TAINET

MERCURY SERIES

Digital Cross Connect System

User's Manual

The Professional Partner

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ABOUT THIS MANUAL

This section guides you on how to use the manual effectively. The manual contains information needed to install, configure, and operate the TAINET Mercury Series. The summary of this manual is as follows:

Chapter 1: Introduction

Introduce the main feature and modularity of Mercury family.

Chapter 2: Installation

Provide installation, operation instructions to ensure working properly.

Chapter 3: Configuration and Monitoring

Detail the configuration and operation instructions.

Chapter 4: Maintenance

Alarm message, performance monitoring and loop testing function for diagnostic.

Chapter 5: Router Configuration

Describe how to setup the built-in Router interface.

Appendix A: Physical Cabling Pin Assignment

Describe the port connectors and interface information.

Appendix B: Ordering Information

Ordering information of Mercury Product.

Appendix C: Trouble Shooting

Provides brief list of trouble shooting tips.

Appendix D: Trouble Report Form

Allows user to submit equipment-related trouble information back to Tainet.

Appendix E: Glossary

SYMBOLS USED IN THIS MANUAL

3 types of symbols are used throughout this manual. These symbols are used to advise the users when a special condition arises, such as a safety or operational hazard, or to present extra information to the users. These symbols are explained below:

Warning:

This symbol and associated text are used when death or injury to the user may result if operating instructions are not followed properly.

Caution:

This symbol and associated text are used when damages to the equipment or impact to the operation may result if operating instructions are not followed properly.

Note:

This symbol and associated text are used to provide the users with extra information that may be helpful when following the main instructions in this manual.

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Chapter 1. Introduction

ABOUT THIS CHAPTER

This chapter introduces the main features and modularity of Mercury family, including the general feature description, application, technical specification and the information of the tributary modules.

1.1 General Description

The Mercury Series Integrated Access Devices (Mercury 800, 3600, 3600+, 3820) are based on high-capacity 1/0 non-blocking cross connection technology. With modularized design, Mercury provides diversified interfaces for terminating network circuits and connecting various Data / Voice / Video equipment. DS0 traffic can be consolidated, groomed, and connected among network interfaces and service interfaces. In any combinations, full time slot interchange (TSI) among ports are possible, One alarm contact connector in front or rear panel, and LED display in front panel provide alarm indicators for operator to monitor and maintain the system.

The interface card for Mercury 800 is the same as Mercury 3600/ 3600+ and 3820 but with different internal connector design. The built-in non-channelized router module (for Mercury 800) or 16 channels Channelized router module (32 timeslots totally, for Mercury 3600+/ 3820) for SNMP agent function are supported. Also the firmware of Mercury 800 and 3600+/ 3820 can be upgraded by using TFTP program.

Mercury 800

Mercury 800 is a small-size multi-access platform for 64 Kbps base unit. It supports built-in 2 E1 interface and router module, other 2 slots are used for optional modules in different applications. This compact 2-port mini-multi service device is best suitable for CPE side lower capacity requirement of voice and data application. Mercury 800 has optional rack-mount hardware for mounting into a 19” rack.

Mercury 3600

Mercury 3600 is a 1U-high platform with 4 generic slots and 1 management slot. It can support higher capacity for voice, data and video application. The 5th slot can be plugged in with a Router interface with SNMP agent. It is especially suitable for use as an economic, compact remote distribution node. It comes with rack-mount hardware for mounting in a 19” rack.

Mercury 3600+

Mercury 3600+ is a 1U-high platform with 5 generic slots and Built-in channelized router module is supported with SNMP agent. It can support higher capacity for voice, data and video application. It is especially suitable for use as an economic, compact remote distribution node. It comes with rack-mount hardware for mounting in a 19" rack.

Mercury 3820

Mercury 3820 is a 3U-high platform with 10 slots. Built-in channelized router module is supported. The high capacity platform will be the best application for edge office and POP site. It shares the same modules and cards of Mercury 3600. It also comes with rack-mount hardware for mounting in a 19" rack.

- Command line setup mode

It's user-friendly operation mode in special command line. Any emulated terminal software such as VT100 / ANSI can be used to configure it.

- Craft port

For Mercury 800, 3600+ and 3820, the supervised port can also be defined to PPP port by pressing front panel button. It is designed in DTE mode with a RJ-45 connector. The RJ-45 to DB9 adapter (with null modem crossed inside) is required for craft port setting. The speeds support 1200 / 2400 / 4800 / 9600 /19200 / 38400 / 57600 / 115200 bps, asynchronous with data format 8-N-1 and non-flow control.

For Mercury 3600, the craft port can work in DCE mode using DB9 type connector and support asynchronous speeds at 1200 / 2400 / 4800 / 9600 / 19200 bps, data format 8-N-1 and none-flow-control. It can be directly connected to PC COM port without Null modem.

- TFTP firmware upgrading

Mercury 800, 3600+ and 3820 support upgrading Flash firmware via TFTP server, and the upgrading procedures can be performed more easily, flexibly, with time saved during the upgrade.

- Support NMS agent

Support for SNMP protocol or graphic interface management system.

- Non-channelized / channelized router

Built-in Non-channelized (for Mercury 800) / channelized (16 channels, 32 timeslots total for Mercury 3820/ 3600+) router as an SNMP agent with 10BaseT Ethernet RJ-45 connector.

- Real-time clock generator and Y2K compliant

Date and time can be set by command line.

- Security protection

Prevent unauthorized access into this device, the login ID and PW are necessary for operator to enter into the access mode for advanced system operation. Otherwise, an operator can only monitor system status.

- Twenty user profiles

Operators can create their personal profiles or loaded a default power-up profile when system is being initialized. The total capacity of those 20 profiles syntax is 2K.

- System clock source

System clock source can be defined to be Internal or received from the designated ports. User can select the Master and Secondary clock as the system clock from the designated ports. If the Master clock is lost, the internal PLL will activate then auto switch to the Secondary clock. System also supports Holdover if both the Master and Secondary clocks are lost.

- Performance monitor

Errored Seconds (ES), Severely Errored Seconds (SES), unavailable second (UAS) are supported by Mercury's performance monitoring features. The historical performance data include 15-min / 1-hour / 1-day report that complies with ITU-T G.826, G.821.

- Alarm table history

Displays the latest 100 alarms status for easy system monitoring.

1.1.1 General Features

- 3 different sized Mercury Series Product for different requirements.
- Data port slots can be inserted with the various optional modules.
- 2 built-in E1 ports for Mercury 800 with software selectable balance / unbalance interface.
- Built-in Ethernet control interface for Mercury 800 / 3820 /3600+, following IEEE 802.3 protocol and based on 10baseT with RJ-45 connector and support SNMP protocol.
- Mercury 800 / 3600+/ 3820 PPP port supports asynchronous mode speed from 2400 to 115200bps, in sync mode supports external clock up to 128 Kbps. Its V.24 Interface in RJ-45 connector can be selected as a craft port alternative.
- Alarm contact connector is used to indicate when an alarm is generated, with external buzzer and external LED.

The following Table 1-2-1 lists main characteristics of Mercury Series product.

	Mercury 800	**Mercury 3600**	**Mercury 3600+**	**Mercury 3820**
Cross-Connection Capacity	Up to 10 T1/E1	Up to 16 T1/E1	Up to 16 T1/E1	Up to 32 T1/E1

	Mercury 800	Mercury 3600	Mercury 3600+	Mercury 3820
Time Slot Interchange Capacity	608 x 608	1024 x 1024	1024 x 1024	2048 x 2048
Management Interface	Craft port: VT-100 terminal/ Support PPP mode; Ethernet: Telnet/ SNMP	Craft port: VT-100 terminal Optional Router/ Router-C module provides Ethernet for Telnet/ SNMP	Craft port: VT-100 terminal/ Support PPP mode; Ethernet: Telnet/ SNMP	Craft port: VT-100 terminal/ Support PPP mode; Ethernet: Telnet/ SNMP
SNMP Management	Built-in SNMP Agent; In-band management via DS0; Out-band management via Ethernet	Optional Router/Router-C module works as SNMP Agent	Built-in SNMP Agent; In-band management via DS0; (up to 16 remote nodes) Out-band management via Ethernet	Built-in SNMP Agent; In-band management via DS0; (up to 16 remote nodes) Out-band management via Ethernet
Firmware Upgrade	By TFTP	Replace EPROM	By TFTP	By TFTP
On-Board I/O Interfaces	2 port E1 Interface; Long/Short haul configurable; 75/120 Ohms configurable	None	None	None
Number of I/O Slots	2	5	5	10
Plug-in I/O Module	Not Supported; Open case to mount I/O modules	Supported; Insert I/O Modules without open case	Supported; Insert I/O Modules without open case	Supported; Insert I/O Modules without open case
Hot Swappable I/O Modules	Not Supported	Not Supported	Supported	Supported
Module Correspondency	Modules are independent to others	Mercury 3600/ 3600+/ 3820 use same modules	Mercury 3600/ 3600+/ 3820 use same modules	Mercury 3600/ 3600+/ 3820 use same modules
Power Supply	AC or DC power adapter	Built-in AC or DC power supply; Redundant power module	Built-in AC or DC power supply; Redundant power module	2 slots for power module; AC or DC power module; Redundant and

	Mercury 800	Mercury 3600	Mercury 3600+	Mercury 3820
		(optional)	(optional)	Hot swappable power module (optional)
Environment	Operation temp: 0 ~ 50°C Storage temp: -25 ~ 70°C Humidity: 0 ~ 95%RH (non-condensing)	Operation temp.: 0 ~ 50°C Storage temp.: -25 ~ 70°C Humidity: 0 ~ 95%RH (non-condensing)	Operation temp.: 0 ~ 50°C Storage temp.: -25 ~ 70°C Humidity: 0 ~ 95%RH (non-condensing)	Operation temp.: 0 ~ 50°C Storage temp.: -25 ~ 70°C Humidity: 0 ~ 95%RH (non-condensing)
Dimension	218 (W) x206 (D) x59 (H) mm	430 (W) x330 (D) x44 (H) mm	430 (W) x330 (D) x44 (H) mm	445 (W) x320 (D) x132 (H) mm

Table 1.1 General Features of Mercury Series Product

1.1.2 Purpose and Key Features

The Mercury 800, 3600/3600+, and 3820 are a family of highly versatile digital cross-connect systems with SNMP management. The Mercury family offers a wide range of system requirement, yet maintains the same common set of advanced features.

Mercury family offers user-programmable routing at the level of the individual time slot, and thus allows connecting any incoming 64 Kbps time slot to any outgoing 64 Kbps time slot. For time slots that carry voice channels, T1-to-E1 conversions can also include the required A-law / μ-law and signaling format conversion.

In addition, the Mercury family supports fractional E1 and T1 applications (cross-connection of *n*×64 Kbps channels). For these applications, user's data is automatically inserted into E1 or T1 frames using the minimum number of time slots.

1.1.3 Modularity

The Mercury family is a series of modularized systems that can be equipped with various types of input / output (I/O) modules, to provide the required interface for various types of applications. For the current module types and their capabilities, please refer to Section 1.4 Module Information for more detailed.

1.1.4 Chassis Types

Mercury 3600/3600+ and 3820 units use modular 19" chassis; Mercury 800 uses a modular 9.5" chassis. Each chassis provides various physical slots that can be installed with different modules by the user to obtain the desired configuration.

The Power Supply system can include redundant power supply module (except for the

Mercury 800, which uses external power supply) on I/O slot. When redundant power module is installed, they share the load current. In case one of them fails the other takes over the full load without disruption normal operation.

User interfacing system consists of I/O modules. The number of I/O modules that can be installed in a chassis depends on the chassis type.

1.1.5 Handling of Alarm and Performance Conditions

The Mercury Series Product provides indications regarding problems on one of its link to the other link. The alarm indications will support the current alarm and performance monitoring in the individual data link.

1.1.6 System Management

The Mercury Series Product supports two system management options:

- Use of a craft terminal controlled by the CLI (Command Line Interface) program stored in the Mercury.
- Local and remote management by generic IP hosts using the Telnet communication protocol, the management functions being similar to those provided by a craft terminal.

1.1.7 Craft Terminal Capabilities

The craft terminal provides a simple, command-line interface. The terminals can communicate with the managed Mercury system via the serial RS-232 communication ports.

The serial port is generally configured as a DTE (for Mercury 800/ 3600+ and 3820) or DCE (for Mercury 3600) port, for direct connection to a terminal. The Null Modem Kit may be required when it works in DTE mode; it can also connect the terminal via a leased line modem link, or a low-speed data multiplexer channel. Thus, a remote operator can perform all the functions available from a craft terminal connected to the Mercury system.

1.1.8 Remote Management using Telnet over IP

The Mercury system supports the Telnet communication protocol, which enables any IP host to access the Mercury system supervision facility using TCP/IP communication. The Telnet user has access to the same command-line interface that is available to the user of a craft terminal.

For Mercury 3600, one of the Channelize or Non-channelize Router modules is requiring to provide this function.

1.2 General Application

This section presents typical Mercury applications and explains special application considerations.

1.2.1 T1/E1 Converter

The Mercury systems can be used as programmable T1/E1 converters. A typical system configuration is shown in Figure 1.1. To perform the required conversion, the Mercury system must include both T1 module and E1 modules, and the time slots must be routed as required between a T1 port and an E1 port.

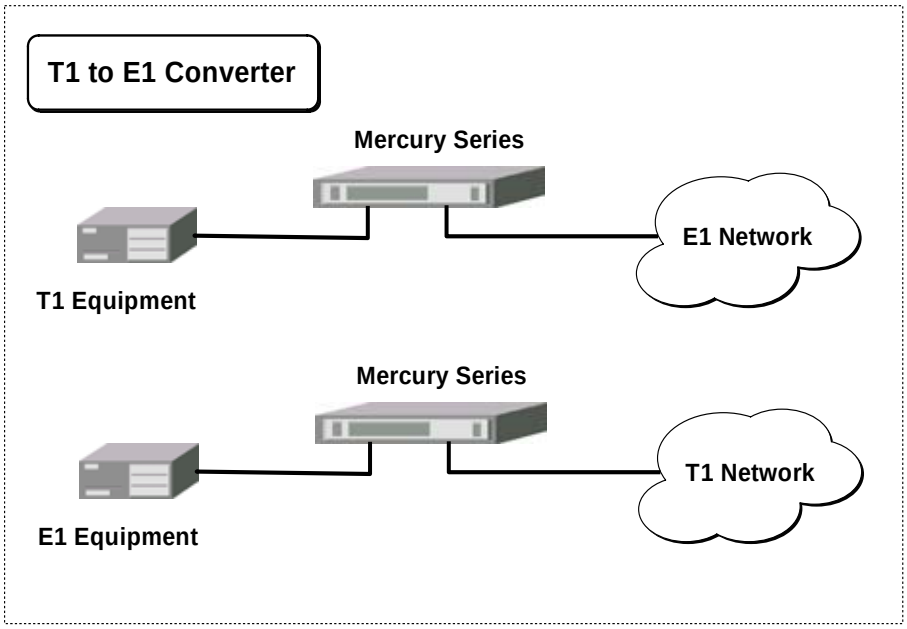


Figure 1.1 T1/E1 converters

The user in accordance with the specific requirements of each system can select the conversion services below:

- Transparent full-duplex transfer of data from all the T1 time slots to the corresponding E1 time slots, and vice versa, and the addition of the appropriate frame synchronization and housekeeping signals, as specified by the applicable standards. The user can define the channels (time slots) to be transferred from trunk to trunk: to instruct the Mercury system to transfer transparently the information carried in these time slots, they are defined as data time slots. The Mercury system inserts a user-selectable idle code in empty time slots.
- When the equipment that generates the T1 or E1 line signal is a voice multiplexer, the Mercury system can perform A-law/μ-law conversion in accordance with ITU-T Rec. G.711. (A-law/μ-law module requires). The conversion can be performed on all the channels, or on channels individually selected by the user: for this purpose, the user defines the time slots for which A-law/μ-law conversion is desired, as voice time slots.

