these features, the bay(s) must be modified for proper operation with the VPM.

Note: Only terminal bays in a frequency diversity system need the mentioned firmware change since the existing MC codes for hot standby are already VPM-compatible.

5.2.2 DS3 PORT ASSIGNMENTS

The requirements and recommendations listed below are guidelines for assigning DS3 Ports. The responsibility for assigning the DS3 Ports, as well as other interconnecting points for the VPM, will vary from station to station. If FMAC personnel are not responsible for assigning DS3 Ports in a station, they should be notified as soon as possible about any assignments or changes.

1. When assigning the DS3 Ports for a newly installed VPM shelf, always begin with DS3 Port A1.
2. Assign/reserve DS3 Ports according to:
   - Type of monitored equipment used
   - Number of channels used
   - Expected growth of the monitored equipment's configuration.

   Example: If the monitored equipment is a 135A/EC bay in a 1X3 configuration and is expected to grow to a 1X4 configuration, 15 DS3 Ports (3 D3P inputs X 5 channels) would be required.
3. Assign the D3P inputs of the protection channel to the first DS3 Port assigned to the monitored equipment. Then sequentially assign the regular channel inputs (1 through 7) thereafter.

   Example: If the monitored equipment is a 90C bay, assign protection rails A and B to DS3 Ports A1 and A2, channel 1 rails A and B to DS3 Ports A3 and A4, and all other channels in that order.
4. Assign the next D3P inputs to the next available block of DS3 Ports.

   Example: The first monitored equipment's D3P inputs are assigned DS3 Ports A1 through A6; the second monitored equipment's D3P inputs are assigned the number of required DS3 Ports, beginning with A7.

Located on the inside of the VPM INTERFACE panel door, the DS3 PORT ASSIGNMENT Chart (Figure 5-1) provides an on-site location for recording DS3 Port assignments.

5.2.3 LOCAL OFFICE ALARM ASSIGNMENTS

The VPM provides the following discrete outputs for local alarms:

- MN (Minor)
- MNV (Minor Visual)
- ACOV (Alarm Cutoff Visual).

These alarm outputs are accessible via terminal strip TS1 and are to be connected as designated by the line engineer. Table 5-A lists the discrete local alarms and their punching locations on TS1.

5.2.4 DISCRETE AS&C (ALARM STATUS AND CONTROL) POINT ASSIGNMENTS

The VPM has one discrete alarm output for USR ALM and requires one discrete control input for ALM RST. The USR ALM and ALM RST points may be connected to one of the following:

- The discrete scan input and control output points on the GTP
- The discrete points on an E2A-type telemetry remote
- The discrete points on the User Alarm/Control Feature of an equipped terminal bay.

These discrete points are accessible via terminal strip TS1 and are connected as designated by the line engineer. Table 5-A provides the punching locations on TS1 for the USR ALM and ALM RST points.

TABLE 5-A

LOCAL OFFICE AND DISCRETE ALARM/CONTROL POINTS

DESIGNATION	TS1 LOCATION	APPLICATION
ALM RST ALM RSTR	H10 H9	Remote Control Point
USR ALM USR ALMR	G10 G9	Remote Alarm Point
ACOV ACOVR	F10 F9	Local Alarm Cutoff Relay
MN MNR	E10 E9	Local Audible Alarm Relay
MNV MNVR	D10 D9	Local Visual Alarm Relay

5.2.5 GTP SERIAL PORT ASSIGNMENT

The VPM requires one TABS (Telemetry Asynchronous Bit—Serial) port on the GTP remote. Table 5-B lists the VPM-GTP interconnections. The VPM Cable Lead column refers to GTP cable ED-8C681-20, Group 4 that interfaces the VPM shelf to the GTP.

If additional information on the GTP port assignment is required, refer to AT&T Practice 201-653-511.

TABLE 5-B
VPM-GTP INTERCONNECTIONS

VPM CABLE LEAD			
	COLOR		
NAME	BODY	STRIPE	GTP TABS PORT
+TXD	Blue	None	RCVA
-TXD	White	Blue	RCVB
+RXD	Orange	None	TXMTA
-RXD	White	Orange	TXMTB

5.2.6 FMAC DATA BASE ASSIGNMENTS

The FMAC (Facilities Maintenance and Administration Center) requires the following assignment information for its data base:

a. SCOTS (Surveillance and Control of Transmission Systems)

- Discrete remote alarm and control point (USR ALM and ALM RST) assignment.

b. FMAS (Facilities Maintenance and Administration System)

- GTP port assignment and DS3 Port assignments for associated channel, rail, and system identification.

5.2.7 DC POWER ASSIGNMENT

The VPM shelf can be operated with either a -24 V or -48 V power source. The current requirements for fusing are as follows:

- 10 amps if -24 V
- 5 amps if -48 V.

The dc power leads are connected to terminal block TB1.

5.3 VPM SHELF FEATURES AND OPTIONS

The standard features of the VPM shelf and its selectable options are described in this part. The information for ordering the VPM shelf for the intended application is also provided. Table 5-C summarizes this information.

5.3.1 STANDARD VPM SHELF ASSEMBLY

The VPM shelf is equipped with mounting brackets that allow it to be miscellaneously-mounted in either a world class bay framework or a 23-inch unequal flange bay framework. No additional hardware is necessary. When mounting the VPM shelf, always maintain a minimum clearance of 1 inch below the shelf. The ordering code for a standard VPM shelf is J98779A-1, List 1.

Each standard VPM shelf is equipped with the wiring and the common equipment necessary to monitor and process eight D3P inputs. The common equipment includes the following circuit packs:

- 1 - AMR118 VMR Pulse Interface
- 1 - MC45084A-1 VPM Main Controller
- 1 - MC45085A-1 VPM Alarm/Telemetry Processor.

List 1 also includes the VPM User's Manual (AT&T 422-600-100AC).

5.3.2 DC POWER OPTION

In addition to specifying List 1 when ordering a VPM shelf, the following options have to be specified:

1. List 2 (–24 V dc power supply) ***or*** List 3 (–48 V dc power supply)
2. List 4 (the number of DS3 signals to be monitored).

List 2 provides a 471BA POWER UNIT (–24 V dc power supply). List 3 provides a 474BA POWER UNIT (–48 V dc power supply). To order a VPM shelf in its basic configuration, specify ordering code J98779A-1 List 1, List 2 ***or*** J98779A-1 List 1, List 3. Both power units are prestrapped to provide the required +5 V for each circuit pack and the VPM INTERFACE panel.

5.3.3 ADDITIONAL DS3 MONITORING OPTION

If the number of DS3 signals (and their respective D3P inputs) to be monitored is more than eight, additional VMR INTFC circuit packs are required. Each additional VMR INTFC circuit pack installed will increase the DS3 monitoring capacity for the VPM shelf by eight. The additional circuit packs are ordered by specifying the number of List 4s desired in addition to J98779A-1, List 1. A maximum of seven List 4s may be ordered. Table 5-C lists the number of List 4s required for additional DS3 monitoring capacity.

TABLE 5-C

VPM SHELF ASSEMBLY AND OPTIONS (EXAMPLE)

FEATURE/OPTION	J98779A-1 ORDERING CODE/OPTION	FUNCTION	COMMENTS
VPM Shelf Assembly	List 1	Provides equipment to monitor eight D3P inputs	Equipment includes — 1 VPM shelf assembly 1 AMR118 VMR INTFC circuit pack 1 MC45084A1 VPM CONTR circuit pack 1 MC45085A1 VPM TELEM circuit pack 1 VPM User's Manual
VPM Power (Choose One)			
471BA	List 2	Provides +5 V from −24 V dc supply	Must be ordered in addition to List 1 (do not order with List 3)
474BA	List 3	Provides +5 V from -48 V dc supply	Must be ordered in addition to List 1 (do not order with List 2)
Additional DS3 monitoring	Number of List 4	Each additional VMR INTFC circuit pack provides the monitoring capability for for 8 D3P inputs	Ordered in addition to List 1 for additional D3P inputs monitoring
9-16	1		
17-24	2		
25-32	3		
33-40	4		
41-48	5		
49-56	6		
57-64	7		

Example

If the VPM shelf is to be powered by a −24 V supply and is to monitor 32 D3P inputs, the ordering code is J98779A-1, List 1, List 2, and three List 4s.

5.3.4 RECOMMENDED SPARE CIRCUIT PACKS

The recommended quantity of spare circuit packs and the ordering information are given in Table 5-D.

TABLE 5-D
SPARE CIRCUIT PACKS

NAME	CODE	COMCODE	RECOMMENDATIONS
VMR INTFC	AMR118	104025622	one for four
VPM CONTR	MC45084A1	105229595	one for one
VPM TELEM	MC45085A1	105229603	one for one
Power Unit	471BA (–24 V)	103825345	one for one
Power Unit	474BA (–48 V)	103831435	one for one

5.4 INTERFACE CABLING OPTIONS

This part is used to order the VPM interface cabling. The D3P, CSRVS, and GTP cable assemblies, plus the miscellaneous wiring, are required for each VPM shelf. The PC cable assemblies are optional. The interface cabling options are summarized in Table 5-E.

5.4.1 D3P CABLE ASSEMBLIES

The D3P cable assemblies (ED-8C681-20, cable groups 1 and 2) connect the D3P connectors to the DS3 Ports on the VPM INTERFACE panel. Cable group 1 is used with 90C terminal bays and cable group 2 is used with 135A and 135EC terminal bays. Each cable group will support the D3P signals for one channel of the respective terminal bay. If VPM is to monitor three channels from a 90C bay and two channels from a 135A bay, three group 1 cables and two group 2 cables are required.

5.4.2 CSRVS CABLE ASSEMBLY

The CSRVS cable assembly (ED-8C681-20, cable group 3) connects the CSRVS connector located on the left side of the terminal bay fan shelf to terminal strip TS2 of the VPM shelf. One group 3 cable is required for each system (terminal and associated growth bays) monitored by the VPM. Cable group 3 is used with both 90C and 135A/EC bays as it can support a maximum of 12 CSRVS signals (12 channels).

5.4.3 GTP CABLE ASSEMBLY

The GTP cable assembly (ED-8C681-20, cable group 4) supports the TABS link between the VPM and the GTP. This cable connects the GTP connector (P1) located on the upper right side of the VPM shelf to a TABS port on the GTP. Only one group 4 cable is required for each VPM shelf.

5.4.4 PC CABLE ASSEMBLIES (OPTIONAL)

The PC cable assemblies (ED-8C681-20 cable groups 5 and 6) are only required if VPM monitoring by a PC is being performed. Cable group 5 is used to interface the PC with the VPM while the PC is operating in the GTP Simulation mode. Cable group 6 is used to interface the PC with the VPM while operating in the Listen-In mode.

Note: If the PC to be used is not equipped with an RS-422/485 communication port, refer to AT&T Practice 104-600-002, located in the APPENDIX tab, for conversion methods to interface the PC with the VPM.

TABLE 5-E

INTERFACE CABLING OPTIONS

CABLE NAME	FUNCTION	ED-8C681-20 ORDERING CODE	LENGTH LIMITATIONS	COMMENTS
D3P Cable	Supports 2 D3P signals for one 90C channel	Group 1	500 ft	Specify length and quantity*
D3P Cable	Supports 3 D3P signals for one 135A/EC channel	Group 2	500 ft	Specify length and quantity*
CSRVS Cable	Supports the CSRVS signals for either 90C, 135A, or 135EC system	Group 3	500 ft	Specify length and quantity*
GTP Cable	Supports the TABS link from the VPM to the GTP	Group 4	4000 ft	Specify length only one required per VPM shelf*
PC Cable	Supports the PC-VPM interface for the PC operating in the GTP Simulation Mode	Group 5	Standard length	Only required for VPM monitoring by a PC
PC Cable	Supports the PC-VPM interface for the PC operating in the Listen-In Mode	Group 6	Standard length	Only required for VPM monitoring by a PC

*The line engineer shall specify the total length of cable required between bays, including the cable drops to the panel locations and the 4 feet required to feed the panels from the bay duct.

5.4.5 MISCELLANEOUS WIRING

In addition to the interface cabling assemblies, the VPM requires miscellaneous wiring to be completed prior to operation.

1. Shielded pair wiring for the following:
   - Local office alarm signals
   - Discrete AS&C signals.
2. 12-gauge stranded wiring for dc power.

5.5 RECOMMENDED TEST EQUIPMENT

Refer to Part 4.6, RECOMMENDED TEST EQUIPMENT in the MAINTENANCE tab.

5.6 ENGINEERING CHECKLIST

This part provides a checklist of preinstallation planning and assignments necessary to support the VPM shelf. Refer to Part 5.2, ADMINISTRATIVE REQUIREMENTS for additional details.

1. Assign mounting location of shelf.
2. Ensure that monitored equipment is compatible.
3. Assign DS3 ports.
4. Assign local office alarm relays.
5. Assign discrete AS&C relays.
6. Assign GTP serial port.
7. Provide necessary details for SCOTS and FMAS data bases.
8. Assign dc power source.

5.7 EQUIPMENT ORDERING CHECKLIST

This part provides a checklist of the ordering requirements for the VPM shelf assembly and associated hardware. Refer to Parts 5.3, VPM SHELF FEATURES AND OPTIONS, 5.4, INTERFACE CABLING OPTIONS, and/or 5.5, RECOMMENDED TEST EQUIPMENT for additional details.

VPM Shelf Assembly

1. Always order J98779-A1, List 1.
2. In addition, select either:
   - List 2 for –24 V power source
   - List 3 for –48 V power source.
3. In addition, select the required number of List 4s if more than eight D3P inputs are to be monitored.
4. Order the appropriate spare circuit packs.

Interface Cabling

5. Specify quantity, length, and group 1 and/or 2 for D3P cable assemblies.
6. Specify quantity, length, and group 3 for CSRVS cable assemblies.
7. Specify length and group 4 for GTP cable assembly.
8. Specify groups 5 and 6 for PC cable assembly (optional).
9. Ensure that sufficient miscellaneous wiring is available.

Test Equipment

10. Ensure that appropriate testing equipment is available.

DS3 PORT ASSIGNMENT							
PORT	CHAN	RAIL	SYSTEM	PORT	CHAN	RAIL	SYSTEM
A1				E1			
A2				E2			
A3				E3			
A4				E4			
A5				E5			
A6				E6			
A7				E7			
A8				E8			
B1				F1			
B2				F2			
B3				F3			
B4				F4			
B5				F5			
B6				F6			
B7				F7			
B8				F8			
C1				G1			
C2				G2			
C3				G3			
C4				G4			
C5				G5			
C6				G6			
C7				G7			
C8				G8			
D1				H1			
D2				H2			
D3				H3			
D4				H4			
D5				H5			
D6				H6			
D7				H7			
D8				H8			

Figure 5-1 — DS3 PORT ASSIGNMENT Label

VIOLATION PULSE MONITOR
USER'S MANUAL

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LIST OF TABLES

6. ACCEPTANCE PROCEDURES

6.1 GENERAL

This part is used to verify that the VPM shelf is properly functioning and all telemetry links are properly connected and functioning. Acceptance procedures are provided for the following:

1. A newly installed VPM shelf
2. An existing VPM shelf where transmission equipment already reporting to the VPM shelf has new D3P (DS3) inputs added (transmission channel/rail growth)
3. An existing VPM shelf that is monitoring other transmission systems that has a new transmission system added.

Caution: All of these procedures require a service-affecting protection switch operation that when operated and released will cause a momentary out-of-frame condition on the transmission line. Obtain permission from the surveillance control center before performing the protection switch operation.

All interconnecting cabling should be installed and the monitored transmission equipment should be functioning normally and configured properly for VPM compatibility before performing these procedures. If in doubt, refer to the INSTALLATION ENGINEERING tab for verification.

6.2 PREACCEPTANCE CONSIDERATIONS

Generally, acceptance involves two functions:

1. Verification of the shelf hardware operation (if new shelf)
2. Verification of the data connections, telemetry link, and data base assignments between the monitored equipment and the FMAS (Facilities Maintenance and Administration System) center.

The first function is required only when the shelf is newly installed. The second function is required in all cases.

The first function involves operational tests of the shelf, including AS&C (alarm status and control) verification with the AS&C surveillance center. ***The AS&C data base must include the VPM alarm and control assignments before final verification can be completed.***

The second function involves operational procedures on the monitored transmission equipment to verify that each DS3 rail is properly recognized by the telemetry equipment. ***The FMAS data base must include the monitored equipment DS3 Port assignments before final verification can be completed.*** However, if FMAS data base or personnel are not ready for telemetry link validation, the telemetry between the monitored transmission equipment and the VPM output to the GTP can be validated using a PC (personal computer) in the GTP Simulation mode. This mode requires a personal computer and the associated software and cable assembly. Refer to Part 3.5, PC OPERATION in the OPERATION tab for further details.

6.3 VPM CONNECTION AND STRAPPING VERIFICATION PROCEDURE

This section contains a checklist for the VPM connections and strappings that should be visually verified. Tables 6-A, 6-B, and 6-C provide consolidated points of reference for these connections and strappings.

PROCEDURE

1. Visually check that all D3P inputs are properly connected to their assigned DS3 Ports. Refer to Table 6-A.

   Note: If specific details are necessary, refer to Parts 3.3, ASSIGNING DS3 PORTS and 3.4, D3P INPUT PROCEDURES in the OPERATION tab.

2. Visually check that all CSRVS leads are properly connected to their assigned TS2 punchings.
3. Visually check that the power cable is properly connected to terminal block TB1 on the VPM shelf.
4. Visually check that the remote telemetry alarm and the control (USR ALM and ALM RST) are connected to their assigned TS1 punchings and their assigned scan input and control output points (Table 6-B).
5. Visually check that the local office alarms, MN, MNV, and ACOV, are properly connected to their assigned TS1 punchings and local indicators (Table 6-B).
6. Visually check that the B/C threshold strapping on TS1 is configured for each VMR INTFC circuit pack's monitored equipment (Table 6-C).

This procedure is complete.

TABLE 6-A

VPM INTERCONNECT CABLING

VPM COMPONENT	SIGNAL	CABLING	EXTERNAL
DS3 Port of VPM INTERFACE panel	D3P	ED-8C681-20 Groups 1 and 2	D3P Connector Terminal Bay End
TS2	CSRVS	ED-8C681-20 Group 3	CSRVS Connector Terminal Bay End
P1	TXD and RXD of TABS link	ED-8C681-20 Group 4	TABS Serial Port-GTP

TABLE 6-B

VPM DISCRETE ALARM AND CONTROL CONNECTIONS

DISCRETE ALARM/ CONTROL POINT	TS1 PUNCHING LOCATION	EXTERNAL CONNECTION
MNV MNVR	D10 D9	Local visual indicator
MNV MNVR	E10 E9	Local audible indicator
ACOV ACOVR	F10 F9	Local visual indicator
USR ALM USR ALMR	G10 G9	Scan input points On GTP*
ALM RST ALM RSTR	H10 H9	Control output points on GTP*

*Discrete points on an E2A Telemetry Remote or the User Alarm and Control feature on equipped terminal bays may be used as an alternate.

TABLE 6-C

VPM B/C THRESHOLD STRAPPING

VMR INTFC CIRCUIT PACK SLOT LOCATION	B/C THRESHOLD STRAP ON TS1 (NOTE)
A	A1
B	B1
C	C1
D	D1
E	E1
F	F1
G	G1
H	H1

Note

No strap is required for digital radio compatibility. Indicated TS1 pin is strapped to ground for lightwave compatibility.

6.4 ACCEPTING A NEW VPM SHELF

This procedure is used to verify the operational functions of a newly installed or replaced VPM shelf.

Prerequisites:

1. The transmission system(s) being monitored should be configured to support the operation of the VPM shelf. If in doubt, refer to Part 5.2.1, MONITORED EQUIPMENT COMPATIBILITY in the INSTALLATION ENGINEERING tab.
2. All interoffice/interframe cabling should be installed and the dc supply should be connected to the shelf.
3. The AS&C remote telemetry center should establish the data base assignments for the USR ALM scan point and the ALM RST control point.

The following apparatus, or equivalent, is required:

1 - Digital multimeter

1 - Controller reset tool.

DANGER: To prevent electrical shock when measuring dc voltage, follow office safety requirements.

Warning: To prevent ESD (electrostatic discharge) damage to plug-in units, ensure that all ESD precautions in the MAINTENANCE tab are followed.

PROCEDURE

Note: If any requirements are *not* met, refer to Table 6-D to isolate and clear the problem before proceeding to the next step.

1. Verify correct VPM connections and strapping. (Refer to Part 6.3, VPM CONNECTION AND STRAPPING VERIFICATION PROCEDURE.)
2. Disengage all equipped circuit packs from the backplane connectors.
3. Engage the POWER UNIT.

   Requirement: The ALM/OFF indicator on the POWER UNIT should light when first engaged and then extinguish when seated (see *Note*).

   Note: Sometimes the power unit will need a load to turn on. If necessary, engage a circuit pack.

4. *Caution: Improper connection of power leads may result in damage to engaged circuit packs.*

   Verify polarity of power leads before engaging circuit packs by checking input voltage to VPM shelf at TB1.

   Requirement: −23 V to −28.5 V (−24 V)
   −48 V to −52.5 V (−48 V).

5. Check dc input voltage at V IN test points on power unit.

   Requirement: −23 V to −28.5 V (−24 V)
   −48 V to −52.5 V (−48 V).

6. Insert the remaining circuit packs one at a time, and verify that the ALM/OFF indicator is not lighted. If ALM/OFF lights, replace circuit pack that caused indication.
7. Check dc output voltage at V1 points of POWER UNIT.

   Requirement: +4.8V to +5.2V.
8. On the VPM CONTR unit, press the CONTR RESET control (recessed switch) until the CONTR FAIL indicator lights; then release the switch.

   Requirement: All VPM shelf alarm indicators should extinguish within approximately 3 seconds.
9. Verify common alarm (COM ALM), local office alarms (MN, MNV, and ACOV), remote USR ALM, and alarm cut-off (ACO):
   a. Disengage the VMR INTFC circuit pack in position A.

      Requirement 1: COM ALM on the VPM TELEM circuit pack should light.

      Requirement 2: Local office alarms should activate.

      Requirement 3: Remote USR ALM should activate.
   b. Operate the ACO pushbutton on the VPM TELEM circuit pack.

      Requirement 1: Audible local (MN) alarm should silence.

      Requirement 2: Visual local (MNV) alarm should extinguish.

      Requirement 3: ACOV alarm should activate.
   c. Reinsert the VMR INTFC circuit pack.
   d. On the VPM CONTR unit, press the CONTR RESET control (recessed switch) until the CONTR FAIL indicator lights; then release the switch.

      Requirement: All alarms should clear.
10. Verify remote ALM RST control:
    a. Disengage latch lever on POWER UNIT, and reengage latch lever to bring in at least one of the CONTR FAIL indicators (may take several tries).
    b. Request an ALM RST control from alarm center.

    Requirement 1: All shelf and local office alarms should clear.

    Requirement 2: Remote USR ALM should clear.
11. On the VPM CONTR circuit pack, press the CONTR RESET control (recessed switch) until the CONTR FAIL indicator lights; then release the switch.
12. Perform the procedure in Part 6.5, VERIFICATION OF THE TELEMETRY LINK TO FMAS for all channels and for the individual DS3 rails associated with each transmission system connected to the VPM shelf.

    Note: If FMAS is not ready to receive reports, the DS3-to-GTP telemetry link can be verified using a PC. Refer to the procedure in Part 6.6, DS3-TO-GTP TELEMETRY LINK VERIFICATION USING A PC.

This procedure is complete.

TABLE 6-D

TROUBLE ISOLATION PROCEDURES FOR A NEWLY INSTALLED VPM SHELF

REFER TO STEP	CONDITION	ACTION REQUIRED
3	ALM/OFF LED did not light when first engaged	1. Check dc office supply voltage 2. Check wiring/connections between VPM shelf and dc office supply
	ALM/OFF LED remained lighted with POWER UNIT fully seated	1. Replace POWER UNIT 2. If condition still exists, suspect excessive current drain by one or more units, shorted pins, or faulty shelf. Inspect and replace components as necessary
4	DC input voltage out of requirement range	1. Replace POWER UNIT 2. If condition still exists, (a) Check dc office supply voltage (b) Check wiring/connections between VPM shelf and dc office supply
7	DC output voltage out of requirement range	1. Replace POWER UNIT 2. If condition still exists, suspect excessive current drain by one or more units, shorted pins, or faulty shelf. Inspect and replace components as necessary
8	VPM shelf alarm indicator(s) present	Refer to Part 4.3, CORRECTIVE MAINTENANCE in the MAINTENANCE tab
9a	COM ALM LED does not light	Replace VPM TELEM circuit pack
	Local office alarm(s) fails to activate	1. Check the connection/wiring between TS1 (Table 6-B) and local office indicators 2. Replace VPM TELEM circuit pack

TABLE 6-D (Contd)

TROUBLE ISOLATION PROCEDURES FOR A NEWLY INSTALLED VPM SHELF

REFER TO STEP	CONDITION	ACTION REQUIRED
9a (Contd)	USR ALM fails to activate	1. Check the connection/wiring between USR ALM points on TS1 (Table 6-B) and the scan input points of discrete remote 2. Replace VPM TELEM circuit pack
9b	Audible office (MN) alarm fails to silence Visual office (MNV) alarm fails to extinguish ACOV alarm fails to activate	1. Check the connection/wiring between TS1 (Table 6-B) and the local office indicator 2. Replace VPM TELEM circuit pack
9d	Alarm condition present	1. Operate CONTR RESET 2. If condition still exists, refer to Part 4.3, CORRECTIVE MAINTENANCE in the MAINTENANCE tab
10	VPM shelf alarm present	1. Check the connection/wiring between ALM RST points on TS1 (Table 6-B) and the control output points of GTP remote 2. If condition still exists, refer to Part 4.3, CORRECTIVE MAINTENANCE in the MAINTENANCE tab 3. Operate CONTR RESET. If not clear, suspect remote data base assignment or control relay.

TABLE 6-D (Contd)

TROUBLE ISOLATION PROCEDURES FOR A NEWLY INSTALLED VPM SHELF

REFER TO STEP	CONDITION	ACTION REQUIRED
10 (Contd)	USR ALM fails to clear	1. Check the connection/wiring between USR ALM points on TS1 (Table 6-B) and the scan inputs of GTP 2. Replace VPM TELEM circuit pack 3. If condition still exists, suspect remote data base assignment or control relay

6.5 VERIFICATION OF THE TELEMETRY LINK TO FMAS

This procedure is used to verify that each DS3 rail of the monitored equipment is properly recognized by FMAS. This procedure does not trigger all parameters that are monitored by FMAS. If that level of verification is desired, contact the technical support group for the necessary procedures.

The following procedure can be used for ONLY 135A/EC or 90C frequency diversity systems.

This procedure requires a technician at the far-end transmitting terminal station.

Note: If desired, a PC can be used in the Listen-In mode to monitor the reports being sent to FMAS; see Part 3.5, PC OPERATION in the OPERATION tab.

Prerequisites

1. No visible alarms should be on the VPM shelf, the VPM shelf should be initialized for the latest configuration, and all interoffice/interframe cabling should be installed.
2. The FMAS data base should establish the appropriate DS3 port assignments to receive VPM reports.

The following conditional guidelines should be followed when verifying the telemetry link:

- ***If accepting a newly installed VPM shelf,*** perform this procedure for each channel and associated DS3 rail for ***all*** transmission systems that are connected to the VPM.
- ***If accepting a NEW transmission system to a working VPM shelf,*** perform this procedure for each channel and associated DS3 rail for the new transmission system only.
- ***If accepting new or reassigned DP3 inputs from a transmission system already monitored by a working VPM shelf,*** perform this procedure ***only*** on the channel and transmission system associated with the changed inputs.

PROCEDURE

Note 1: To achieve correct results, always allow the observation interval to cycle once before verifying requirements.

Note 2: If any requirements are not met, refer to Table 6-E; isolate and clear the problem before proceeding to the next step.

1. Verify that FMAS personnel are ready to receive VPM reports.
2. At the line terminal bay, verify protection switch status by operating the EXER pushbutton on the RCV STAT unit.

   Requirement: All equipped rails for that monitored transmission system should indicate PSC (protection switch counts).

3. ***Caution: Operating and resetting the SPAN SWITCH will cause momentary out-of-frame conditions on the DS3 rails associated with the regular channel that was switched. Obtain the necessary release before proceeding.***

   Verify the telemetry link for the appropriate channel and individual DS3 rail as follows:

   a. At the line terminal bay, perform the appropriate manual switching operation as follows:

      - If verifying a protection channel, perform receiving ***protection channel lockout***.
      - If verifying a regular channel, perform receiving ***span switch***.

   b. ***Caution: Removing the DS3 input cable from the unprotected transmission channel will cause service outage.***

      At transmitting (far-end) terminal station, have technician remove the TRMT DS3 IN cable for rail A on the appropriate digital terminal shelf.

      Requirement: An OOF (out-of-frame) condition should exist for the rail and channel that has the cable removed.

   c. At far-end station, reinstall TRMT DS3 IN cable for rail A.

      Requirement: The OOF condition should clear.

   d. Repeat Steps b and c for any other equipped DS3 rails on the channel.

   e. At the line terminal bay, release the ***protection channel lockout*** or ***span switch***.

   f. Repeat Steps a through e for all transmission channels to be verified.

4. Repeat Steps 2 and 3 for all monitored transmission systems to be verified.

5. On the VPM CONTR unit, press the CONTR RESET control (recessed switch) until the CONTR FAIL indicator lights; then release the switch.

This procedure is complete.

TABLE 6-E

TROUBLE ISOLATION PROCEDURES FOR VERIFICATION OF THE TELEMETRY LINK TO FMAS

REFER TO STEP	CONDITION	ACTION REQUIRED
2	None of the rails indicate PSCs	1. Check all D3P and CSRVS connections/wiring for proper installation 2. Suspect that FMAS data base assignments are wrong 3. If condition still exists, operate CONTR RESET 4. If condition still exists, replace VPM TELEM and/or VPM CONTR circuit pack
	Some of the rails indicate PSCs	1. Check the CSRVS connections/ wiring for the DS3 rails not reporting 2. Suspect that FMAS data base assignments are wrong 3. If condition still exists, replace VMR INTFC circuit packs associated with the DS3 rail(s) not reporting
3b	OOF condition does not exist	1. Check the D3P inputs of the corresponding DS3 rails for correct connection to assigned DS3 Ports 2. Suspect that FMAS data base assignments are wrong 3. If condition still exist, replace VMR INTFC circuit packs associated with the DS3 rail(s) not reporting
3c	OOF condition does not clear	1. Check TRMT DS3 IN cable of DS3 rail being verified 2. If condition still exists, replace VMR INTFC circuit pack associated with the DS3 rail(s) being verified

6.6 DS3-TO-GTP TELEMETRY LINK VERIFICATION USING A PC

This procedure is used to replace the GTP remote with a PC to verify that each DS3 rail of the monitored equipment is properly connected to the VPM shelf. This procedure does not trigger all parameters that are monitored by the PC program. If that level of verification is desired, contact the technical support group for the necessary procedures.

This procedure can be used for ONLY 135A/EC or 90C frequency diversity systems.

The procedure can be used to verify the DS3-to-VPM telemetry link when the FMAS data base or personnel are not ready for complete DS3-to-FMAS verification at the time that the shelf is installed. However, the recommended method is to verify the telemetry link via FMAS the first time, since service-affecting switch operations that should be kept to a minimum are required.

The procedure requires a technician at the far-end, transmitting terminal station.

Before beginning this procedure, the technician should become familiar with the information in Part 3.5, PC OPERATION in the OPERATION tab.

Prerequisites: No visible alarms should be on the VPM shelf, and all interoffice/interframe cabling should be installed.

The following equipment, or equivalent, is required:

1 - AT&T PC 6300 personal computer

1 - GTPSIM software program

1 - Small straight-slot screwdriver

1 - PC interface cable (ED-8C681-20, Group 5).

The conditional guidelines given in 6.5 Telemetry Link Verification to FMAS procedure also apply to this procedure.

PROCEDURE

Note 1: To achieve correct results, always allow the observation interval to cycle once before verifying requirements.

Note 2: If any requirements are not met, refer to Table 6-E to isolate and clear the problem before proceeding to next step.

1. Set up the PC/VPM hardware configuration and enter the GTP Simulation mode. When prompted by PC, enter 30 for SYNC interval, "e" for exception reports, 1 for number of errors to report, and 0 for lowest service line to be displayed (*Note 3*). If necessary, refer to Part 3.5.5, GTP SIMULATION MODE in the OPERATION tab.

   Note 3: Entering a 0 for the lowest service line will display information for seven sequentially equipped ports starting with DS3 Port A1. If more than seven DS3 inputs are connected, quit ("q") the program and reestablish the lowest line number to be displayed (i.e., to display the next seven DS3 ports starting with port B1, enter 8 for the lowest line number to be displayed). All other entries are the same as given in Step 1.

2. Wait for interval to complete a cycle. Then on the VPM CONTR unit, press the CONTR RESET control (recessed switch) until the CONTR FAIL indicator lights; then release the switch.

Note 4: After the next sync request, the PC monitor should display the total lines to display (total number of D3P inputs connected to the VPM INTERFACE panel) and list the individual DS3 Ports that are connected. If a large number of D3P inputs are connected, it is advisable to stop the screen or print out the results in order to verify the results.

Requirement 1: The total number of lines should equal the total number of D3P inputs.

Requirement 2: The DS3 Ports listed should match the DS3 PORT ASSIGNMENT chart (Port A1 would be listed as 0, Port A2 as 1, A3 as 2, ...A8 as 7 B1 as 8, etc.). If necessary, refer to Table 3-G in the OPERATION tab.

Requirement 3: All displayed rails should indicate a 1 for the "dsp dmi" and "psi miss data" parameters, and all other parameters should indicate 0. (See *Note 3.*)

3. Choose a system (or individual rails) to be verified, and if necessary, reestablish the lowest number to be displayed. (See Note 3.)

   Note 5: The remaining steps should be performed on an individual transmission system connected to the VPM shelf.

4. At the line terminal bay, verify protection switch status by operating the EXER pushbutton on the RCV STAT unit.

   Requirement: The "not in service" parameter should indicate a 1 for all protection rails and a 0 for all equipped regular channel rails.

5. ***Caution: Operating and resetting the span switch will cause momentary out-of-frame conditions on the DS3 rails associated with the regular channel that was switched. Obtain the necessary release before proceeding.***

   Verify the telemetry link for the appropriate channel and individual DS3 rail as follows:

   a. At the line terminal bay, perform the appropriate manual switching operation as follows:

      - If verifying a protection channel, perform a protection channel lockout.
      - If verifying a regular channel, perform a ***span switch***.

   b. ***Caution: Removing the DS3 input cable from the unprotected transmission channel will cause service outage.***

      At transmitting (far-end) terminal station, have technician remove the TRMT DS3 IN cable for rail A on the appropriate digital terminal shelf.

      Requirement: The "dsp oof state" parameter should indicate 1 for the rail and channel that has the cable removed.

   c. At far-end station, reinstall TRMT DS3 IN cable for rail A.

      Requirement: The "dsp off state" parameter should change to 0.

   d. Repeat Steps b and c for any other equipped DS3 rails on the channel. (See *Note 3.*)

e. At the line terminal bay, release the protection channel lockout or span switch.

f. Repeat Steps a through e for all transmission channels to be verified. (See *Note 3*.)

6. Repeat Steps 3, 4, and 5 for all monitored transmission systems to be verified.

7. On the VPM CONTR unit, press the CONTR RESET control (recessed switch) until the CONTR FAIL indicator lights; then release the switch.

This procedure is complete.

TABLE 6-F

TROUBLE ISOLATION PROCEDURES FOR DS3-TO-GTP TELEMETRY LINK VERIFICATION USING A PC

REFER TO STEP	CONDITION	ACTION REQUIRED
2	Total number of lines do not equal total number of D3P inputs	1. Check all D3P and CSRVS connections for proper connection 2. Operate CONTR RESET on VPM CONTR circuit pack 3. If condition still exists and (a) Total lines is 0, replace VPM TELEM and/or VPM CONTR circuit pack (b) Total lines displayed matches conflicting data found in Requirement 2, replace VMR INTFC circuit pack associated with the DS3 rail(s) not reporting
	The displayed DS3 Ports does not match DS3 PORT ASSIGNMENT label	1. Check the D3P inputs for the DS3 Ports not reporting 2. If condition still exists, replace VMR INTFC circuit pack associated with the DS3 rails not reporting
	One or more parameters indicate a value other than indicated in Requirement 3	1. Refer to Part 3.5.3, DS3 PERFORMANCE REPORT in the OPERATION tab for explanation of the parameter Other values than those specified in Requirement 3 indicate that there is an error condition in the monitored equipment
4	One or more of the regular channel rails' "not in service" parameter is a 1	1. Check the CSRVS connections/ wiring for the protection versus the regular channel assignments. 2. If condition still exists, replace VMR INTFC unit associated with improper report

TABLE 6-F (Contd)

TROUBLE ISOLATION PROCEDURES FOR DS3-TO-GTP TELEMETRY LINK VERIFICATION USING A PC

REFER TO STEP	CONDITION	ACTION REQUIRED
5b	"dsp oof state" does not indicate a 1	1. Check D3P input of corresponding DS3 rail for correct connection to assigned DS3 Port 2. If condition still exists, replace VMR INTFC circuit pack associated with the DS3 rail(s) being verified 3. If condition still exists and (a) Total lines is 0, replace VPM TELEM and/or VPM CONTR circuit pack (b) Total lines displayed matches conflicting data found in Requirement 2, replace VMR INTFC circuit pack associated with the DS3 rail(s) not reporting
5c	"dsp off state" still indicates a 1	1. Check TRMT DS3 IN cable of DS3 being verified for proper connection 2. If condition still exists and (a) Total lines is 0, replace VPM TELEM and/or VPM CONTR circuit pack (b) Total lines displayed matches conflicting data found in Requirement 2, replace VMR INTFC circuit pack associated with the DS3 rail(s) not reporting

VIOLATION PULSE MONITOR
USER'S MANUAL

CONTENTS PAGE

LIST OF TABLES

7. DOCUMENTATION ORDERING

7.1 ORDERING INFORMATION

Documents may be ordered from AT&T Customer Information Center using the IND 1-80.80 ordering form or by telephone (telephone is best method when order is small). A special 800 telephone number has been assigned for ordering documentation. The following information must be provided when placing your order either by telephone or by order form:

1. Person ordering
2. Telephone number
3. Requisition number
4. Bill-to address
5. Ship-to address
6. Responsibility code originating
7. Responsibility code charged
8. Geographic location code
9. Function code or account
10. Type of order, such as:
    a. One-time order—Complete document with *no* future updates.
    b. One-time standing order—Complete document with automatic future updates.
    c. Standing order only—Order placed previously as a one-time order and customer decided automatic updates are needed.

Order the document by the 9-digit number for the binder, the individual AT&T Practice, or the drawing number (SD, ED, etc.), as appropriate.

This VPM User Manual can be ordered by using AT&T Practice 422-600-100AC.

When ordering by telephone, use the toll free number 1-800-432-6600. When ordering by mail, use form IND 1-80.80. After completing the form, mail it to:

Commercial Sales Department
Customer Information Center
AT&T Customer Products
Post Office Box 19901
Indianapolis, Indiana 46219

Copies of form IND 1-80.80 can be obtained by calling the 800 number above.

7.2 RELATED DOCUMENTATION

Table 7-A lists additional documentation associated with the VPM shelf that can be ordered from Customer Information Center. Some of these drawings are packaged in the rear of this binder.

TABLE 7-A

RELATED DOCUMENTATION

DOCUMENT	NUMBER
VPM Shelf Assembly	
Schematic Drawing	SD-7C536-01
Equipment Drawing	ED-8C679-30
J-Drawing	J98779A-1
T-Drawing	T-7C536-30
AMR118 Circuit Pack Schematic	CPS-AMR118
MC45084A1 Circuit Pack Schematic	CPS-AMR110B
MC45085A1 Circuit Pack Schematic	CPS-AMR124
VPM Interconnect Cable Assembly	ED-8C681-20
135A Line Terminal Schematic Drawing	SD-7C416-01
135EC Line Terminal Schematic Drawing	SD-7C423-01
90C Line Terminal Schematic Drawing	SD-54534-01
CB 149 Serial Telemetry Monitor and Test Set—User Manual	AT&T Practice 104-600-002
General Telemetry Processor (GTP) System Documentation	AT&T Practice 201-653-011
Compatibility Bulletin, Issue 3	CB #149

7.3 DRAWING DEFINITIONS

Various types of "drawings" are used by AT&T. Conventions have been established that define the type of drawing to be used for a specific application. The following information defines the basic, customer orderable drawings used in digital radio products.

- ***J and ED Drawings:*** Equipment drawings used for manufacturing and ordering information. They normally have:

  1. List or group structure ordering information
  2. Stock list Bill of Material
  3. Assembly views.

  Generally, major equipment packages are J drawings and minor assemblies are ED drawings. Ordering information is a list structure on Js and a group structure on EDs.

- *T Drawings:* Wiring information for units, panels, bays, or interconnects (between bays). The dashed numbers (-30, -31, etc.) are assigned for convenience. Normally a new dashed number is assigned to each panel or bay. If one SD (schematic drawing) covers many units or panels, the T drawing will have the same information broken down into various dash numbers for ease of manufacture.
- *SD and CD:* SDs are AT&T Bell Laboratories documents that show the method of wiring or interconnecting equipment. The SD usually shows wiring information, feature and option tables, notes, current drains, etc. A CD (circuit description) of the SD information is provided as part of the SD.
- *CPS (Circuit Pack Schematic):* A schematic drawing for a plug-in unit. The CPS provides a functional description, a block diagram, faceplate information, current drain, I/O pin map, etc.

VIOLATION PULSE MONITOR
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8. SD DRAWINGS

This tab contains the following SD drawings:

- SD-7C536-01 Violation Pulse Monitor Shelf Application Schematic.

SHEET INDEX

CONTENTS	SHEET NO.	SHEET ISSUE NO.
SHEET INDEX SUPPORTING INFORMATION OPTION INDEX	A1	L1
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P/O FS 1 - VPM SHELF	B2	L1
P/O FS 1 - VPM SHELF	B3	L1
P/O FS 1 - VPM SHELF	B4	L1
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CIRCUIT NOTES EQUIPMENT NOTES INFORMATION NOTES	D1	L1
CAD 1	G1	L1
CAD 2	G2	L1
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OPTION INDEX

APP OR WRG	RATED ON ISSUE	REF NOTES	LOCATION
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B	L1		4A2
C	L1		3A7
D	L1		3A2
E	L1		2A7
F	L1		2A2
G	L1		1A7
H	L1		1A2
Y	L1		586
Z	L1		586

DWG ISSUE	CD ISSUE	DATE ISSUED	DRAWN	APPD
L1	-	1-8-88		

SUPPORTING INFORMATION

CATEGORY	NO.

VIOLATION PULSE MONITOR SHELF APPLICATION SCHEMATIC

(VPM SHELF)

DWG SIZE	ISSUE
6S	L1

AT&T BELL LABORATORIES | SD-7C536-01 | M | SHEET A1 OF 11

E-7565
PRINTED IN U.S.A.

PART OF FS 1

VPM SHELF
(SEE NOTE 103)

VIA CAD 2

H10 CSRVS 8H *
H9 CSRVS 7H *
H8 CSRVS 6H *
H7 CSRVS 5H *

NC 049, 148, 048

04-080 (H) AMR118 VPM INTFC <H>

026 <H8>

049	D3P 8H	039
149	D3P 8H	139
048	CSRVS 8H	138
150	SUPRT 8H	154

026 <H7>

043	D3P 7H	037
143	D3P 7H	137
042	CSRVS 7H	038
144	SUPRT 7H	054

026 <H6>

037	D3P 6H	035
137	D3P 6H	135
036	CSRVS 6H	134
138	SUPRT 6H	153

026 <H5>

031	D3P 5H	033
131	D3P 5H	133
030	CSRVS 5H	034
132	SUPRT 5H	053

026 <H4>

025	D3P 4H	028
125	D3P 4H	128
024	CSRVS 4H	127
126	SUPRT 4H	152

026 <H3>

019	D3P 3H	026
119	D3P 3H	126
018	CSRVS 3H	027
120	SUPRT 3H	052

026 <H2>

013	D3P 2H	024
113	D3P 2H	124
012	CSRVS 2H	123
114	SUPRT 2H	151

026 <H1>

007	D3P 1H	022
107	D3P 1H	122
006	CSRVS 1H	023
108	SUPRT 1H	051

VIA CAD 2

H4 CSRVS 4H *
H3 CSRVS 3H *
H2 CSRVS 2H *
H1 CSRVS 1H *

VIA CAD 1

H3 AVAILI H * 129
H1 B/C THRSHLD H * 029

TO SYSTEM BEING MONITORED (SEE SD-7C425-01 OR SD-54535-01) (SEE NOTE XXX)

145 * +S
155 * -S
5C8

020 EBCLK
107 -FLEN
007 ERES
112 ELA9
⊖ ERD,EWR
⊖ XLA(8,9)
⊖ ELA(0-8)
⊖ EAD(8-15)
⊖ EAD(0-7)
E8

SEE NOTE 102

VIA CAD 2

G10 CSRVS 8G *
G9 CSRVS 7G *
G8 CSRVS 6G *
G7 CSRVS 5G *

NC 049, 148, 048

04-088 (G) AMR118 VPM INTFC <G>

032 <G8>

052	D3P 8G	039
152	D3P 8G	139
051	CSRVS 8G	138
153	SUPRT 8G	154

032 <G7>

046	D3P 7G	037
146	D3P 7G	137
045	CSRVS 7G	038
147	SUPRT 7G	054

032 <G6>

040	D3P 6G	035
140	D3P 6G	135
039	CSRVS 6G	134
141	SUPRT 6G	153

032 <G5>

034	D3P 5G	033
134	D3P 5G	133
033	CSRVS 5G	034
135	SUPRT 5G	053

032 <G4>

028	D3P 4G	028
128	D3P 4G	128
027	CSRVS 4G	127
129	SUPRT 4G	152

032 <G3>

022	D3P 3G	026
122	D3P 3G	126
021	CSRVS 3G	027
123	SUPRT 3G	052

032 <G2>

016	D3P 2G	024
116	D3P 2G	124
015	CSRVS 2G	123
117	SUPRT 2G	151

032 <G1>

010	D3P 1G	022
110	D3P 1G	122
009	CSRVS 1G	023
111	SUPRT 1G	051

VIA CAD 2

G4 CSRVS 4G *
G3 CSRVS 3G *
G2 CSRVS 2G *
G1 CSRVS 1G *

VIA CAD 1

G3 AVAILI G * 129
G1 B/C THRSHLD G * 029

TO SYSTEM BEING MONITORED (SEE SD-7C425-01 OR SD-54535-01)

NOTES:

1- *-DENOTES LOOSE WIRING AND NOT PART OF BACKPLANE PRINTED CIRCUIT.

F4

020 EBCLK
107 -FLEN
007 ERES
112 ELA9
⊖ EDR,EWR
⊖ XLA(8,9)
⊖ ELA(0-8)
⊖ EAD(8-15)
⊖ EAD(0-7)
2E4

SEE NOTE 102

VPM SHELF		DWG SIZE 6S	ISSUE L1
AT&T BELL LABORATORIES	SD-7C536-01	M	SHEET B1

E-742147-01 PRINTED IN U.S.A.

PART OF FS 1

VPM SHELF
(SEE NOTE 103)

TO SYSTEM BEING MONITORED (SEE SD-7C425-01 OR SD-54535-01) (SEE NOTE XXX)

VIA CAD 2

F10 CSRVS 8F *
F9 CSRVS 7F *
F8 CSRVS 6F *
F7 CSRVS 5F *

NC 049, 048, 148

04-096 (F) AMRI18 VPM INTFC <F>

038 <F8>	049	D3P 8F	039
	149	D3P 8F	139
	048	CSRVS 8F	138
	150	SUPRT 8F	154
038 <F7>	043	D3P 7F	037
	143	D3P 7F	137
	042	CSRVS 7F	038
	144	SUPRT 7F	054
038 <F6>	037	D3P 6F	035
	137	D3P 6F	135
	036	CSRVS 6F	134
	138	SUPRT 6F	153
038 <F5>	031	D3P 5F	033
	131	D3P 5F	133
	030	CSRVS 5F	034
	132	SUPRT 5F	053
038 <F4>	025	D3P 4F	028
	125	D3P 4F	128
	024	CSRVS 4F	127
	126	SUPRT 4F	152
038 <F3>	019	D3P 3F	026
	119	D3P 3F	126
	018	CSRVS 3F	027
	120	SUPRT 3F	052
038 <F2>	013	D3P 2F	024
	113	D3P 2F	124
	012	CSRVS 2F	123
	114	SUPRT 2F	151
038 <F1>	007	D3P 1F	022
	107	D3P 1F	122
	006	CSRVS 1F	023
	108	SUPRT 1F	051

VIA CAD 2

F4 CSRVS 4F *
F3 CSRVS 3F *
F2 CSRVS 2F *
F1 CSRVS 1F *

VIA CAD 1

F3 AVAILI F * 129
F1 B/C THRSHLD F * 029

1F9

020	EBCLK	EBCLK
107	-FLEN	-FLEN
007	ERES	ERES
112	ELA9	ELA9
@	ERD,EWR	ERD,EWR
@	XLA(8,9)	XLA(8,9)
@	ELA(0-8)	ELA(0-8)
@	EAD(8-15)	EAD(8-15)
@	EAD(0-7)	EAD(0-7)

SEE NOTE 102

E8

TO SYSTEM BEING MONITORED (SEE SD-7C425-01 OR SD-54535-01)

VIA CAD 2

E10 CSRVS 8E *
E9 CSRVS 7E *
E8 CSRVS 6E *
E7 CSRVS 5E *

NC 049, 148, 048

04-104 (E) AMRI18 VPM INTFC <E>

044 <E8>	052	D3P 8E	039
	152	D3P 8E	139
	051	CSRVS 8E	138
	153	SUPRT 8E	154
044 <E7>	046	D3P 7E	037
	146	D3P 7E	137
	045	CSRVS 7E	038
	147	SUPRT 7E	054
044 <E6>	040	D3P 6E	035
	140	D3P 6E	135
	039	CSRVS 6E	134
	141	SUPRT 6E	153
044 <E5>	034	D3P 5E	033
	134	D3P 5E	133
	033	CSRVS 5E	034
	135	SUPRT 5E	053
044 <E4>	028	D3P 4E	028
	128	D3P 4E	128
	027	CSRVS 4E	127
	129	SUPRT 4E	152
044 <E3>	022	D3P 3E	026
	122	D3P 3E	126
	021	CSRVS 3E	027
	123	SUPRT 3E	052
044 <E2>	016	D3P 2E	024
	116	D3P 2E	124
	015	CSRVS 2E	123
	117	SUPRT 2E	151
044 <E1>	010	D3P 1E	022
	110	D3P 1E	122
	009	CSRVS 1E	023
	111	SUPRT 1E	051

VIA CAD 2

E4 CSRVS 4E *
E3 CSRVS 3E *
E2 CSRVS 2E *
E1 CSRVS 1E *

VIA CAD 1

E3 AVAILI E * 129
E1 B/C THRSHLD E * 029

NOTES:

1- * -DENOTES LOOSE WIRING AND NOT PART OF BACKPLANE PRINTED CIRCUIT.

G4

020	EBCLK	EBCLK
107	-FLEN	-FLEN
007	ERES	ERES
112	ELA9	ELA9
@	ERD,EWR	ERD,EWR
@	XLA(8,9)	XLA(8,9)
@	ELA(0-8)	ELA(0-8)
@	EAD(8-15)	EAD(8-15)
@	EAD(0-7)	EAD(0-7)

3E3

SEE NOTE 102

VPM SHELF		DWG SIZE 6S	ISSUE L1
AT&T BELL LABORATORIES	SD-7C536-01	M	SHEET B2

PART OF FS 1

VPM SHELF
(SEE NOTE 103)

TO SYSTEM BEING MONITORED (SEE SD-7C425-01 OR SD-54535-01) (SEE NOTE XXX)

VIA CAD 2

D10	CSRVS 8D	*
D9	CSRVS 7D	*
D8	CSRVS 6D	*
D7	CSRVS 5D	*

NC 048, 148, 049

04-112 (D) AMR118 VPM INTFC <D>

050 <D8>

049	D3P 8D	039
149	D3P 8D	139
048	CSRVS 8D	138
150	SUPRT 8D	154

050 <D7>

043	D3P 7D	037
143	D3P 7D	137
042	CSRVS 7D	038
144	SUPRT 7D	054

050 <D6>

037	D3P 6D	035
137	D3P 6D	135
036	CSRVS 6D	134
138	SUPRT 6D	153

050 <D5>

031	D3P 5D	033
131	D3P 5D	133
030	CSRVS 5D	034
132	SUPRT 5D	053

050 <D4>

025	D3P 4D	028
125	D3P 4D	128
024	CSRVS 4D	127
126	SUPRT 4D	152

050 <D3>

019	D3P 3D	026
119	D3P 3D	126
018	CSRVS 3D	027
120	SUPRT 3D	052

050 <D2>

013	D3P 2D	024
113	D3P 2D	124
012	CSRVS 2D	123
114	SUPRT 2D	151

050 <D1>

007	D3P 1D	022
107	D3P 1D	122
006	CSRVS 1D	023
108	SUPRT 1D	051

VIA CAD 2

D4	CSRVS 4D	*
D3	CSRVS 3D	*
D2	CSRVS 2D	*
D1	CSRVS 1D	*

VIA CAD 1

D3	AVAILI D	*	129
D1	B/C THRSHLD D	*	029

2F9

020	EBCLK	EBCLK
107	-FLEN	-FLEN
007	ERES	ERES
112	ELA9	ELA9
@	ERD,EWR	ERD,EWR
@	XLA(8,9)	XLA(8,9)
@	ELA(0-8)	ELA(0-8)
@	EAD(8-15)	EAD(8-15)
@	EAD(0-7)	EAD(0-7)

SEE NOTE 102

E8

TO SYSTEM BEING MONITORED (SEE SD-7C425-01 OR SD-54535-01)

VIA CAD 2

C10	CSRVS 8C	*
C9	CSRVS 7C	*
C8	CSRVS 6C	*
C7	CSRVS 5C	*

NC 148, 049, 048

04-120 (C) AMR118 VPM INTFC <C>

056 <C8>

052	D3P 8C	039
152	D3P 8C	139
051	CSRVS 8C	138
153	SUPRT 8C	154

056 <C7>

046	D3P 7C	037
146	D3P 7C	137
045	CSRVS 7C	038
147	SUPRT 7C	054

056 <C6>

040	D3P 6C	035
140	D3P 6C	135
039	CSRVS 6C	134
141	SUPRT 6C	153

056 <C5>

034	D3P 5C	033
134	D3P 5C	133
033	CSRVS 5C	034
135	SUPRT 5C	053

056 <C4>

028	D3P 4C	028
128	D3P 4C	128
027	CSRVS 4C	127
129	SUPRT 4C	152

056 <C3>

022	D3P 3C	026
122	D3P 3C	126
021	CSRVS 3C	027
123	SUPRT 3C	052

056 <C2>

016	D3P 2C	024
116	D3P 2C	124
015	CSRVS 2C	123
117	SUPRT 2C	151

056 <C1>

010	D3P 1C	022
110	D3P 1C	122
009	CSRVS 1C	023
111	SUPRT 1C	051

VIA CAD 2

C4	CSRVS 4C	*
C3	CSRVS 3C	*
C2	CSRVS 2C	*
C1	CSRVS 1C	*

VIA CAD 1

C3	AVAILI C	*	129
C1	B/C THRSHLD C	*	029

G4

020	EBCLK	EBCLK
107	-FLEN	-FLEN
007	ERES	ERES
112	ELA9	ELA9
@	ERD,EWR	ERD,EWR
@	XLA(8,9)	XLA(8,9)
@	ELA(0-8)	ELA(0-8)
@	EAD(8-15)	EAD(8-15)
@	EAD(0-7)	EAD(0-7)

4E4

SEE NOTE 102

NOTES:

1- * -DENOTES LOOSE WIRING AND NOT PART OF BACKPLANE PRINTED CIRCUIT.

VPM SHELF		DWG SIZE 6S	ISSUE L1
AT&T BELL LABORATORIES	SD-7C536-01	M	SHEET B3

PART OF FS 1

VPM SHELF
(SEE NOTE 103)

TO SYSTEM BEING MONITORED (SEE SD-7C425-01 OR SD-54535-01) (SEE NOTE XXX)

VIA CAD 2

B10 CSRVS 8B *
B9 CSRVS 7B *
B8 CSRVS 6B *
B7 CSRVS 5B *

NC 048
148
049

04-128 (B) AMR118 VPM INTFC <B>

062 <B8>

049	D3P 8B	039
149	D3P 8B	139
048	CSRVS 8B	138
150	SUPRT 8B	154

062 <B7>

043	D3P 7B	037
143	D3P 7B	137
042	CSRVS 7B	038
144	SUPRT 7B	054

062 <B6>

037	D3P 6B	035
137	D3P 6B	135
036	CSRVS 6B	134
138	SUPRT 6B	153

062 <B5>

031	D3P 5B	033
131	D3P 5B	133
030	CSRVS 5B	034
132	SUPRT 5B	053

062 <B4>

025	D3P 4B	028
125	D3P 4B	128
024	CSRVS 4B	127
126	SUPRT 4B	152

062 <B3>

019	D3P 3B	026
119	D3P 3B	126
018	CSRVS 3B	027
120	SUPRT 3B	052

062 <B2>

013	D3P 2B	024
113	D3P 2B	124
012	CSRVS 2B	123
114	SUPRT 2B	151

062 <B1>

007	D3P 1B	022
107	D3P 1B	122
006	CSRVS 1B	023
108	SUPRT 1B	051

VIA CAD 2

B4 CSRVS 4B *
B3 CSRVS 3B *
B2 CSRVS 2B *
B1 CSRVS 1B *

VIA CAD 1

B3 AVAILI B * 129
B1 B/C THRSHLD B * 029

3F9

020	EBCLK	EBCLK
107	-FLEN	-FLEN
007	ERES	ERES
112	ELA9	ELA9
@	ERD,EWR	ERD,EWR
@	XLA(8,9)	XLA(8,9)
@	ELA(0-8)	ELA(0-8)
@	EAD(8-15)	EAD(8-15)
@	EAD(0-7)	EAD(0-7)

SEE NOTE 102

E8

TO SYSTEM BEING MONITORED (SEE SD-7C425-01 OR SD-54535-01)

VIA CAD 2

A10 CSRVS 8A *
A9 CSRVS 7A *
A8 CSRVS 6A *
A7 CSRVS 5A *

049
148
048

04-136 (A) AMR118 VPM INTFC <A>

068 <A8>

052	D3P 8A	039
152	D3P 8A	139
051	CSRVS 8A	138
153	SUPRT 8A	154

068 <A7>

046	D3P 7A	037
146	D3P 7A	137
045	CSRVS 7A	038
147	SUPRT 7A	054

068 <A6>

040	D3P 6A	035
140	D3P 6A	135
039	CSRVS 6A	134
141	SUPRT 6A	153

068 <A5>

034	D3P 5A	033
134	D3P 5A	133
033	CSRVS 5A	034
135	SUPRT 5A	053

068 <A4>

028	D3P 4A	028
128	D3P 4A	128
027	CSRVS 4A	127
129	SUPRT 4A	152

068 <A3>

022	D3P 3A	026
122	D3P 3A	126
021	CSRVS 3A	027
123	SUPRT 3A	052

068 <A2>

016	D3P 2A	024
116	D3P 2A	124
015	CSRVS 2A	123
117	SUPRT 2A	151

068 <A1>

010	D3P 1A	022
110	D3P 1A	122
009	CSRVS 1A	023
111	SUPRT 1A	051

VIA CAD 2

A4 CSRVS 4A *
A3 CSRVS 3A *
A2 CSRVS 2A *
A1 CSRVS 1A *

VIA CAD 1

A3 AVAILI A * 129
A1 B/C THRSHLD A * 029

SEE NOTE 102

G4

@	XLA(8,9)	
020	EBCLK	EBCLK
107	-FLEN	-FLEN
007	ERES	ERES
112	ELA9	ELA9
@	ERD,EWR	ERD,EWR
@	ELA(0-8)	ELA(0-8)
@	EAD(8-15)	EAD(8-15)
@	EAD(0-7)	EAD(0-7)

5D2

SEE NOTE 102

VIA CAD 1 ( )10

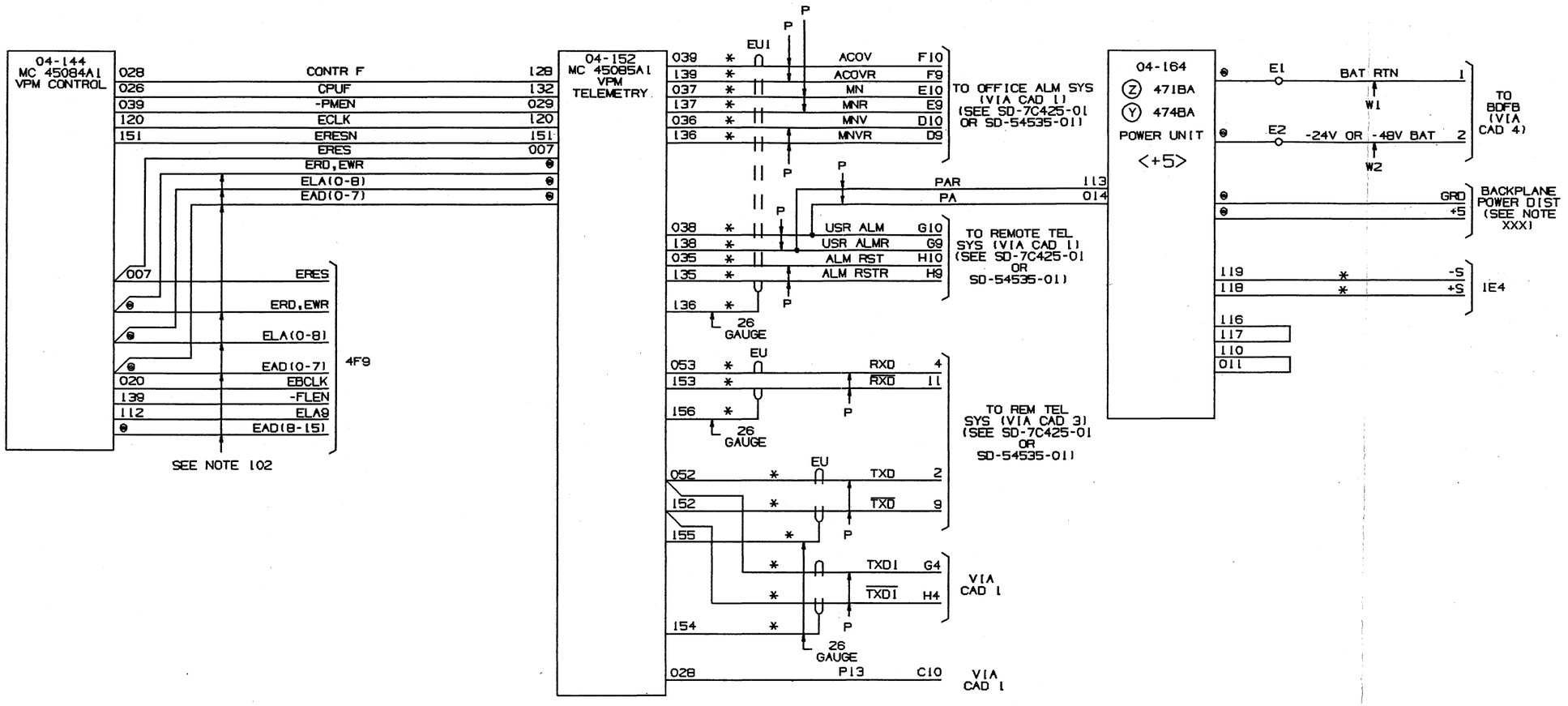
NOTES:

1-* -DENOTES LOOSE WIRING AND NOT PART OF BACKPLANE PRINTED CIRCUIT.