In addition to A-law/μ-law conversion, the Mercury system can also perform conversion of the signaling formats. Signaling conversion is performed when robbed-bit signaling is used on the T1 trunk; the signaling information carried by the "robbed bits" in the T1 frame is converted, in accordance with user's selection, to channel-associated signaling (CAS) on the E1 trunk, and vice versa. The CAS information is inserted in time slot 16, and therefore G.732S framing is always used. Since time slot 16 must be reserved for CAS, it is not cross-connected between the E1 and T1 trunks. When CCS signaling is used, e.g., in ISDN PRI access applications, the E1 framing mode is G.732N, and robbed-bit signaling is disabled on the T1 side. Thus, A-law/μ-law conversion can be performed on voice time slots, and time slot 16 of the E1 frame must be transferred to the T1 side, to continue the signaling path.

1.2.2 Transport of T1 frame over E1 Transmission Facilities

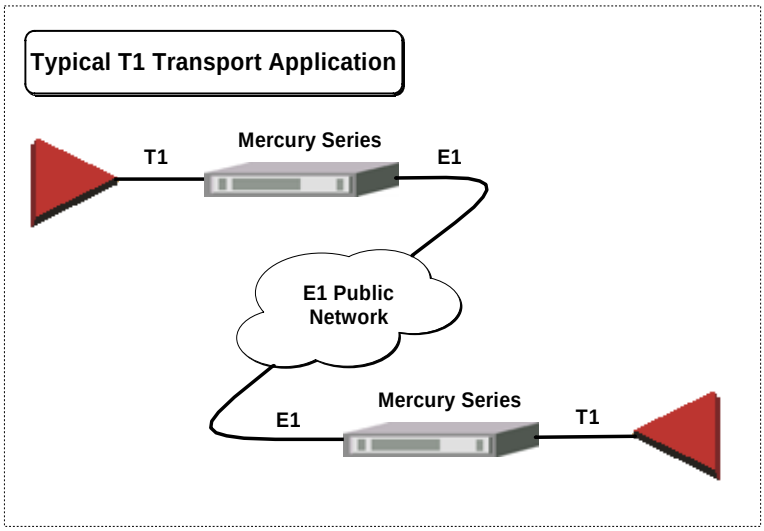


Figure 1.2 Transport of T1 frame over E1 transmission Facilities

The Mercury system allows the transport of a T1 frame across E1 transmission facilities. This function can be performed as shown in Figure 1.2. In the transport application, it is necessary to transfer the T1 trunk data, including the F-bit, transparently without any conversion from end to end; therefore the T1 frames must be processed in accordance with ITU-T Rec. G.802.

1.2.3 Channel Relocation, Digital Access and Cross-Connect Application

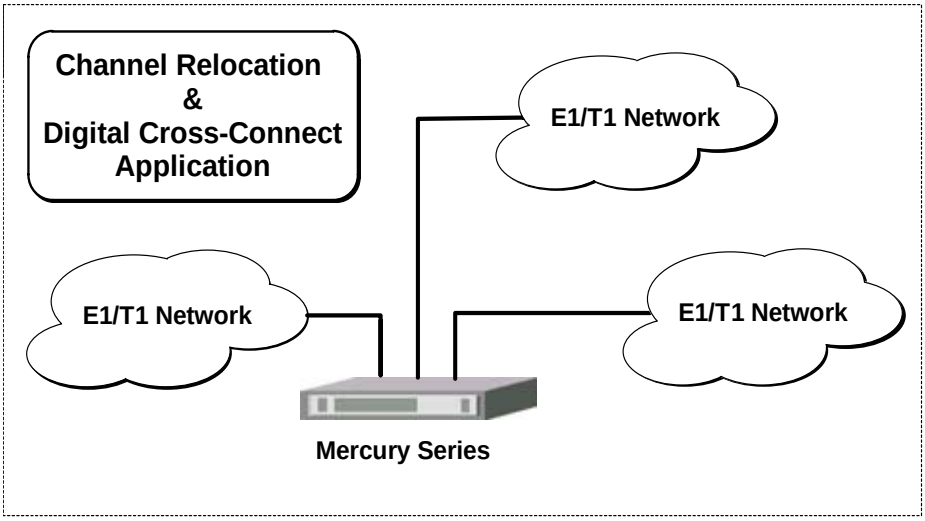


Figure 1.3 Channel relocation and Digital Cross-Connect Application

In Channel relocation and digital access cross-connect system for both voice and data applications, the channels of a T1 and/or E1 trunk are moved from one time slot to another, in accordance with user's programming. These capabilities are available in addition to the other capabilities described in the previous sections.

The channel relocation and digital cross-connect services can be performed between dissimilar trunks, e.g., between E1 and T1 trunks, or between similar links, e.g., between two E1 trunks or between two T1 trunks.

The Mercury system will also perform, when required, the conversion of the signaling formats (i.e., will convert robbed-bit signaling to CEPT channel-associated signaling), and will move the channel signaling information to the appropriate location in the signaling frame, in parallel with the change in channel numbers.

Table 4.1 lists the alarm message generated by the E1 module, specifies their class (major or minor), type (alarm or performance monitoring), and explains their meaning. The Mercury systems can be used as programmable T1/E1 converters. A typical system configuration is shown in Figure 1.3. To perform the required conversion, the Mercury system must include both T1 module and E1 modules, and the time slots must be routed as required between a T1 port and an E1 port.

1.2.4 Fractional T1 and E1 Access Point

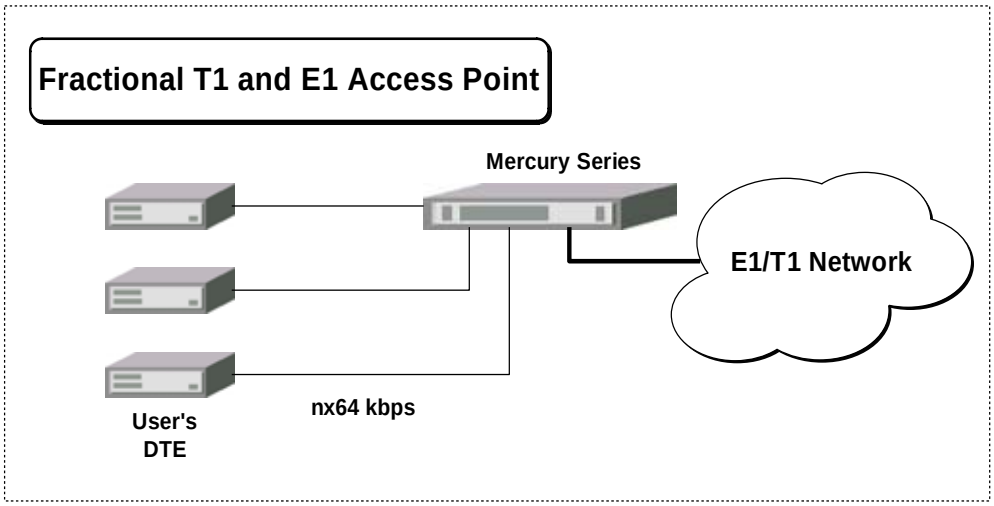


Figure 1.4 Fractional T1 and E1 Access Point

The Mercury system can be used to provide an access point for fractional T1 and E1 services, as a replacement for dedicated fractional CSU/DSU units.

For this service, the Mercury system must include a High Speed Data Port – RS530, 1P-V35, 2P-V35 or 4P-Data that connects to the user's equipment. Those modules support connection at rates of *n*×64 Kbps, where *n* = 1 to 31 for RS530 and 1P-V35 module (64 to 1984 Kbps, respectively), and n = 1 to 32 for 2P-V35 and 4P-Data module (64 Kbps to 2048 Kbps). The user's data stream is then routed to the desired time slots of a selected E1 or T1 port.

1.2.5 T1/E1 Drop, Insert and Bypass for Data & Voice

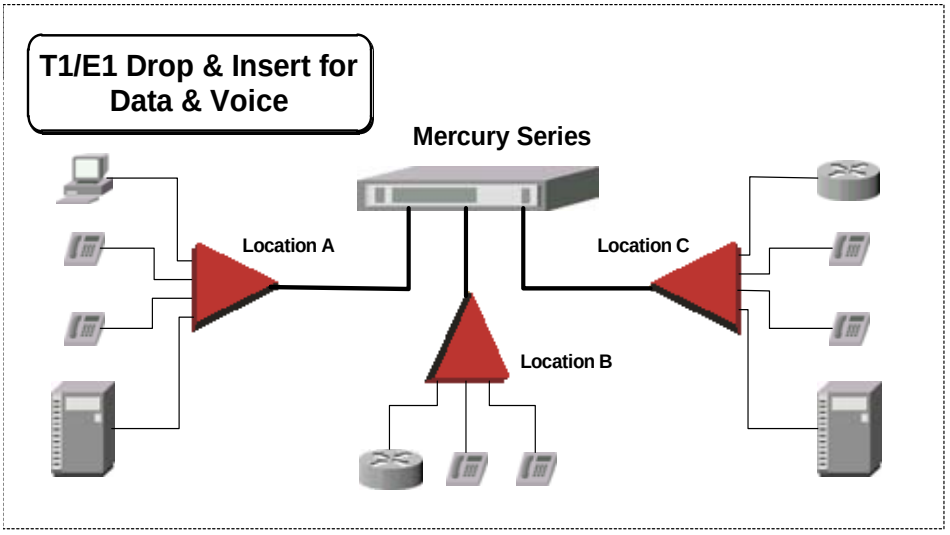


Figure 1.5 T1/E1 Drop & Insert for Data & Voice

In a drop, insert and bypass application, channels from a trunk connecting two locations are dropped at an intermediate location, inserted for additional data, or just bypassed to allow the data to continue on to the next location.

In the basic application shown in Figure 1.5, some of the channels of trunk A are routed to trunk B, and others are routed to trunk C. Similarly, some of the channels of trunk B are routed to trunk C. This arrangement can be extended to any desired number of trunks.

1.2.6 TDM Modular Integrated Access Device

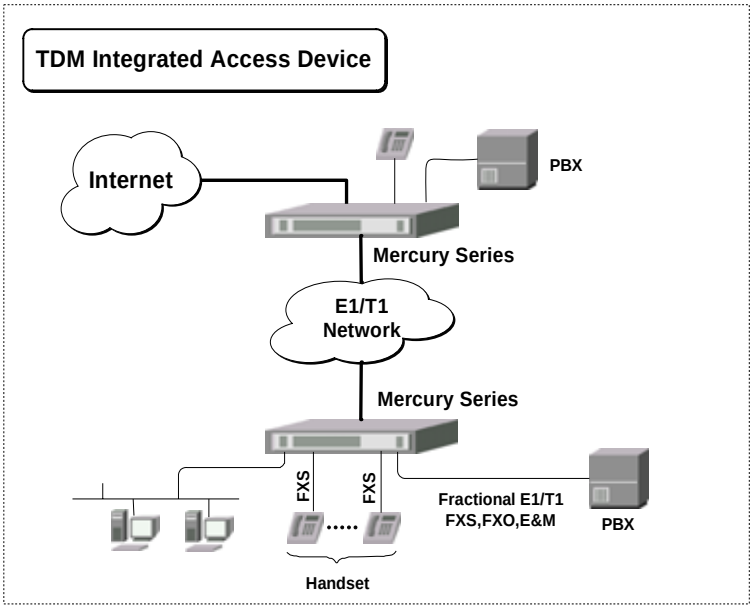


Figure 1.6 TDM Modular Integrated Access Device

Mercury system is an E1/T1 or Fractional E1/T1 modular integrated access device (IAD). It can operate multiple applications simultaneously. Mercury enables service providers to bundle voice services and Internet access over a single E1 or T1 line.

A variety of voice interfaces are available – E1/T1 for digital PBX connectivity or analog voice interfaces (FXS, FXO or E&M) for connecting an analog PBX or telephones.

Mercury system can be also treated as a Multiplexer for variant services and de-multiplex those data stream at the remote site via upper trunk such as E1/T1, xDSL or Fiber optical links. Mercury can also be connected to the E1 interface which may be dropped from the SDH network and set up to follow the clock coming from the dedicated E1 port.

The Mercury has programmable timeslot assignment allowing data from the LAN, sub-E1/T1 port, analog voice ports and data port to be placed into timeslots, either consecutively or alternately. Mercury also allows flexible timeslot allocation of the data port timeslots. Each timeslot of the sub-E1/T1 port is placed on the same timeslot of the main E1/T1 link.

1.2.7 E1/T1 Channelized Routing Application

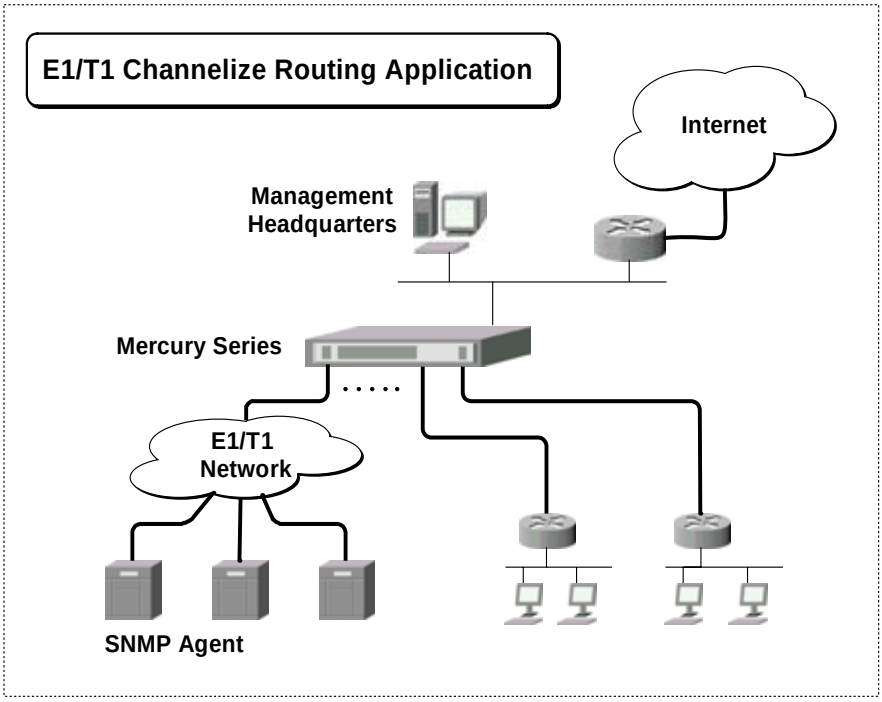


Figure 1.7 E1/T1 Channelized Routing Application

Mercury with Channelized Router Module will provide the IP routing up to a maximum 32 PPP links with 64 Kbps data rate, or any combinations with time slots cross connected to the DDN (E1/T1, V.35 or RS-530). This will provide a flexible and cost-effective solution to the specific requirements of the network management or small branch office routing solution.