VPM SHELF		DWG SIZE 6S	ISSUE L1
AT&T BELL LABORATORIES	SD-7C536-01	M	SHEET B4

PART OF FS 1

VPM SHELF
(SEE NOTE 103)



NOTES:

1-* -DENOTES LOOSE WIRING AND NOT PART OF BACKPLANE PRINTED CIRCUIT.

VPM SHELF		DWG SIZE 6S	ISSUE L1
AT&T BELL LABORATORIES	SD-7C536-01	M	SHEET B5

APP FIG 1

BACKPLANE & WIRING PER
FS 1 VPM SHELF

CABLE ASSEMBLY

CA DESIG	W1		W2	
CA CODE	12 GAUGE STRANDED		12 GAUGE STRANDED	
TERMINATION DESIG	E1	TB1-1	E2	TB1-2
TERMINATION CODE	AMP 41898-1		AMP 41898-1	
OPTION				
FS LOCATION	587		587	
CA COMM CODE	845946219		845946227	

APP FIG 2

POWER UNIT AND
CIRCUIT PACKS
PER FS 1

CIRCUIT PACKS

LOC	04-152	04-144	04-136	04-128	04-120	04-112	04-104	04-096	04-088	04-080
DESIG	VPM TELEMETRY	VPM CONTROL	VPM INTFC	VPM INTFC	VPM INTFC	VPM INTFC	VPM INTFC	VPM INTFC	VPM INTFC	VPM INTFC
CODE	MC 45085A1	MC 45084A1	AMR118	AMR118	AMR118	AMR118	AMR118	AMR118	AMR118	AMR118
OPTION			A	B	C	D	E	F	G	H
FS LOC	5B3	5B0	4A7	4A2	3A7	3A2	2A7	2A2	1A7	1A2

POWER UNIT

LOC	04-164	
DESIG	POWER UNIT	
CODE	471BA	474BA
OPTION	Z	Y
FS LOC	5B6	5B6

VPM SHELF		DWG SIZE 6S	ISSUE L1
AT&T BELL LABORATORIES	SD-7C536-01	M	SHEET C1

CIRCUIT NOTES:

101.

DESIG	AMPS	OPT	POTENTIAL
-24V	10	Z	-24V SIG
-48V	5	Y	-48V SIG

VOLTAGE RANGE		
POTENTIAL	NORMAL	EMERGENCY
-24V SIG	-23V TO -26V	-20V TO -28V
-48V SIG	-48V TO -52.5V	-42.5V TO -52.5V

102.

DATA & ADDRESS BUS I/O			
LEAD DESIG	PIN NUMBER	LEAD DESIG	PIN NUMBER
EAD0	002	ELA0	008
EAD1	102	ELA1	108
EAD2	003	ELA2	009
EAD3	103	ELA3	109
EAD4	004	ELA4	010
EAD5	104	ELA5	110
EAD6	005	ELA6	011
EAD7	105	ELA7	111
EAD8	013	ELA8	012
EAD9	113	ERD	006
EAD10	014	EWR	106
EAD11	114	XL8	149
EAD12	015	XL9	050
EAD13	115		
EAD14	016		
EAD15	116		

103.

BACKPLANE POWER & GROUND TABLE				
POS	GROUND	POS	GROUND	+5
026	008,014,020,026,032,038,044,050,106,112,118,124,130,136,142,148	080	000,001,055,056,100,101,155,156	045,046,047,145,146,147
		088	000,001,055,056,100,101,155,156	045,046,047,145,146,147
032	011,017,023,029,035,041,047,053,109,115,121,127,133,139,145,151	096	000,001,055,056,100,101,155,156	045,046,047,145,146,147
		104	000,001,055,056,100,101,155,156	045,046,047,145,146,147
038	008,014,020,026,032,038,044,050,106,112,118,124,130,136,142,148	112	000,001,055,056,100,101,155,156	045,046,047,145,146,147
		120	000,001,055,056,100,101,155,156	045,046,047,145,146,147
044	011,017,023,029,035,041,047,053,109,115,121,127,133,139,145,151	128	000,001,055,056,100,101,155,156	045,046,047,145,146,147
		136	000,001,055,056,100,101,155,156	045,046,047,145,146,147
050	008,014,020,026,032,038,044,050,106,112,118,124,130,136,142,148	144	000,001,024,028,055,056,100,101,155,156	045,046,047,145,146,147
		152	000,001,055,056,100,101,155,156	045,046,047,145,146,147
056	011,017,023,029,035,041,047,053,109,115,121,127,133,139,145,151	164	000,001,032-043,100,101,132-143	045-056,145-156
		POS	BAT RTN	-24V OR -48V BAT
062	008,014,020,026,032,038,044,050,106,112,118,124,130,136,142,148	164	003,004,005,103,104,105	006,007,008,106,107,108
068	011,017,023,029,035,041,047,053,109,115,121,127,133,139,145,151			

EQUIPMENT NOTES:

201. UNLESS OTHERWISE SPECIFIED:

ALL WIRES SHALL BE 26DP.

EU- DENOTES KS-22487,L105 26 GAUGE SOLID

EU1-DENOTES 816AS SHIELDED CABLE.

INFORMATION NOTES:

301. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS.
CAPACITANCE VALUES ARE IN MICROFARADS.
VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.

302.

FEATURE OR OPTION		PROVIDE APP FIG	APP OPT	QUANTITY	SEE NOTE
WIRED VPM SHELF		1		AS REQD	
REQUIRED CIRCUIT PACKS FOR MONITORING UP TO EIGHT DS3 TRIBUTARIES		2		PER VPM SHELF	
	-24V BAT	2	Z	AS REQD	
	-48V BAT	2	Y	AS REQD	
ADDITIONAL CIRCUIT PACKS REQUIRED TO EXPAND MONITORING CAPABILILITIES TO UP TO 64 DS3 TRIBUTARIES	16	2	B	AS REQD	
	24	2	C	AS REQD	
	32	2	D	AS REQD	
	40	2	E	AS REQD	
	48	2	F	AS REQD	
	56	2	G	AS REQD	
	64	2	H	AS REQD	

303.

RECORD OF FIGURES, WIRING AND APPARATUS CHANGES					
CHANGED ON ISS	IF JOB RECORDS DO NOT SPECIFY	THIS OPT WAS FURN	SEE NOTE	USE IN CKT AVAIL	USE IN CKT DISC AVAIL

VPM SHELF

DWG SIZE 6S

ISSUE L1

AT&T BELL LABORATORIES | SD-7C536-01 | M | SHEET D1

E-74211/7-811
PRINTED IN U.S.A.

CAD 1

VPM STRAPPING OPTIONS (SEE NOTE XXX)

A1	B/C THRSHLD A	029	04-136
A2	GRD	000	
A3	AVAILI A	129	
A4			
A7			
A8			
A9			
A10	XLA8		04-136
B1	B/C THRSHLD B	029	04-128
B2			
B3	AVAILI B	129	
B4			
B5			
B6			
B7			
B8			
B9			
B10	XLA9		04-136
C1	B/C THRSHLD C	029	04-120
C2			
C3	AVAILI C	129	
C4			
C5			
C6			
C7			
C8			
C9			
C10	P13	028	04-152
D1	B/C THRSHLD D	029	04-112
D2			
D3	AVAILI D	129	
D4			
D5			
D6			
D7			
D8			
D9	P MNVR	136	04-152
D10	MNV	036	

OFF ALM SYS

PART OF TSI 342A TS

SEE NOTE XXX	E1	B/C THRSHLD E	029	04-104
	E2	GRD	000	
	E3	AVAILI E	129	
	E4			
	E5			
	E6			
	E7			
	E8			
OFF ALM SYS	E9	P MNR	137	04-152
	E10	MN	037	
SEE NOTE XXX	F1	B/C THRSHLD F	029	04-096
	F2			
	F3	AVAILI F	129	
	F4			
	F5			
	F6			
	F7			
	F8			
OFF ALM SYS	F9	P ACOVR	139	04-152
	F10	ACOV	039	
SEE NOTE XXX	G1	B/C THRSHLD G	029	04-088
	G2			
	G3	AVAILI G	129	
	G4			
	G5			
	G6	P TXD1	052	04-152
	G7	TXD1	152	
	G8			
REM TEL SYS	G9	P USR ALMR	138	
	G10	USR ALM	038	
SEE NOTE XXX	H1	B/C THRSHLD H	029	04-080
	H2			
	H3	AVAILI H	129	
	H4			
	H7			
	H8			
REM TEL SYS	H9	P ALM RSTA	135	04-152
	H10	ALM RST	035	

PART OF TSI 342A TS

VPM SHELF

DWG SIZE 6S | ISSUE L1

AT&T BELL LABORATORIES | SD-7C536-01 | M | SHEET G1

CAD 2

TO SYSTEM BEING MONITORED (SEE NOTE XXX)

A1	CSRVS 1A	023	
A2	CSRVS 2A	123	
A3	CSRVS 3A	027	
A4	CSRVS 4A	127	
A7	CSRVS 5A	034	04-136
A8	CSRVS 6A	134	
A9	CSRVS 7A	038	
A10	CSRVS 8A	138	
B1	CSRVS 1B	023	
B2	CSRVS 2B	123	
B3	CSRVS 3B	027	
B4	CSRVS 4B	127	
B5			
B6			04-128
B7	CSRVS 5B	034	
B8	CSRVS 6B	134	
B9	CSRVS 7B	038	
B10	CSRVS 8B	138	
C1	CSRVS 1C	023	
C2	CSRVS 2C	123	
C3	CSRVS 3C	027	
C4	CSRVS 4C	127	
C5			
C6			04-120
C7	CSRVS 5C	034	
C8	CSRVS 6C	134	
C9	CSRVS 7C	038	
C10	CSRVS 8C	138	
D1	CSRVS 1D	023	
D2	CSRVS 2D	123	
D3	CSRVS 3D	027	
D4	CSRVS 4D	127	
D5			
D6			04-112
D7	CSRVS 5D	034	
D8	CSRVS 6D	134	
D9	CSRVS 7D	038	
D10	CSRVS 8D	138	

PART OF TS2 342A TS

TO SYSTEM BEING MONITORED (SEE NOTE XXX)

E1	CSRVS 1E	023	
E2	CSRVS 2E	123	
E3	CSRVS 3E	027	
E4	CSRVS 4E	127	
E5			
E6			04-104
E7	CSRVS 5E	034	
E8	CSRVS 6E	134	
E9	CSRVS 7E	038	
E10	CSRVS 8E	138	
F1	CSRVS 1F	023	
F2	CSRVS 2F	123	
F3	CSRVS 3F	027	
F4	CSRVS 4F	127	
F5			
F6			04-096
F7	CSRVS 5F	034	
F8	CSRVS 6F	134	
F9	CSRVS 7F	038	
F10	CSRVS 8F	138	
G1	CSRVS 1G	023	
G2	CSRVS 2G	123	
G3	CSRVS 3G	027	
G4	CSRVS 4G	127	
G5			
G6			04-088
G7	CSRVS 5G	034	
G8	CSRVS 6G	134	
G9	CSRVS 7G	038	
G10	CSRVS 8G	138	
H1	CSRVS 1H	023	
H2	CSRVS 2H	123	
H3	CSRVS 3H	027	
H4	CSRVS 4H	127	
H7	CSRVS 5H	034	04-080
H8	CSRVS 6H	134	
H9	CSRVS 7H	038	
H10	CSRVS 8H	138	

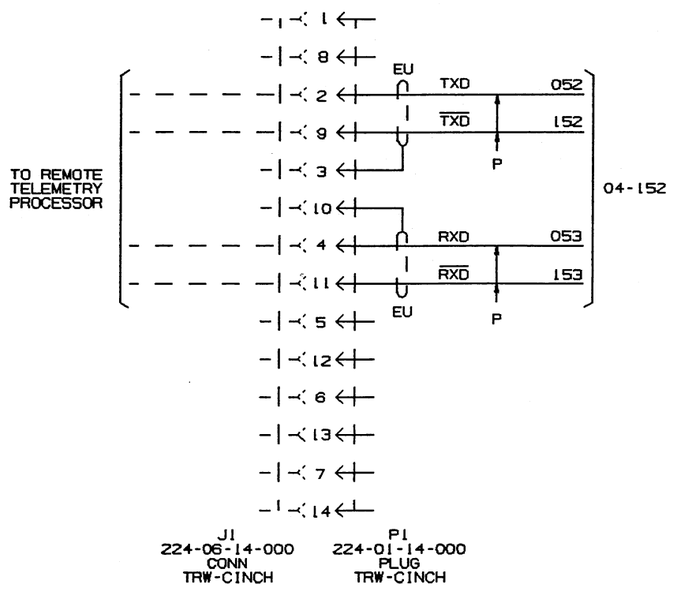
PART OF TS2 342A TS

VPM SHELF

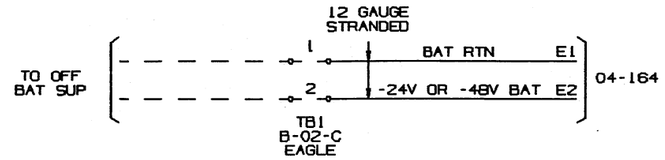
DWG SIZE	ISSUE
6S	L1

AT&T BELL LABORATORIES | SD-7C536-01 | M | SHEET G2

CAD 3



CAD 4



VPM SHELF		DWG SIZE 6S	ISSUE L1
AT&T BELL LABORATORIES	SD-7C536-01	M	SHEET G3

VIOLATION PULSE MONITOR
USER'S MANUAL

9. CPS DRAWINGS

The CPS drawings contained in this tab provide circuit descriptions, input/output pin descriptions, and schematic drawings for the following circuit packs:

- CPS-AMR110B — AMR110B Circuit Pack, VPM CONTROLLER Circuit.
- CPS-AMR118 — AMR118 Circuit Pack, VMR INTERFACE Circuit
- CPS-AMR124 — AMR124 Circuit Pack, VPM TELEMETRY Circuit

SHEET INDEX		
ITEM	PAGE	ISSUE
SHEET INDEX		
RECORD OF CHANGES		
SUPPORTING INFORMATION		
SYSTEM USED ON	1	1
CURRENT DRAIN		
INPUT/OUTPUT INFORMATION	2	1
CIRCUIT DESCRIPTION		
SYMBOL	3	1

DWG ISS	CD ISS	DATE ISSD	DRN	APP
1		12-4-86		

CURRENT DRAIN	
+5V	650MA MAX

RECORD OF CHANGES

DWG ISS.	PREV FURN	STD	MFR DISC	SERIES NUMBER	SEE NOTE	CLEI CODE

SUPPORTING INFORMATION

SYSTEM USED ON	DESIGN CONTROL	CATEGORY	NO.
ADR	MV	CONNECTOR REQUIREMENTS ON PWB ON FRAME	

1N52

AMR110B CIRCUIT PACK
TERMINAL CONTROLLER
CIRCUIT

DWG SIZE	ISSUE
6S	1

AT&T BELL LABORATORIES	CPS-AMR110B	SHEET 1 OF 3

INPUT/OUTPUT DESCRIPTION

PIN#	DESIG	DESCRIPTION (BD FUNCTION)	I/O	SIGNAL
PRIMARY BUS				
002	EAD0	EXTERNAL DATA BUS	I/O	TTL
102	EAD1	EXTERNAL DATA BUS	I/O	TTL
003	EAD2	EXTERNAL DATA BUS	I/O	TTL
103	EAD3	EXTERNAL DATA BUS	I/O	TTL
004	EAD4	EXTERNAL DATA BUS	I/O	TTL
104	EAD5	EXTERNAL DATA BUS	I/O	TTL
005	EAD6	EXTERNAL DATA BUS	I/O	TTL
105	EAD7	EXTERNAL DATA BUS	I/O	TTL
008	ELA0	EXTERNAL LATCHED ADDR BUS	0	TTL
108	ELA1	EXTERNAL LATCHED ADDR BUS	0	TTL
009	ELA2	EXTERNAL LATCHED ADDR BUS	0	TTL
109	ELA3	EXTERNAL LATCHED ADDR BUS	0	TTL
007	ERES	EXTERNAL RESET SIGNAL ACTIVE-HIGH	0	TTL
006	ERD	EXTERNAL READ CONTROL LINE ACTIVE-LOW	0	TTL
106	EWR	EXTERNAL WRITE CONTROL LINE ACTIVE-LOW	0	TTL
107	EPCLK	EXTERNAL PERIPHERAL CLOCK 2.4576 MHZ	I	TTL
SECONDARY ADDR/CONTROL/CLOCK BUS				
010	ELA4	EXTERNAL LATCHED ADDR BUS	0	TTL
110	ELA5	EXTERNAL LATCHED ADDR BUS	0	TTL
011	ELA6	EXTERNAL LATCHED ADDR BUS	0	TTL
111	ELA7	EXTERNAL LATCHED ADDR BUS	0	TTL
012	ELA8	EXTERNAL LATCHED ADDR BUS	0	TTL
112	ELA9	EXTERNAL LATCHED ADDR BUS	0	TTL
013	ELA10	EXTERNAL LATCHED ADDR BUS	0	TTL
113	ELA11	EXTERNAL LATCHED ADDR BUS	0	TTL
014	ELA12	EXTERNAL LATCHED ADDR BUS	0	TTL
114	ELA13	EXTERNAL LATCHED ADDR BUS	0	TTL
015	ELA14	EXTERNAL LATCHED ADDR BUS	0	TTL
115	ELA15	EXTERNAL LATCHED ADDR BUS	0	TTL
016	ELA16	EXTERNAL LATCHED ADDR BUS	0	TTL
116	ELA17	EXTERNAL LATCHED ADDR BUS	0	TTL
017	ELA18	EXTERNAL LATCHED ADDR BUS	0	TTL
117	ELA19	EXTERNAL LATCHED ADDR BUS	0	TTL
151	ERESIN	RESET (CPU) IN ACTIVE LOW	I	TTL
124	ERDY	CPU READY	I	TTL

PIN#	DESIG	DESCRIPTION (BD FUNCTION)	I/O	SIGNAL
		ACTIVE HIGH		
054	ENMI	NON-MASKABLE INTR	I	TTL
		ACTIVE LOW		
024	EHOLD	CPU HOLD	I	TTL
		ACTIVE HIGH		
022	EIO/M	IO/MEMORY SELECT HIGH IO LOW MEMORY	0	TTL
123	EINTA	INTR ACKNOWLEDGE ACTIVE LOW	0	TTL
122	EALE	ADDR LATCH ENABLE ACTIVE HIGH	0	TTL
018	EDEN	DATA ENABLE ACTIVE LOW	0	TTL
118	EDT/R	DATA TRANSMIT/RECEIVE HIGH TRANSMIT LOW RECEIVE	0	TTL
137	EHALTN	HALT STATUS ACTIVE LOW	0	TTL
023	EHLDA	HOLD ACKNOWLEDGE ACTIVE HIGH	0	TTL
025	EOSC	OSCILLATOR 14.7456 MHZ	0	TTL
120	ECLK	PROCESSOR CLOCK 4.9152 MHZ	0	TTL
020	EBCLK	BAUD RATE 1 CLOCK 1.2288 MHZ	0	TTL
125	EB2CLK	BAUD RATE 2 CLOCK 153.600 KHZ	0	TTL
ADDRESS DECODING - ALL ACTIVE LOW				
138	EPS0	PAGE SELECT 0	0	TTL
128	EBS0	BANK SELECT 0 IO ADDR SPACE	0	TTL
038	TELMEN	TELM DPR ENABLE	0	TTL
139	FLEN	FAULT LOC DPR ENABLE	0	TTL
039	PMEN	PERF MON DPR ENABLE	0	TTL
044	EN3	ENABLE 3- SPARE	0	TTL
127	EBS08	BANK SELECT 0 LOW HALF	0	TTL
052	ECS80	CKT SELECT 8	0	TTL
027	ECS90	CKT SELECT 9	0	TTL
051	ECSA0	CKT SELECT A	0	TTL
150	ECSB0	CKT SELECT B	0	TTL
152	ECSC8F	CKT SELECT C HIGH HALF	0	TTL
050	ECSD0	CKT SELECT D	0	TTL
149	ECSE0	CKT SELECT E	0	TTL
049	ECSF0	CKT SELECT F	0	TTL
INTERRUPT/TIMER				
037	EIR0	INTR 0	I	TTL

INPUT/OUTPUT DESCRIPTION (CONT)

PIN#	DESIG	DESCRIPTION (BD FUNCTION)	I/O	SIGNAL
		ACTIVE HIGH		
136	EIR1	INTR 1 ACTIVE HIGH	I	TTL
134	EIR2	INTR 2 ACTIVE LOW	I	TTL
036	EIR3	INTR 3 ACTIVE LOW	I	TTL
135	EIR4	INTR 4 ACTIVE LOW	I	TTL
133	EIR6	INTR 6 ACTIVE LOW	I	TTL
033	EIR7	INTR 7 ACTIVE LOW	I	TTL
129	EGATE0	TIMER 0 END OF COUNT INDICATION, ACTIVE LOW	0	TTL
SANITY TIMER				
026	CPUF	CPU FAIL ACTIVE HIGH	0	TTL
028	CONTRF	CONTROLLER FAIL ACTIVE HIGH	I	TTL
053	RSTINH	RESET INHIBIT ACTIVE LOW	I	TTL
154	ERESTART	CPU RESTART ACTIVE LOW	0	TTL

CIRCUIT DESCRIPTION

FUNCTIONAL DESCRIPTION:

THE AMR110B TERMINAL CONTROLLER CIRCUIT PACK PROVIDES A CONTROLLER FUNCTION WHICH IS BASED ON THE 8088 MICROPROCESSOR. ADDITIONAL FUNCTIONS PROVIDED INCLUDE: BUFFERED DATA, ADDRESS AND CONTROL BUSES, INTERRUPT CONTROLLER, PROGRAMMABLE TIMERS, RAM DATA MEMORY, EPROM PROGRAM MEMORY, ADDRESS DECODING AND A SANITY TIMER. IT FORMS THE CENTRAL PART OF THE MULTI-BOARD TERMINAL STATION CONTROLLER FOR FREQUENCY DIVERSITY SYSTEMS AND BOTH THE TERMINAL AND REGENERATOR STATION CONTROLLERS FOR HOT STANDBY SYSTEMS.

BLOCK DIAGRAM DESCRIPTION:

1. MICROPROCESSOR
THE 8-BIT 8088 MICROPROCESSOR FORMS THE CENTRAL CORE OF THE CIRCUIT PACK. ITS NON-MASKABLE INTERRUPT (ENMI) IS EDGE BOARD AVAILABLE ALONG WITH THE HOLD SIGNAL (EHOLD). FOR ON BOARD PROGRAM MEMORY APPLICATIONS, SUCH AS HOT STANDBY, THE EHOLD LEAD MUST BE TIED LOW ON THE BACKPLANE. FOR OFF BOARD APPLICATIONS, IT IS DESIGNED TO BE OPERATED THROUGH THE ASSOCIATED MEMORY BOARD, EG., THE AMR111 IN FREQUENCY DIVERSITY.

2. CLOCK/RESET/WAIT STATE CONTROL
THE 8284A CLOCK GENERATOR AND DRIVER GENERATES THE PROCESSOR CLOCK FROM A 14.7456MHZ CRYSTAL. THIS DEVICE IN ASSOCIATION WITH A 4-BIT COUNTER PROVIDES THE FOLLOWING EDGE BOARD BUFFERED CLOCK SIGNALS FOR USE BY THE STATION CONTROLLER PERIPHERAL CIRCUIT PACKS.

DESIG	FREQ
EOSC	14.7456MHZ
ECLK (EOSC/3)	4.9152MHZ
EPCLK (ECLK/2)	2.4576MHZ
EBCLK (EPCLK/2)	1.2288MHZ
EB3CLK (EPCLK/8)	307.2KHZ
EB2CLK(EPCLK/16)	153.6KHZ

THE DEVICE GENERATES A SYNCHRONIZED SYSTEM RESET SIGNAL THROUGH ITS SCHMITT TRIGGER INPUT FROM THE FOLLOWING THREE SOURCES: 1) AN RC NETWORK FOR POWER ON RESET, 2) A FRONT PANEL RECESSED PUSHBUTTON FOR MANUAL RESET, AND 3) A BACKPLANE INPUT (ERESIN) FOR AUTOMATIC RESET FROM THE HARDWARE SANITY TIMER CIRCUIT.
THE WAIT STATE GENERATOR WILL INTRODUCE ONE MACHINE CYCLE OF DELAY FOR USE WHEN ACCESSING SLOW PERIPHERAL DEVICES. THE OUTPUT OF THE WAIT STATE GENERATOR FEEDS THE 8284 DEVICE WHICH PROVIDES A SYNCHRONIZED READY SIGNAL FOR THE MICROPROCESSOR. USE OF THE WAIT CYCLE IS CONTROLLED BY THE WAIT SIGNAL WHICH IS AN OUTPUT FROM THE PROGRAMMABLE ADDRESS DECODER CIRCUIT. THE BACKPLANE ERDY INPUT SIGNAL IS AVAILABLE FOR ANY ADDITIONAL OFF BOARD GENERATED WAIT STATE.

CIRCUIT DESCRIPTION (CONT)

3. SYSTEM PRIMARY BUS
THE PRIMARY BUS IS A RESERVED SECTION OF I/O BACKPLANE PINS WHICH GOES TO ALL STATION CONTROLLER PERIPHERAL CIRCUIT PACKS. IT CONSISTS OF THE FOLLOWING FUNCTIONS:
ADDRESS BUS: A 4-BIT (A0-A3) LATCHED AND BUFFERED ADDRESS BUS.
DATA BUS: AN 8-BIT BIDIRECTIONAL DATA BUS. TRI-STATE CONTROL OF THE BIDIRECTIONAL TRANSCEIVER IS BY MEANS OF THE ONBRD SIGNAL. THIS SIGNAL DISABLES THE TRANSCEIVER UNDER THE FOLLOWING CONDITIONS: THE INTERRUPT ACKNOWLEDGE (INTA) AND DATA ENABLE (DEN) SIGNALS FROM THE MICROPROCESSOR, THE DATA MEMORY SELECT SIGNAL (CSRAM) AND THE INTERRUPT CONTROLLER, PROGRAMMABLE TIMER AND SANITY TIMER PERIPHERAL CIRCUITS SELECT SIGNAL (CSC07) FROM THE ADDRESS DECODER. WHEN IN USE FOR OFF BOARD FUNCTIONS, ITS DIRECTION IS CONTROLLED BY THE MICROPROCESSORS DATA TRANSMIT/RECEIVE (DT/-R) SIGNAL.
CONTROL BUS: THREE BITS FROM THE 10-BIT BUFFERED CONTROL BUS ARE A PART OF THE PRIMARY BUS: READ (ERD), WRITE (EWR) AND RESET (ERES).
CLOCK BUS: THE PERIPHERAL CLOCK (EPCLK), ONE OF THE 6 CLOCK SIGNALS DESCRIBED ABOVE, IS A PART OF THE PRIMARY BUS.

4. SECONDARY ADDR/CONTROL/CLOCK BUS: THE REMAINING 16 LATCHED AND BUFFERED ADDRESS SIGNALS AND THE REMAINING CONTROL AND CLOCK SIGNALS ARE BACKPLANE AVAILABLE FOR USE BY THE PERIPHERAL CIRCUIT PACKS ON A AS NEEDED BASIS.

5. INTERRUPT CONTROLLER
AN 8-BIT PROGRAMMABLE INTERRUPT CONTROLLER (8259) IS USED TO INTERFACE INTERRUPT REQUESTS TO THE MICROPROCESSOR. TWO OF INTERRUPT INPUTS ARE ACTIVE HIGH SIGNALS, FIVE ARE ACTIVE LOW SIGNALS, AND ONE INPUT IS USED INTERNALLY BY THE SYSTEM CLOCK GENERATOR.

6. TIMERS
AN 8253 TIMER DEVICE, CONTAINING THREE 16-BIT PROGRAMMABLE TIMERS, PROVIDES USER TIMING CAPABILITY. ONE OF THE TIMERS IS DEDICATED AS A SOFTWARE SYSTEM CLOCK, VIA INTERRUPT 5. THE OTHER TWO ARE AVAILABLE FOR GENERAL USE BY THE APPLCATION SOFTWARE.

7. DATA MEMORY
8K BYTES OF RANDOM ACCESS MEMORY (RAM) IS AVAILABLE FOR USE BY THE APPLICATION SOFTWARE.

8. PROGRAM MEMORY
A SOCKET IS PROVIDED FOR OPTIONALLY EQUIPPING PROGRAMMABLE MEMORY OF THE FOLLOWING TYPES: 27128-16K BYTES, 27256-32K BYTES, OR 27512-64K BYTES. TWO OPTIONING TERMINAL FIELDS ARE USED TO CONNECT THE APPROPRIATE CONTROL SIGNALS TO PINS 1 AND 27 OF THE PROM SOCKET, AS FOLLOWS.

PROM	E9 (PIN 1)	E5 (PIN 27)
27128	E10	E4
27256	E10	E3
27512	E8	E3

9. ADDRESS DECODER
THE ADDRESS DECODING FOR ALL OF THE MICROPROCESSOR INTERFACED DEVICES, BOTH INTERNALLY ON THE AMR110B UNIT ITSELF AND EXTERNALLY ON THE PERIPHERAL CIRCUIT PACKS, IS ACCOMPLISHED IN THE FOLLOWING HIERARCHICAL FASHION.
HIGH LEVEL 20-BIT DECODING:
THE OVERALL 20-BIT ADDRESS SPACE IS INITIALLY BROKEN UP BY MEANS OF A PROGRAMMABLE 512 X 8 BIPOLAR PROM. THIS GIVES A MINIMUM BLOCK SIZE CAPABILITY OF 4K BYTES. THIS ALLOWS FOR FLEXIBILITY IN USING THE BASIC CIRCUIT FOR OTHER APPLICATIONS. THE SPECIFIC CONFIGURATION FOR THE AMR110B IS AS FOLLOWS:

SIGNAL	ADDRESS RANGE	SIZE
EPROM	F0000-FFFFF	64K
EPS0	00000-0FFFF	64K
CSRAM	00000-01FFF	8K
WAIT	0C000-0FFFF	16K
PMEN	0C000-0CFFF	4K
FLEN	0D000-0DFFF	4K
TELMEN	0E000-0EFFF	4K
EBS0	0FF00-0FFFF	256
EN3	NOT ASSIGNED	

SIGNAL	DESCRIPTION
EPROM	PROGRAM MEMORY SELECT
EPS0	PAGE 0 SELECT - 64K DATA MEMORY (RAM) AND ALL MEMORY MAPPED IO
CSRAM	DATA MEMORY SELECT
WAIT	MEMORY MAPPED IO WAIT STATE SELECT
EBS0	MEMORY MAPPED IO ADDRESS SPACE
TELMEN	AS&C TELEMETRY DUAL PORT RAM SELECT
FLEN	FAULT LOCATE DUAL PORT RAM SELECT
PMEN	PERFORMANCE MONITOR DUAL PORT RAM SELECT

CIRCUIT DESCRIPTION (CONT)

MEMORY MAPPED IO DECODING:
AN EIGHT-BIT EQUAL-TO COMPARATOR (25LS2521) IS USED TO DECODE THE UPPER 256 BYTE BLOCK FROM THE PAGE 0 SELECT. THIS SPACE IS DEFINED BY THE EBS0 SIGNAL AND IS USED FOR PERIPHERAL CIRCUIT SELECTION.
THE EBS0 BLOCK IS FURTHER DIVIDED IN HALF, VIA ADDRESS A7, INTO THE FOLLOWING TWO AREAS.
1) EBS00 IS THE BOTTOM 128 BYTES OF THIS BLOCK. IT IS USED IN FREQUENCY DIVERSITY TO DECODE THE CHANNEL STATUS CIRCUIT PACKS (AMR113-PROTECTION, AMR114-REGULARS). ADDRESSES A6-A3 ARE USED TO DECODE THE INDIVIDUAL STATUS SLOTS VIA FIXED BACKPLANE CODED WIRING, ALLOWING FOR A MAXIMUM OF 16 CHANNELS. ADDRESS A2 DECODES THE TWO HALVES OF THE DUAL REGULAR CHANNEL STATUS UNITS, LEAVING ADDRESSES A1-A0 FOR THE INDIVIDUAL PORT DECODING.
2) THE UPPER 128 BYTES ARE DIVIDED, VIA A 3 LINE TO 8 LINE DECODER (LS138), INTO 8 16-BYTE WIDE PERIPHERAL CIRCUIT PACK SELECT LEADS. ADDRESSES A3-A0 ARE THEN AVAILABLE FOR PORT DECODING ON A GIVEN PERIPHERAL UNIT.
FINALLY, CIRCUIT SELECT CSC0 SPACE IS DIVIDED IN HALF VIA ADDRESS A3 AND A DUAL 2 LINE TO 4 LINE DECODER (LS139). THE LOWER 8 BYTES, REPRESENTED BY SIGNAL CSC07, ARE USED FOR DECODING THE ON BOARD PERIPHERAL CHIPS. THE UPPER 8 BYTES, REPRESENTED BY SIGNAL ECS8F, IS AVAILABLE FOR OFF BOARD SELECTION.
THE 256 BYTE EBS0 SPACE CAN ALSO BE ACCESSED VIA IO MAPPING. FOR THIS MODE OF OPERATION THE IO PORT ADDRESSES ARE FROM 0 TO 255.

THE SPECIFIC CONFIGURATION IS AS FOLLOWS:

SIGNAL	ADDRESS RANGE	SIZE
EBS00	0FF00-0FF7F	128
(EBS01)	0FF80-0FFFF	128
ECS80	0FF00-0FF0F	16
ECS90	0FF90-0FF9F	16
ECSA0	0FFA0-0FFAF	16
ECSB0	0FFB0-0FFBF	16
ECSC0	0FFC0-0FFCF	16
CSC07	0FFC0-0FFC7	8
INTRPT_ENB	0FFC0-0FFC1	2
SNTY_TRG	0FFC2-0FFC3	2
TIMER_ENB	0FFC4-0FFC7	4
ECS8F	0FFC8-0FFCF	8
ECSD0	0FFD0-0FFDF	16
ECSE0	0FFE0-0FFEF	16
ECSF0	0FFF0-0FFFF	16

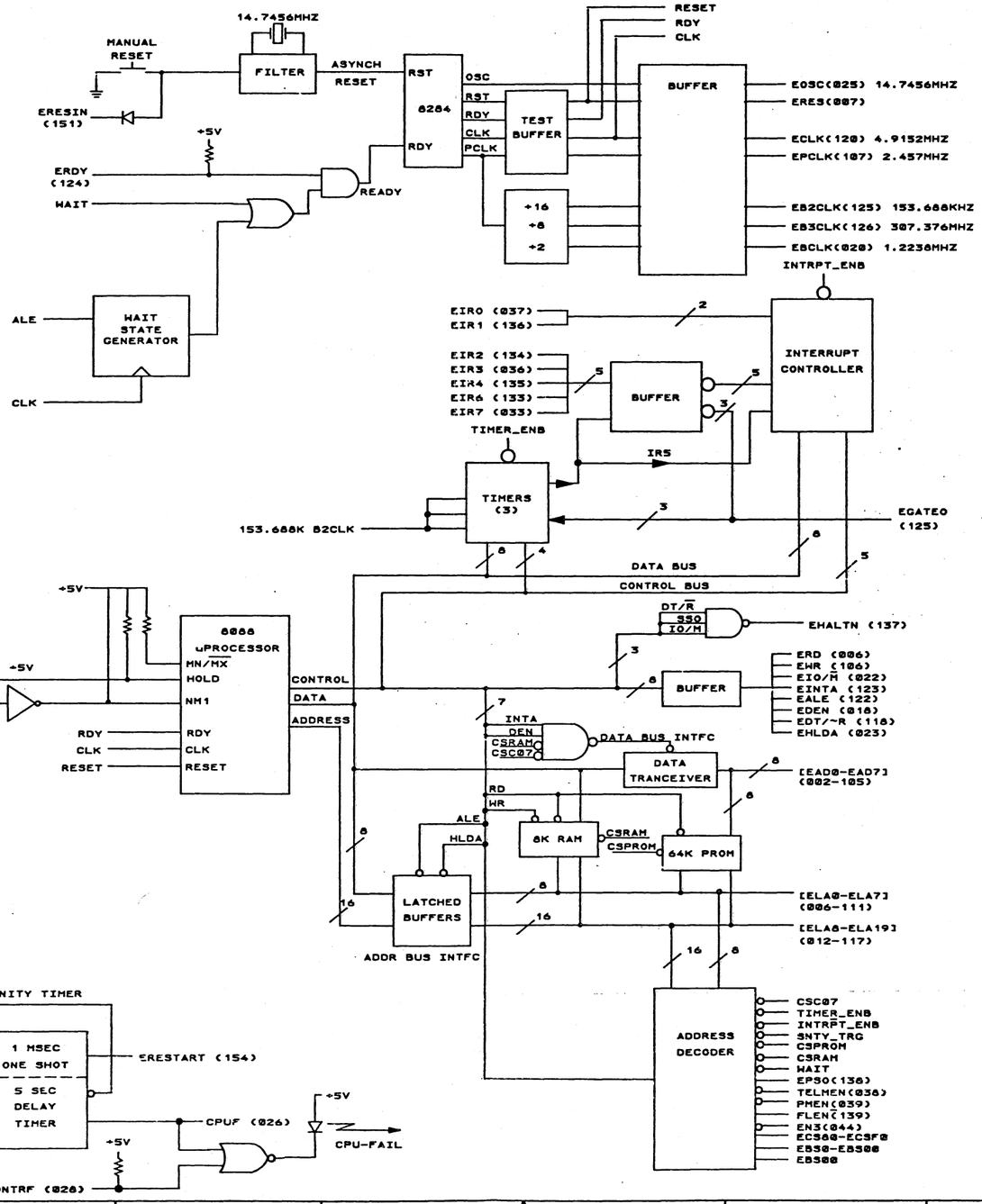
10. SANITY TIMER
A HARDWARE SANITY TIMER IS PROVIDED WHICH CAN BE USED TO AUTOMATICALLY RESET THE MICROPROCESSOR IF THE APPLICATION PROGRAM WERE TO BECOME LOST. IT CONSISTS OF TWO TIMERS.
THE FIRST STAGE IS A 5 SECOND DELAY TIMER WHICH MUST BE RETRIGGERED BY THE APPLICATION PROGRAM BY WRITING (ANY DATA VALUE) TO THE SANITY TIMER ADDRESS WITHIN THIS TIME FRAME. IF THE TIMER IS ALLOWED TO TIME OUT ITS TWO OUTPUTS WILL GO ACTIVE. ONE, CPUF, IS A LOGIC LEVEL ALARM SIGNAL (ACTIVE HIGH) AVAILABLE ON THE BACKPLANE AND WHICH ALSO DRIVES THE FACEPLATE CPU FAIL LED. THE OTHER OUTPUT DRIVES THE SECOND STAGE.
THE SECOND STAGE IS A 1-MSEC ONE SHOT WHOSE OUTPUT, ERESTART, IS AVAILABLE ON THE BACKPLANE AND IS NORMALLY CONNECTED TO THE ERESIN INPUT TO THE RESET CIRCUITRY. THE OUTPUT OF THIS STAGE CAN BE DISABLED BY PULLING THE RSTINH SIGNAL LOW.
THE FACEPLATE CPU FAIL INDICATOR MAY ALSO BE DRIVEN BY THE CONTRF INPUT. SINCE A LOGIC 0 REPRESENTS THE OFF (NO ALARM) STATE, IT MUST BE PULLED LOW ON THE BACKPLANE WHEN NOT USED.

AMR110B CIRCUIT PACK

DWG SIZE 6S | ISSUE 1

AT&T BELL LABORATORIES | CPS-AMR110B | 2

SYMBOL



AMR110B CIRCUIT PACK		
	DWG SIZE 6S	ISSUE 1
AT&T BELL LABORATORIES	CPS-AMR110B	3

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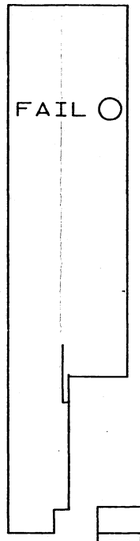
ITEM	PAGE	ISSUE
SHEET INDEX RECORD OF CHANGES CURRENT DRAIN DRAWING NOTES SUPPORTING INFORMATION SYSTEM USED ON CIRCUIT DESCRIPTION	1	1
INPUT/OUTPUT INFORMATION	2	1
SYMBOL	3	1

CIRCUIT DESCRIPTION

THE VMR PULSE INTERFACE CIRCUIT PACK (AMR118) MONITORS AND COUNTS THE PULSES GENERATED BY THE DS-3 PARITY VIOLATION MONITOR/RECEIVER CIRCUIT PACK (AMR72B) IN RESPONSE TO PARITY ERRORS AND DS-3 FRAME LOSS. THE DATA COLLECTED FOR A DEFINED MEASUREMENT INTERVAL IS USED TO ASCERTAIN THE PERFORMANCE OF THE DS-3 SIGNAL MONITORED BY THE AMR118.

DRAWING NOTES

101. FACEPLATE DIAGRAM FOR AMR118.



RECORD OF CHANGES						
DWG ISSUE	PREV FURN	STD	MFR DISC	SERIES NUMBER	SEE NOTE	CLEI CODE

CURRENT DRAIN	
+5V	1425 MA MAX 1215 MA TYP

DWG ISS	CD ISS	DATE ISSD	DRN	APP
1		8-26 87		

SUPPORTING INFORMATION

SYSTEM USED ON	DESIGN CONTROL	CATEGORY	NO.
ADR	MV		

AMR118 CIRCUIT PACK AN52
VMR INTERFACE
CIRCUIT

DWG SIZE	ISSUE
6S	1

AT&T BELL LABORATORIES	CPS--AMR118	SHEET 1 OF 3

INPUT/OUTPUT INFORMATION

PIN#	DESIG	DESCRIPTON (BOARD FUNCTION)	I/O	SIGNAL
PRIMARY BUS				
002	EAD0	EXTERNAL LATCHED DATA BUS	IO	TTL
102	EAD1	EXTERNAL LATCHED DATA BUS	IO	TTL
003	EAD2	EXTERNAL LATCHED DATA BUS	IO	TTL
103	EAD3	EXTERNAL LATCHED DATA BUS	IO	TTL
004	EAD4	EXTERNAL LATCHED DATA BUS	IO	TTL
104	EAD5	EXTERNAL LATCHED DATA BUS	IO	TTL
005	EAD6	EXTERNAL LATCHED DATA BUS	IO	TTL
105	EAD7	EXTERNAL LATCHED DATA BUS	IO	TTL
013	EAD8	EXTERNAL LATCHED DATA BUS	IO	TTL
113	EAD9	EXTERNAL LATCHED DATA BUS	IO	TTL
014	EAD10	EXTERNAL LATCHED DATA BUS	IO	TTL
114	EAD11	EXTERNAL LATCHED DATA BUS	IO	TTL
015	EAD12	EXTERNAL LATCHED DATA BUS	IO	TTL
115	EAD13	EXTERNAL LATCHED DATA BUS	IO	TTL
016	EAD14	EXTERNAL LATCHED DATA BUS	IO	TTL
116	EAD15	EXTERNAL LATCHED DATA BUS	IO	TTL
008	ELA0	EXTERNAL LATCHED ADDRESS BUS	I	TTL
108	ELA1	EXTERNAL LATCHED ADDRESS BUS	I	TTL
009	ELA2	EXTERNAL LATCHED ADDRESS BUS	I	TTL
109	ELA3	EXTERNAL LATCHED ADDRESS BUS	I	TTL
010	ELA4	EXTERNAL LATCHED ADDRESS BUS	I	TTL
110	ELA5	EXTERNAL LATCHED ADDRESS BUS	I	TTL
011	ELA6	EXTERNAL LATCHED ADDRESS BUS	I	TTL
111	ELA7	EXTERNAL LATCHED ADDRESS BUS	I	TTL
012	ELA8	EXTERNAL LATCHED ADDRESS BUS	I	TTL
112	ELA9	EXTERNAL LATCHED ADDRESS BUS	I	TTL
048	XLA5	STRAPPED BOARD ADDRESS LEAD (LSB)	I	TTL
148	XLA6	STRAPPED BOARD ADDRESS LEAD	I	TTL
049	XLA7	STRAPPED BOARD ADDRESS LEAD	I	TTL
149	XLA8	STRAPPED SHELF ADDRESS LEAD (LSB)	I	TTL
050	XLA9	STRAPPED SHELF ADDRESS LEAD	I	TTL
006	-ERD	EXTERNAL READ CONTROL LINE ACTIVE LOW	I	TTL
106	-EWR	EXTERNAL WRITE CONTROL LINE ACTIVE LOW	I	TTL
007	ERES	EXTERNAL RESET SIGNAL ACTIVE HIGH	I	TTL
107	-FLEN	EXTERNAL BOARD SELECT SIGNAL ACTIVE LOW	I	TTL
020	EBCLK	EXTERNAL CLOCK 1.2288MHZ	I	TTL

PIN#	DESIG	DESCRIPTON (BOARD FUNCTION)	I/O	SIGNAL
VMR INTERFACE				
022	D3P1	RS422 VMR PARITY PULSE LINE #1	I	
122	D3PB1	COMPLEMENT OF D3P1	I	
023	CSRVS1	LINE #1 SERVICE STATUS INPUT SERVICE PRESENT HIGH	I	TTL
051	SUPRT1	D3P LINE #1 SUPPORT SIGNAL	I	TTL
024	D3P2	RS422 VMR PARITY PULSE LINE #2	I	
124	D3PB2	COMPLEMENT OF D3P2	I	
123	CSRVS2	LINE #2 SERVICE STATUS INPUT SERVICE PRESENT HIGH	I	TTL
151	SUPRT2	D3P LINE #2 SUPPORT SIGNAL	I	TTL
026	D3P3	RS422 VMR PARITY PULSE LINE #3	I	
126	D3PB3	COMPLEMENT OF D3P3	I	
027	CSRVS3	LINE #3 SERVICE STATUS INPUT SERVICE PRESENT HIGH	I	TTL
052	SUPRT3	D3P LINE #3 SUPPORT SIGNAL	I	TTL
028	D3P4	RS422 VMR PARITY PULSE LINE #4	I	
128	D3PB4	COMPLEMENT OF D3P4	I	
127	CSRVS4	LINE #4 SERVICE STATUS INPUT SERVICE PRESENT HIGH	I	TTL
152	SUPRT4	D3P LINE #4 SUPPORT SIGNAL	I	TTL
033	D3P5	RS422 VMR PARITY PULSE LINE #5	I	
133	D3PB5	COMPLEMENT OF D3P5	I	
034	CSRVS5	LINE #5 SERVICE STATUS INPUT SERVICE PRESENT HIGH	I	TTL
053	SUPRT5	D3P LINE #5 SUPPORT SIGNAL	I	TTL
035	D3P6	RS422 VMR PARITY PULSE LINE #6	I	
135	D3PB6	COMPLEMENT OF D3P6	I	
134	CSRVS6	LINE #6 SERVICE STATUS INPUT SERVICE PRESENT HIGH	I	TTL
153	SUPRT6	D3P LINE #6 SUPPORT SIGNAL	I	TTL
037	D3P7	RS422 VMR PARITY PULSE LINE #7	I	
137	D3PB7	COMPLEMENT OF D3P7	I	
038	CSRVS7	LINE #7 SERVICE STATUS INPUT SERVICE PRESENT HIGH	I	TTL
054	SUPRT7	D3P LINE #7 SUPPORT SIGNAL	I	TTL

INPUT/OUTPUT INFORMATION (CONT)

VMR INTERFACE (CONT)

039	D3P8	RS422 VMR PARITY PULSE LINE #8	I	
139	D3PB8	COMPLEMENT OF D3P8	I	
138	CSRVS8	LINE #8 SERVICE STATUS INPUT SERVICE PRESENT HIGH	I	TTL
154	SUPRT8	D3P LINE #8 SUPPORT SIGNAL	I	TTL
029	BCTHRSHLD	TYPE B/C ERROR THRESHOLD STRAPPING	I	TTL
129	AVAIL1	AVAILABLE INPUT FOR GROWTH	I	TTL
030	AVAIL2	AVAILABLE INPUT FOR GROWTH	I	TTL
017	EXTAL1	OPTIONAL EXTERNAL OSC SOURCE TO IC1	I	TTL
117	EXTAL2	OPTIONAL EXTERNAL OSC SOURCE TO IC2	I	TTL
018	EXTAL3	OPTIONAL EXTERNAL OSC SOURCE TO IC3	I	TTL
118	EXTAL4	OPTIONAL EXTERNAL OSC SOURCE TO IC4	I	TTL

PIN#	DESIG	DESCRIPTON (BOARD FUNCTION)	I/O	SIGNAL
POWER BUS AND RESERVED PINS				
000	GRD	GROUND BUS	G	
100	GRD	GROUND BUS	G	
001	GRD	GROUND BUS	G	
101	GRD	GROUND BUS	G	
055	GRD	GROUND BUS	G	
155	GRD	GROUND BUS	G	
056	GRD	GROUND BUS	G	
156	GRD	GROUND BUS	G	
045	+5VIN	VCC +5V SOURCE INPUT	P	
145	+5VIN	VCC +5V SOURCE INPUT	P	
046	+5VIN	VCC +5V SOURCE INPUT	P	
146	+5VIN	VCC +5V SOURCE INPUT	P	
047	+5VIN	VCC +5V SOURCE INPUT	P	
147	+5VIN	VCC +5V SOURCE INPUT	P	
021	VCC1	RESERVED +12V SOURCE INPUT	P	
121	VCC1	RESERVED +12V SOURCE INPUT	P	
040	VEE	RESERVED -5V SOURCE INPUT	P	
140	VEE	RESERVED -5V SOURCE INPUT	P	
041	VEE	RESERVED -5V SOURCE INPUT	P	
141	VEE	RESERVED -5V SOURCE INPUT	P	
042	VEE	RESERVED -5V SOURCE INPUT	P	
142	VEE	RESERVED -5V SOURCE INPUT	P	
043	VEE	RESERVED -5V SOURCE INPUT	P	
143	VEE	RESERVED -5V SOURCE INPUT	P	
019	VEE1	RESERVED -12V SOURCE INPUT	P	
119	VEE1	RESERVED -12V SOURCE INPUT	P	

****

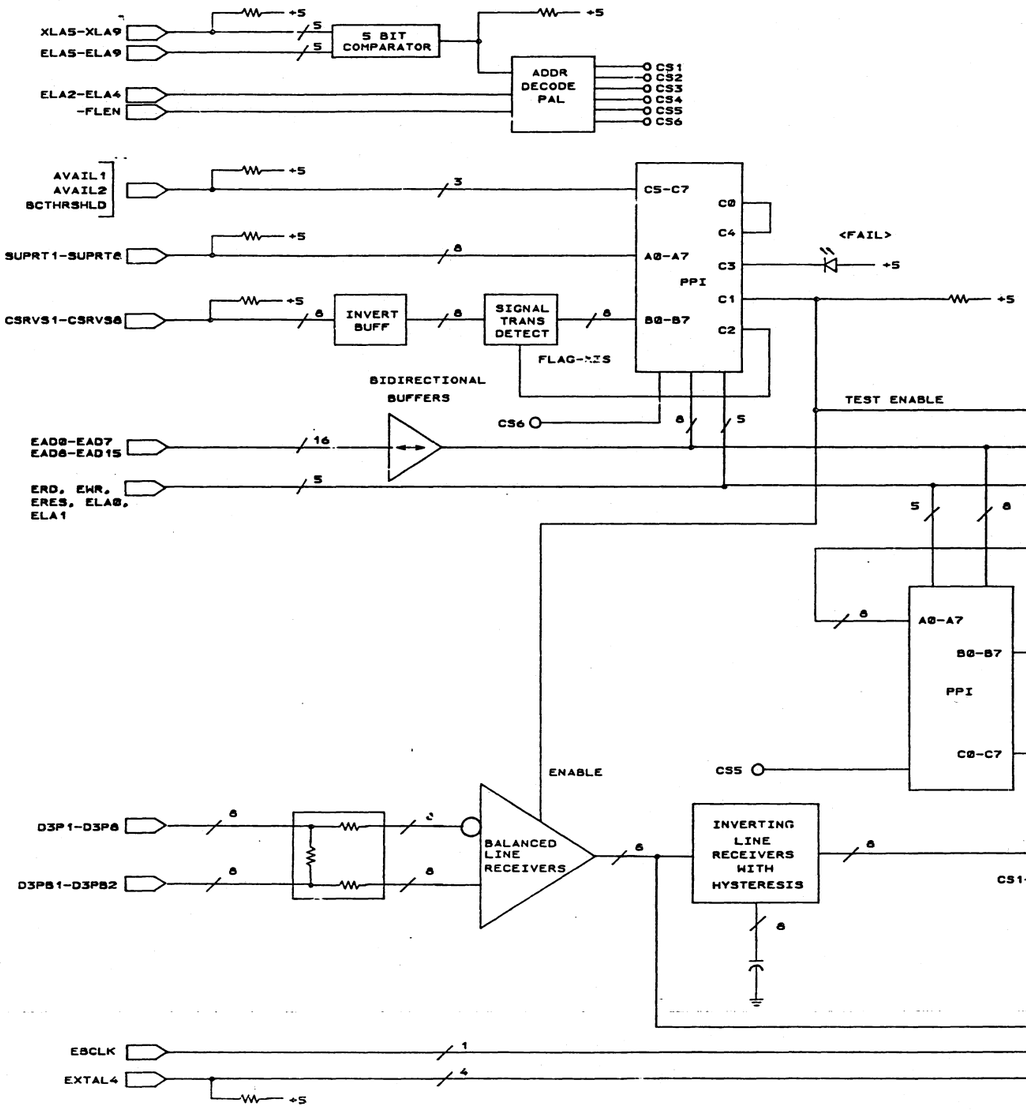
SEE PROPRIETARY NOTICE ON SHEET 1

AMR118 CIRCUIT PACK

DWG SIZE 6S | ISSUE 1

AT&T BELL LABORATORIES | CPS-AMR118 | 2

SYMBOL



SEE PROPRIETARY NOTICE ON SHEET 1

AMR118 CIRCUIT PACK

DWG SIZE 6S | ISSUE 1

AT&T BELL LABORATORIES | CPS-AMR118 | 3

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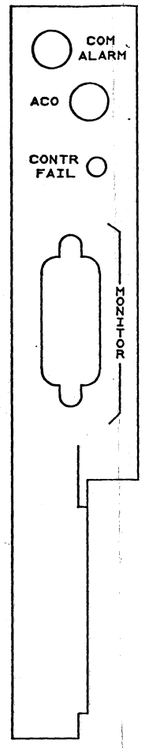
CIRCUIT DESCRIPTION INPUT/OUTPUT INFORMATION	3	1

RECORD OF CHANGES						
DWG ISSUE	PREV FURN	STD	MFR DISC	SERIES NUMBER	SEE NOTE	CLEI CODE

CURRENT DRAIN	
+5V(VCC)	1200MA

DRAWING NOTES

101. FACEPLATE DIAGRAM FOR AMR124.



DWG ISS	CD ISS	DATE ISSD	DRN	APP
1		9-3 87		

SUPPORTING INFORMATION

SYSTEM USED ON	DESIGN CONTROL	CATEGORY	NO.
ADR	MV		

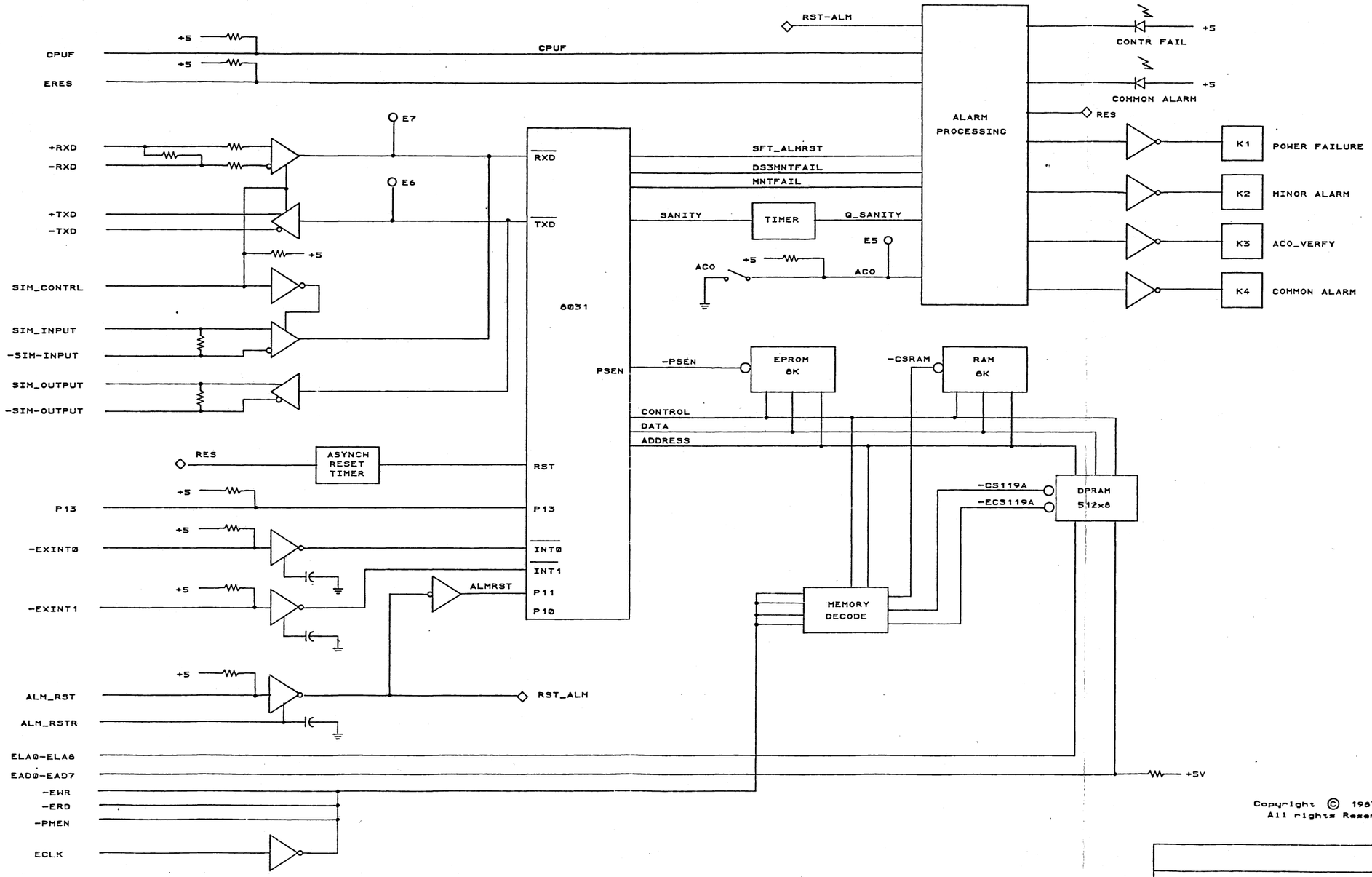
AN52

AMR124 CIRCUIT PACK
VPM TELEMETRY
CIRCUIT

DWG SIZE	ISSUE
6S	1

AT&T BELL LABORATORIES	CPS-AMR124	SHEET 1 OF 3

SYMBOL



AMR124 CIRCUIT PACK	DWG SIZE 6S	ISSUE 1
AT&T BELL LABORATORIES	CPS-AMR124	2

CIRCUIT DESCRIPTION

ALARM/TELEMETRY PROCESSOR CIRCUIT PACK PROVIDES THE TELEMETRY AND ALARM INTERFACE BETWEEN THE VPM AND THE GTP.