1.2.8 T1/E1/Fiber Ring Protected Application

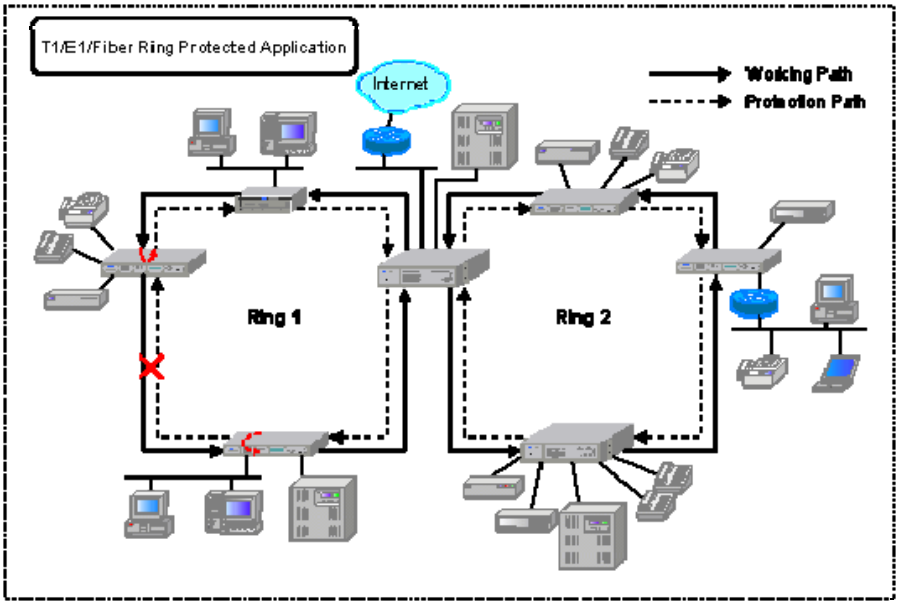


Figure 1.8 T1/E1/Fiber Ring Protected Application

T1 / E1 / Fiber ring protection is the physical and logical ring topology. Nodes on the

network are physically connected via T1 / E1 / Fiber interface to a Mercury tributary card. Mercury has T1 / E1 / Fiber connections to connect to the nodes and it also has special connections called Last Port and Next Port to connect to other Mercury units. T1 / E1 / Fiber ring protect require a start node which is designated as Master mode; all other nodes connect to the chain act in the Slave mode. This mechanism will automatically distinguish all node connections.

If one of the links fails due to cable faults or problems, the Main Ring can be wrapped to the Backup Ring. Wrapping is a term that is used to indicate that the Backup Ring is being used in addition to the Main Ring. The Backup Ring is connected to the Main Ring. The Main Ring or a portion of the Main Ring is still being used. Wrapping is only associated with the Last Port and Next Port connectors on the extremity Mercury units. Ring will automatic recover when the faults link has fixed.

1.2.9 Path Protected Application

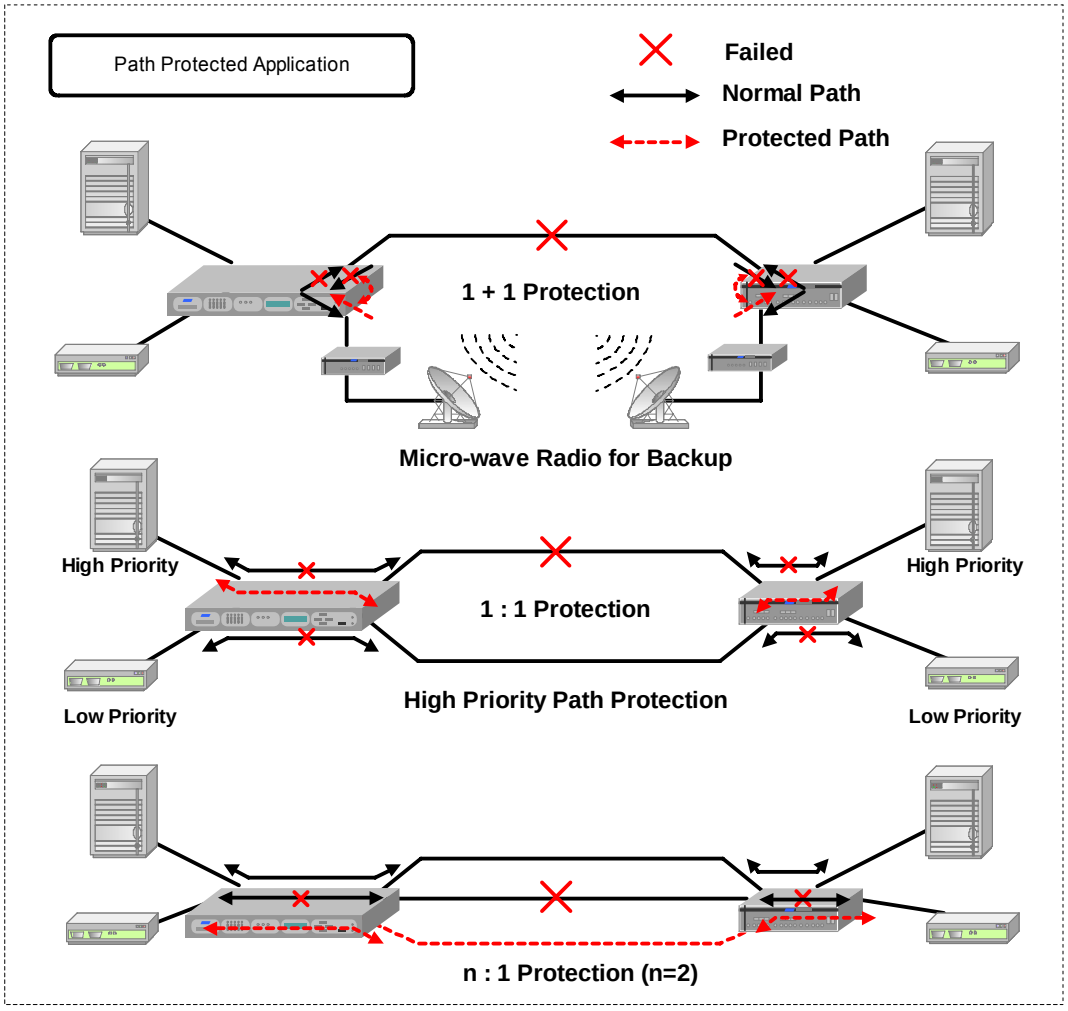


Figure 1.9 T1/E1/Fiber Path Protected Application

With the ring protection facility described in section 1.2.8 above, Mercury also has the 1+1 / 1:1/ N: 1 functionality as indicated in Figure 1.9 that provides an always alive path to ensure that your data transmission work properly.

Currently this function is available for the trunk link module such as E1 / T1 / Fiber / SDSL card, and G.SHDSL card.

1.2.10 Broadcast / Multicast Application

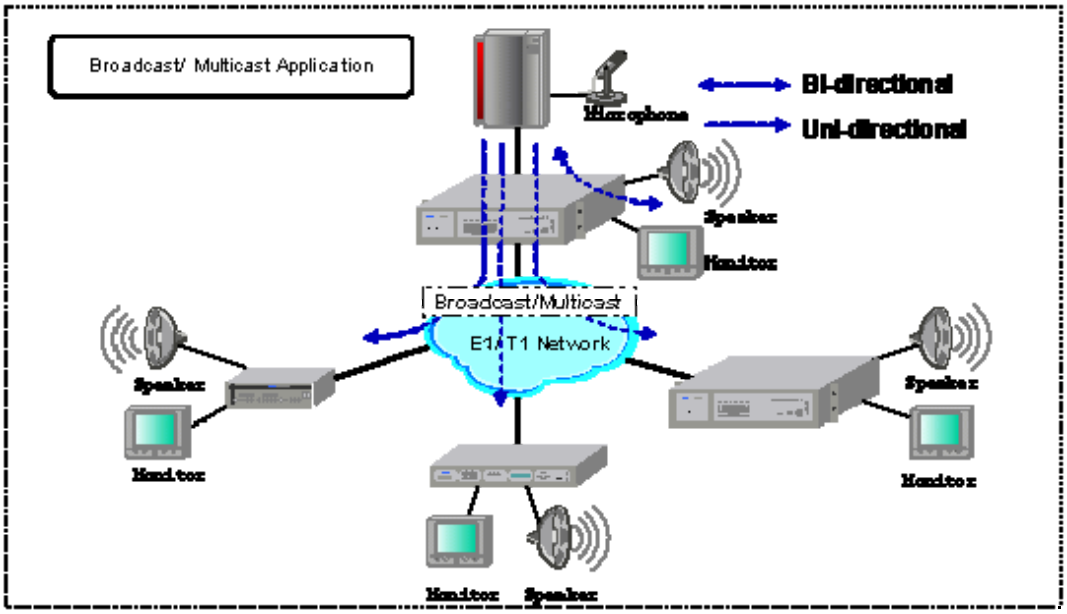


Figure 1.10 Broadcast/ Multicast Application

The broadcast / multicast feature enables a user at a central location to send data to multiple users connected to remote units, and still maintain a normal communication with another user. This capability is achieved by separating the handling of the receive and transmit paths in the time slot switching matrix of Mercury system, this mode is called uni-directional mode, in contrast to the normal bi-directional mode, the system connects the transmit and receive paths between the same pair of ports.

1.3 Technical Specification

1.3.1 Electrical Characteristic

The on board E1 interfaces for Mercury 800 refers to ITU-T G.703 (Physical / electrical characteristics of hierarchical digital interfaces).

Bit rate	2.048 Mbps ± 50ppm
Line code	HDB3
Pulse shape	Meet G.703
Peak voltage of mark	2.37V± 10%(75Ω) 3V± 10% (120Ω)
Peak voltage of space	0±0.237V(75Ω) 0±0.3V(120Ω)
Pulse width	244ns± 25ns
Ratio of amplitude	0.95 to 1.05
Ratio of width	0.95 to 1.05
Output jitter	Refer to G.823
Input attenuation	Attenuation ≥6db at 1024kHz

Jitter tolerance	Refer to G.823
Jitter transfer	Refer to G.823
Wander	Refer to G.823
Return loss	*51 kHz~102 kHz ≥12dB / 102 kHz~2048 kHz ≥ 18db / 2048 kHz~3072 kHz ≥ 14dB*

Table 1.2 Electrical Characteristic of E1

The on board Ethernet interface for Mercury 800 and 3820 refers to IEEE-802.3 (Carrier sense multiple access with collision detection access method and physical layer specification) with RJ-45 connector.

Output impedance	5~10 Mhz 85Ω ~111Ω
Return loss	5~10 Mhz >15db
Impedance balance	~20Mhz < 29 - 17log(5/10)
Common mode output voltage	<50mV
Differential mode output voltage	See 802.3 14-1(pulse template)
Input impedance	5~10Mhz 85Ω~111Ω
Transmission length	100m
Ratio Isolated resistor	>2MΩ
Leakage current	At 1.5kv <10ma

Table 1.3 Physical Characteristic of E1

- E1 Interface (E1-4CB/U, E1-2CB/U)
  - □ General Description
    - 2 or 4 ports E1 card with Balance or Unbalance interface
  - □ Electrical Characteristic
    - Line Rate: 2.048 Mbps ±50 ppm
    - Line Code: HDB3
    - Input Signal: ITU-T G.703
    - Coding: ITU-T G.704
    - Jitter: ITU-T G.823
    - Framing: CCS/ CAS/ Unframed
  - □ Timeslot Allocation
    - User-defined, any time slot (0~31) to any time slot mapping.
  - □ Clock Source
    - Can be set to derived external clock from received port A or C.
- E&M Interface (4P-POTS-E&M)
  - □ General Description
    - The 4P-POTS-E&M Card can provides four analog voice interfaces. Either 2-wire or 4-wire can selected by Dip Switch, the impedance of the 2-wire can select 600ohm or 900ohm by Dip Switch and the 4-wire impedance is 600ohm. its supported Signaling Type is E&M Signaling Type Ⅰ ~ Ⅴ and Jumper selectable. The configuration of its driver mode is E-Lead Originated or called Side B, Signaling Unit Side.

- The analog signals can converted to 64Kbps PCM digital signals with A-law or μ-law which selected by software, and can only cross connected to E1、T1、Fiber1V or 1PSHDSL card now.

□ KEY FUNCTION

- Four voice ports operate in 2-Wire 600/900 Ohm & 4-Wire 600-Ohm interfaces.
- Supports E&M Signaling type I, II, III, IV, V.
- Dip Switch Setting Line Interface Impedance.
- Jumper-Setting to select E&M type
- Trunk interface to PBX or key system.
- Supports loopback path in analog or digital
- Software-Configurable Transmission Level Points (TLPs) for both Transmit & Receive paths
- NOTE: In Type I, Ⅲ, V the Common Ground must exist between PBX (Side A) and Line Equipment(Side B).

□ Electrical Characteristic

- E&M DC INTERFACE:
- Physical Interface: DB44 Connector
- Configuration: Side B (Signaling Unit Side or E-Lead Originate)
- Signaling Mode: E&M types - I through V
- M-Lead: The current detector provides an impedance of approximately 3.3kΩ(about 14.5mA) to signaling ground. (The On-hook and Off-hook state depend on the detector circuit)
- SB-Lead: The battery through a current limiting that limit the current to 30mA.
- E-Lead: The lead connected to SG-Lead in the Type-2 and Type-4.
- SG-Lead: The lead connected to E-Lead in the Type-2 and Type-4.
- ANALOG INTERFACE
- 2W INTERFACE (Comply with ITU-T G.712)
- Impedance: 600Ω or 900Ω Selectable
- Return Loss: 300Hz ~ 600Hz >12dB, 600Hz ~ 3400Hz >15dB
- Input level: 0 to –5 dBm, Software Configurable in steps of 1dB(A->D, Default: 0dBm)
- Output level: -2 to –8 dBm, Software Configurable in steps of 1dB(D-A, Default: -2dBm)
- Attenuation/Frequency Distortion: Figure 5/G.712
- Idle Channel Noise: < -65 dBm0p
- 4W INTERFACE (Comply with ITU-T G.712)
- Impedance: 600Ω

- Input level: –14 ~ +3 dBm, Software Configurable in steps of 1dB(A→D, Default: 0dBm)
- Output level: -13 ~ +4 dBm, Software Configurable in steps of 1dB(D→A, Default: -2dBm)
- Attenuation/Frequency Distortion: Figure 4/G.712
- Idle Channel Noise: < -65 dBm0p

There are some states shows on Front Panel (see below):

LED Display	Status	Description
YELLOW	ACTIVE	M-Lead & E-Lead are Active.
FLASH RED	SENSE	M-Lead detected current flow from E&M PBX and send Off-Hook Signaling to TDM bus.
RED	SEIZE	E-Lead receive Off-Hook Signaling from TDM bus and Drive out to E&M PBX
GREEN	IDLE	M-Lead & E-Lead are Idle.

Table 1.4 Front Panel LED indicator

■ T1 Interface (T1-4CB, T1-2CB)

□ General Description

- 2 or 4 ports T1 card with 120 Ohm interface

□ Electrical Characteristic

- Line Rate: 1.544 Mbps ±32 ppm
- Line Code: AMI/B8ZS
- Input Signal: DSX-1
- Jitter: AT&T TR 62411
- Framing: D4/ ESF/ Unframed
- Output Signal: DSX-1 with 0, -7.5, -15dB LBO
- Pulse Template: AT&T TR 62411

□ Timeslot Allocation

- User-defined, any time slot (0~31) to any time slot mapping.

□ Clock Source

- Can be set to derived external clock from received port A or C.

■ 1P-SHDSL-V

□ General Description

- The 1P-SHDSL-V card is a signal port Single-pair High-speed Digital Subscriber Line (SHDSL) system, and a high performance transmission technology is fully conforming to ITU-T G.991.2. It supports CPE mode and CO mode application and select with software set. It supports multi-rate trunk solution for Mercury 3820 and low cost service. The data rate is directly with T1/E1 N×64k bps.
- 1P-SHDSL-V card also provide voice signaling information transmission function. It is included a mode (Signaling mode) to transmit voice

signaling information (ABCD bits). Therefore, it can be a trunk for voice application.