INPUT/OUTPUT INFORMATION

PIN#	DESIG	DESCRIPTON (BOARD FUNCTION)	I/O	SIGNAL
PRIMARY BUS				
002	EAD0	EXTERNAL LATCHED DATA BUS	IO	TTL
102	EAD1	EXTERNAL LATCHED DATA BUS	IO	TTL
003	EAD2	EXTERNAL LATCHED DATA BUS	IO	TTL
103	EAD3	EXTERNAL LATCHED DATA BUS	IO	TTL
004	EAD4	EXTERNAL LATCHED DATA BUS	IO	TTL
104	EAD5	EXTERNAL LATCHED DATA BUS	IO	TTL
005	EAD6	EXTERNAL LATCHED DATA BUS	IO	TTL
105	EAD7	EXTERNAL LATCHED DATA BUS	IO	TTL
008	ELA0	EXTERNAL LATCHED ADDRESS BUS	I	TTL
108	ELA1	EXTERNAL LATCHED ADDRESS BUS	I	TTL
009	ELA2	EXTERNAL LATCHED ADDRESS BUS	I	TTL
109	ELA3	EXTERNAL LATCHED ADDRESS BUS	I	TTL
010	ELA4	EXTERNAL LATCHED ADDRESS BUS	I	TTL
110	ELA5	EXTERNAL LATCHED ADDRESS BUS	I	TTL
011	ELA6	EXTERNAL LATCHED ADDRESS BUS	I	TTL
111	ELA7	EXTERNAL LATCHED ADDRESS BUS	I	TTL
012	ELA8	EXTERNAL LATCHED ADDRESS BUS	I	TTL
006	-ERD	EXTERNAL READ CONTROL LINE ACTIVE LOW	I	TTL
106	-EWR	EXTERNAL WRITE CONTROL LINE ACTIVE LOW	I	TTL
007	ERES	EXTERNAL RESET SIGNAL ACTIVE HIGH	I	TTL
029	-PMEN	EXTERNAL BOARD SELECT SIGNAL ACTIVE LOW	I	TTL
120	ECLK	EXTERNAL CLOCK 4.9152MHZ	I	TTL

PIN#	DESIG	DESCRIPTON (BOARD FUNCTION)	I/O	SIGNAL
AUXILIARY INPUT/OUTPUTS				
028	P13	AVAILABLE STRAP INPUT TO THE 8031	I	TTL
128	CONTRF	CONTROL OUTPUT INDICATING CONTRF	I	TTL
129	-EXINT0	AVAILABLE EXTERNAL INTERUPT TO 8031	I	TTL
130	-EXINT1	AVAILABLE EXTERNAL INTERUPT TO 8031	I	TTL
132	CPUF	EXTERNAL FLAG INDICATING CONTR FAIL	I	TTL
035	ALM-RST	EXTERNAL ALARM RESET INPUT	I	
135	ALM-RSTR	RETURN PATH FOR ALM-RST CONTACT POINT	I	
036	MNV	MINOR VISUAL ALARM CONTACT POINT	I	
136	MNV	RETURN PATH FOR MNV CONTACT POINT	0	
037	MN	MINOR ALARM CONTACT POINT	I	
137	MNR	RETURN PATH FOR MN CONTACT POINT	0	
038	USRALM	DISCRETE TELEMETRY ALARM CONTACT POINT	I	
138	USRALMR	RETURN PATH FOR USRALM CONTACT POINT	0	
039	ACOV	ALARM CUTOFF VISUAL CONTACT POINT	I	
139	ACOVR	RETURN PATH FOR ACO CONTACT POINT	0	
151	AMR110B_RST	REMOTE RESET FOR AMR110B	0	TTL
053	+RXD	RS422 TELEMETRY INPUT INTERFACE TO GTP	I	
153	-RXD	COMPLEMENT OF +RXD	I	
052	+TXD	RS422 TELEMERY OUTPUT INTERFACE TO GTP	0	
152	-TXD	COMPLEMENT OF +TXD	0	
J2-01	SIM-INPUT	INPUT FROM SIMULATOR- RS423 LEVEL	I	
J2-02	SIM-OUTPUT	OUTPUT TO SIMULATOR- RS423 LEVEL	0	
J2-03	SIM-CNTRL	CONTROL TO TRISTATE +/- TXD & +/-RXD	I	

INPUT/OUTPUT INFORMATION (CONT)

PIN#	DESIG	DESCRIPTON (BOARD FUNCTION)	I/O	SIGNAL
POWER BUS AND RESERVED PINS				
000	GRD	GROUND BUS	G	
100	GRD	GROUND BUS	G	
001	GRD	GROUND BUS	G	
101	GRD	GROUND BUS	G	
055	GRD	GROUND BUS	G	
155	GRD	GROUND BUS	G	
056	GRD	GROUND BUS	G	
156	GRD	GROUND BUS	G	
045	+5VIN	VCC +5V SOURCE INPUT	P	
145	+5VIN	VCC +5V SOURCE INPUT	P	
046	+5VIN	VCC +5V SOURCE INPUT	P	
146	+5VIN	VCC +5V SOURCE INPUT	P	
047	+5VIN	VCC +5V SOURCE INPUT	P	
147	+5VIN	VCC +5V SOURCE INPUT	P	
021	VCC1	RESERVED +12V SOURCE INPUT	P	
121	VCC1	RESERVED +12V SOURCE INPUT	P	
040	VEE	RESERVED -5V SOURCE INPUT	P	
140	VEE	RESERVED -5V SOURCE INPUT	P	
041	VEE	RESERVED -5V SOURCE INPUT	P	
141	VEE	RESERVED -5V SOURCE INPUT	P	
042	VEE	RESERVED -5V SOURCE INPUT	P	
142	VEE	RESERVED -5V SOURCE INPUT	P	
043	VEE	RESERVED -5V SOURCE INPUT	P	
143	VEE	RESERVED -5V SOURCE INPUT	P	
019	VEE1	RESERVED -12V SOURCE INPUT	P	
119	VEE1	RESERVED -12V SOURCE INPUT	P	

AMR124 CIRCUIT PACK		
	DWG SIZE 6S	ISSUE 1
AT&T BELL LABORATORIES	CPS-AMR124	3

VIOLATION PULSE MONITOR
USER'S MANUAL

10. J/ED DRAWINGS

The following J and ED drawings are contained in this tab:

J98779A1 This J drawing provides manufacturing, engineering and ordering information for the VPM shelf assembly.

ED-8C681-20 This ED drawing provides manufacturing and ordering information for the interconnecting cable assemblies used with the VPM.

TABLE OF CONTENTS

TABLE D-LIST OF ASSOCIATED REFERENCES

NUMBER	TITLE
ED8C679-30	VPM SHELF ASSY
ED8C681-20	CABLE ASSY

ISSUE NOTES

ORIGINAL APPROVED VC1-VCR • CERTIFIED 05/22/87 • JTE • RWD • GJR • 1 QC

ENGINEERING NOTES

51. INFORMATION FURNISHED PER THIS DRAWING IS IN ACCORDANCE WITH ATTP
52. THIS EQUIPMENT IS TO BE MISCELLANEOUSLY MOUNTED IN A ED54804-51 WORLD CLASS BAY FRAMEWORK OR IN A 23 INCH UNEQUAL FLANGE BAY FRAMEWORK PER ED97162-51, ED97162-52 OR ED8C501-50. MOUNT THIS SHELF SUCH THAT A MINIMUM OF ONE INCH OF CLEARANCE IS MAINTAINED BELOW THE SHELF AT ALL TIMES INCLUDING THE SUBSEQUENT MOUNTING OF OTHER SHELVES.
53. THIS EQUIPMENT PROVIDES A TELEMETRY INTERFACE BETWEEN 90C AND/OR 135A AND/OR 135EC LINE TERMINAL BAYS AND G.T.P. FOR THE MONITORING, COLLECTION, AND PROCESSING OF DS3 PARITY VIOLATION PULSES FOR A MAXIMUM OF 64 DS3 SIGNALS PER SHELF.
54. REFER TO ED54804-51, ED97162-51, ED97162-52, OR ED8C501-50 BAY FRAMEWORK SPECIFICATIONS WHEN ORDERING A BAY FRAME AND/OR FOR SUPPLEMENTARY FRAMEWORK DETAILS.
55. OPTIONAL ELECTROSTATIC DISCHARGE (ESD) WRIST STRAPS (E/W CORD AND PLUG) ARE AVAILABLE TO AID IN THE PREVENTION OF DAMAGE TO ELECTRICAL COMPONENTS BY ESD.
    2212 WRIST STRAP (MEDIUM) (901011312)
    2213 WRIST STRAP (LARGE) (901011320)
56. IN TABLE A, CIRCUIT FEATURES SHOWN IN PARENTHESES INDICATE THAT THE FIGURE, WIRING OR APPARATUS IS FURNISHED ELSEWHERE AND NOT AS PART OF THE LIST CONNECTED WITH THE FEATURE SHOWN IN PARENTHESES.
57. THE LINE ENGINEER SHALL INSTRUCT THE INSTALLER WHEN INSTALLING THE ED8C681-20, GROUP 1 AND/OR GROUP 2 CABLE ASSEMBLIES IN THE "VPM INTERFACE" AREA OF THIS EQUIPMENT, TO PLACE THE 963M INSULATION DISPLACEMENT CONNECTOR (FASTECH), PART OF THE CABLE ASSEMBLIES, WITH THE GREY PORTION OF THE CONNECTOR TO THE RIGHT WHEN INSERTING INTO THE 12A RETAINER, PART OF THE SHELF, IF IT BECOMES NECESSARY TO REMOVE A CONNECTOR, THE INSTALLER SHOULD PLACE A THIN BLADE SCREWDRIVER BETWEEN THE BLACK PORTION OF THE FASTECH CONNECTOR AND THE 12A RETAINER AND TURN THE SCREWDRIVER GENTLY TO RELEASE THE CABLE ASSEMBLY.
58. THE LINE ENGINEER SHALL INSTRUCT THE INSTALLER TO WRITE ON THE "DS3 PORT ASSIGNMENT" LABEL THE PORT ASSIGNED AND ON LABEL OF ED8C681-20 GROUP 1 AND/OR 2, THE CHANNEL ( ) AND RAIL ( ) ASSIGNMENT FOR SYSTEM ( ).
59. SPARING RECOMMENDATIONS FOR THE CIRCUIT PACKS, MICROCODED CIRCUIT PACKS AND POWER UNITS ARE AS FOLLOWS
    AMR118 -ONE FOR EVERY FOUR EQUIPPED
    MC45084A1 -ONE FOR ONE
    MC45085A1 -ONE FOR ONE
    47181 -ONE FOR ONE
    47481 -ONE FOR ONE
60. OPTION B SHALL BE USED FOR FIRST LIST 4, OPTION C FOR THE SECOND, OPTION D FOR THE THIRD AND SO ON, UP TO A MAXIMUM OF SEVEN LIST 4.

TABLE A-FEATURES

EQUIPMENT: DESCRIPTION	REF NOTE	RATING	LIST OR GROUP	QUANTITY	EQUIPMENT OR CIRCUIT	LIST, GROUP OR FIG	WRG APP	SCHEMATIC	FIG	OPT	SD EQUIVALENT
ASSEMBLY, WIRING AND COMMON EQUIPMENT FOR ONE VIOLATION PULSE MONITOR (VPM) SHELF ASSEMBLY WHICH PROVIDES MONITORING OF DS3 PARITY VIOLATION PULSES FOR A MAXIMUM OF 64 DS3 SIGNALS. (EQUIPPED TO MONITOR 8 DS3 SIGNALS) (SEE NOTES 52,53 & 59)			1	1	T7C536-50	1					1 *Y*
				1	ED8C679-30	G1					1 *Y*
EQUIPMENT REQUIRED IN ADDITION TO LIST 1 WHEN THE SHELF ASSEMBLY IS POWERED BY A -24 VOLT BATTERY SUPPLY. (DO NOT ORDER WITH LIST 3) (SEE NOTE 59)			2	1	T7C536-50	(1)	Z				2
				1	ED8C679-30	G2					2
EQUIPMENT REQUIRED IN ADDITION TO LIST 1 WHEN THE SHELF ASSEMBLY IS POWERED BY A -48 VOLT BATTERY SUPPLY. (DO NOT ORDER WITH LIST 2) (SEE NOTE 59)			3	1	T7C536-50	(1)	Y				3
				1	ED8C679-30	G3					3
EQUIPMENT REQUIRED IN ADDITION TO LIST 1 TO PROVIDE INTERFACE FOR 8 ADDITIONAL DS3 SIGNALS. (MAXIMUM 7-LIST 4) (SEE NOTES 59 & 60)			4	1	T7C536-50	(1)	B,C D,E F,G OR H				4

TABLE C-WIRING PROVIDED BY INSTALLER

CIRCUIT NAME	SCHEMATIC	WIRING DIAGRAM	FIG	OPT	WIRED	NOTE REMARKS
INSTALLER						

COMMON SYSTEMS
DIGITAL RADIO
SPECIFICATION FOR
VIOLATION PULSE MONITOR
SHELF ASSEMBLY

DRAWING-ID J98779A-1
ISSUE 1

AT&T RATING
DIST CODE 1N52

SHEET 1

DWG SIZE X8S

TABLE C-WIRING PROVIDED BY INSTALLER

CIRCUIT NAME	SCHEMATIC	WIRING DIAGRAM	FIG	OPT	WIRED	NOTE REMARKS
135A/EC LINE TERM CKT	SD7C425-01	T7C425-30				
90C LINE TERM CKT	SD54535-01	T54535-30				

SHOP INST

MANUFACTURING NOTES

1. () INDICATES DESIGNATIONS TO BE STAMPED IN ACCORDANCE WITH JOB INFORMATION.
2. */ PARTS (A) REQUIRED FOR MANUFACTURE WHEN EQUIPMENT INVOLVED IS SHOP MOUNTED OR (B) TO BE SHIPPED ATTACHED TO OR ENCLOSED IN THE SAME CONTAINER WITH THE ASSOCIATED ITEM WHEN FIELD MOUNTED
3. < > INDICATES DESIGNATIONS WHICH ARE PROVIDED IN ACCORDANCE WITH OTHER INFORMATION.
4. W* PARTS TO BE (A) SHOP ASSEMBLED, BUT WHICH CANNOT BE ASSEMBLED UNTIL THE ASSOCIATED EQUIPMENT IS BEING MOUNTED OR (B) SHIPPED ATTACHED TO, OR ENCLOSED IN THE SAME CONTAINER WITH THE ASSOCIATED EQUIPMENT WHEN FIELD MOUNTED.

STOCKLIST

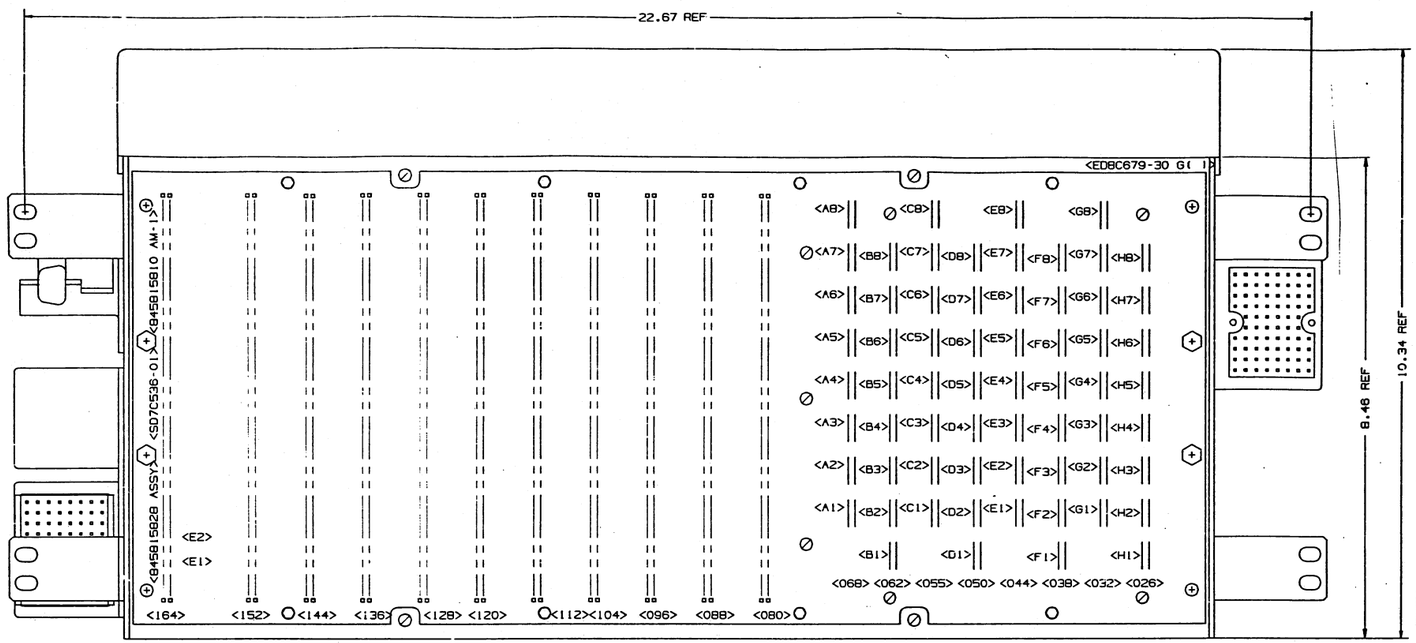
ITEM NBR	LIST GROUP CODE	QTY PER CODE	PRODUCT IDENTIFIER	CODE	DESCRIPTION	REFERENCE POSITION	NOTE SYM NBR
100	1	1	ED8C679-30,G1		SHELF ASSY,VPM WIRED		
105	2	1	ED8C679-30,G2		SHELF ASSY,VPM WIRED		
110	3	1	ED8C679-30,G3		SHELF ASSY,VPM WIRED		
300	3	1	845818053		LABEL, DESIGNATION		
305	2	1	845818061		LABEL, DESIGNATION		
310	1	1	845818079		LABEL, DESIGNATION		
500	1,4	1	104025622	AMR118	PACK,CIRCUIT CLEI = DRPQOPPAXX		
510	1	1	105229595	MC45084A1	PACK,CIRCUIT, MICROCODED CLEI = DRMQOD2AXX		
520	1	1	105229603	MC45085A1	PACK,CIRCUIT, MICROCODED CLEI = DRMQOD3AXX		
530	2	1	103825345	4718A	UNIT, POWER CLEI = PWPQ74GAXX		
540	3	1	103821435	4748A	UNIT, POWER CLEI = PWPQ73ZAXX		
550	1	7	103819983	155C	BLANK, APPARATUS		
560	4	OMIT 1	103819983	155C	BLANK, APPARATUS		
600	1	1	105355705	P422-600-100AC	DOCUMENT, VIOLATION PULSE MONITOR USER MANUAL		W*
900	1	4	803535012	P353501	SCREW, SPECIAL ROUND HEAD MACHINE .216-24 X 5/16 STEEL 289A FINISH		*/

MISCELLANEOUS TABLES

SHEET INDEX 01000

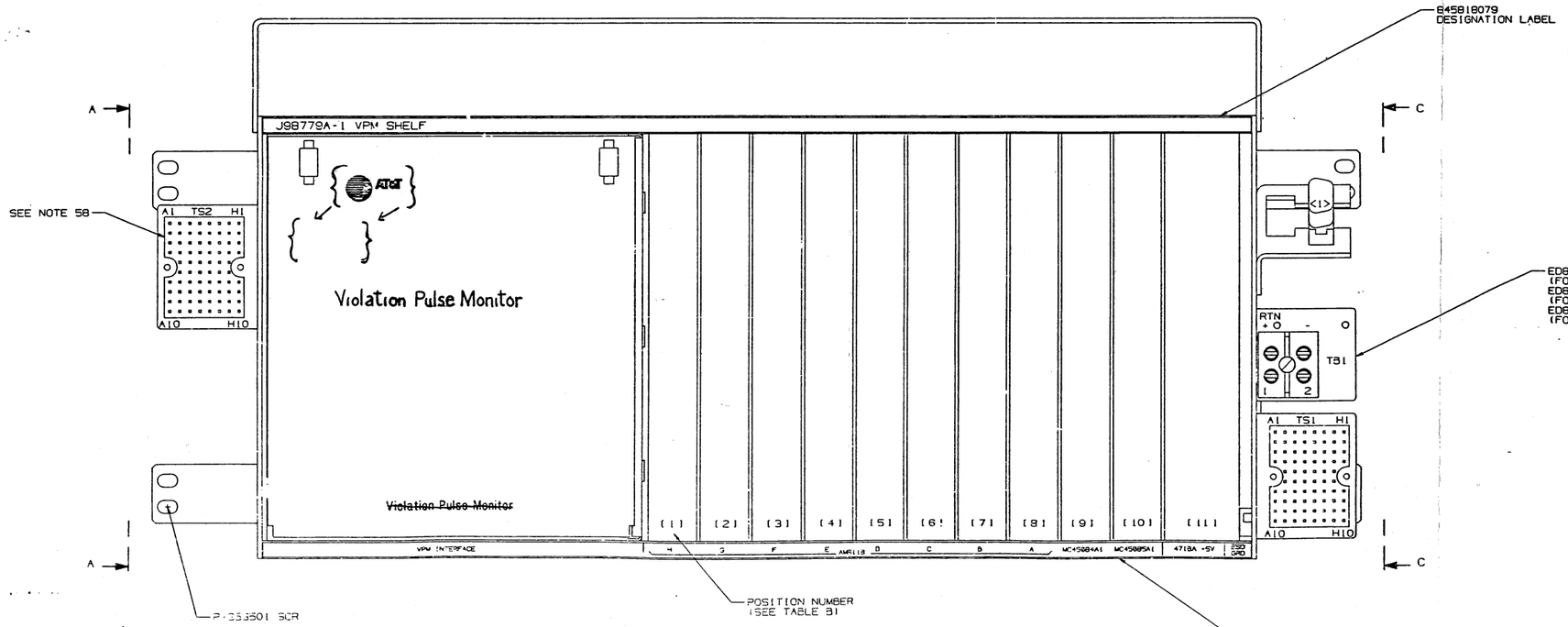
SHEET NUMBER	ISSUE
1	1
2	1
3	1
4	1

{505 1 1 846016517 LABEL}



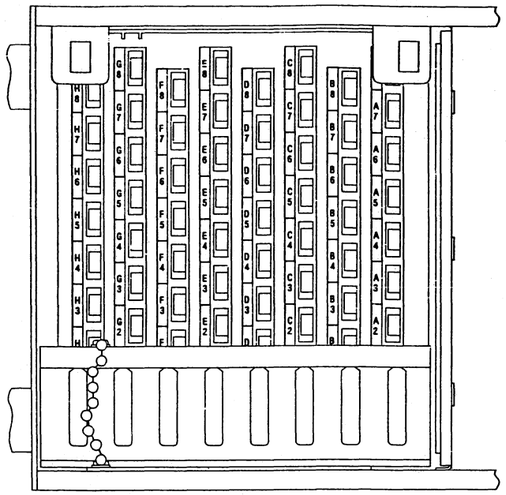
(REAR COVER REMOVED)
REAR VIEW

TABLE B			
LINE	POS NO.	LIST	PLUG-IN CODE
1	1	1	155C BLANK
2	1	7TH-4	AMR118
3	2	1	155C BLANK
4	2	6TH-4	AMR118
5	3	1	155C BLANK
6	3	5TH-4	AMR118
7	4	1	155C BLANK
8	4	4TH-4	AMR118
9	5	1	155C BLANK
10	5	3RD-4	AMR118
11	6	1	155C BLANK
12	6	2ND-4	AMR118
13	7	1	155C BLANK
14	7	1ST-4	AMR118
15	8	1	AMR118
16	9	1	MC45084A1 (AMR108)
17	10	1	MC45085A1 (AMR124)
18	11	2	471BA
19	11	3	474BA



(UNLESS OTHERWISE SPECIFIED,
ALL DESIGNATIONS IN THIS VIEW ARE PROVIDED
IN ACCORDANCE WITH OTHER INFORMATION)
FRONT VIEW
(FOR LIST 1 UNLESS OTHERWISE SPECIFIED)
FIG 1

VIOLATION PULSE MONITOR SHELF ASSEMBLY		DWG SIZE A3S	ISSUE 1
AT&T TECHNOLOGIES, INC.	J98779A-1		SHEET NO. 3



(DESIGNATIONS IN THIS VIEW ARE PROVIDED IN ACCORDANCE WITH OTHER INFORMATION)
(PARTIAL FRONT VIEW COVER REMOVED)
(SEE NOTE 58)
VIEW G-G

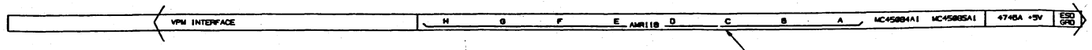
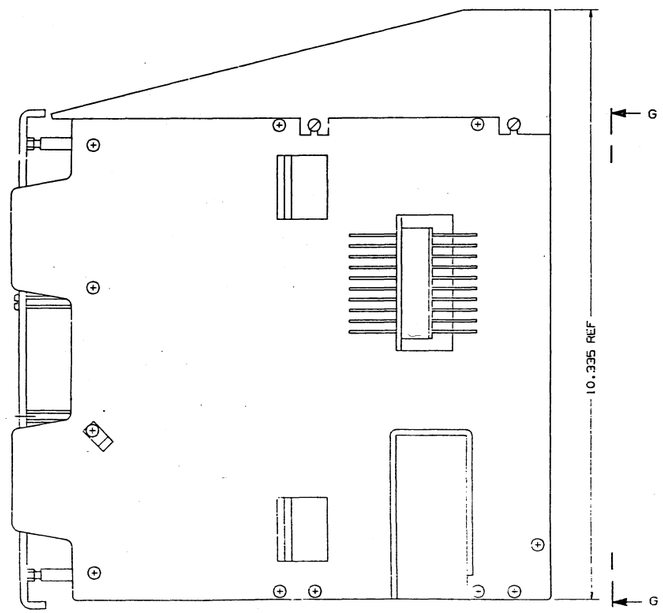
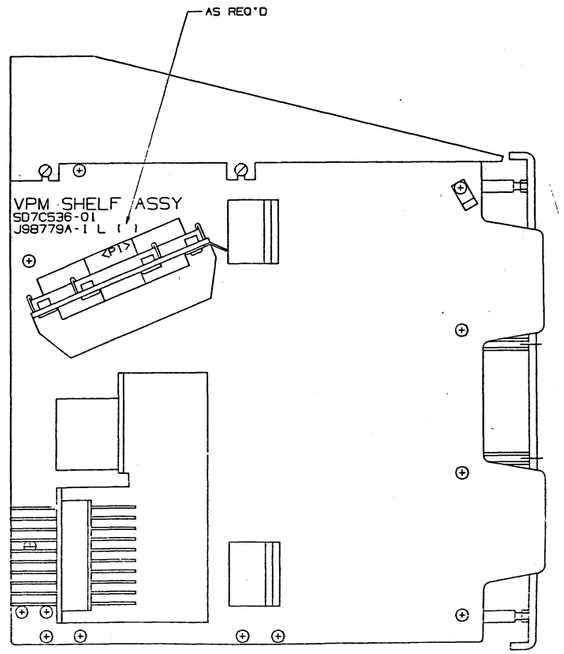


FIG B

845818053
DESIGNATION LABEL
REF

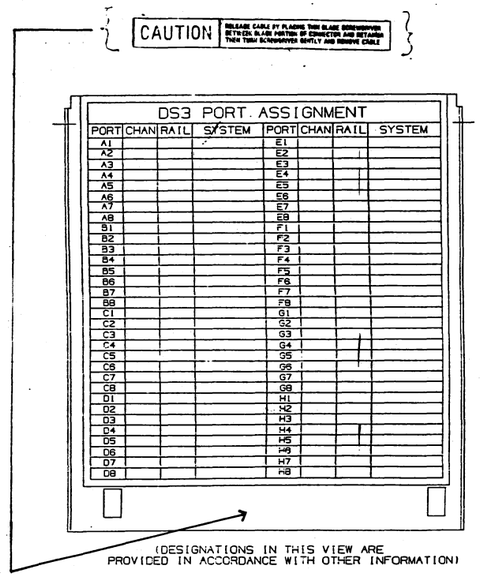


(LEFT SIDE VIEW)
VIEW A-A



(RIGHT SIDE VIEW)
VIEW C-C

Issue 2
896016517 LABEL



DS3 PORT ASSIGNMENT

PORT	CHAN	RAIL	SYSTEM	PORT	CHAN	RAIL	SYSTEM
A1				E1			
A2				E2			
A3				E3			
A4				E4			
A5				E5			
A6				E6			
A7				E7			
A8				E8			
B1				F1			
B2				F2			
B3				F3			
B4				F4			
B5				F5			
B6				F6			
B7				F7			
B8				F8			
C1				G1			
C2				G2			
C3				G3			
C4				G4			
C5				G5			
C6				G6			
C7				G7			
C8				G8			
D1				H1			
D2				H2			
D3				H3			
D4				H4			
D5				H5			
D6				H6			
D7				H7			
D8				H8			

(DESIGNATIONS IN THIS VIEW ARE PROVIDED IN ACCORDANCE WITH OTHER INFORMATION)
(COVER IN OPEN POSITION)
(SEE NOTE 59)
FIG A

VIOLATION PULSE MONITOR SHELF ASSEMBLY	DWG SIZE X85	ISSUE 1
AT&T TECHNOLOGIES, INC. J98779A-1		SHEET NO.

ENGINEERING NOTES

51. INFORMATION FURNISHED PER THIS DRAWING IS IN ACCORDANCE WITH ATTP-

52. ASSOCIATED DRAWINGS:
T-7C425-30 (135A/EC)
T-54535-30 (90C)

53. FOR GROUP 1,2 AND 3 THE LINE ENGINEER SHALL SPECIFY THE TOTAL LENGTH OF CABLE REQUIRED BETWEEN BAYS INCLUDING CABLE DROPS TO PANEL LOCATIONS AND 4 FEET OF CABLE REQUIRED TO FEED THE PANELS FROM THE BAY DUCT. MAXIMUM CABLE LENGTHS ORDERED FOR THESE GROUPS SHALL NOT EXCEED ~~100~~ 500 FEET.

54. THE LINE ENGINEER SHALL SPECIFY LENGTH OF CABLE REQUIRED FOR GROUP 4. MAXIMUM CABLE LENGTH ORDERED SHALL NOT EXCEED ~~100~~ 500 FEET.

MANUFACTURING NOTES

1. FOR TOLERANCES ON DIMENSIONS AND NOTES ON LABELS AND STAMPING SEE H-800-144.
2. SHOP SHALL CUT UNUSED LEADS DEAD AT BUTT OF CABLE.
3. SHOP SHALL PROVIDE LABEL OR STAMPING FOR FUNCTIONAL DESIGNATIONS.
4. SHOP SHALL ADD LENGTHS AS REQUIRED FOR CONNECTOR TERMINATIONS.
5. SHOP SHALL SECURE CABLE AT APPROXIMATELY THREE FOOT INTERVALS.
6. ✓IN REQUIRED COLUMN OF STOCKLIST INDICATES QUANTITY AS REQUIRED.
7. SHOP SHALL PROVIDE PROTECTION FOR LEADS ENTERING HOODS.
8. THE SHOP SHALL APPLY TAPE AT THE "TO END" BEFORE APPLYING SHRINK TUBING. THE SHRINK TUBING SHALL OVERLAP THE CONNECTOR BY 1/8 INCH.
9. CA1 AND CA2 FOR GROUP 1 AND CA1,CA2 AND CA3 FOR GROUP 2 SHALL BE IDENTIFIED AT THE TO END ADJACENT TO CONNECTOR.
10. < > INDICATES DESIGNATIONS WHICH ARE PROVIDED IN ACCORDANCE WITH OTHER INFORMATION.

6	5	4	3	2			1		ASSEMBLY FIGURE NUMBER	GG
4	4			4	4	4	4	4	TO END OF CABLE SEE NOTE	FF
4	4	4	4	4	4	4	4	4	FROM END OF CABLE SEE NOTE	EE
									TERMINATE TO END OF CABLE PER ED-92524-11-21 FIG	DD
									TERMINATE FROM END OF CABLE PER ED-92524-11-21 FIG	CC
3,9	3,9			5	5	5	5	5	EQUIP TO END OF CABLE WITH ITEM	BB
4,6	2	2	7,8 6	2			2		EQUIP FROM END OF CABLE WITH ITEM	AA
T-7C425-30	T-7C425-30	T-7C425-30	T-7C425-30	T-7C425-30			T-7C425-30		USED ON	LINE
									L	
									K	
									J	
									H	
									G	
									F	
									E	
									D	
									C	
									B	
10-0	10-0	NOTE 54	NOTE 53	NOTE 53			NOTE 53		A	

DIMENSIONS
(FIGURE 1 & NOTE 1)

DO NOT CHANGE THIS DRAWING WITHOUT MAKING THE CORRESPONDING CHANGE IN CAMELOT WHEN REQUIRED

				1	1	1	1	1	845820612	LABEL		15
				✓					402839138	KS-22487,L105 CABLE, G,W-G		14
✓	✓	✓			✓		✓		402839146	KS-22487,L105 CABLE, O,W-O		13
✓	✓	✓				✓		✓	402839062	KS-22487,L105 CABLE, BL,W-BL		12
			✓						102568832	816AS CABLE		11
												10
1	1								997088158	KS-19088,L4 CONNECTOR		9
			1						803382415	(P-338241) WIRING STAY BAND		8
			1						996975900	KS-19196,L1 CONNECTOR HOOD		7
1			1						997082581	KS-19088,L1 CONNECTOR		6
				1	1	1	1	1	104197223	963N3-6 CONNECTOR		5
1									402761894	239-33-99-006 HOOD		4
1	1								404100166	SDH-9GFCS HOOD		3
	1	1		1			1		403707847	224-06-14-000 CONNECTOR		2
										(TRW-CINCH)		1
									PIECE	NAME	NOTE	ITEM
REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	STOCK LIST			
				3	2	1	2	1	← CABLE NUMBER			
GROUP 6	GROUP 5	GROUP 4	GROUP 3	GROUP 2			GROUP 1					

SH NO.	ISSUE
6	1
5	1
4	1
3	1
2	1
1	1

SHEET INDEX

1-31-87

JTE	RPJ	GJR	1

AN28

COMMON SYSTEMS
DIGITAL TRANSMISSION FACILITIES
SPECIFICATION FOR
INTERCONNECTING CABLE ASSEMBLIES

DWG SIZE	ISSUE
6S	1

AT&T TECHNOLOGIES, INC. | ED8C681-20 | SHEET NO. 6 SHTS.SHT1

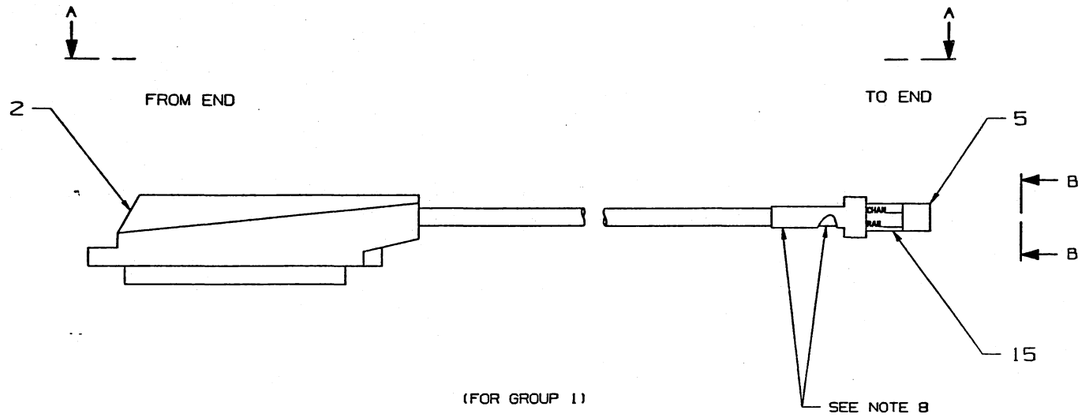
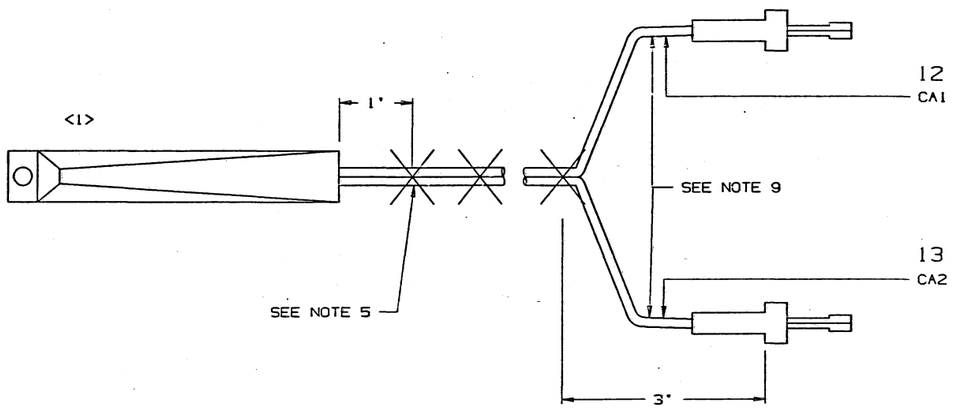
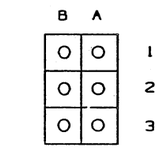


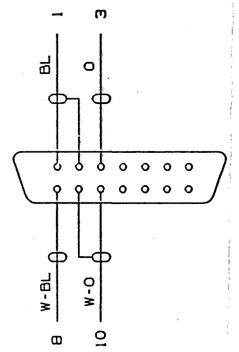
FIG 1

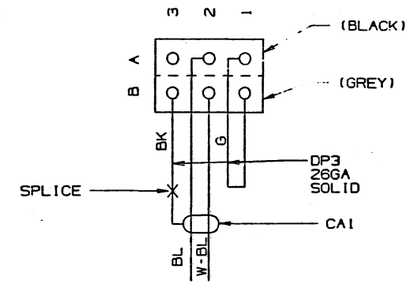


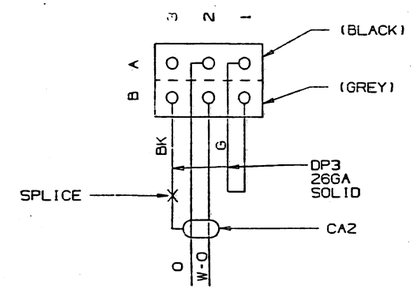
VIEW A-A



VIEW B-B







(WIRING DIAGRAM)

GROUP 1

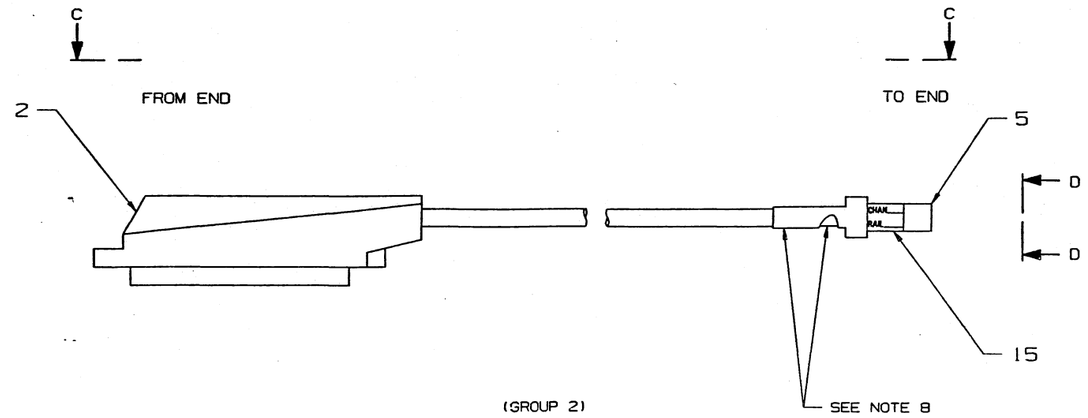
ATTENTION
THIS DWG WAS PRODUCED FROM DIGITAL DATA.
DO NOT CHANGE THIS DRAWING WITHOUT MAKING THE CORRESPONDING CHANGE IN CAMELOT AND/OR THE DIGITAL FILE.

TITLE
INTERCONNECTING CABLE ASSEMBLIES

DWG SCALE:NTS

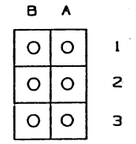
AT&T

MV	ED8C681-20	SHEET NO. 2	ISSUE NO. 1	M	DWG SIZE 8S

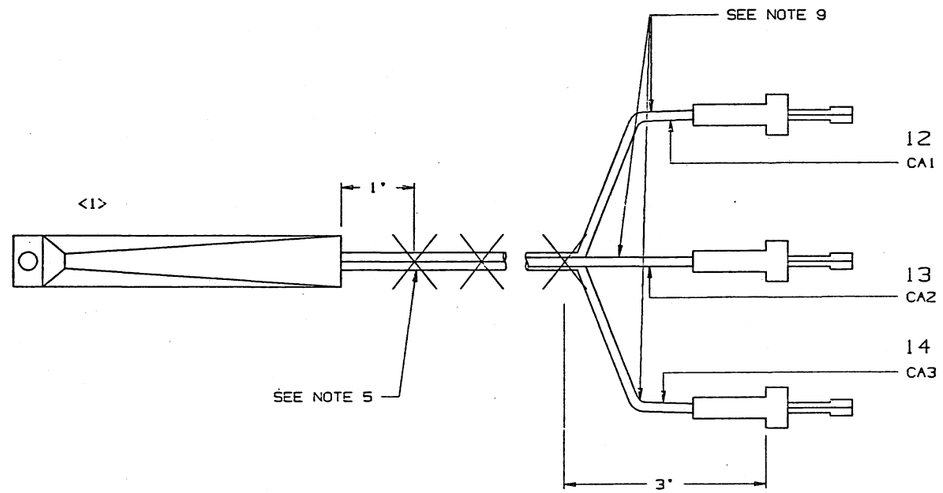


(GROUP 2)

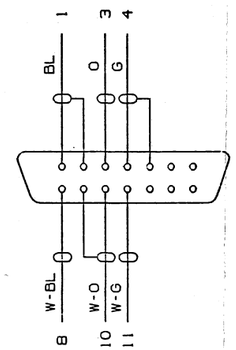
FIG 2

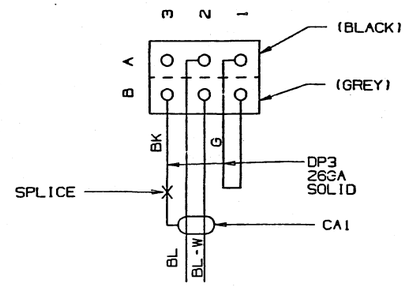


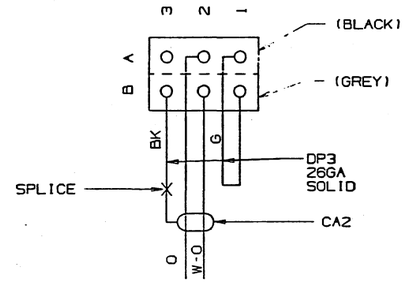
VIEW D-D

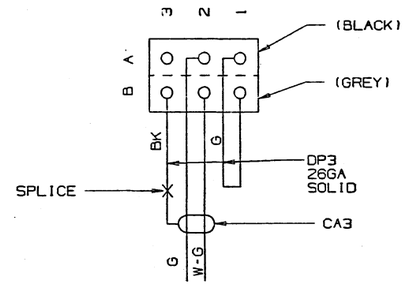


VIEW C-C









(WIRING DIAGRAM)

GROUP 2

ATTENTION

THIS DWG WAS PRODUCED FROM DIGITAL DATA.

DO NOT CHANGE THIS DRAWING WITHOUT MAKING THE CORRESPONDING CHANGE IN CAMELOT AND/OR THE DIGITAL FILE.

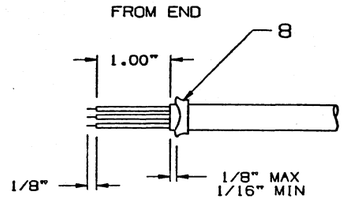
TITLE
INTERCONNECTING CABLE ASSEMBLIES

DWG SCALE:NTS

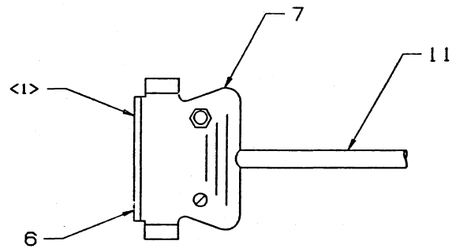
AT&T

MV	ED8C681-20	SHEET NO. 3	ISSUE NO. 1	M	DWG SIZE 6S

11/85 PRINTED IN U.S.A.

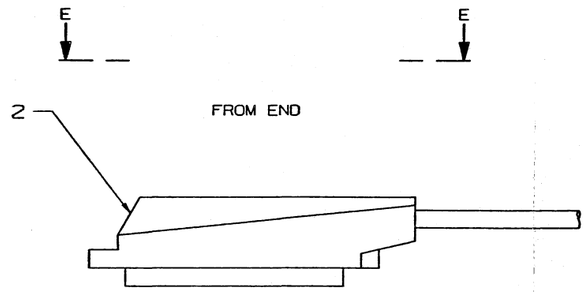


TYPICAL PREPARATION OF CABLE
(FOR GROUP 3)
STEP 1



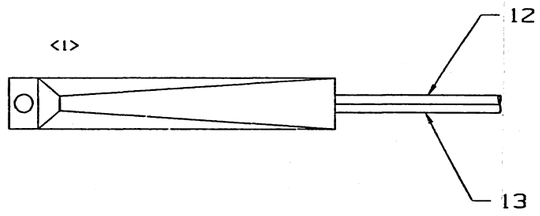
ASSEMBLY OF GROUP 3
STEP 2

FIG 3

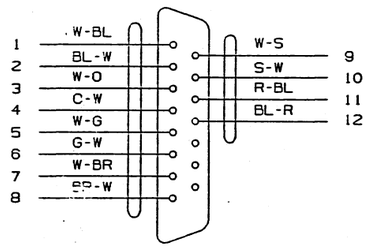


(FOR GROUP 4)

FIG 4

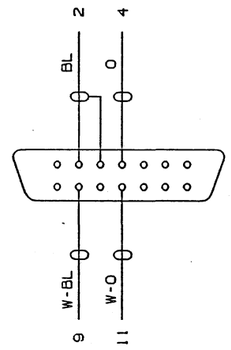


VIEW E-E



(WIRING DIAGRAM)

GROUP 3



(WIRING DIAGRAM)

GROUP 4

ATTENTION
THIS DWG WAS PRODUCED FROM DIGITAL DATA.
DO NOT CHANGE THIS DRAWING WITHOUT MAKING THE CORRESPONDING CHANGE IN CAMELOT AND/OR THE DIGITAL FILE.

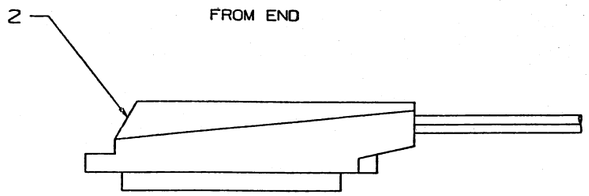
TITLE
INTERCONNECTING CABLE ASSEMBLIES

DWG SCALE:NTS

AT&T

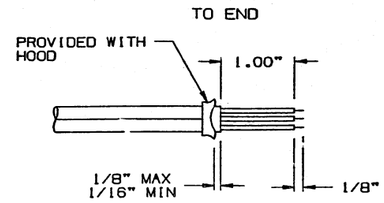
MV	ED8C681-20	SHEET NO. 4	ISSUE NO. 1	M	DWG SIZE 6S

11/85: PRINTED IN U.S.A.

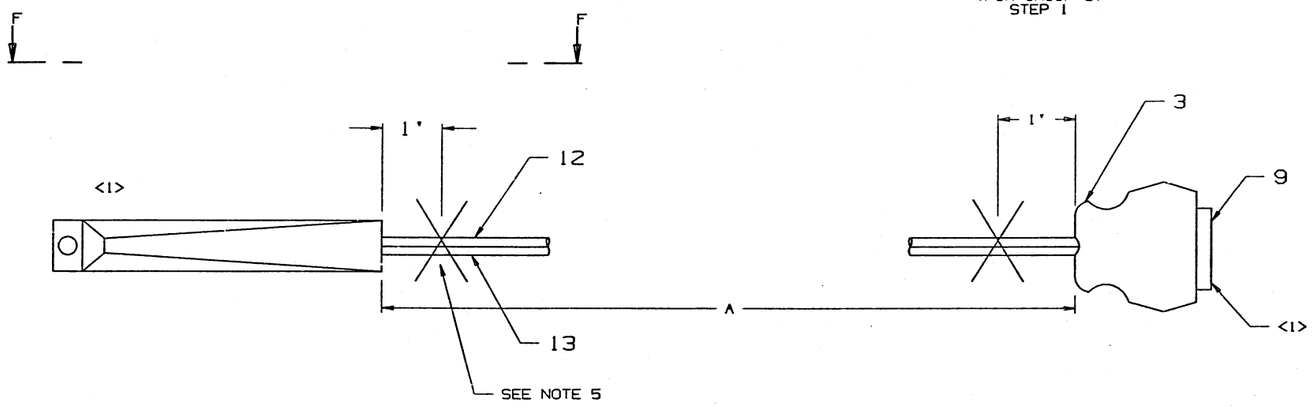


(FOR GROUP 5)

VIEW F-F

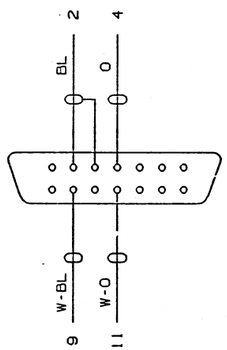


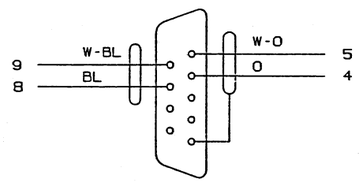
TYPICAL PREPARATION OF CABLE
(FOR GROUP 5)
STEP 1



ASSEMBLY OF GROUP 5
STEP 2

FIG 5





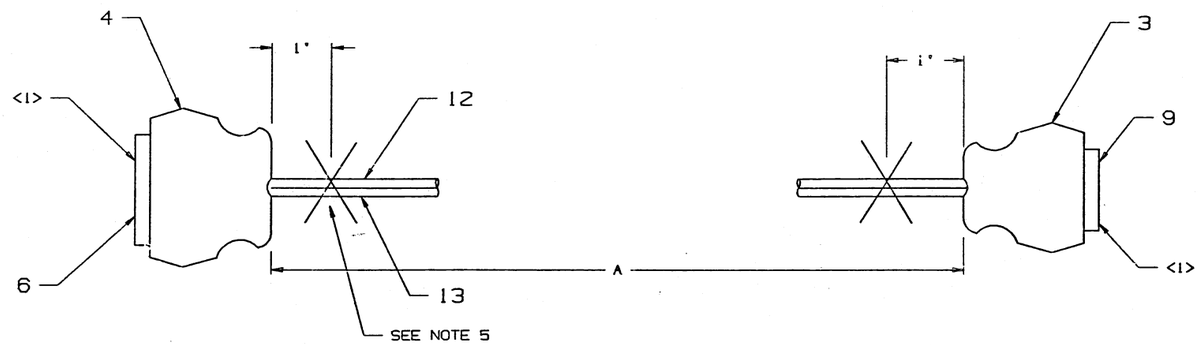
(WIRING DIAGRAM)

GROUP 5

TITLE: INTERCONNECTING CABLE ASSEMBLIES	ATTENTION: THIS DWG WAS PRODUCED FROM DIGITAL DATA. DO NOT CHANGE THIS DRAWING WITHOUT MAKING THE CORRESPONDING CHANGE IN CAMELOT AND/OR THE DIGITAL FILE.
	DWG SCALE:NTS
	AT&T
MV ED8C681-20	SHEET NO. 5 / ISSUE NO. 1 / M / DWG SIZE 6S

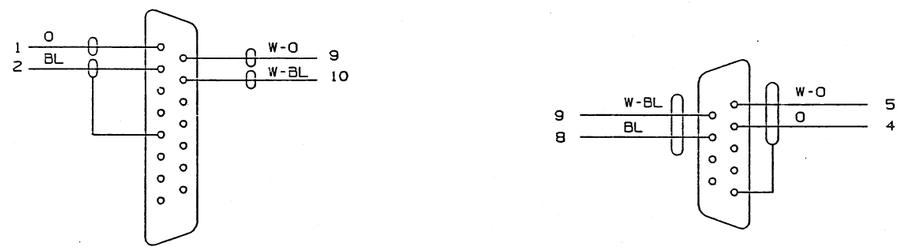
11-951 PRINTED IN U.S.A.

TYPICAL PREPARATION OF CABLE
(FOR GROUP 6)
STEP 1



ASSEMBLY OF GROUP 6
STEP 2

FIG 6



(WIRING DIAGRAM)

GROUP 6

TITLE	INTERCONNECTING CABLE ASSEMBLIES
	ATTENTION: THIS DWG WAS PRODUCED FROM DIGITAL DATA. DO NOT CHANGE THIS DRAWING WITHOUT MAKING THE CORRESPONDING CHANGE IN CAMELOT AND/OR THE DIGITAL FILE.
	DWG SCALE:NTS
	AT&T
MV ED8C681-20	SHEET NO. 6 · ISSUE NO. 1 · M · DWG SIZE 6S

11/85 PRINTED IN U.S.A.

VIOLATION PULSE MONITOR
USER'S MANUAL

11. APPENDIX

This tab contains documentation needed to support AT&T Practive 422-600-100AC, VIOLATION PULSE MONITOR USER'S MANUAL.

Attached is AT&T Practice 104-600-002, CB149 SERIAL TELEMETRY MONITOR AND TEST SET. This document describes the operating instructions for the GTPSIM program version 1.005B.

PRELIMINARY

CB149 SERIAL TELEMETRY MONITOR AND TEST SET DIGITAL RADIO SYSTEMS DESCRIPTION

CONTENTS PAGE

PURPOSE

This document describes the operating instructions for the GTPSIM program version 1.005B.

To aid in the implementation of the TABS (telemetry asynchronous block) protocol into digital radio systems, a program (GTPSIM) was developed. GTPSIM will simulate the GTP (general telemetry processor), and drive Terminal Radio Bays with the TABS protocol defined in Compatibility Bulletin #149 (CB149). This program was needed to develop the firmware (in the Terminal Radio Bays) that interfaces with a GTP.

HARDWARE REQUIREMENT

Your copy of GTPSIM will run on an AT&T PC 6300 or TOSHIBA 1100 PLUS PC or TOSHIBA 3100 PC. If you are using a PC 6300, with a METRABYTE COMM 422 board interface, (Metrabyte Corporation, Stoughton, MA) you can only operate your PC in the GTP simulation mode (see MODES OF OPERATION section). In this case, when you start your program, you must enter a "2" to indicate to the program that you are using the PC communication port 2. The 422 board should be set to the base address for COMM2 and RS-422 without the CTS or RTS signals as described in your METRABYTE data sheet. Your pin-outs are also described in the data sheet.

If you are using an External to PC RS-232C, to RS-422 converter with the RS-232C RTS (Request To Send) lead, you may use the LISTEN-IN MODE (see MODES OF OPERATION section). The recommended unit is the B & B Electronics RS-232C to RS-485 converter (model 485COR) with model 485ps power supply unit. Set up information is furnished with the unit. When running in this configuration, use either the PC 6300 or TOSHIBA 1100 PLUS. Connect the built-in PC serial port (COMM1) to the ME. Appendix B shows the cables and straps needed to allow the GTPSIM program to run. When the program is started, select COMM1 as your serial port by entering a "1" when prompted by the PC during program initialization.

GETTING YOUR DISKETTE READY

The GTPSIM program is sent out as a floppy diskette. This diskette should be copied onto a formatted system diskette. To format the diskettte, use the standard MS-DOS™ FORMAT command with a '/s' option. After formatting your system diskette, copy all the files from the GTPSIM diskette onto your system diskette. To copy the files, insert your GTPSIM diskette in A drive and the formatted system diskette in B drive. Then, input the MS-DOS copy command -- "copy a:*.* b:". After this copy is done, remove the diskettes from the drives. From now on use your newly created diskette (system diskette) to boot your computer. To do this, place the newly created diskette in drive A and reset the PC. The PC will start, and the GTPSIM program will begin to run following the start-up of MS-DOS. ***Diskette manipulation is necessary to avoid MS-DOS copyrights violation.***

After loading your data base, you can specify the start-up data base by modifying the file AUTOEXEC.BAT on your system diskette. AUTOEXE.BAT is a one line file consisting of the line "GTPSIM" and can be accessed by using the MS-DOS "TYPE" command. Enter GTPSIM to start the program. If you wish to "customize" your diskette to load a data base on boot of the system, use your MS-DOS EDLIN line editor to change that line to "GTPSIM -f xxxxx". The "xxxxx" denotes the data base you want to load at the start of the program. For example, if you enter "gtpsim -f 135fd", the starting data base would describe an ADR 135 Frequency Diversity Alarm Set.

When you look at your diskette, with a MS-DOS "DIR" command, it should contain data base files describing both the 135 and 90C Frequency Diversity Radio Systems and 135 Hot Standby Systems. You can use any of these files to boot your system or build your own data base as described in Appendix A.

DISKETTE FILES

The floppy diskette you receive contains the following files:

90ahs - An ASCII file defines the text to be output for alarm and status points for a 90a hot standby system.

90afd - An ASCII file defines the text to be output for alarm and status points for a 90a frequency diversity system.

90C - An ASCII file defines the text to be output for alarm and status points for a 90C system.