- In signaling mode, Timeslot 0 is used to transmit signaling bits (ABCD bits). Therefore, it only could be able to transmit signaling bits in Frame mode. 1P-SHDSL-V card provides 31 channels in Frame mode. And, it can support 30 channels voice data at most.

□ Electrical Characteristic

- Meet ITU-T G.991.2 relative requirements
- Loop performance and performance test meet ITU-T G.991.2 requirements
- EOC (embedded operation channel) supporting
- Power back-off supporting
- Line code: Trellis Coded Pulse Amplitude Modulation (TC-PAM)
- LTU and NTU mode
- Wetting current source (sub-module)
- Line protection: ITU-T K.20
- Port Number: One port per card.
- Line Speed：Multi-rate (200 - 2064) Kbps (increment step: 64K bps)
- Date rate：64K to 2.048M bps (increment step: 64K bps)
- . Connector: RJ-45, 135 ohm balanced via 2 wire twisted pair
- Temperature:
  Operation: 0˚C~50˚C
  Storage: -10˚C~70˚C
- Relative Humidity:
  Operation: 0%~ 90%, non-condensing
  Storage: 0%~ 95%, non-condensing
- Wetting Current:
- 4.6 mA constant current provide. (LTU Side)
- Power Consumption:
  The maximum power consumption of 1P-SHDSL-V card is 3.5 Walt.
- Voice channels:
  30 voice channels per card at most.

□ Timeslot Allocation

- User-defined, any time slot (0~31) to any time slot mapping.

□ Clock Source

□ Can be set to derived external clock from received port

■ 2V.35 card (2P-V35)

□ General Description

- 2 ports V.35 cards with data rate N x 64 Kbps (N=1~32) each.

□ Electrical Characteristic

- Refer to ITU-T Recommendation V.35 interface

50 ohms	←	Resource	←	150 ohms
35 ohms	←	Rshort	←	165 ohms, short-circuit terminals to signal ground
0.44 V	←	Vta-tb	←	0.66V, terminated by 100-ohm resistive load

Table 1.5 V.35 Electrical Characteristic

- Maximum Output Jitter: 0.065 UI.

□ Timeslot Allocation

- User-defined, any time slot (0~31) to any time slot mapping.

□ Clock Source

- Can be set to derived external clock from received port A or C.

■ 2/4-Data card (2/4P-Data)

□ General Description

- Provide 2/4 data ports in DCE mode with software selectable to ITU-T V.35/EIA530A/X.21 interface. Each data rate is N x 64 Kbps (N=1~32).

□ Electrical Characteristic

- Refer to ITU-T Recommendation interface

□ Timeslot Allocation

- User-defined, any time slot (0~31) to any time slot mapping.

□ Clock Source

- Can be set to derived external clock from received port A, B, C, or D.

□ Compatibility

Compatible software of Boot and Flash for Mercury 800			
Boot version	**Flash Version**	**2P-Data card**	**4P-Data card**
V1.03	V1.16	Supported	Not Support

Table 1.6 Data module compatibility Table

Compatible hardware and software for Mercury 3600				
Hardware version	**Compatible Software**	**Flash ROM**	**2P-Data card**	**4P-Data card**
V1.0	V1.xx	2M	Not support	Not support
V2.0	V5.04	4M	Not support	Supported
V2.0	V5.10	4M	Supported	Supported
Note: Only Hardware version V2.0 and Software V5.04 or above supports 4P-Data card, and V5.10 or above supports 2P-Data card.				

Table 1.7 Compatible hardware and software for Mercury 3600

Compatible software of Boot and Flash for Mercury 3820			
Boot version	**Flash Version**	**2P-Data card**	**4P-Data card**
V1.03	V1.07	Supported	All supported
Note: All released Boot and Flash version support 4P-Data card.			

Table 1.8 Compatible software of Boot and Flash for Mercury 3820

■ 4-FXS card (4-FXS, 4-FXS-D)

□ General Description

- 4 ports FXS voice card

□ Electrical Characteristic

- Digitizing technique:
  64 Kbps A-law PCM coding specified in ITU-T G.711
- Analog interface:
  FXS: 2 wire: A, B signaling bit will be provided
- Leased line: 2 wire; no signaling bit provided
- Analog characteristics:
  2 wire operation at 64 Kbps: ITU-T G.712
- Nominal level: -10 dBm
- Impedance: 600 ohms
- Return loss (300 to 3400 Hz): Better than 20 dB
- Relative levels:
  Input level: 0 to –5 dBr, adjustable in steps of 0.5dB
  Output level: -2 to –7.5 dBr, adjustable in steps of 0.5dB
- Total distortion:
  The ratio of signal-to-total distortion power measured with the proper noise weighting (see table 4/ITU-T G.223)
- Idle channel noise:
  Weighted noise: not exceed –65 dBmO
- Single frequency noise: not exceed –50 dBmO in all hand.
- Not exceed –73 dBmO in voice band
- Isolation: 1500 Vrms
- Signaling: loop start
- On-hook / off-hook threshold:
  5 mA between tip and ring in off-hook state
  0.5 mA between tip and ring in on-hook state
- Ring generation:
  38VRMS(±10%) overload protected, 17, 22, 25, 30 Hz (±10%), 1 second ON, 2 second OFF or 1 second ON, 3 second OFF
- Diagnostics test:
  Local digital loopback
  404 Hz, 1004 Hz tone injection

□ Timeslot Allocation

- Each channel occupies 64 Kbps bandwidth that allocated on time slot 0.

□ Clock Source

- Follow the active system clock of Mercury only.

□ Compatibility

Caution:
If voice card was plugged into Mercury 3820, additional external –48DC power should be connected at PWR3 socket at rear panel of Mercury 3820. And for Mercury 800 and 3600, no other external power is required.

■ 4-POTS-Voice card (4-POTS-FXS) & (4-POTS-FXS LL type)

□ General Description

- 4 ports FXS voice card. The 4P-POTS-Voice card provide 3 different sub-modules that can support FXS, FXO and 2/4 wire E&M with changing the sub-modules only. The voice signal can be multiplexed as a 64 Kbps signal then transfer into a digital network. 4 ports FXO voice card.

The FXS LL type module cannot be used with other normal FXS and FXO module, for the Hotline application it can only use LL type to LL type module, or use LL type module with E1 or Fiber interface, which has the voice signaling.

Note: The LL type voice module can only be used for Mercury 3600.

□ Electrical Characteristic

- Digitizing technique:
  64 Kbps A-law PCM coding specified in ITU-T G.711
- Analog interface:
  FXO: 2-wire POTS interface
- Analog characteristics:
  2 wire operation at 64 Kbps: ITU-T G.712
- Nominal level: -10 dBm
- Impedance: 600 ohms
- Return loss (300 to 3400 Hz):
  Better than 20 dB
- Relative levels:
  Input level: 0 to -5 dBr, adjustable in steps of 1dB
  Output level: -2 to -7.5 dBr, adjustable in steps of 1dB
- Total distortion:
  Comply with Figure 11 of ITUT-G.712
- Idle channel noise:
  Weighted noise: not exceed -65 dBm0
- Single frequency noise: Not exceed -73 dBm0 in voice band
- Signaling: loop start (excluding LL type Module)
- Ring generation:

>35 VRMS, reference at 25Hz (excluding LL type Module)

- DC impedance (Off-hook):
  >300 Ohms at 25mA feed (excluding LL type Module)
- Diagnostics test:
  Full Digital loopback
  TSA loopback
  1 KHz tone injection

□ Timeslot Allocation

- Each channel occupies 64 Kbps bandwidth allocated on time slot 0.

□ Clock Source

- Follow the active system clock of Mercury only.

□ Compatibility

Compatible Software of Boot and Flash for Mercury 800			
Boot Version	**Flash Version**	**H/W Version**	**4-POTS-FXS**
V1.03	V2.20	V2.0	Supported

Table 1.9 Compatible Software of Boot and Flash for Mercury 800

Compatible Software of Boot and Flash for Mercury 3600		
Flash Version	**H/W Version**	**4-POTS-FXS**
V5.21	V2.0	Supported

Table 1.10 Compatible Software of Boot and Flash for Mercury 3600

Compatible Software of Boot and Flash for Mercury 3820		
Boot Version	**Flash Version**	**4-POTS-FXS**
V1.03	V1.08	Supported

Table 1.11 Compatible software of Boot and Flash for Mercury 3820

Caution:
If a voice card was plugged into Mercury 3600+/3820, an additional external –48DC power should be connected at PWR3 socket at rear panel of Mercury 3600+/3820. But for Mercury 800, no other external power is required. Mercury 3600 with one power module can inserted one 4P-POTS-FXS card only.

■ 4-POTS-Voice card (4-POTS-FXO)

□ General Description

- 4 ports FXO voice card. The 4P-POTS-Voice card provide 3 different sub-modules that can support FXS, FXO and 2/4 wire E&M with changing the sub-modules only. The voice signal can be multiplexed as a

64 Kbps signal then transfer into a digital network. 4 ports FXO voice card.

□ Electrical Characteristic

- Digitizing technique:
  64 Kbps A-law PCM coding specified in ITU-T G.711
- Analog interface:
  FXO: 2 wires POTS interface
- Analog characteristics:
  2 wire operation at 64 Kbps: ITU-T G.712
- Nominal level: -10 dBm
- Impedance: 600 ohms
- Return loss (300 to 3400 Hz):
  Better than 20 dB
- Relative levels:
  Input level: 0 to –5 dBr, adjustable in steps of 1dB
  Output level: -2 to –7.5 dBr, adjustable in steps of 1dB
- Total distortion:
  Comply with Figure 11 of ITU-T G.712
- Idle channel noise:
  Weighted noise: not exceed –65 dBmO
- Single frequency noise: Not exceed –73 dBmO in voice band
- Signaling: loop start
- Ring generation:
  >35 VRMS, reference at 25Hz
- DC impedance (Off-hook):
  >300 Ohms at 25mA feed
- Diagnostics test:
  Full Digital loopback
  TSA loopback
  1 KHz tone injection

□ Timeslot Allocation

- Each channel occupies 64 Kbps bandwidth allocated on time slot 0.

□ Clock Source

- Follow the active system clock of Mercury only.

□ Compatibility

Compatible software of Boot and Flash for Mercury 800		
Boot Version	**Flash Version**	**4-POTS-FXO**
V1.03	V1.16	Supported

Table 1.12 Compatible Software of Boot and Flash for Mercury 800

Compatible software of Boot and Flash for Mercury 3820		
Boot Version	**Flash Version**	**4-POTS-FXO**
V1.03	V1.07	Supported

Table 1.13 Compatible Software of Boot and Flash for Mercury 3820

Caution:
If a voice card was plugged into Mercury 3820, an additional external –48DC power should be connected at PWR3 socket at rear panel of Mercury 3820. But for Mercury 800 and 3600, no other external power is required.

- Router card; Single Router Module (Router):
  - □ General Description
    - Router Module can provide TCP/IP Protocol and two PPP ports. Provides "In band" (TELNET), "Out band" (Console port) Management
  - □ Electrical Characteristic
    - LAN Port:
      Physical Layer Signal: IEEE802.3
      Electric Signal: IEEE802.3
      Connector: RJ-45, 10BaseT
    - WAN Port (AUX port):
      ASYNC:
      Baud: 2.4 Kbps to 115.2 Kbps
      Data: 8 Bit, start/stop
      Stop: 1, 1.5, 2bit
      Parity: even, odd, none
      Flow Control: RTS / CTS
      SYNC:
      Baud: 2.4 Kbps to 128 Kbps
      Data: Sync PPP
      Clock: external
      Electric Signal: V.24
      Connector: RJ-45
- Channelized Router Module (Router-C):
  - □ General Description
    - Router Module can provide TCP/IP Protocol and 32 channels (WAN INTERFACE). Provides "In band" (TELNET), "Out band" (Console port) Management
  - □ Electrical Characteristic

- LAN Port:
  Physical Layer Signal: IEEE802.3
  Electric Signal: IEEE802.3
  Connector: RJ-45, 10BaseT
- WAN Port:
- Support 32 channels (WAN INTERFACE)
- Protocol:
  PPP (RFC compliant)
  IP (RFC compliant)
  ARP (RFC compliant)
  TELNET (RFC compliant)
  SNMP (RFC compliant)

□ Timeslot Allocation

- User-defined, any time slot (0~31) to any time slot mapping.

□ Clock Source

- Follow the active system clock of Mercury only.

■ A/U law card (A/U Law)

□ General Description

- Non-blocking A-law/μ-law conversion of 120 time slot. It is used for transferring the voice signal between E1 and T1 voice switch.

□ Electrical Characteristic

- ITU-T G.711: Pulse code modulation (PCM) of voice frequencies

□ Timeslot Allocation

- No necessary to assigned the time slot.

□ Clock Source

- Follow the active system clock of Mercury only.

■ X.50 card (X50-MUX-5C, X50-MUX-4C, X50-DACS-2C)

□ General Description

- X.50 cards have 5 Physical ports with RS232 I/F characteristics, and the SCSI II cable to 5 DB25 female connector is necessary. By using X.50 multiplexing, it supports low speed data rate for data service, so that 5 ports use for one 64 K time slot.
- X50-MUX-5C:
  For Each port (5 port)
  Speed (2400, 4800, 9600, 19200)
  Sync only
- X50-MUX-4C:
  For each port (4 port)
  Speed (2400, 4800, 9600, 19200)
  Sync mode for each port. Async mode only use in 1,2 port

- X50-DACS-2C:
  For each port (2 port) can be set to different time slot
  Speed (2400,4800,9600,19200)
  Sync / Async mode

□ Electrical Characteristic

- Data Transmission Interface:
  Physical: V.24 / V.28, 5 ports, DCE, external Null modem is necessary when act in DTE mode.
- Electrical specification:
  X-50 Division 3 multiplexing
- Sync mode:
  Bit stream transparent
- DTE speed:
  2400, 4800, 9600, 19200 (only the first two ports support 19200)
- RS232 interface:
  IN: TD, RTS, DTR
  OUT: RD, CTS, TC, RC, DCD, DSR
  Network:

	DTE Mode	DCE Mode	Function
Out	TD	RD	Force (off) mark when not in sync Data out
In	RD	TD	Data input
Out		CTS	CTS: Follow RTS state Force on
In	DCD	RTS	ON when network OK
Out		DSR	Connect to DTR input pin
Out	RTS	DCD	On when Synchronization established RTS/DCD signaling Force on
Out	EXC	TC, RC	Clock of Transmission rate
In		DTR	Data terminal ready

Table 1.14 RS232 Network mode

- Maintenance Access Interfaces:
  FAS error count
- Test Access interfaces:
  Loop on Network side (LL)
  Loop on tributary side (RL)
- Interface signaling:
  Selectable to send the RTS to remote DCD.
- Performance Requirement:
  Full follow X-50 division 3, “20 8-bits envelop” Structure, so, provide 48k/64 Kbps affiance.
- Transmission propagation Delay time: < 50ms.

- Noise immunity:
  System can synchronize the trunk transmission link error rate less than 1×10-4, and keep synchronization when error rate less than 5×10-4.
- Protocol:
  ITU-T X.50
  V.24
  V.28

□ Timeslot Allocation

- All 5 ports occupy 64 Kbps bandwidth allocated on time slot 0.

□ Clock Source

- Follow the active system clock of Mercury only.

■ 4-V24 card (4P-V24)

□ General Description

- 4 Physical ports RS232 I/F with SCSI II cable converter to 5 DB25 female ports, but the 5th port is un-used. All 4 ports can select individual 64K time slot, or combined few of them in 1 time slot for saving the bandwidth.
- Data Rate: 1200, 2400, 4800, 9600, 19200 bps
- Data format: support Synchronous and Asynchronous mode.
- Synchronous:
  Internal clock, the outside equipment should follow Mercury's clock
- Asynchronous:
  Supports 7 or 8 data bits, 1 stop bit, none parity and none flow control mode.