135fd - An ASCII file defines the text to be output for alarm and status points for a 135fd system.

135hs - An ASCII file defines the text to be output for alarm and status points for a 135hs system.

dgcode - A text file searched to locate diagnostic code information (90C and 135FD only).

gtpsim.exe - The executable program.

autoexec.bat - A MS-DOS start-up file.

cont.tim - An example of time based control input file.

cont.log - An example of a logic based control input file.

sers-g - A ASCII file that descrbes the FT SERIES G AS&C alarm text for a TCC.

sers-g.tma - A ASCII file that describes the FT SERIES G AS&C alarm text for a TMA.

sers-g.f1 - A ASCII file that describes the FT SERIES G AS&C alarm for a general application fault locate link.

sers-g.pm - A ASCII file that describes the FT SERIES G AS&C alarm for a general application performance monitor link.

dummy.db - A dummy data base description which will allow you to process AS&C data without text messages.

STARTING THE GTPSIM PROGRAM

When the program starts, the following information is displayed:

- BTL department which originated the program
- Name of the program
- Version number of the program
- Date and time.

To communicate with the bay, enter the selected serial port code. (You do not have to use a '2' on a PC 6300 if you are using an external protocol converter. You can enter a '1' with a PC 6300 with an external converter, and use the PC 6300 to listen in on links.) After the code is entered, the system parameters are displayed, followed by the starting user menu. The system parameters tell you the mode of the PC, the color state, and the COMM port you are using. This starting output is depicted in Figure 1.

MODES OF OPERATION

The GTPSIM program runs in two modes that change the level of menu presented to you. The modes are LISTEN and GTP simulate. On start, the program assumes a LISTEN state. In this state, the LISTEN menu is presented to you. Figure 1 shows the complete LISTEN menu.

INPUT REQUESTS

You can make an input selection with a single character followed by a carriage return. Only the first character of the input line is recognized as your request. The input is buffered by MS-DOS into a line. This means you can type your request, and if you make a mistake, you can use the BACK SPACE key to correct your input before you hit the RETURN key. When you hit the RETURN key, your command is entered.

LISTEN MENU OR MAIN MENU

In the LISTEN mode you have the following choices:

l - Listen in on a link
g - Enter/Exit GTP simulate mode
d - Diagnostic code information
! - escape to MS-DOS
c - turn color on or off
e - turn on or off TABS line error logging
b - send a TABS level 2 test message with PC loopback
x/q - exit the program

l option

This option will start listening in on a TABS link. In this mode, you will be prompted for some more follow-up information before listening starts. You will be asked to define the number of Switch Section Hops. This number is required by the output program to correctly display the FL (Fault Locating) hop numbers. (See output section.) The input number is the number of regenerators plus the number of repeater plus 1. If this number is not entered properly, the FL output report will contain the wrong number of hops. If you are not using the Fault Locate Link, enter any valid number. The number of working service channels/lines is asked for next. This number is also used in the output formatting programs. You need to specify the correct

number. If this number is not entered correctly, both the PM (Performance Monitoring) and FL output reports may cut off the higher numbered channels/lines.

You will be asked to select exception reports or regular reports. All the data collection made by the PC is the same. The only difference in the report is in the output formatting. In the exception report, the PC will scan the data collected on the FL or PM links, and report on that subset of lines or channels which meet the following criteria:

- If the PM or FL data indicates an out of FRAME in the measurement period, a line or channel will be entered on the list to be output.
- If the measured FL indicates an RDI bit set, an entry on the list will be made.
- If the reported number of parity errors is greater than or equal the number, you get to input next.

Upon completion of the data scan, the list of lines/channel will be output, followed by a report on each of the lines/channels up to the amount that will fill up the PC screen.

The report format is described in the output section. If you enter "e", you will be asked to input the number of parity errors to trigger a report. Then, you will be asked if you desire to log the reports. This implies that you can send a second copy. If you enter "prn", the data will be sent to the printer. If you enter another name, it will be used as a diskette file name to send the reports.

This option will also assume you want to active display option set on. (See output section.) Exception reporting is assumed on SERIES-G systems. Also , the "e" option is the recommended option for radio systems.

If you choose to specify the "n" option (regular reports), you need to specify the lowest service channel/line to be displayed on output. This is necessary because the output display will only fit 5 columns of the FL or PM data on the screen at one time. The protection channel is always displayed at the output This option is needed on a radio system larger than 1 by 4 when you look at data for the higher radio channels.

You will also be asked if you want to see all the AS&C bit maps or only want to see those display maps with active bits. The recommended option is 'a' or only those displays with active bits. This cuts down on display time and data you will have to look at. You will be required to specify if you are listening in on a VPM link. If so, you must enter a 'v' when prompted. This is because CB149 used the same messages for the PM link and the VPM link, and internally the PC must differentiate the two links. After this, the eavesdropping will go active and data will start coming out at you. The listening mode operates on all the radio TABS links. The outputs will be presented on the screen after collection. In the case of the AS&C link, this will be after a GTP AS&C response message when the link should be quiet for at least one poll time period. For the PM, FL, and VPM links, the program will report the data collected following a CB149 SYNC message. This collection will mean the reported FL or PM data will be delayed by one reporting period following the period in which the reported events occur. At this.point, the link should be one CB149 sync wait period.

To exit the LISTEN mode, you hit any key followed by the RETURN key. This will return you to the MAIN menu.

g option

The 'g' option will start the GTP simulation mode and allow you to command the BAY. If you are in the GTP simulation mode when the simulation mode is entered, you will exit it, and

return to the LISTEN mode. If you are in the LISTEN mode, you will enter the simulation mode.

The GTP simulation mode will display six new MAIN menu options. They are 't', 'a', 'p', 'f', 'v', and 's' (see Figure 2). These options are explained later. In the simulation mode, if you select one of the sub-menus 'a','f','p', or 'v', you will enable the PC's serial port transmitter which will cause the GTP and PC to malfunction. In effect, the two transmitters will 'buck' each other and neither will work properly. To prevent this, the system will remind you to disconnect the GTP before you are allowed to enter this mode.

d option

The 'd' option will be used by the operator to explain the two digit diagnostic code displayed on the terminal bay. To aid the operator in interpreting these codes, a file DGCODE.TXT was placed on the diskette. This file contains text for each defined diagnostic code in a radio system. After opting for a 'd', you will be asked for the code, and the diskette file will be searched for the code. If a valid code is found, it will be displayed on your screen.

! option

The '!' option will allow you to enter a MS-DOS command while the program remains in the computer. When the command is complete, control will be returned to the GTPSIM program. A few DOS commands that may be useful to the casual operator are: COPY, DATE, TIME, and DIR.

c option

The 'c' option will turn ON the color output for AS&C bit maps if it is OFF or turn OFF color if it is ON. The initial state of color is determined by the PC's serial port that was selected at the start of the program. If you use COMM2 (the PC 6300 option) you have color initially turned ON. Otherwise, color is initially turned OFF. This option only affects the bits maps in the AS&C outputs. The color option will not work well if you are expecting to get a printed output.

e option

The 'e' option will turn on or off the logging of the TABS error messages. The 'e' option will turn the option off or on. You must specify where to write the error test. The extra copy of the error will be sent to either diskette file or printer as you use in the follow up prompt.

b option

The 'b' option will be used as a self test of the PC. This option will expect the PC's RS-422 output to be looped back onto it's input. In this mode, a test message is sent out of the PC and checked on input for self checking the PC.

x/q option

The 'x' or 'q' options will cause the GTPSIM program to exit back to MS-DOS.

GTP SIMULATION MODE

In the GTP simulation mode, the MAIN menu is expanded to allow you to act like a GTP and request data from a terminal bay. In this mode, you can select a sub-menu for each tabs link. The links that can be selected are AS&C, PM, FL, and VPM. These options will each have their own sub-menu which will be explained by link.

AS&C SUB-MENU

The AS&C sub-menu is shown in Figure 3. The menu selection method is the same as the method used in the MAIN menu. If a selection requires more data, you will answer the follow-up questions asked by the PC. Each selection is explained below.

t command

This command is used to TEST a link. It will issue a TABS level 2 test message to the Monitored Equipment and wait for a reply. The reply is then verified and you are informed if the connections between the PC and the bay are correct. If connections are not, the command will fail and you should verify your connections and PC port assignments.

d command

The 'd' command will be the most used command. It will periodically collect data from the bay, and display the data it collected. This command will ask you if you want to see all the display maps or just the ones with active bits. It is recommended you use the 'a' input when running this command. The frequency of request is determined by the terminal bay based on information provided in a TABS configuration message for AS&C. The output is explained in the Output section of this document. A 'q' followed by a return will exit this loop.

0 (zero) command

The '0' command is used to simulate GTP remote commands to the terminal bay. This command will ask you to provide follow-up information regarding the HOP number, display, and point you want to set. You enter the data one line at a time as each piece is requested. When the data is complete, the remote command will be sent to the bay. Next the PC will wait 15 seconds and then ask the bay to report all the AS&C data.This is to allow you to get feedback as to whether or not your command took. You may abort this wait by hitting a RETURN key while waiting. Only one point may be set in each '0' command.

k command

This option will allow you to specify an output AS&C control point automatically. The automatic control point is either time based or logic based. The PC will assert this point based on an input control point file. The input file will specify up to 16 control points that can be set or cleared based on time or logic. The time based controls will allow you to set or clear a point every 'n' seconds as defined in the input file. The logic based controls will allow you to set or reset a control point based on the logical combining of any AS&C alarm or status points. Note that in the installation of radio systems it is sometimes required to start the 15 minute Performance Tests to bring in alarms on low error rates. These tests will time out on a radio system every 15 minutes, and have to be restarted by SCOTS. The format of these two files is described in an appendix.

h command

This command will be used to turn on and turn off the logging of the text string associated with AS&C points. If this option is off and you enter an 'h' command, the PC will write the text string for a AS&C point to both the PC console and another output port. If the port is a device on the PC (i.e., 'prn' for a printer port), the data will be sent to that device and the CRT. If the device is not a standard PC device, a file on PC disk will be created and the data sent there. This logging of AS&C data can be turned off if it is active by entering another 'h' command. If this option is turned on and no printer is present, or no disk is ready to receive data, the PC will stop and not function correctly.

l command

The 'l' command will load a new data base. A data base is the messages associated with each AS&C point. You will be asked to provide a file name to load. The file will be loaded and the command will end. If there is something wrong with your file, an error message will be issued, and you will be asked again. You may terminate the 'l' option by entering a 'p' at this point. Beware! Your data base may be destroyed at this time and you might get strange results.

f command

The 'f' option will reset the serial port on the PC. This may have to be done if the PC receiver 'hangs up'. A 'hang up' may be caused by switching from one port to another. The switching may produce noise which will get the PC's receiver stuck and no data is heard by the PC. This should be the first thing you try if you switch TABS links, or reset the bay and start getting error messages out of the PC.

a command

The 'a' command will scan the data base stored in the PC's memory. It will ask you if you want to see the terminal displays or regenerator displays. The points will be displayed one page at a time when the RETURN key is hit at the end of each page. A 'q' can be used to terminate this command prior to reaching the end of the data base. The data text messages are displayed by display number, point number, an 'A' or 'S' to indicate alarm or status point, and the associated text string. An 'X' and the text not used will be displayed for points defined but not assigned value in the data base.

b command

The 'b' command is like the 'a' command except it will display the control points defined in a system. This command will allow you to view the defined remote controls available to you to set.

? command

The '?' command will allow you to ask about an individual point. It will ask you for Terminal or Regenerator set and the display and point number. Using this information the PC will display the text for that specific point in the 'a' format.

p command

The 'p' command will exit the sub-menu and return you to the MAIN menu. When at the MAIN menu, the PC's transmitter is disabled if you are using an external RS-232 to RS-422 converter. (The RTS lead is turned OFF.) This will allow you to go to LISTEN mode in the MAIN menu directly without turning off the GTP simulation mode.

m command

The 'm' command will cause the PC to display the current sub-menu. After the menu is displayed, you are prompted to select the command you wish to execute.

PM SUB-MENU

The PM sub-menu is shown in Figure 4. This menu selection is the same as the method used in the MAIN menu. If a selection requires more data, you answer the follow-up questions asked by the PC. Each selection is explained below.

t command

The 't' command is used to TEST a link. It will issue a TABS level 2 test message to the monitored equipment and wait for a reply. The reply is then verified and you are told if it was good or not. The purpose of this command is to provide a quick check of the link to verify the cables are connected to the terminal bay correctly. If they are not, the command will fail and you should verify your connections and PC port assignments.

d command

The 'd' option will start polling the bay for PM information. The command will ask you to specify a measurement period, usually 60 seconds, over which to collect data. You will also be asked to provide the lowest service channel or line number you wish to report to your screen. This number will only be used in the displaying of the data to establish the first column of

output after the protection channel. The PC will ask the bay for a configuration message, and based on that and your input, ask the bay for data. The sequence of requests is:

1 - Issue a PM sync message
to start a measurement period.
2 - Wait one sync wait period.
3 - Issue a PM sync message.
4 - Wait one sync wait period.
5 - Request PM data from the bay.
6 - Report the PM data collected
over the period.
7 - Wait one user specified poll interval.
8 - Go to Step #3.

You can exit the 'd' command by hitting any key and a RETURN key.

h command

The 'h' option is the same logging option described in the LISTEN mode This option will send a second copy of your reports to either a printer or a diskette file.

f command

The 'f' option will reset the serial port on the PC. This may have to be done if the PC receiver 'hangs up'. A 'hang up' may be caused by switching from one port to another. The switching may produce noise which will get the PC's receiver stuck and no data is heard by the PC. This should be the first thing you try if you switch TABS links, or reset the bay and start getting error messages out of the PC.

p command

The 'p' command will exit the sub-menu and return you to the MAIN menu. When at the MAIN menu, the PC's transmitter is disabled if you are using an external RS-232 to RS-422 converter. (The RTS lead is turned OFF.) This will allow you to go to LISTEN mode in the MAIN menu directly without turning off the GTP simulation mode.

m command

The 'm' command will cause the PC to display the current sub-menu. After the menu is displayed, you are prompted to select the command you wish to execute.

FL SUB-MENU

The FL sub-menu is shown in Figure 5. This menu selection is the same as the method used in the MAIN menu. If a selection requires more data, you answer the follow-up questions asked by the PC. Each selection is explained below.

t command

The 't' command is used to TEST a link. It will issue a TABS level 2 test message to the monitored equipment and wait for a reply. The reply is then verified and you are told if it was good or not. The purpose of this command is to provide a quick check of the link to verify the cables are connected to the terminal bay correctly. If they are not, the command will fail and you should verify your connections and PC port assignments.

d command

The 'd' option will start polling the bay for FL information. The command will ask you to specify a measurement period, usually 60 seconds, over which to collect data. You will also be asked to provide the lowest service channel or line number you wish to report to your screen. This number will only be used in the displaying of the data to establish the first column of

output after the protection channel. The PC will ask the bay for a configuration message, and based on that and your input, ask the bay for data. The sequence of requests is:

1 - Issue an FL sync message
to start a measurement period.
2 - Wait one sync wait period.
3 - Issue an FL sync message.
4 - Wait one sync wait period.
5 - Request FL data from the bay.
6 - Report the FL data collected
over the period.
7 - Wait one user specified poll interval.
8 - Go to Step #3.

You can exit the 'd' command by hitting any key and a RETURN key.

h command

The 'h' option is the same logging option described in the LISTEN mode. This option will send a second copy of your reports to either a printer or a diskette file.

f command

The 'f' option will reset the serial port on the PC. This may have to be done if the PC receiver 'hangs up'. A 'hang up' may be caused by switching from one port to another. The switching may produce noise which will get the PC's receiver stuck and no data is heard by the PC. This should be the first thing you try if you switch TABS links, or reset the bay and start getting error messages out of the PC.

p command

The 'p' command will exit the sub-menu and return you to the MAIN menu. When at the MAIN menu, the PC's transmitter is disabled if you are using an external RS-232 to RS-422 converter. (The RTS lead is turned OFF.) This will allow you to go to LISTEN mode in the MAIN menu directly without turning off the GTP simulation mode.

m command

The 'm' command will cause the PC to display the current sub-menu. After the menu is displayed, you are prompted to select the command you wish to execute.

TBOS SUB-MENU

The TBOS sub-menu contains the same selection options as the TABS AS&C menu. The input options are the same with the exception that you must specify the type of station before the menu appears. This is necessary because TBOS data is valid for the local station only. This also means that at a regenerator station, the hop number on output for the station is "0". The basic TBOS-AS&C sub-menu is shown in Figure 6.

VPM SUB-MENU

The VPM sub-menu is shown in Figure 7. This menu selection is the same as the selection method used in the MAIN menu. If a selection requires more data, you answer the follow-up questions asked by the PC. Each selection is explained below.

t command

The 't' command is used to TEST a link. It will issue a TABS level 2 test message to the monitored equipment and wait for a reply. The reply is then verified and you are told if it was good or not. This command provides a quick check of the link to verify the cables are connected to the terminal bay correctly. If they are not, the command will fail and you should

verify your connections and PC port assignments.

d command

The 'd' option will start polling the bay for FL information. The command will ask you to specify a measurement period, usually 60 seconds, over which to collect data. You will also be asked to provide the lowest service channel or line number you wish to report to your screen. This number will only be used in the displaying of the data to establish the first column of output after the protection channel. The PC will ask the bay for a configuration message, and based on that and your input, ask the bay for data. The sequence of requests is:

1 - Issue a PM sync message
to start a measurement period.
2 - Wait one sync wait period.
3 - Issue a PM sync message.
4 - Wait one sync wait period.
5 - Request PM data from the bay.
6 - Report the PM data collected
over the period.
7 - Wait one user specified poll interval.
8 - Go to Step #3.

You can exit 'd' command by hitting 'q' key and a RETURN key.

h command

The 'h' option is the same logging option described in the LISTEN mode. This option will send a second copy of your reports to either a printer or a diskette file.

f command

The 'f' option will reset the serial port on the PC. This may have to be done if the PC receiver 'hangs up'. A 'hang up' may be caused by switching from one port to another. The switching may produce noise which will get the PC's receiver stuck and no data is heard by the PC. This should be the first thing you try if you switch TABS links, or reset the bay and start getting error messages out of the PC.

p command

The 'p' command will exit the sub-menu and return you to the MAIN menu. When at the MAIN menu, the PC's transmitter is disabled if you are using an external RS-232 to RS-422 converter. (The RTS lead is turned OFF.) This will allow you to go to LISTEN mode in the MAIN menu directly without turning off the GTP simulation mode.

m command

The 'm' command will cause the PC to display the current sub-menu. After the menu is displayed, you are prompted to select the command you wish to execute.

S OPTION

The 's' option should only be used by people very knowledgeable about CB149. This option will expand the length of the sub-menus to include individual TABS message types. The full tabs menu's selections are not explained in this memorandum. The entry into the FULL TABS mode and sub-menu's are shown in Figures 8,9,10,11,12.

Caution: Do not use the 's' option unless you are fully familiar with the operation.

OUTPUT DATA

The PC reports data for Alarms Status and Control, Fault Locating, and Performance Monitoring. The AS&C output consists of a display map and a text string which is output for each display point that changes. The top of the report is a set of lines indicating the bit positions 1 through 64 across the display map. On the left side, the HOP number, display number and bit number are output. The HOP number is the relative station address starting from the local terminal of the station reporting the display data. It is important to note here that any repeater stations equipped with DMR's do not report alarm data, and occupy no station HOP numbers. The output bit map follows next on the same line, where a '.' is used to indicate a bit is off. If you are running with the color option, then a '!' is used to indicate an active alarm. If the '!' is flashing red, the corresponding point is an alarm point. If you attempt to use the MS-DOS print screen key in the color mode, the output may not be what you want. The color option is not recommended for hard copy output.

If you are running with the no color option, the same data is presented but an 'A' or 'S' is used to indicate active alarms or status points.

Following the bit map, a text string may be output which will define the point(s) which has changes since the last output. These text messages are only displayed on change of status.

When setting up the system for output, you must tell the bit map section of the output routine if the output bit map is to contain all the defined displays, or only show the displays with active alarm or status points.

The FL report will display FL data in an array structure. The columns across will be the radio channels, and the lines down will be HOP numbers. The first column will always be the protection line (0), and the remaining columns will be the requested radio channel numbers beginning with the lowest service channel and continuing across the screen until either the maximum number of columns is reached or the highest equipped channel is found. The line output will consist of the HOP number followed by the FL data. The HOPS are numbered with the far end terminal being HOP 0, and then each station in ascending sequence until you reach the local terminal. FL data is collected in the receive direction of transmission on radio channels or lines. On a SERIES-G system, lines are identified by 3 single digits fields quad, line and trib. The FL data consists of five pieces of data appearing as columns under the line or channel number. A '.' under a column indicates the inactive state of the corresponding data item. These columns are labeled "D", "r", "dm", "f", and "ei" where the numbers under the headers are as follows:

D - DMRs are active and switched to this channel.
- DLMs on a SERIES-G system are the quad, line and trib to which the DLM is switched. An '*' in this field on a SERIES-G system is a non DLM ISRM.

f - The station and channel reports were out of frame.

dm - The station and channel have data missing.

r - The RDI bit is set (see CB149).

ei - An estimate of the number of errors at this location. This number is converted to a base 10 number with 1 significant digit of output raised to a power of 10 (e format data item).

If you have the exception option the reports will be the same, but troubles will only be reported on the lines.

The PM report is similar to the FL report except PM data is for the entire switch section in the receive direction. The report is organized in columns of radio channels. The protection channel/line (0) is always reported first followed by the lowest requested service channel up to the maximum number of columns or the highest service channel, whichever comes first. The data is presented in three sections. First the DSP data, then the PSI data, and finally the PSD data. A '.' under a column indicates a 0 or no data for the corresponding data item.

The information in the DSP block is a data missing indicator set if the terminal for some reason could not collect valid PM data. Three types of error seconds are reported. Error seconds type A is a count of the number of seconds in the measurement interval in which one error occurred. Error seconds type B is a count of the number of seconds in the measurement interval in which two or more errors occurred but less than the number required to switch. Error seconds C is a count of the number of seconds in which you were out of frame or had more than the switch threshold number of errors. This block of data also contains a count of the number of out of frame transitions during the period, and the out of frame state at the end of the period. A count of the number of errors that occurred in the measurement interval is also reported.

In the PSI block of data, information on service lines is reported. This information has a data missing field as in the DSP data. This section reports information on service failures and switches. The data reports the channels' NSA (Non Service Affecting) switch transitions count in the period, and the state at the end of the period. The channel's SA (Service Affecting) failure transitions count, and the service failure state at the end of the measurement interval are reported. The PSI data also contains the duration in seconds of both the NSA and SA conditions.

The PSD data is only for the protection line. A data missing indicator is also included. Following the missing indicator data is the data on the protection line. A count of the number of accesses onto or off of protection and the state of protection at the end of the period are reported. Also reported are: a count of the number of access transitions, states during the period and the duration in seconds of these states.

A) gtpsim.exe -f 135fd

54214 GTP_SIMULATION - TABS - VERSION 1.005B
Wed Jul 1 12:39:58 1987

loading "135fd"
loading TERMINAL displays
loading REGEN displays
loading TERMINAL CONTROLS displays
loading REGEN CONTROLS displays
PLEASE enter the COMM port number you are using (1 or 2) Normally a
or '1' or '2' on a AT&T 6300

1
PC parameter settings: LISTENING, COLOR OFF, COMM1 ERROR LOGGING
OFF.
Enter Command:

'l':ENTER LISTEN IN MODE
'g':ENTER/EXIT GTP SIMULATION MODE
'd':DISPLAY DIAGNOSTIC CODE INFORMATION
'!':RUN AN MS-DOS SYSTEM COMMAND
'c':TURN ON/OFF COLOR
'e':TURN ON/OFF ERROR LOGGING
'b':RUN PC LOOPBACK TEST
'q':EXIT GTPSIM PROGRAMT

Figure 1—Menu at Program Startup

OPTION?:g
WARNING the GTP must be disconnected in this mode
Please enter a 'l' if this has been done anything else will
abort request l
PC parameter settings: LISTENING, COLOR OFF, COMM1 ERROR LOGGING
OFF.
Enter Command:

'l':ENTER LISTEN IN MODE
'g':ENTER/EXIT GTP SIMULATION MODE
'd':DISPLAY DIAGNOSTIC CODE INFORMATION
'!':RUN AN MS-DOS SYSTEM COMMAND
'c':TURN ON/OFF COLOR
'e':TURN ON/OFF ERROR LOGGING
'b':RUN PC LOOPBACK TEST
'q':EXIT GTPSIM PROGRAMT
't':SELECT TBOS OPTION
'a':SELECT TABS AS&C OPTION
'p':SELECT LINE PM OPTION
'f':SELECT FL OPTION
'v':SELECT DS3 PM REPORTING OPTION
's':ENTER/EXIT SPECIAL TABS TESTING MODE

Figure 2—Menu When GTP Simulation Active

```
OPTION?:a
ALARM SURVEILLANCE AND CONTROL
AS&C Output logging is off
      Enter command:m                    press 'm' for the MENU

          't': TEST PC DATA LINK
          'd': MONITOR AS&C  DISPLAY DATA
          'o': SEND A REMOTE  CONTROL COMMAND
          'k': SEND AUTOMATIC  REMOTE  CONTROL COMMANDS
          'h': TURN ON/OFF PRINTER OR DISK LOGGING OF AS&C
               TEXT MESSAGE
          'l': LOAD A NEW AS&C DATABASE
          'f': RESET THE TABS LINK
          '?': DISPLAY A SINGLE SCAN POINT DEFINITION
          'a': DISPLAY ENTIRE SCAN POINT DATABASE
          'b': DISPLAY ENTIRE  CONTROL POINT DATABASE
          'p': RETURN TO THE PRVIOUS MENU
          'm': DISPLAY THE AS&C MENU



ALARM SURVEILLANCE AND CONTROL
AS&C Output logging is off
      Enter command:                     press 'm' for the MENU
```

Figure 3—Basic AS&C SUB Menu

```
OPTION?:p
LINE PERFORMANCE MONITORING
PM Output logging is Off
      Enter command:m                    press 'm' for the MENU


          't': TEST PC DATA LINK
          'd': MONITOR AM DATA
          'h': TURN ON/OFF PRINTER OR DISK LOGGING OF PM
               EXCEPTION REPORT
          'f': RESET THE PC DATA LINK
          'p': RETURN TO THE PREVIOUS MENU
          'm': DISPLAY THE LINE PM MENU
LINE PERFORMANCE MONITORING
PM Output logging os Off
      Enter command:                     press 'm' for the MENU
```

Figure 4—Basic Line Performance Monitoring SUB Menu

```
OPTION?:f
FAULT LOCATING
      Enter command:m                    press 'm' for the MENU

          't': TEST PC DATA LINK
          'd': MONITOR AM DATA
          'h': TURN ON/OFF PRINTER OR DISK LOGGING OF PM
               EXCEPTION REPORT
          'f': RESET THE PC DATA LINK
          'm': DISPLAY THE FL MENU
          'p': RETURN TO THE PREVIOUS MENU
FAULT LOCATING
FL Output logging is off
      Enter Command:                     press 'm' for the MENU
```

Figure 5—Basic Fault Locating SUB Menu

TBOS ALARM SURVEILLANCE AND CONTROL
AS&C Output logging is off
Enter command:m press 'm' for the MENU

'd': MONITOR AS&C DISPLAY DATA
'o': SEND A REMOTE CONTROL COMMAND
'k': SEND AUTOMATIC REMOTE CONTROL COMMANDS
'h': TURN ON/OFF PRINTER OR DISK LOGGING OF AS&C TEXT MESSAGE
'l': LOAD A NEW AS&C DATABASE
'f': RESET THE PC DATA LINK
'?': DISPLAY A SINGLE SCAN POINT DEFINITION
'a': DISPLAY ENTIRE SCAN POINT DATABASE
'b': DISPLAY ENTIRE CONTROL POINT DATABASE
'p': RETURN TO THE PRVIOUS MENU
'm': DISPLAY THE TBOS MENU

AS&C Output logging is off
Enter command: press 'm' for the MENU

Figure 6—Basic TBOS-AS&C SUB Menu

OPTION?:p

DS3 PERFORMANCE MONITORING
VPM Output logging is Off
Enter command:m press 'm' for the MENU

't': TEST PC DATA LINK
'd': MONITOR AM DATA
'h': TURN ON/OFF PRINTER OR DISK LOGGING OF DS3 PM EXCEPTION REPORT
'f': RESET THE PC DATA LINK
'p': RETURN TO THE PREVIOUS MENU
'm': DISPLAY THE LINE DS3 PM MENU

DS3 PERFORMANCE MONITORING
VPM Output logging os Off
Enter command: press 'm' for the MENU

Figure 7—Basic DS3 Performance Monitoring SUB Menu

```
OPTION?:s

Special TABS test menu turned ON
Please enter the TABS level 2 address to monitor
Enter a '0' on RADIO systems
0
PC parameter settings: FULL TABS, multi-point address=0 color Off, com2
logging  Off.
Enter Command:m

        'l':ENTER LISTEN IN MODE
        'g':ENTER/EXIT GTP SIMULATION MODE
        'd':DISPLAY DIAGNOSTIC CODE INFORMATION
        '!':RUN AN MS-DOS SYSTEM COMMAND
        'c':TURN ON/OFF COLOR
        'e':TURN ON/OFF ERROR LOGGING
        'b':RUN PC LOOPBACK TEST
        'q':EXIT GTPSIM PROGRAMT
        't':SELECT TBOS OPTION
        'a':SELECT TABS AS&C OPTION
        'p':SELECT LINE PM OPTION
        'f':SELECT FL OPTION
        'v':SELECT DS3 PM REPORTING OPTION
        's':ENTER/EXIT SPECIAL TABS TESTING MODE
```