□ Electrical Characteristic

- Data Transmission Interface:
  Physical: V.24/ V.28, 4 ports, DCE, external Null modem is necessary when act in DTE mode
- RS232 interface:
  IN: TD, RTS, DTR, EC
  OUT: RD, CTS, TC, RC, DCD, DSR
- Test Access interfaces:
  Loop on Network side (LL)
  Loop on tributary side (RL)
- Temperature:
  Operation: 0 ~ 50 °C
  Storage: -10 ~ 70 °C
- Relative Humidity:
  Operation: 0 ~ 90%, non-condensing
  Storage: 0 ~ 95%, non-condensing

- Power Consumption:
  0.93 Watt when 4 ports (A,B,C,D) are used simultaneously.

□ Timeslot Allocation

- All 4 ports can select individual 64K time slot that located on time slot 0, or combined few of them in 1 time slot for saving the bandwidth.

□ Clock Source

- Follow the active system clock of Mercury only.

□ Compatibility

Compatible software of Boot and Flash for Mercury 800		
Boot version	**Flash Version**	**4P-V24 card**
V1.03	V1.16	Supported

Table 1.15 Compatible Software of Boot and Flash for Mercury 800

Compatible hardware and software for Mercury 3600			
Hardware version	**Compatible Software**	**Flash ROM**	**4P-V24 card**
V1.0	V1.xx	2M	Not support
V2.0	V5.10	4M	Supported

Table 1.16 Compatible Software of Boot and Flash for Mercury 3600

Caution:
For Mercury 3820, all released versions will support the 4P-V24 card.

■ 1P-V24-DS card

□ General Description

- One 1P-V24-DS Card can connects one master DTE device, which supports V.24 & V.28 interface. The master can connect remote DTE devices through 1P-V24-DS & 4P-V24 cards, which plug in Mercury 3820 & Mercury 800.
  The 1P-V24-DS card support V.24 / V.28 interface. One port per card and it can connect with one DTE device. 1P-V24-DS card provide Data Sharing function. If it connects with a host DTE device, the host can communicate with other eight-servant device via 1P-V24-DS card at most.

□ Electrical Characteristic

- Five data rate can be selected: 1.2Kbps, 2.4kbps, 4.8kbps, 9.6kbps, and 19.2kbps.
- It provides synchronous mode and asynchronous mode.
  In synchronous mode, the clock of DTE device follows Mercury's

clock.

In asynchronous mode, it supports 7 data bits with 1 stop bit mode and 8 data bits with 1 stop bit mode. It only supports none parity and none-flow control mode.

□ Test Function

- It provides LL(local loopback) and RL(remote loopback) function.

□ Environmental Conditions

- Temperature:

  Operation: 0℃~50℃

  Storage: -10℃~70℃

- Relative Humidity

  Operation: 0%~ 90%, non-condensing

  Storage: 0%~ 95%, non-condensing

□ Power Consumption

- 0.93 Walt.

■ IDSL card (4-IDSL)

□ General Description

- 4 ports IDSL card that works in LT mode is using 2B1Q modulation technology to extend the operation distance via 2-wire copper line.

□ Electrical Characteristic

- U-reference interface according to

  ANSI T1.601 (1992)

  ETSI TS 102 080 (1998)

  ITU-T G.961 standards

- Two-wire metallic subscriber loops

  Full duplex data transmission and reception basic rate access at 144K bit/s 2B1Q block code (2 binary, 1 quaternary) at 80-kHz symbol rate.

- Line protection

  Comply FCC part 68

- Line Speed:

  Synchronous: 144K BPS

- Line Requirement:

  2-wire unconditioned unloaded twisted Line

- Operating Range:

  Up to 6.0 Km over 26 gauge wire

  Up to 7.8 Km over 24 gauge wire

  Pass all the test for ANSI loop 1-15

- Line Coding: 2B1Q
- Output Level: 13dBm

- Line Impedance: Balanced 135Ω
- Line Interface: RJ-11 Connector X 4
- Diagnostic Capability:
  DL: Local Digital Loopback
  AL: Analog Loopback
  RDL: Remote Digital Loopback
- Near-End and Far-End Block Error Count
- Timing: Internal clock (fsc: 8Khz PCM 2.048Mhz)
- Power consumption: Less than 1.5 Watts
- Operating Temperature: 0 ~ 50 °C
- Storage Temperature: -25 °C ~ 70 °C
- Relative Humidity: up to 95 % (non-condensing)

□ Timeslot Allocation

Time Slot	0	1	2	3
Idsl	B1	B2	Reserve	D (bits 7,6)

Table 1.17 IDSL Port time slot assignment

□ Clock Source

- Follow the active system clock of Mercury only.

■ SDSL card (SDSL)

□ General Description

- SDSL card is a single port card with CAP modulation that works in LTU and NTU mode via 2 wire copper line.

□ Electrical Characteristic

- LTU and NTU mode
- Line Coding: CAP
- Line Speed: multi-rate (144-2064) Kbps
- Line Requirement: 2 wire unconditioned unloaded twisted Line
- Operating Range:
  3.7 Km over 26 gauge wire (2064 Kbps)
  5.2 Km over 24 gauge wire (2064 Kbps)
- SDSL interface according to ITU-T standard G.991.1
- Line Interface: RJ-45 Connector
- Line Impedance: Balanced 135
- Output Level: 13-14dBm
- Timing: PCM side (fsc: 8KHz, clock: 2.048MHz)
- Power consumption: Less than 1.3 Watts
- Operating Temperature: 0 ~ 50 °C
- Storage: -20°C ~ 70°C
- Relative Humidity: up to 95 %(non-condensing)

□ Timeslot Allocation

- User-defined, any time slot (0~31) to any time slot mapping.

□ Clock Source

- The SDSL card that acts as NTU mode can receive clock from LTU.

□ Compatibility

Compatible hardware and software for Mercury 3600			
Hardware version	**Compatible Software**	**Flash ROM**	**SDSL card**
V1.0	V1.xx	2M	Not support
V2.0	V5.xx	4M	Supported
1. The difference between Mercury 3600 hardware version V1.0 (with software version V1.xx) and V2.0 (with software version V5.xx) is that only hardware V2.0 supports SDSL card, and all other functions are the same. 2. So the SDSL card is available for Mercury 3600 hardware version V2.0 and software version V5.00 or above.			

Table 1.18 Compatible hardware and software for Mercury 3600

Compatible software of Boot and Flash for Mercury 800		
Boot version	**Flash Version**	**SDSL card**
V1.02	V1.04	Supported

Table 1.19 Compatible Software of Boot and Flash for Mercury 800

Caution:

For Mercury 3600+/3820, all released versions will support the SDSL card.

■ Fiber Optical card (Fiber-1, Fiber-2, Fiber-B)

□ General Description

- 3 types of Fiber Optical cards are provided for the uplink trunk. These cards can aggregate all the tributary data with electrical characteristic and convert them through the optical trunk link.
- The FOM card Fiber-B can provide automatic protection switching function for optical link, when Optical signal fails; switching is completed in less than 30ms.
- The FOM can provide alarm and status indicators on Front panel, including Fiber fail, Frame Sync loss, Fiber Optical Frame error, Code Violation.

□ Electrical Characteristic

- The FOM Output power –6 dBm
- The FOM Sensitivity is –32 dBm
- The transfer distance up to 55Km
- The FOM provide error rate 1<10^(-10) transmission
- The FOM can be use as clock source
- The FOM volume is 8M

- Optical source: signal mode, laser diode, 1310nm
- Connector: FC-type

□ Timeslot Allocation

- User-defined, any time slot (0~127) to any time slot mapping.

□ Clock Source

- Can be set to derived external clock from received port A, C.

■ Fiber-1V & Fiber-1VWA20 (Fiber-1VWB20)

□ General Description

The FIBER-1V card can provide with alarm and status indicators on Front panel. (Include Frame Sync Loss, Remote Sync Loss, Code Violation, OE Loss)

The FIBER-1VWA20 (B20) has to be use one A type and one B type as a pair; the A20 type has the TX as 1550nm, RX 1310nm, and running in one fiber line. B20 type is same as A type module card but it has the TX as 1310nm and RX as 1550nm.

□ Electrical Characteristic

- Propagation delay time about 600 ns.
- The FIBER-1V card output power > 0 ~ -5dBm.
- The FIBER-1V card sensitivity is –32dBm.
- The FIBER-1V card system gain: 26dB.
- The FIBER-1V provide error rate 1<10^(-10) transmission.
- The FIBER-1V can be use as clock source.
- The FIBER-1V volume is 8.192M.

□ PORT NUMBER

- One port includes 128 time-slots per card.

□ DATA RATE & LINE RATE

- Line Speed：8.192Mbps.
- Date rate：10.24Mbps.

□ VOICE CHANNEL

- 128 voice channels per card at most.

□ OPTICAL INTERFACE

- Optical Source: Laser (Single Mode)
- Operating Wavelength Range: 1310nm (1280nm - 1350nm)
- Optical Connector: FC/PC type (Fiber size→9/125 μm)
- Optical Transceiver Operating Temperature: 0 ~ 70°C

□ ENVIRONMENTAL CONDITIONS

- Temperature:

  Operation: 0°C~50°C, Storage: -10°C ~70°C

- Relative Humidity

Operation: 0%~90%, Non-Condensing.

Storage: 0%~95%, Non-Condensing.

□ Timeslot Allocation

- User-defined, any time slot (0~127) to any time slot mapping.

□ Clock Source

- Can be set to derived external clock from received port A

1.3.2 Timing Control

- Internal clock
- Received for the indicated ports
- Hold-over
- Clock mode switch automatically

1.3.3 Operation Environment

- Temperature: Humidity:
- Storage: -20ºC ~ 70ºC 95%
- Operation: 0ºC ~ 50ºC 90%

1.3.4 Power Requirement

- Mercury 800:
  - □ DC: -36 ~ -72V
  - □ AC: 90 ~ 260V, 50 ~ 60Hz
- Mercury 3600:
  - □ DC: -36 ~ -72V
  - □ AC: 90 ~ 260V, 50 ~ 60Hz
- Mercury 3600+:
  - □ DC: -36 ~ -72V
  - □ AC: 90 ~ 260V, 47 ~ 63Hz
- Mercury 3820:
  - □ Power module 1 (AC)
  - □ Input voltage: AC 90 ~ 260V, 47 ~ 63Hz
  - □ Output voltage: DC 5V, tolerance 0.05V, load 20mA ~ 6A
  - □ Power module 2 (DC)
  - □ Input voltage: DC -36 ~ -72V
  - □ Output voltage: DC 5V, tolerance 0.05V, load 20mA ~ 6A

1.3.5 Power Consumption

- Maximum Power Consumption of Mercury Series Product
- Mercury 800: 36W
- Mercury 3600: 15W
- Mercury 3600+: 40W
- Mercury 3820: 42W

1.3.6 Electromagnetic Spec.

- FCC Part 15 Class A
- EN50082-1
- EN50082-2
- IEC-950

1.4 Module Information

Mercury Series products are modular systems with various equipped I/O modules. They can be equipped with the specific I/O modules in different physical slots. Please refer to following Table 1-5-1 for the compatible combinations.

V Available, **X** Non-Available

Module Compatibility Table	Mercury 800	Mercury 3600		Mercury 3820		
		Slot 1~4	Slot 5	Slot 1~3, 6~8	Slot 4~5, 9~10	Slot10 when In-band NMS used
E1-4CB/U	✓	✓	×	✓	✓ 2ports only	✓
E1-2CB/U	✓	✓	×	✓	✓	✓
T1-4CB	✓	✓	×	✓	✓ 2ports only	✓
T1-2CB	✓	✓	×	✓	✓	✓
2P-V35	✓	✓	✓	✓	✓	✓
2P-Data	✓	✓	×	✓	✓	×
4P-Data	×	✓	×	✓	×	×
1P-V24-DS	✓	×	×	✓	✓	✓
4P-V24	✓	✓	✓	✓	✓	✓
X50-MUX-5C	✓	✓	✓	✓	✓	✓
X50-MUX-4C	✓	✓	✓	✓	✓	✓
X50-DACS-2C	✓	✓	✓	✓	✓	✓
Fiber-1	✓	✓	×	✓	✓	×
Fiber-2	✓	✓	×	✓	×	×
Fiber-B	✓	✓	×	✓	✓	×
Fiber-1V	✓	×	×	✓	✓	×
Fiber-1VW	✓	×	×	✓	✓	×
4-IDSL	✓	✓	✓	✓	✓	✓
SDSL	✓	✓	×	✓	✓	✓
Router	✓	✓	✓	✓	✓	✓
Router-C	✓	✓	✓	✓	✓	✓
Xcode	✓	✓	×	✓	✓	✓
A/U Law	✓	✓slot 2,7	×	✓slot 2,7	×	×
4-FXS	×	✓	✓	×	×	×
4-FXS-D	✓	×	×	✓	✓	✓
1P-SHDSL-V	✓	×	×	✓		✓
4-POTS-FXO	✓	✓	✓	✓	✓	✓

Module Compatibility Table	Mercury 800	Mercury 3600		Mercury 3820		
		Slot 1~4	Slot 5	Slot 1~3, 6~8	Slot 4~5, 9~10	Slot10 when In-band NMS used
4-POTS-E&M	✓	×	×	✓	✓	✓
4-POTS-FXSLL	×	✓	×	×	×	×
4-POTS-FXS	✓	✓	✓	✓	✓	✓

Table 1.20 The suitable I/O module for Mercury Series Product

Caution:
Mercury 3600/3600+ and 3820 share the same I/O modules. But now the interface card for Mercury 800 is different connector designed to Mercury 3600/3600+ and 3820, so the card for Mercury 3600/3600+ and 3820 can NOT plug into Mercury 800.

Chapter 2. Installation

ABOUT THIS CHAPTER

This Chapter provides installation, operation instructions for the Mercury Series Product and to ensure it is working properly.

2.1 Unpacking

Make a preliminary inspection of the shipping container before unpacking, evidence of damage should be noted and reported immediately to the nearest Tainet representative.

Unpack the equipment as follows:

- Place the container with the top facing upwards.
- Unpack equipment carefully, check for completeness against the purchase order.
- Inspect equipment for shipping damage, including bent or loose hardware, or broken connectors.
- To prevent electrostatic discharge (ESD) damage, avoid touching the internal components. Before plugging in any user interface module, please turn the power off.

Caution:
Turn off the power then remove the top cover before changing or installing any module on the Mercury 800 base unit. For Mercury 3600, be sure to turn off the power before replacing any module, otherwise the device may be damaged.

Mercury's shipping package should includes the following items:

- A Mercury stand alone unit
- User Manual in CD type
- A power adapter and/or a power cord
- A RJ-45 to DB-9 adapter (with null modem crossed inside) and a 24 AWG RJ-45 cable for Mercury 800, 3600+ and 3820 craft port operation; for Mercury 3600, a DB-9 adapter cable is included
- A RJ-45 to DB25 adapter is for Mercury 800, 3820 PPP port operations.
- Optional modules and cables

2.2 Site Selection

The AC power for the power adapter of Mercury Series Product must be installed into an easily accessible grounded AC outlet with a range of 100 to 240 VAC, as described in National Electrical Code (NEC) handbook. The Mercury Series Product must be grounded during operation at all times, and must remain grounded whenever connected to power. In addition, Mercury Series Product provides grounding screw located on the rear panel of the product.

Caution:
It's strongly recommended that you should connect the PG (Protective Ground) screw on your AC Power to the earth ground system of your building.

Locate the Mercury Series Product no further than 50 feet (15.24 meters) from your data terminal equipment and within 6 feet (1.83 meters) of a grounded AC outlet furnishing the required power. Install the Mercury in a clean area that is free from extreme environmental changes. Keep enough space in the front and rear for operator access and cable clearance.