Figure 8—Turn On of Special Test Mode

```
OPTION?:a

ALARM SURVEILLANCE AND CONTROL
AS&C OUTPUT Logging is Off
      Enter Command:m

          't': TEST DATA LINK
          'd': MONITOR ALL Display REQUEST
          'o': SEND REMOTE COMMAND
          'h': TURN ON/OFF PRNT OR DISK COPY OF AS&C TEXT MESSAGES
          'l': LOAD A NEW AS&C DATA BASE
          'f': RESET THE PC DATA BASE LINK
          '?': DISPLAY A SINGLE SCAN POINT DEFINITION
          'a': DISPLAY ENTIRE SCAN POINT DATABASE
          'b': DISPLAY ENTIRE CONTROL POINT DATABASE
          'p': RETURN TO THE PREVIOUS MENU
          'm': DISPLAY THE AS&C MENU
          'c': CONFIGURATION REQUEST
          'r': RESEND REQUEST
          'x': SEND A TABS DIAGNOSTIC REQUEST
          '1': CHANGED DISPLAY REQUEST
          '2': ALL DISPLAY REQUEST
          '3': SEND LONG ADDRESS REMOTE COMMAND
          '4': LONG ADDRESS CHANGE DISPLAY REQUEST
          '5': LONG ADDRESS ALL DISPLAY REQUEST
          'i': INPUT DATA STRING
          's': TOGGLE SYSTEM VERIFY

ALARM SURVEILLANCE AND CONTROL
AS&C Output logging is Off
      Enter command:                press 'm' for the MENU
```

Figure 9—Full AS&C SUB Menu

LINE PERFORMANCE MONITORING
PM Output logging is Off
Enter command:m press 'm' for the MENU

't': TEST PC DATA LINK
'd': MONITOR AM DATA
'h': TURN ON/OFF PRINTER OR DISK LOGGING OF PM EXCEPTION REPORT
'f': RESET THE PC DATA LINK
'p': RETURN TO THE PREVIOUS MENU
'm': DISPLAY THE PM MENU
'c': CONFIGURATION REQUEST
'r': RESEND REQUEST
'o': ONE MINUTE SYNC
'1': SINGLE LINE DSP
'2': MULTIPLE LINE DSP
'3': SINGLE LINE PSI
'4': MULTIPLE LINE PSI
'5': SINGLE LINE PSD
'6': MULTIPLE LINE PSD
'7': LONG ADDRESS SINGLE LINE DSP
'8': LONG ADDRESS MULTIPLE LINE DSP
'9': LONG ADDRESS SINGLE LINE PSI
'x': LONG ADDRESS MULTIPLE LINE PSI
'y': LONG ADDRESS SINGLE LINE PSD
'z': LONG ADDRESS MULTIPLE LINE PSD
'i': INPUT DATA STRING

LINE PERFORMANCE MONITORING
PM Output logging is Off
Enter command: press 'm' for the MENU

Figure 10—Full Line Performance Monitoring SUB Menu

```
FAULT LOCATING
FL Output logging is Off
Enter Command:m                    press 'm' for the MENU

        't': TEST PC DATA LINK
        'd': MONITOR FL DATA
        'h': TURN ON/OFF PRNT OR DISK LOGGING OF FL EXCEPTION REPORTING
        'f': RESET THE PC DATA LINK
        'm': DISPLAY THE FL MENU
        'p': RETURN TO THE PREVIOUS MENU
        'c': CONFIGURATION REQUEST
        'r': RESEND REQUEST
        'o': ONE MINUTE SYNC
        '1': SINGLE REGEN AUTO FL
        '2': MULTIPLE REGEN AUTO FL
        '3': MULTIPLE LINE AUTO FL
        '4': DMR SWITCH REQUEST MESSAGE
        'a': DLM SINGLE REGEN AUTO FL
        'e': DLM MULTIPLE REGEN AUTO FL
        'g': DLM MULTIPLE LINE AUTO FL
        's': ENABLE/DISABLE OPTION FOR DEMAND REQUESTS
        'i': INPUT DATA STRING
FAULT LOCATING
FL Output logging is Off
    enter command:                 press 'm' for the MENU
```

Figure 11—Full Fault Locating SUB Menu

DS3 PERFORMANCE MONITORING
VPM Output logging is Off
Enter command:m press 'm' for the MENU

't': TEST PC DATA LINK
'd': MONITOR DS3 PM DATA
'h': TURN ON/OFF PRINTER OR DISK LOGGING OF DS3 PM EXCEPTION REPORT
'f': RESET THE PC DATA LINK
'p': RETURN TO THE PREVIOUS MENU
'm': DISPLAY THE LINE PM MENU
'c': CONFIGURATION REQUEST
'r': RESEND REQUEST
'o': ONE MINUTE SYNC
'1': SINGLE LINE DSP
'2': MULTIPLE LINE DSP
'3': SINGLE LINE PSI
'4': MULTIPLE LINE PSI
'5': SINGLE LINE PSD
'6': MULTIPLE LINE PSD
'7': LONG ADDRESS SINGLE LINE DSP
'8': LONG ADDRESS MULTIPLE LINE DSP
'9': LONG ADDRESS SINGLE LINE PSI
'x': LONG ADDRESS MULTIPLE LINE PSI
'y': LONG ADDRESS SINGLE LINE PSD
'z': LONG ADDRESS MULTIPLE LINE PSD
'i': INPUT DATA STRING

DS3 PERFORMANCE MONITORING
VPM Output logging is Off
Enter command: press 'm' for the MENU

Figure 12—Full DS3 Performance Monitoring SUB Menu

APPENDIX A--DATA BASE DESCRIPTION

BUILDING A DATA BASE

The data base is divided into six parts. Each of the six parts is explained in the following sections.

N AND M

The first line in the file must contain two numbers N,M where N is the number of terminal displays, and M is the number of regenerator displays. These numbers are used in loading the data described below, and in determining the HOP numbers. If the display of interest is greater than N, the display is for a regenerator. For those interested, HOP numbers and local display numbers are computed as follows.

- The generator site or HOP numbers is computed by subtracting N from the display of interest, and dividing the result by the number of regenerator displays.
- The local regenerator display number is determined by subtracting N from the display of interest and taking that result modulus M.

COMMENT LINES

Input lines 2 through 5 are comment lines available to you to place a header on your data base. In the growth of the program, the first line of the comments was used to set program flags to indicate the presence of a "dummy" data base" or a SERIES-G system. These were necessary to support comment the unique addressing used in SERIES-G systems, and to allow for a dummy data base to support other vendor systems.

If the second comment line contains a 'xxx dummy up" line, the program will set a flag to indicate that no AS&C text string is to be output on the reports. If the second line contains a "xxx series g", the program will configure itself to handle the long addressing required by a SERIES-G system, and change the output reporting format to that of a SERIES-G system. Finally, if the second line contains a "xxx series g - tma", the program will set itself into a mode that expects to talk to a SERIES-G TMA AS&C link.

TERMINAL SCAN POINTS

On the 6th line of input there must be the line "terminal scan points". Starting on the 7th line of input, and continuing on until an input line ending with a '.' are the definitions of TERMINAL scan points. Each line is input in the following format. Starting in column is the display number followed by a ':'. Next is the point number followed by a ':'. The definition of the point as an alarm or status point is next. This is done by entering an 'A' for an alarm or an 'S' for a status point. This letter is then followed by a ':'. The last information on the input line is text for the point. This text has a maximum of 35 characters.

REGENERATOR SCAN POINTS

Beginning on the line following the last terminal scan point indicated by an input line ending with a '.', the string "regenerator scan points" must be entered. The data following this is the same as that for the terminal scan points. The last point must end with a '.'.

TERMINAL CONTROL POINTS

On the next line following the last regenerator scan point, must be "terminal control points". The data following this line is in the same format as the scan points except the 'A' or 'B' field is omitted. This block must have a '.' as the last character on the last point.

REGENERATOR CONTROL POINTS

Following the terminal control points, you must have a line that has "regenerator control points". The remaining lines up to a point ending with a '.' will be loaded as the text for regenerator control points.

EXAMPLE OF DATA BASE

The following is an example of GTPSIM data base structure to aid your understanding:

4 4
ter disp #regen disp
64QAM DIGITAL RADIO (135)
TERMINAL STATION 135A
STATION SCAN POINTS and CONTROL POINTS

terminal scan points
1:1:A:TERM control system alarm
1:2:A:TERM fan fail
1:3:A:TERM switch signaling fail
1:4:A:TERM power fail
1:9:A:TMTG rail A incoming fail
1:10:A:TMTG rail B incoming fail
1:11:A:TMTG rail C incoming fail
1:12:A:TMTG radio auto switch alarm
1:13:A:TMTG radio switch lockup
1:14:A:TMTG previous section fail
1:17:A:TMTG REG digital fail
1:18:A:TMTG REG radio fail
1:19:A:TMTG REG radio twt wearout
1:21:A:TMTG PROT digital fail
1:22:A:TMTG PROT radio fail
1:23:A:TMTG PROT radio twt wearout
1:25:A:RCVG rail A service alarm
1:26:A:RCVG rail B service alarm
1:27:A:RCVG rail C service alarm
1:28:A:RCVG receive switch fail
1:29:A:RCVG radio rf preamp fail
1:30:A:RCVG prot auto switch alarm
1:33:A:RCVG REG radio fail
1:34:A:RCVG REG digital fail
1:35:A:RCVG REG performance alarm
1:36:A:RCVG REG switch section prfrmc
1:37:A:RCVG REG switch section fail
1:41:A:RCVG PROT radio fail
1:42:A:RCVG PROT digital fail
1:43:A:RCVG PROT performance alarm
1:44:A:RCVG PROT switch section prfrmc
1:45:A:RCVG PROT switch section fail
2:1:S:TMTG radio switch
2:2:S:TMTG radio manual switch
2:3:S:TMTG radio manual lockout
2:9:S:RCVG receive switch
2:10:S:RCVG receive manual switch
2:11:S:RCVG rtx switch
2:12:S:RCVG rtx manual switch
2:13:S:RCVG manual lockout
2:17:S:RCVG REG prfrmc error rate
2:18:S:RCVG REG prfrmc intermittent

2:19:S:RCVG REG prfrmc test active
2:21:S:RCVG PROT prfrmc error rate
2:22:S:RCVG PROT prfrmc intermittent
2:23:S:RCVG PROT prfrmc test active
2:25:S:TERM order-wire off-hook
2:26:S:TMTG REG downstream prfrmc fail
2:33:S:TMTG stat REG misframe
2:34:S:TMTG stat REG high error rate
2:35:S:TMTG stat REG low error rate
2:37:S:TMTG stat PROT misframe
2:38:S:TMTG stat PROT high error rate
2:39:S:TMTG stat PROT low error rate
3:1:A:USER alarm point #1
3:2:A:USER alarm point #2
3:3:A:USER alarm point #3
3:4:A:USER alarm point #4
3:5:A:USER alarm point #5
3:6:A:USER alarm point #6
3:7:A:USER alarm point #7
3:8:A:USER alarm point #8
3:9:A:USER alarm point #9
3:10:A:USER alarm point #10
3:11:A:USER alarm point #11
3:12:A:USER alarm point #12
3:13:A:USER alarm point #13
3:14:A:USER alarm point #14
3:15:A:USER alarm point #15
3:16:A:USER alarm point #16
3:17:A:USER alarm point #17
3:18:A:USER alarm point #18
3:19:A:USER alarm point #19
3:20:A:USER alarm point #20
3:21:A:USER alarm point #21
3:22:A:USER alarm point #22
3:23:A:USER alarm point #23
3:24:A:USER alarm point #24
3:33:S:USER status point #1
3:34:S:USER status point #2
3:35:S:USER status point #3
3:36:S:USER status point #4
3:37:S:USER status point #5
3:38:S:USER status point #6
3:39:S:USER status point #7
3:40:S:USER status point #8
4:1:S:master + alarm
4:2:S:terminal status
4:4:S:user interface
4:5:S:terminal controller
4:9:S:alignment unit
4:10:S:receive switch

4:11:S:transmit switch cntrl
4:12:S:chan contr REG
4:13:S:chan contr PROT
4:14:S:serv chan muldem
4:15:S:VMR & coder.
regenerator scan points
1:1:A:REGEN control system alarm
1:2:A:REGEN fan fail
1:3:A:REGEN AC switch signaling fail
1:4:A:REGEN BD switch signaling fail
1:5:A:REGEN power fail
1:9:A:RCVG AC radio rf preamp fail
1:10:A:RCVG AC receive switch fail
1:11:A:RCVG AC prot auto switch alarm
1:12:A:TMTG AC radio auto switch alarm
1:13:A:TMTG AC radio switch lockup
1:17:A:RCVG REG AC radio fail
1:18:A:RCVG REG AC digital fail
1:19:A:RCVG REG AC performance alarm
1:21:A:TMTG REG AC digital fail
1:22:A:TMTG REG AC radio fail
1:23:A:TMTG REG AC twt wearout
1:25:A:RCVG PROT AC radio fail
1:26:A:RCVG PROT AC digital fail
1:27:A:RCVG PROT AC performance alarm
1:29:A:TMTG PROT AC digital fail
1:30:A:TMTG PROT AC radio fail
1:31:A:TMTG PROT AC twt wearout
1:33:A:RCVG BD radio rf preamp fail
1:34:A:RCVG BD receive switch fail
1:35:A:RCVG BD prot auto switch alarm
1:36:A:TMTG BD radio auto switch alarm
1:37:A:TMTG BD radio switch lockup
1:41:A:RCVG REG BD radio fail
1:42:A:RCVG REG BD digital fail
1:43:A:RCVG REG BD performance alarm
1:45:A:TMTG REG BD digital fail
1:46:A:TMTG REG BD radio fail
1:47:A:TMTG REG BD twt wearout
1:49:A:RCVG PROT BD radio fail
1:50:A:RCVG PROT BD digital fail
1:51:A:RCVG PROT BD performance alarm
1:53:A:TMTG PROT BD digital fail
1:54:A:TMTG PROT BD radio fail
1:55:A:TMTG PROT BD twt wearout
2:1:S:RCVG REG AC prfrmc error rate
2:2:S:RCVG REG AC prfrmc intermittent
2:3:S:RCVG REG AC prfrmc test active
2:5:S:RCVG PROT AC prfrmc error rate
2:6:S:RCVG PROT AC prfrmc intermittent

2:7:S:RCVG PROT AC prfrmc test active
2:9:S:RCVG AC receive switch
2:10:S:RCVG AC receive manual switch
2:12:S:RCVG/TMTG AC manual lockout
2:14:S:TMTG AC radio switch
2:15:S:TMTG AC radio manual switch
2:17:S:RCVG REG BD prfrmc error rate
2:18:S:RCVG REG BD prfrmc intermittent
2:19:S:RCVG REG BD prfrmc test active
2:21:S:RCVG PROT BD prfrmc error rate
2:22:S:RCVG PROT BD prfrmc intermittent
2:23:S:RCVG PROT BD prfrmc test active
2:25:S:RCVG BD receive switch
2:26:S:RCVG BD receive manual switch
2:28:S:RCVG/TMTG BD manual lockout
2:30:S:TMTG BD radio switch
2:31:S:TMTG BD radio manual switch
2:34:S:TMTG AC downstream prfmc fail
2:35:S:TMTG BD downstream prfmc fail
2:41:S:TMTG stat REG AC misframe
2:42:S:TMTG stat REG AC high error rate
2:43:S:TMTG stat REG AC low error rate
2:45:S:TMTG stat PROT AC misframe
2:46:S:TMTG stat PROT AC high error rate
2:47:S:TMTG stat PROT AC low error rate
2:49:S:TMTG stat REG BD misframe
2:50:S:TMTG stat REG BD high error rate
2:51:S:TMTG stat REG BD low error rate
2:53:S:TMTG stat PROT BD AC misframe
2:54:S:TMTG stat PROT BD high error rate
2:55:S:TMTG stat PROT BD low error rate
3:1:A:user alarm point #1
3:2:A:user alarm point #2
3:3:A:user alarm point #3
3:4:A:user alarm point #4
3:5:A:user alarm point #5
3:6:A:user alarm point #6
3:7:A:user alarm point #7
3:8:A:user alarm point #8
3:9:A:user alarm point #9
3:10:A:user alarm point #10
3:11:A:user alarm point #11
3:12:A:user alarm point #12
3:13:A:user alarm point #13
3:14:A:user alarm point #14
3:15:A:user alarm point #15
3:16:A:user alarm point #16
3:17:A:user alarm point #17
3:18:A:user alarm point #18
3:19:A:user alarm point #19

3:20:A:user alarm point #20
3:21:A:user alarm point #21
3:22:A:user alarm point #22
3:23:A:user alarm point #23
3:24:A:user alarm point #24
3:33:S:user status point #1
3:34:S:user status point #2
3:35:S:user status point #3
3:36:S:user status point #4
3:37:S:user status point #5
3:38:S:user status point #6
3:39:S:user status point #7
3:40:S:user status point #8
4:1:S:master + alarm
4:2:S:REGEN AC status
4:3:S:REGEN BD status
4:4:S:user interface
4:5:S:RGEN controller
4:9:S:alignment unit AC
4:10:S:receive switch AC
4:11:S:transmit switch ctrl AC
4:12:S:chan contr regular AC
4:13:S:chan contr PROT AC
4:14:S:muldem AC
4:17:S:alignment unit BD
4:18:S:receive switch BD
4:19:S:transmit switch ctrl BD
4:20:S:chan contr regular BD
4:21:S:chan contr PROT BD
4:22:S:muldem BD.
terminal control points
1:1:TMTG radio manual switch
1:2:TMTG radio manual lockout
1:3:TMTG radio manual reset
1:4:RCVG receive manual switch
1:5:RCVG rtx manual switch
1:6:RCVG manual lockout
1:7:RCVG manual reset
1:8:RCVG performance test
1:9:TERM control system alarm reset
3:1:USER control operate #1
3:2:USER control release #1
3:3:USER control operate #2
3:4:USER control release #2
3:5:USER control operate #3
3:6:USER control release #3
3:7:USER control operate #4
3:8:USER control release #4.
regenerator control points
1:1:RCVG AC manual reset

1:2:RCVG AC performance test
1:3:RCVG AC receive manual switch
1:5:RCVG/TMTG AC manual lockout
1:7:TMTG AC radio manual switch
1:8:TMTG AC radio manual reset
1:9:RCVG BD manual reset
1:10:RCVG BD performance test
1:11:RCVG BD receive manual switch
1:13:RCVG/TMTG BD manual lockout
1:15:TMTG BD radio manual switch
1:16:TMTG BD radio manual reset
1:17:REGEN control system alarm reset
3:1:user control operate #1
3:2:user control release #1
3:3:user control operate #2
3:4:user control release #2
3:5:user control operate #3
3:6:user control release #3
3:7:user control operate #4
3:8:user control release #4.

BUILDING AN AUTOMATIC CONTROLS DATA BASE

The program will allow you to supply an input file that will be loaded into the PC's memory. There will be one line for each control point to be set up to a maximum of 16. The input file will start with the number of entries to follow. On the second line, you will have the words "time data" or "relay data" to differentiate between time based controls, and logic based controls. The third line is a comment line in the input file. Starting on the fourth line the control points are defined. There is very little error checking of this data so be careful when inputting data.

A time based control point will be asserted based on the nearest poll after the specified time has elapsed. Time based controls also allow you to assert a point once at the start of the "k" command or every PC poll. The format for a time based controls set is as follows:

time, hop, display, point

where time is the number of seconds between the setting of the points, or a -1 if the point is to be set only at the start of a "k" command, or a zero (0) if the control is to be set on each poll for data by the "k" command

The hop is the relative hop number from this end of the system in TABS systems, or a 0 in a TBOS systems.

The display number is next. The display numbers start at 1 for all station types.

The point number is last starting from 1 through 63.

An example of a time based automatic controls file is shown below. In this case, local station display 1 point 2 are asserted on start of the "k" command, and points 9, 8, and 2 are asserted every poll, every 20 seconds, and every 20 seconds.

```
4
time data
del-t    hop    dsp    pnt
-1       0      1      2
0        0      1      9
30       0      1      8
20       0      1      2
```

A logic based control point will be set based on the state of other AS&C display bits. The control point will be asserted if the logical expression is "TRUE." Each of the specified input points to be asserted will consist of three parts. The HOP to send the remote control, the local display number, and the point in that display is set. Next the conditioning points are specified. Each of these points will consist of four parts: the HOP, display, point, and operator. The operator will be either a "|" or a "&". There are, for a logical expression, "or" and "and". The last entry for an output control point is a ";" to signify the end of a control point list, or a "." to end the data to be loaded. The ";" or "." must be the next character following the operator. Finally of interest, if a point is specified as "-n", your expression is true if the specified point is "off."

In the following example, remote controls at the local station will be set if the Alarm and Status bits are in the correct state. In this example, local display 1 point 3 will be set if local display 2 point 3 is set. Control bit 3 in display 1 will also be set if display 2 point 3 is set, or display 2

point 2 is set. The third remote control (display 3 point 1) will be set if display 1 bit 14 is set. The fourth remote control will be set (display 1 bit 8) if display 2 bit 19 is "off." The fifth control (display 3 point 2) will be set if display 1 bit 35 is set. The "." at the end is the end of the points to be loaded.

```
5
relay data
chop    odsip   obit    hop     dsp     pnt     opr
0       1       3       0       2       3       !;
0       1       3       0       2       3       ! 0 2 2 !;
0       3       1       0       1       14      !;
0       1       8       0       2       -19     !;
0       3       2       0       1       35      !.
```

APPENDIX B--MISCELLANEOUS INFORMATION

CONNECTIONS TO A RADIO SYSTEM

This section contains information on how to connect your PC to a terminal bay for either a 135 frequency diversity or a 90C radio system. This section also contains information to assist you in setting up a system that will enable you to broadcast the telemetry data to all the stations over a service channel. A special 210b board (with the RS-422 terminating resistor removed) placed in the terminal(s) is required for this purpose. At the regenerator or far end terminal you can use another 210b to receive the corresponding data.

The information provided below should help in making connections to a radio system.

GTP CONNECTIONS to a 135FD or 90C Radio system

THE BAY AS&C TRANSMIT	on terminal block TSA	+C4	-C5
THE BAY AS&C RECEIVE	on terminal block TSA	+C1	-C2
THE BAY PM TRANSMIT	on terminal block TSA	+D4	-D5
THE BAY PM RECEIVE	on terminal block TSA	+D7	-D8
THE BAY FL TRANSMIT	on terminal block TSA	+C7	-C8
THE BAY FL RECEIVE	on terminal block TSA	+D1	-D2

Terminal Service Channel Access

At a TERMINAL to broadcast data use service channel w, x, or y. Connect jumpers from Normal GTP connections on TSA to Service channel access on TSC. You need 6 jumpers from the TSA block to TSC block which should be about 15 inches long.

GTP replies - TSA		Service channel access - TSC			
Link		W	X	Y	Z
	+ / -	+ / -	+ / -	+ / -	Not usable
ASC	C4/C5 Sub channel 1	B5/B6	E1/E2	G3/G4	
PM	D4/D5 Sub channel 2	B7/B8	E3/E4	G5/G6	
FL	C7/C8 Sub channel 3	B9/B10	D7/D8	F9/F10	
VPM	----- Sub channel 4	C1/C2	D9/D10	G1/G2	

At the receive TERMINAL to access broadcast messages from the other end, you need to attach your PC to Service channels at the following pins on TSC.

		Service channel access - TSC			
Link		W	X	Y	Z
		+ / -	+ / -	+ / -	Not usable
ASC	Sub channel 1	A3/A4	C5/C6	E7/E8	
PM	Sub channel 2	A7/A8	C7/C8	E9/E10	
FL	Sub channel 3	A9/A10	C9/C10	F1/F2	
VPM	Sub channel 4	B1/B2	D1/D2	F3/F4	

Regenerator Service Channel Access

At a Regenerator to access data broadcast over service channels, you must make the following connections for the service channels used to broadcast data from the terminals.

W service channel - A direction
Set dice straps on TSE to connect C3, C4, C5, and C6 to D5.
- B direction
Set dice straps on TSE to connect F3, F4, F5, and F6 to D5.

X service channel - A direction
Set dice straps on TSA to connect C3, C4, C5, and C6 to D5.
- B direction
Set dice straps on TSA to connect F3, F4, F5, and F6 to D5.

Y service channel - A direction
Set dice straps on TSB to connect C3, C4, C5, and C6 to D5.
- B direction
Set dice straps on TSB to connect F3, F4, F5, and F6 to D5.

Connect the PC to pins on the proper terminal block at the top of the bay to listen in on data being sent to the GTP.

Service channel access

A direction (listen in on A terminal's GTP data)

Link		W	X	Y	Z
	terminal block	TSE	TSA	TSB	
		+ / -	+ / -	+ / -	Not usable
ASC	Sub channel 1	B1/B2	B1/B2	B1/B2	
PM	Sub channel 2	B3/B4	B3/B4	B3/B4	
FL	Sub channel 3	B5/B6	B5/B6	B5/B6	
VPM	Sub channel 4	B7/B8	B7/B8	B7/B8	

B direction (listen in on B terminal's GTP data)

Link		W	X	Y	Z
	terminal block	TSE	TSA	TSB	
		+ / -	+ / -	+ / -	Not usable
ASC	Sub channel 1	E1/E2	E1/E2	E1/E2	
PM	Sub channel 2	E3/E4	E3/E4	E3/E4	
FL	Sub channel 3	E5/E6	E5/E6	E5/E6	
VPM	Sub channel 4	E7/E8	E7/E8	E7/E8	

Cables and Connections

The cables and connections needed to allow the GTPSIM program to run with the AT&T PC 6300 are shown in Figure 13. In this figure, a fully populated 25-Pin RS-232 cable connects the PC 6300 and the RS-232C to RS-485 Converter (485 power supply unit). The 25-Pin female is connected to the serial port 1 on the PC 6300 and the 25-Pin male is connected to the RS-232 side of the power supply unit. ***Pins 5,6,8 and 20 of the RS-232/25-Pin female (on the power supply unit) must be connected or jumpered together.*** A 25-Pin female end of a cable is connected to the RS-485 side of the power supply. The pin connections are as indicated in Figure 13. The other end of this cable is connected to the monitored equipment.

With a minor change, the illustration in Figure 13 is used to run GTPSIM program on a portable PC. The fully populated 25-Pin RS-232 cable is replaced with a 9-Pin female to 25-Pin/RS-232 cable. The 9-Pin female is connected to the portable PC. Pins 5,6,8 and 20 are tied and connected to the RS-232 side of the power supply unit.

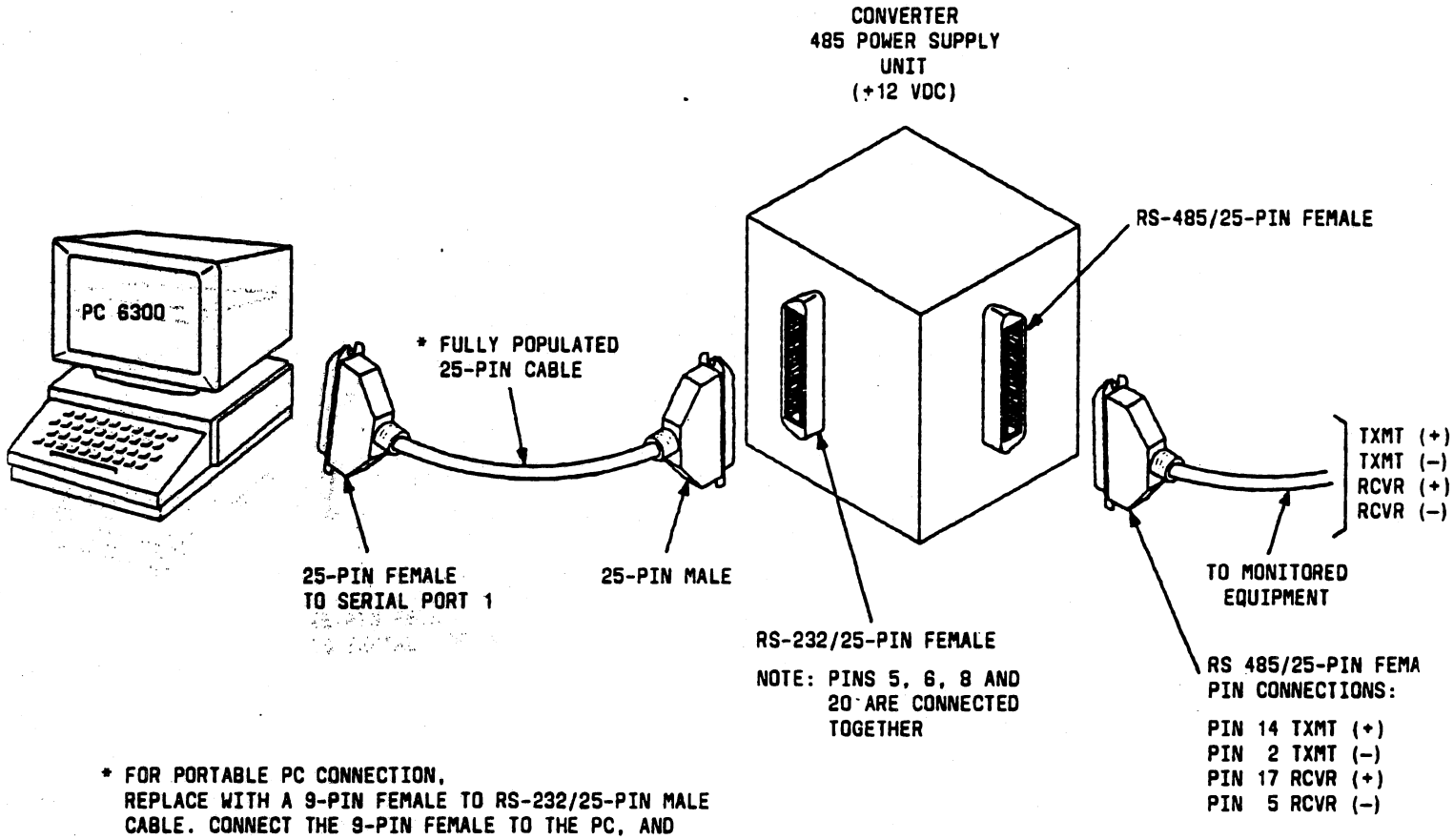
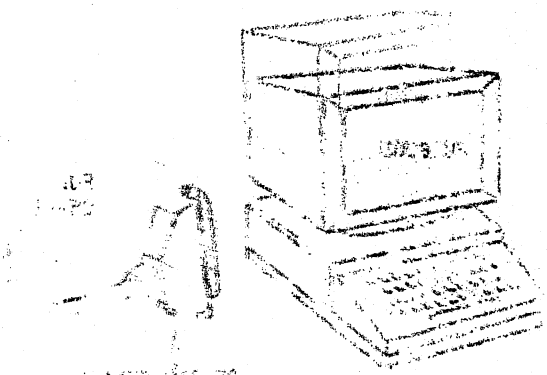


Figure 13—Connections To Personnal Computer (AT&T PC 6300)



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