Caution:
To avoid overheating the Mercury Series Product, do not place anything within 1 inch (2.54 cm) of the Mercury unit, and do not place multiple Mercury units right next to each other.

2.3 Mercury 800 Front Panel Description

The front panel of Mercury 800 enclosure includes the status indicators on each interface module, and buttons as shows on Figure 2.1. Table 2.1 describes the function in detailed.

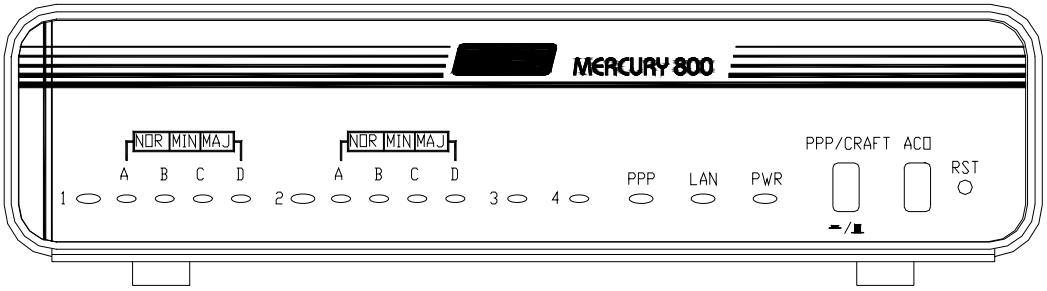


Figure 2.1 Front Panel view of Mercury 800

LED Indicator / Buttons	Status	Description
1.2.3.4	Green	Card is ready in the indicated slot
	Red	Major alarm occurred in slot 3 and 4 only.
	Blinking	Indicates this slot is under testing mode for slot 3, 4.
	Off	Card is unavailable
A.B.C.D	Green	Indicates this channel in normal condition
	Yellow	Minor alarm occurred in this channel
	Red	Major alarm occurred in this channel
	Blinking	Indicates this channel is under testing mode
	Off	Alarm and DAC function are disabled
PPP	Green	PPP protocol is UP
	Blinking	When data is being sent/received
	Off	PPP protocol is DOWN
LAN	Green	An Ethernet is connected
	Blinking	When data is being sent/received
	Off	An Ethernet is unconnected properly
PWR	Green	Power ON
	Off	Power OFF
PPP/CRAFT	Press	The rear panel PPP/Craft port change to Auxiliary PPP mode
	Release	The rear panel PPP/Craft port change to Craft mode
ACO	Press	Alarm Cut Off button, press to clear the alarm
RST	Press	Reset the hardware by pressing this button

Table 2.1 Front Panel Description of Mercury 800

The Front panel PPP/Craft button can be selected to switch the PPP/Craft port on the rear panel to serve as a normal Craft port or an Auxiliary PPP port. Auxiliary PPP serial interface operates at standard RS-232/V.24 DTE mode, and there should be a RJ-45 cable and RJ-45-to-DB25 (Male) adapter when you unpack. It supports both Asynchronous and Synchronous data transmission format. It can be connected to the remote site Router and built up a WAN with PPP protocol. This facility is for user to control Mercury Series Product via IP Network through its Auxiliary PPP port when there is no local LAN at the installation site.

Asynchronous selectable data rate are 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps; 8 data bits, none parity, 1 stop bit and none flow control.

Synchronous data transmission supports up to 128 Kbps.

Caution:
Upon pressing the PPP / Craft button to switch between normal craft mode or auxiliary PPP mode, action will be in effect when system is restarted. Please remember to press the RST reset button to initialize system. All the settings for Mercury 800 will be lost if they are not stored into profile in advance.

2.4 Mercury 800 Rear Panel Description

Mercury 800 supports 2 selectable I/O modules and 2 built-in E1 balance/unbalanced interface, LAN port, PPP/Craft port and power supply socket, the ground screw in the rear panel of Mercury 800. Figure 2.2 shows a typical rear view of Mercury 800, each slot is marked with a label to designate the slot type and definition. Table 2.2 describes the function of each port. Please refer to Chapter 1.4 about the compatible I/O modules for Mercury 800.

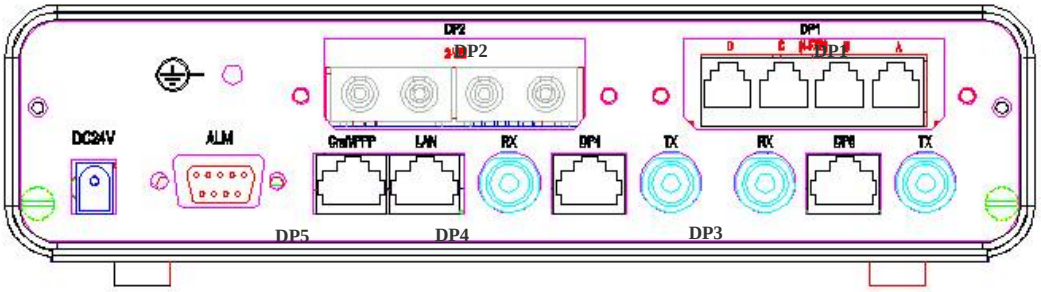


Figure 2.2 Rear Panel view of Mercury 800

Label	Description
DP1, DP2	Data port 1 & 2 are user Plug-in cards
DP3, DP4	Data port 3 & 4 are built-in E1 cards while ordered, the Balance (120Ohm) or Unbalanced (75Ohm) connector is software configurable.
DP5	Built-in router module, located on port5A.
LAN	LAN connector with RJ-45 type for built-in Router module.
CRAFT/PPP	User selectable port by pressing the front panel button (PPP/CRAFT) to change between Craft port or Auxiliary PPP port functionality
ALM	Relay contact to extend the major and minor alarm to the office audible and visible system
DC24V	Power supply connector
PG screw	Protective Ground screw for connecting to the earth ground

Table 2.2 Rear Panel Description of Mercury 800

2.5 Mercury 3600 /3600+ Front Panel Description

The Mercury 3600/3600+ enclosure has 5 slots, 4 slots are assigned to the interface modules and the 5th slot is usually for management use. It can support up to 16 channels and each card can support 4 channels maximum. Figure 2.3 shows the status indicators on each interface module and the buttons. Table 2.3 describes the function in detailed.

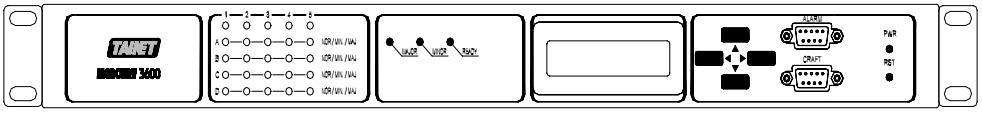


Figure 2.3 Front Panel view of Mercury 3600

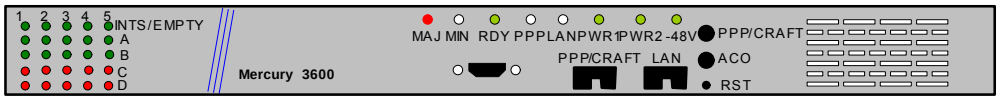


Figure 2.4 Front Panel view of Mercury 3600+

LED Indicator / Buttons	Status	Description
1.2.3.4.5	Green	Card is ready in the indicated slot
	Red	Major alarm occurred in the indicated slot
	Off	Card is unavailable
A.B.C.D	Green	Indicates this channel in normal condition
	Yellow	Minor alarm occurred in this channel
	Red	Major alarm occurred in this channel
	Blinking	Indicates this channel is under testing mode
	Off	Alarm and DAC function are disabled
READY	Green	System is ready
	Off	System is under self-testing while initialing
MAJOR	Red	Major alarm occurred in the system
	Off	No major alarm
MINOR	Yellow	Minor alarm occurred in the system
	Off	No minor alarm
PWR	Green	Power ON
	Off	Power OFF
RST	Press	Reset the hardware by pressing this button
Key Pad	Press	Show alarm history on LCD panel

Table 2.3 Front Panel Description of Mercury 3600

- ALARM:

- The ALARM relay contact is to extend the major and minor alarms of Mercury 3600/3600+ to the office audible and visual alarm system. Refer to Appendix A for its pin assignment.

■ CRAFT:

- The Front panel CRAFT port serves as a normal supervise port and operates at standard RS-232/V.24 DCE mode in DB-9 type connector, it can direct connect to PC COM port for operation

2.6 Mercury 3600 /3600+ Rear Panel Description

There are 5 slots on the rear panel of Mercury 3600/3600+, the first 4 slots can be plugged in with I/O modules, while the 5th slots is usually used for management with the Non-Channelized or Channelized router module (3600 only). Figure 2.5 shows a typical rear view of Mercury 3600 /3600+ with 5 slots, power supply socket and ground screw. Each slot is marked with a label that designates the slot type and definition. Table 2.4 describes the function of each port. Please refer to Section 1-5 about the compatible I/O modules for Mercury 3600.

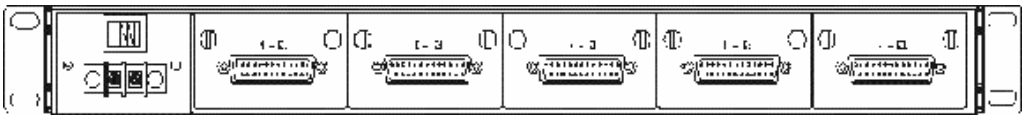


Figure 2.5 Rear Panel view of Mercury 3600/3600+

Label	Description
DP1 ~ 5	Data port 1 to 5 are user Plug-in cards
Power Supply socket	Power supply socket for Mercury 3600/3600+
PG screw	Protective Ground screw for connecting to the earth ground

Table 2.4 Rear Panel Description of Mercury 3600/3600+

2.7 Mercury 3820 Front Panel Description

Mercury 3820 is a 10-slots digital cross connect system with user selectable I/O modules. The front panel of Mercury 3820 enclosure includes the status indicators on each interface module; the buttons, ALM relay, PPP / Craft port and LAN port as shows on Figure 2.6. Table 2.5 describes the function in detailed.

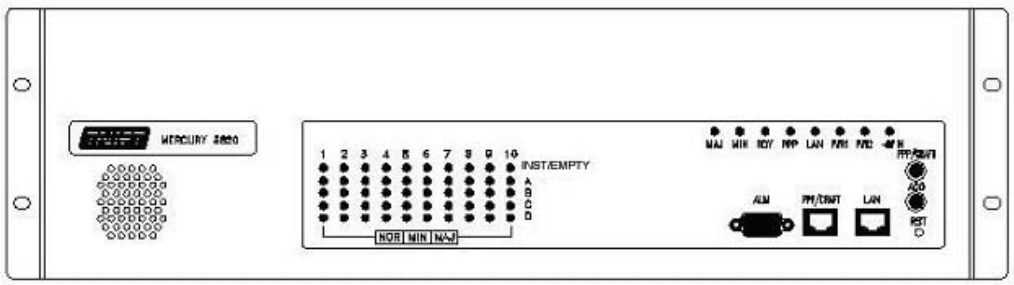


Figure 2.6 Front panel view of Mercury 3820

LED Indicator / Buttons	Status	Description
1.2.3.4 ~ 10	Green	Card is ready in the indicated slot
	Off	Card is unavailable
A.B.C.D	Green	Indicates this channel in normal condition
	Yellow	Minor alarm occurred in this channel
	Red	Major alarm occurred in this channel
	Blinking	Indicates this channel is under testing mode
	Off	Alarm and DAC function are disabled
RDY	Green	System is ready
	Off	System is under self-testing while initialing
MAJ	Red	Major alarm occurred in the system
	Off	No major alarm
MIN	Yellow	Minor alarm occurred in the system
	Off	No minor alarm
PPP	Green	PPP protocol is UP
	Blinking	When data is being sent/received
	Off	PPP protocol is DOWN
LAN	Green	An Ethernet is connected
	Blinking	When data is being sent/received
	Off	An Ethernet is unconnected properly
PWR 1 ~ 2 *Note	Green	Power ON
	Off	Power OFF
-48V *Note	Green	Power 48V ON
	Off	Power 48V OFF
PPP/CRAFT	Press	The front panel PPP/Craft port change to Auxiliary PPP mode
	Release	The front panel PPP/Craft port change to Craft mode
ACO	Press	Alarm Cut Off button, press to clear the alarm
RST	Press	Reset the hardware by pressing this button

Table 2.5 Front Panel Description of Mercury 3820

Note:
The LED PWR 1/2 will light on while the power module is plugged into the rear panel power supply socket 1/2 with the power turned on. The LED –48V lights on when power supply socket 3 on the rear panel is connected to the external –48VDC power source. The -48VDC is for voice application and generates the ring tone, if there is any voice card plugged into Mercury.

- ALM:
  - The ALARM relay contact is to extend the major and minor alarm of Mercury 3820 to the office audible and visual alarm system. Refer to Appendix A for its pin assignment.
- LAN:
  - The front panel LAN connector with RJ-45 type is for Mercury 3820's built-in router module. The10BaseT Ethernet port follows IEEE 802.3 protocol and supports SNMP protocol.
- PPP/CRAFT:
  - The Front panel PPP/Craft button can be selected to switch the PPP/Craft port on the front panel to serve as a normal Craft port or an Auxiliary PPP port. Auxiliary PPP serial interface operates in standard RS-232/V.24 DTE mode, and there should be a RJ-45 cable and RJ-45-to-DB25M adapter when you unpack, it supports both Asynchronous and Synchronous data transmission format. It can be connected to the remote site Router and build up a WAN with PPP protocol. This facility is for user to control Mercury Series Product via IP Network through its Auxiliary PPP port when there is no local LAN at the installation site.
- Asynchronous
  - Selectable data rates are 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps; 8 data bits, none parity, 1 stop bit and none flow control.
- Synchronous
  - Data transmission support up to 128 Kbps.

Note:
When pressing the PPP / Craft button to switch between normal craft mode or auxiliary PPP mode, action will be in effect immediately when system has been restarted. Please remember to press the RST reset button to initialize the system. All the settings for Mercury 3820 will be lost if they are not stored into profile in advance.

2.8 Mercury 3820 Rear Panel Description

Mercury 3820 enclosure has 10 selectable I/O modules, and power supply socket in the rear panel. Figure 2.7 shows a typical rear view of Mercury 3820. Each slot is marked with a label that designates the slot type and definition. The built-in router module is located in port11A, and will occupy the TDM bus of port10A and share the same bus if E1 card is inserted into port10. Table 2.6 describes the function of each port. Please refer to Section 1.4 about the compatible I/O modules for Mercury 3820.

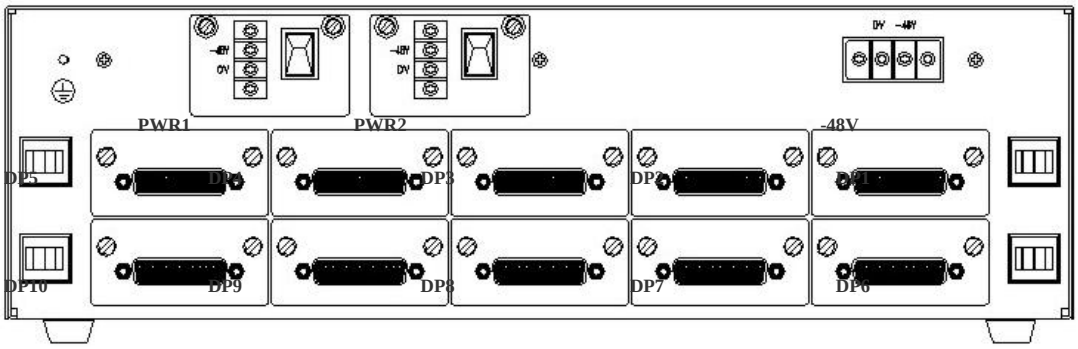


Figure 2.7 Rear panel view of Mercury 3820

Label	Description
DP1 ~ 10	Data port 1 to 10
DP11	Built-in ch-router module, located on port11A.
PWR 1 ~ 2	Power supply sockets 1/2 for Mercury 3820.
-48V	Power supply socket 3 for connecting to external -48VDC, this is for voice application. Once the voice cards is plugged into Mercury, this –48VDC power is required to supply the additional power for generation of the ring tone.
PG screw	Protective Ground screw for connecting to the earth ground

Table 2.6 Rear Panel Description of Mercury 3820

2.9 Installing New Cards

Different module cards can be plugged into the Mercury Family units at the rear panel. Mercury 800 and 3600 do not support hot-swappable function. As such to change any of the modules for Mercury 800 and 3600, please remove the power adapter first, loosen the screws on the rear panel, and remove the old module, before finally plugging in the new interface. Make sure each plug-in module is seated firmly then tighten the lock-in screw. Finally connect the power adapter to power on the system.

Mercury 3820 supports hot-swappable function. Therefore, plugging or unplugging the modules without turning off the power is permitted

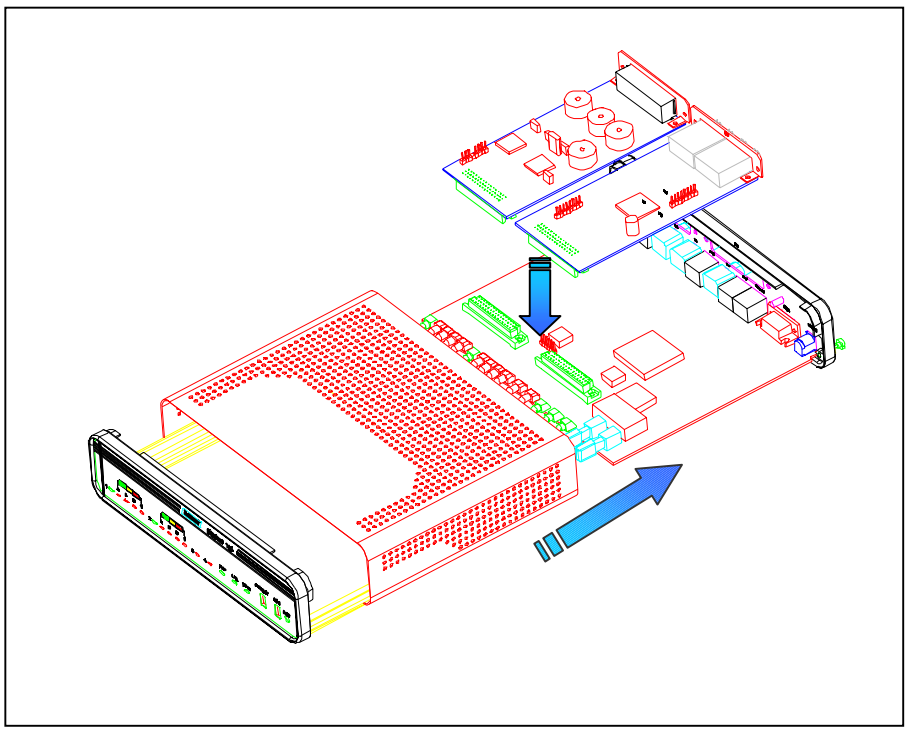


Figure 2.8 Installing New cards for Mercury 800

Caution:

Turn off the power then remove the top cover before changing or installing any module on the Mercury 800 base unit. For Mercury 3600, be sure to turn off the power before replacing any module, otherwise the device may be damaged.

Chapter 3. Configuration & Monitoring

ABOUT THIS CHAPTER

This Chapter describes in detail the installation and operation instructions for how to configure Mercury Series Product by means of VT-100 terminal, and IP host using the Telnet connection, after initial configuration of LAN IP setting is done via the emulated terminal program at the beginning.

- Use the terminal emulation software to perform all the operations of Mercury Series product.
- Use the Telnet protocol to connect to the IP hosts of Mercury Series products, this offers the same functionality as the supervised craft port.

3.1 Hardware Requirements

3.1.1 Operations using Terminal

Any terminal emulation software can be communicated with Mercury Series product to perform the configuration and monitoring. The following table lists some common software based on the type of PC you are using.

PC Operation System	Software
Windows 95,98,ME or NT	HyperTerm (included with Windows software)
Windows 3.1	Terminal (included with Windows software)
Macintosh	ProComm, VersaTerm (supplied separately)

Table 3.1 Platform supported

The terminal emulation is necessary to perform the initial configuration. The supervised port located on the rear / front panel of Mercury 800 / 3820 is designed as a craft port of DTE type with a RJ-45 connector. Therefore, RJ-45 to DB-9 adapter (with null modem crossed inside) must be connected between PC COM port and Mercury 800 / 3600+/ 3820's craft port. For Mercury 3600's craft port, it works as a DCE type with a DB-9 connector, so that it can be directly connected to PC COM port without Null modem.

- Characteristics of Mercury craft port
  - □ Data Format:
    - 19200 bps(default), 8 data bits, No parity, 1 Stop bit, No flow control
  - □ Type:

- DTE mode with RJ-45 connector in V.24/RS-232 physical type (800, 3600+/ 3820)
- DCE mode with DB-9 connector in V.24/RS-232 physical type (3600)

□ Emulated Terminal: VT-100/ANSI compatible terminal

3.1.2 Requirements by using Telnet Protocol

Mercury 800 /3600+ and 3820 provides a built-in LAN connector in 10BaseT interface that can be directly connected using straight cable to the local LAN Ethernet hub port. To perform the telnet functionality on Mercury 3600, an additional router module is necessary. Therefore, a PC or UNIX workstation that wants to access Mercury Series Product must have its Ethernet NIC (Network Interface Card) and acts with TCP/IP protocol. When the IP settings of Mercury Series product are performed by the supervised craft port in advance, and the communication between Mercury and PC workstation is established, the administrator can directly access Mercury by telnet with additional parameter UDP port 2000. This option offers the same functionality to operate Mercury Series Product in command line as the supervised craft port.

The Mercury is assigned a default IP address when delivered (172.16.5.111 with Network Mask 255.255.240.0).

■ Characteristics of Telnet Functionality

□ Syntax:

- telnet Mercury's IP (access into Router Module)
- telnet Mercury's IP 2000 (access into Mercury via UDP port 2000)

3.2 Communicated Language

The language that can be accepted and executed by Mercury Series Product is entered into the command line with correct syntax. Using the simple and easily understood commands will allow the Mercury equipment to perform the specified actions. The commands can be entered after the prompt Mercury> in either upper case or lower case letters. All the commands must end with a carriage return or ENTER key. The SPACE key is used to insert a separator between commands and parameters, and the BACKSPACE key can be pressed to clear the typing errors. The command structure is as follows:

■ Command Grammar

□ Command _ Parameter1 _ Parameter2 _ Parameter N ↵

□ Command: English letters for a short description or alpha numeric will be valid here.

□ Parameter: Generally, the parameter would be a channel number or time slot number.

- □ _: Separation character, it has to be SPACE, with no limit on the count
- □ ↵: Termination character, it has to be a carriage return (ENTER)

■ Physical Slot Number

- □ For the physical slot number for Mercury, we give each one an exclusive number '1','2','3','4', etc., and that is the "slot number" for the specified slot. Mercury 800 supports 5 physical slots, Slots 1 and 2 can be plugged into with any kind of interface module, and Slots 3,4 and 5 are built into Mercury 800 when ordered, Slots 3, 4 are E1 interface and Slot 5 is Router interface. For Mercury 3820 /3600+ the built-in Router interface is located in slot 11A and 6A

■ Channel Number

- □ Suppose that there is a 4E1 card, which has 4 ports, installed in slot number 1, and we name these 4 ports as Port "A", Port "B", Port "C" and Port "D". The Channel Number is then designated as combining the slot-number with the port-name. Hence, the channel number for the first port of the 4E1 is 1A, and the second port will be 1B and so on

■ Time-Slot Number

- □ For each channel, the data transfer speed can be divided into several time slots and each of the time slots is based on 64 Kbps throughputs. Numbers 0 through 31 are assigned to the time slots; such numbers are the "time-slot number". "Time-slot number 0" means the first time-slot, and "time-slot number 31" will be the last one.

3.3 Starting Configuration

When the connection is established by using terminal emulation or telnet protocol, the welcome message will appear on the terminal screen. There are two operating modes, Monitoring and Access mode, in Mercury Series system. Press "Help" or "?" after the prompt Mercury> will display the help index of the commands in Mercury Series Product.

```
                              DACS Command Line Environment, Version 1.88
    (c)Copyright Tainet Communication System Corp. Tue Nov 29 11:08:30 2005

        WARNING: monitor mode only, use LOGIN command for access mode !

Mercury>
```

Figure 3.1 Mercury start up screen

3.3.1 Monitoring Mode

Under Monitoring mode, it only allows user to view the current alarm history, such as port status and performance monitoring for each ports. Any modification of the settings is forbiddance in this mode. The "Help" message is shown below.

```
Mercury>help
                          [Help Message]
               ABOUT - About Mercury 100/700/800
    ALM - View/Clear Alarm History        CLS - Clear Screen
   HELP - Help Message                  LOGIN - Enter Access Mode
 LOGOUT - Enter Monitor Mode              PM - Performance Monitor
   STAT - View Port Status
        NOTE: 1. HELP [command] - for command table or syntax
              2. port identifier - 1A,1B,1C,1D,2A ...,4A,5A
```

Figure 3.2 Mercury Monitoring Mode Screen (Mercury 800)

3.3.2 Access Mode

To ensure the system works normally, the Login ID and Password are required for operator with supervisor status to control all sessions in Access mode. After entering into the Access mode, supervisor has full authority to operate Mercury. The default Login ID "TAINET" and Password *Note can be changed using internal commands. The "Help" message under Access mode is shown below:

Note: The default Login ID and Password for Mercury Family:

	Login ID	Login Password
Mercury 800	TAINET	800
Mercury 3600	TAINET	3600
Mercury 3600+	TAINET	3600
Mercury 3820	TAINET	3820

```
Mercury>help
                        [Help Message]

     ? - Help Message                  ABOUT - About Mercury
   ALM - View/Clear Alarm History       BOOT - System Reboot
   CLK - Setup Clock Source              CLR - Clear Port Status
   CLS - Clear Screen                  CRAFT - Setup Craft Speed
  DATE - Setup Date                      E1 - Setup E1 Parameters
   FXS - Setup FXS Parameters           HELP - Help Message
  IDLE - Setup Idle Code                IDSL - Setup IDSL Parameters
  LINK - Setup Link Parameters          LOGB - Start Logging Profile
  LOGE - Stop & Save/Append Profile     LOGI - Select Profiles for Reboot
 LOGIN - Enter Access Mode              LOGL - List the Name of Profiles
LOGOUT - Enter Monitor Mode             LOGR - Run Specified Profiles
  LOGV - View Contents of a Profile      NET - Setup Network Device
    PM - Performance Monitor            SECC - Setup ID & P/W(confirm)
  SECE - Setup ID & P/W(entry)        SIGIDL - Setup Idle Signal
  STAT - View Port Status                T1 - Setup T1 Parameters
  THRE - Setup PM Threshold             TIME - Setup Time
  USER - View User Status                V35 - Setup V.35 Parameters
   X50 - Setup X.50 MUX Parameters        XC - Setup Connection Port
    XT - Setup Connection Timeslot        XV - View Connection Table
  DROP - Setup Add-Drop Connection TS     RP - Setup ring protection
 RS530 - Setup RS530 Parameters
  XSLT - Setup extend slot5 (for Mercury 3600 only)
   NMS - Setup NMS & SNMP link port (for Mercury 3600 only)

       NOTE: 1. HELP [command] - for command table or syntax
             2. port identifier - 1A,1B,1C,1D,2A ...,4A,5A
```

Figure 3.3 Mercury Help Screen

Caution:
Once the Login ID and PW are changed, please memorize it, otherwise the Mercury must be sent back to TAINET for service while the ID or PW will be lost forever.

3.4 The Basic Concept in Configuring Mercury

After entering the Access mode, user may follow the instructions below to become familiar with Mercury Series Product. This section will explain the basic concepts while configuring Mercury.

3.4.1 System clock

Define the system clock to be Internal or externally received from the designated ports. Here you can also select the Master and Secondary clock as the system clock from the indicated ports. If the port providing the Master clock fails, the alternative port for Secondary clock will become active as a backup clock. Only ports A and C with certain specified modules can be locked onto the external clock. Refer to Section 3.6.6 for more detailed description and examples.

- Command Set : CLK [INT] | [port] [port]

3.4.2 Tributary cards parameters

Setup the parameters for each tributary card, such as the Line Coding, Framing mode for T1 or E1 card; physical signal, transmission speed (start and end time slot) for V.35 card. Refer to Section 3.6 for more detailed description and examples.

3.4.3 Cross Connection

Establish the internal communication link between two ports. This allows user to do the assignment for the indicated ports or its time slots. There are two kinds of cross connection commands, XC and XT. XC is the port (channel) assignment command, and is used to do the cross connection between two ports. XT is the time slot assignment command; it is used for cross connection between the designated ports and their time slot. Refer to Section 3.6.48 and 3.6.50 for more detailed description and examples.

- Command Set:
  - XC [mode] porta portb
  - XT [mode] [porta tsa]

3.4.4 Diagnostic

Mercury Series Product provides the diagnostic ability such as the function of alarm status, performance monitoring and loopback testing. The alarm status shows the current alarm condition in the alarm buffer, and the performance monitoring lists the performance evaluation as a group report for 15-minutes / 1-hour/ 1-day interval. The loopback testing may force the data to loop back and check the connection section by section. Refer to Section 3.6.3, 3.6.19, 3.6.32, 3.6.39, and Chapter 1 for more detailed description and examples.

- Command Set:
  - ALM [CLR] | [port] [/p]
  - LINK port [LL:act] [RL:act] [ACT:sw]
  - PM [port] [VIEW:view] | [CLR:clr]
  - STAT [port]

3.5 Default Configuration Setting and User Stored Profiles

There is a factory default configuration for Mercury Series Product and each of the tributary modules. When powering on the Mercury or plugging in a new card, the default factory settings will be loaded until further changes are done by the operator-supervisor. Refer to the following table for the default settings of each card.

Mercury Series Product also provides up to 20 sets of user profiles for Supervisor to save a specified profile name with the different commands with regard to different

applications. By using "LOGB" and "LOGE" commands, supervisor can create their own profiles easily. When performing command "LOGB", system will start memorizing and saving the subsequently entered commands into the memory; stop and save into the specified profile number and profile name after command "LOGE". It also allows supervisor to arrange any of the profiles as the initial profiles by commands "LOGI" when powering on or rebooting the system. Mercury will load the selected profiles and execute all commands following the power-on sequence. Refer to Section 3.6.20, 3.6.21, 3.6.22 for more detailed description and examples.

Supervisor may also create a text file (such as Windows Notepad) to edit all commands in it. Optimize your commands, copy all commands in this text file and paste them when operating in craft terminal.

System			
Command	**Description**	**Default Setting**	
Craft	Craft port speed	4: 19200	
Clk	Clock settings	Internal	
Idle	Idle code	0x7E	
Link port [ACT:sw]	Enable/Disable the service of alarm and DAC (digital access cross connect) functions	sw:0, enable alarm and DAC	
Sigidl	Idle signal code	0F	
Sece / Secc	Setup and Confirm the Login ID and PW	ID	PW
	For Mercury 800	TAINET	800
	For Mercury 3600	TAINET	3600
	For Mercury 3600+	TAINET	3600
	For Mercury 3820	TAINET	3820
Thre type [UA:ua] [ES:es][SES:ses][CV:cv]	Setup PM threshold Including UA, ES, SES, CV	UA, ES, SES, and CA all 0, disable	

Table 3.2 System Command of Mercury

V.35 Card		
Command	**Description**	**Default Setting**
V35 port [CTS:act]	V.35 card Clear to Send Signal	act:1, signal active
V35 port [DSR:act]	V.35 card Data Set Ready Signal	act:1, signal active
V35 port [DCD:act]	V.35 card Data Carrier Detect Signal	act:1, signal active
V35 port [RI:act]	V.35 card Ring Indicator Signal	act:0, signal inactive
V35 port [DEV:dev]	Clock type for the connected device	dev:0, DTE without clock
V35 port [INV:inv]	TxC and RxC clock polarity	Inv:0, TxC normal and RxC normal

Table 3.3 V.35 Command

E1 Card		
Command	**Description**	**Default Setting**
E1 port [Fr:fr]	Framing mode: FAS (Frame Alignment Signal) or Unframed mode	fr:0, FAS mode
E1 port [CAS:cas]	CCS (Common Channel Signaling) or CAS (Channel Associated Signaling)	cas:0, CCS mode
E1 port [TCRC:act]	CRC (Cyclic Redundancy Check) on Tx port	tcrc:1, Enable
E1 port [RCRC:act]	CRC (Cyclic Redundancy Check) on Rx port	rcrc:1, Enable
E1 port [CV:cv]	CV (Code Violation) or BPV (Bipolar Violation) mode	cv:0, CV
E1 port [BAL:bal]	Balance (120 Ohm) or Unbalance (75 Ohm)	bal:0, Unbalance
E1 port [HAUL:haul]	Short haul or Long haul selection	haul:0, short haul
E1 port [SIDLE:sig]	Signal Idle code	sig:09h
E1 port [DET:sig]	Signal Detect Number	sig:00h
E1 port [CHG:sig]	Signal Change Number	sig:00h
E1 port [AIS:ais]	AIS (Alarm Indication Signal)	ais:0, disable

Table 3.4 E1 command

T1 Card		
Command	**Description**	**Default Setting**
T1 port [CO:co]	Line coding: B8ZS (Bipolar Unframed mode) or AMI (Alternate Mark Inverting)	co:0, B8ZS coding
T1 port [FR:fr]	ESF (Extend Super Frame), DF (also called Super Frame, SF) or Unframed mode	fr:0, ESF
T1 port [LI:li]	Line driver, Line Built Out (LBO)	li:1, 133ft
T1 port [RRL:rrl]	Start/Stop remote loopback	rrl:0, stop
T1 port [DRL:drl]	Enable/Disable the RRL function can be requested by remote site	drl:1, on
T1 port [SIDLE:sig]	Signal Idle code	sig:09h
T1 port [DET:sig]	Signal Detect Number	sig:00h
T1 port [CHG:sig]	Signal Change Number	sig:00h
T1 port [AIS:ais]	AIS (Alarm Indication Signal)	ais:0, disable

Table 3.5 T1 Command

IDSL Card (always in LT mode)		
Command	**Description**	**Default Setting**
IDSL port [OP:op]	IDSL card operation mode	op:0, link
IDSL port [RDL:rdl]	Request Remote Loopback	rdl:0, normal

Table 3.6 IDSL Command

FXS Card		
Command	**Description**	**Default Setting**
FXS port [R:r]	FXS card line impedence	r:0, 600 Ohm
FXS port [DL:dl]	Digital loop back testing	dl:0, disable
FXS port [TTX:ttx]	Teltex tone	ttx:0, ttx off
FXS port [RING:ring]	Ring frequency and cadency	ring:4, 25Hz, 1 sec on / 2 sec off

FXS port [Tgain:tgain]	Tx direction relativc gain	tgain:0, 0 dBr
FXS port [Rgain:rgain]	Rx direction relative gain	rgain:0, 0 dBr

Table 3.7 FXS Command

X.50 Card		
Command	**Description**	**Default Setting**
X.50 port chan [MOD:mod]	Setup X.50 card channel Sync or Async mode	mod:0, Sync
X.50 port chan [SPD:spd]	Setup channel speed (2400 to 19200)	spd:0, stop
X.50 port chan [DCD:dcd]	Setup channel DCD signal	dcd:2, follow Remote RTS
X.50 port chan [CTS:cts]	Setup channel CTS signal	cts:1, follow Local RTS
X.50 port chan [DEV:dev]	Setup channel device type	dev:0, DTE type
X.50 port chan [INV:inv]	Channel clock polarity	inv:0, Normal type
X.50 port chan [SIG:sig]	Signaling action	sig:0, signaling 0
X.50 port chan [LL:act]	Enable local loopback	act:0, disable
X.50 port chan [RL:act]	Enable remote loopback	act:0, disable
X.50 port chan [HC:hc]	Setup hook channel	hc:0, no hook channel
X.50 port chan [PH:act]	Setup Phase number	ph:0, phase 0

Table 3.8 X.50 Command

SDSL Card		
Command	**Description**	**Default Setting**
SDSL port [MOD:mod]	Setup the mode of SDSL card	mod:1, NTU
SDSL port [TEST:test]	Enable the loopback testing	test: 0, Normal
SDSL port [FR:fr]	Setup the Framing mode of SDSL card	fr:0, frame mode

Table 3.9 SDSL Command

2/4P Data Card		
Command	**Description**	**Default Setting**
DATA port [TYPE:type]	Setup the interface type of 2/4P-Data card, it supports RS530A/RS530/X21/V35	type:0, N/A
DATA port [CTS:act]	Clear to Send Signal	act:1, signal active
DATA port [DSR:act]	Data Set Ready Signal	act:1, signal active
DATA port [DCD:act]	Data Carrier Detect Signal	act:1, signal active
DATA port [RI:act]	Ring Indicator Signal	act:0, signal inactive
DATA port [DEV:dev]	Clock type for the connected device	dev:0, DTE without clock
DATA port [INV:inv]	TxC and RxC clock polarity	Inv:0, TxC normal and RxC normal

Table 3.10 2/4P Data Card

4P-V24 Card		
Command	**Description**	**Default Setting**
V24 port [MOD:mod]	Setup V24 card Sync, Async mode and its data format	mod:2, Async 8-n-1 data format
V24 port [SPD:spd]	Setup channel speed (1200 to 19200)	spd:3, 9600bps
V24 port [DCD:dcd]	Setup channel DCD signal	dcd:1, on when sync
V24 port [CTS:cts]	Setup channel CTS signal	cts:1, follow Local RTS
V24 port [INV:inv]	Channel clock polarity	inv:0, Normal type
V24 port [LL:act]	Enable local loopback	act:0, disable
V24 port [RL:act]	Enable remote loopback	act:0, disable
V24 port [CC:cc]	Enable the port combined function	cc:0, none

Table 3.11 DATA Command

FXO Card		
Command	**Description**	**Default Setting**
FXO port [DL:act]	Digital loop back testing	act:0, disable
FXO port [TSA:act]	TSA loop back testing, reserved for factory	act:0, disable
FXO port [TONE:act]	1KHz tone injection	act:0, disable
FXO port [Tgain:tgain]	Tx direction relative gain	tgain:0, 0 dBr
FXO port [Tgain:tgain]	Tx direction relative gain	tgain:0, 0 dBr
FXO port [Roff:time]	Ring off time	time:6, 6 sec

Table 3.12 FXO Command

3.6 Command Set Description

This Section describes the detail description and parameters of Mercury Series Command Set. The following is all Command Set of Mercury Series.

3.6.1 Help Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Display the Help message for the index of all the command sets in Help message of Mercury Series Product, and also show the detailed format for each command.
- Syntax: HELP [cmd]
- Param:
  - □ cmd - valid command text
- Example:
  - □ HELP
  - □ HELP clk: View the detailed format of clk command

```
Mercury>help
                        [Help Message]

     ? - Help Message                  ABOUT - About Mercury
   ALM - View/Clear Alarm History       BOOT - System Reboot
   CLK - Setup Clock Source              CLR - Clear Port Status
   CLS - Clear Screen                  CRAFT - Setup Craft Speed
  DATE - Setup Date                      E1 - Setup E1 Parameters
   FXS - Setup FXS Parameters           HELP - Help Message
  IDLE - Setup Idle Code                IDSL - Setup IDSL Parameters
  LINK - Setup Link Parameters          LOGB - Start Logging Profile
  LOGE - Stop & Save/Append Profile     LOGI - Select Profiles for Reboot
 LOGIN - Enter Access Mode              LOGL - List the Name of Profiles
LOGOUT - Enter Monitor Mode             LOGR - Run Specified Profiles
  LOGV - View Contents of a Profile      NET - Setup Network Device
    PM - Performance Monitor            SECC - Setup ID & P/W(confirm)
  SECE - Setup ID & P/W(entry)        SIGIDL - Setup Idle Signal
  STAT - View Port Status                T1 - Setup T1 Parameters
  THRE - Setup PM Threshold             TIME - Setup Time
  USER - View User Status               V35 - Setup V.35 Parameters
   X50 - Setup X.50 MUX Parameters       XC - Setup Connection Port
    XT - Setup Connection Timeslot       XV - View Connection Table
  DROP - Setup Add-Drop Connection TS    RP - Setup ring protection
 RS530 - Setup RS530 Parameters
  XSLT - Setup extend slot5 (for Mercury 3600 only)
   NMS - Setup NMS & SNMP link port (for Mercury 3600 only)

       NOTE: 1. HELP [command] - for command table or syntax
             2. port identifier - 1A,1B,1C,1D,2A ...,4A,5A
Mercury>help clk
  Usage: Setup Clock Source
 Syntax: CLK [INT] | [port] [port]
 Params: port - port identifier
          INT - internal clock
  Notes: 1. view current setup if no parameter
         2. first port identifier used for master clock source
         3. second port identifier used for secondary clock source
         4. valid port idenntifier are 1A, 1C, 2A, 2C...
```

Figure 3.4 HELP Screen

3.6.2 About Command

Accommodate: Mercury 800, 3600+, 3820

- Purpose:
  - □ Display the software and hardware version and released time for Mercury 800, 3600+, and 3820, and the contacting phone number and e-mail address of TAINET.
- Syntax: ABOUT
- Example:
  - □ ABOUT

```
Mercury>about                                          /; for Mercury 800
        (c)Copyright TAINET Communication System Corp.
        Headquarters : No. 25, Alley 15, Lane 120, Sec. 1. Nei-Hu Rd,
                       Taipei 114, Taiwan
        URL : http://www.tainet.net/
        TEL : 886-2-26583000
        FAX : 886-2-26583232
        E-mail : sales@tainet.net, support@tainet.net
        Release Time : Mon Nov 28 20:56:19 2005
        Software : 2.80
        Hardware : 2.00
```

Figure 3.5 About Command Screen for 800

```
Mercury>about                                      /; for Mercury 3600+
        (c)Copyright TAINET Communication System Corp.
        Headquarters : No. 25, Alley 15, Lane 120, Sec. 1. Nei-Hu Rd,
                       Taipei 114, Taiwan
        URL : http://www.tainet.net/
        TEL : 886-2-26583000
        FAX : 886-2-26583232
        E-mail : sales@tainet.net, support@tainet.net
        Release Time: Tue Nov 29 11:32:56 2005

        [POWER]
        Power 1 : 5V  Power 2 : 5V  External Power : 48V

        [H/W]                    [S/W]
        Front Panel : V1.00      Mercury 3600+(channelize): V1.04T
        DACS Card   : DACS17
        Middle Board: V1.01
```

Figure 3.6 About Command Screen for 3600+

```
Mercury>about                                          /; for Mercury 3820
        (c)Copyright TAINET Communication System Corp.
        Headquarters : No. 25, Alley 15, Lane 120, Sec. 1. Nei-Hu Rd,
                       Taipei 114, Taiwan
        URL : http://www.tainet.net/
        TEL : 886-2-26583000
        FAX : 886-2-26583232
        E-mail : sales@tainet.net, support@tainet.net
        Release Time: Tue Nov 29 11:08:30 2005

        [POWER]
        Power 1 : 5V  Power 2 : None  External Power : None

        [H/W]                    [S/W]
        Front Panel : V1.00      Mercury 3820(channelize): V1.88
        DACS Card   : DACS33
        Middle Board: V1.00
```

Figure 3.7 About Command Screen for 3820

3.6.3 Alm Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Display the current alarm messages with the dates and times that are stored in the alarm buffer.
- Syntax: ALM [CLR] | [port]
- Param:
  - □ port: Indicated port
  - □ CLR: Clear alarm history
- Example:
  - □ ALM:
    - Display all alarm messages in buffer
  - □ ALM CLR:
    - Clear the alarm saved in buffer
  - □ ALM 4A:
    - Display the alarm message with specified port (4A)

```
Mercury>alm
[Alarm History]
 4A 2001/08/31 14:49:31  MAJ:LOS RCL
 3A 2001/08/31 14:49:32  MAJ:LOS RCL
```

Figure 3.8 Alm Command Screen

3.6.4 Bert Command

Accommodate: Mercury 3600+, 3820

- Purpose: Setup and View DACS BERT
- Syntax: BERT [err|CLR] | port sts ets [[TP:pat] | [UP:usr]] [TM: time]
- Param:
  - □ None To view status and BER
  - □ err 0:stop BERT 1~255: insert error number
  - □ CLR Reset BERT
  - □ port Port identifier
  - □ sts Start time-slot
  - □ ets End time-slot
  - □ TP Test pattern type
  - □ UP User pattern byte
  - □ TM Test period
  - □ pat 0: All 1s
    1: 2^20-1 Modified QRSS
    2: 31(2^5-1) PRBS 3: 63(2^6-1) PRBS

4: 511(2^9-1) PRBS(V.52) (default test pattern)
5: 511(2^9-1) PRBS(reversed)
6: 2047(2^11-1) PRBS(0.151)
7: 2047(2^11-1) PRBS(reversed)
8: 2^15-1 PRBS(0.151) (noninverted)
9: 2^20-1 PRBS(V.57)
10: 2^20-1 PRBS(CB113/CB114)
11: 2^23-1 PRBS(0.151)(noninverted)
12: ALT(010) (alternating 1s and 0s)

- □ usr 0~255
- □ time 0: Continus(default value)
  1: 1Minute
  2: 15 Minutes
  3: 30 Minutes
  4: 1 Hour
  5: 24 Hours

3.6.5 Boot Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Simulate the sequence when powering up the system. This will perform a complete hardware reset, self-testing, reload the initial profile if specified. Some settings will be lost if not saved into profile.
- Syntax: BOOT [S] [H]
- Param:
  - □ None: Reboot command supported for Mercury 3600
  - □ S: Software reboot, for Mercury 800, 3600+, 3820
  - □ H: Hardware reboot, for Mercury 800, 3600, 3600+, 3820
- Example:
  - □ BOOT S System software reboot

```
Mercury>help boot
  Usage: System Reboot
 Syntax: BOOT [S] | [H]
 Params: S - software reset
         H - hardware reset
Mercury>boot s
        Software reseting .....
```

Figure 3.9 Boot Command Screen

3.6.6 Clk Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Define the system clock to be internal or received from the designated ports. When set to **INT**, the internal oscillator of Mercury Series Product will generate the clock as system clock, and all the tributary cards will follow it. Here you can also select the **Master** and **Secondary** clock as the system clock from the indicated ports. In case the port providing the Master clock fails, the alternative port for Secondary clock will be activated as backup clock. Only ports **A** and **C** for some specified modules can be locked onto external clock.
- Syntax: CLK [INT] | [port] [port]
- Param:
  - □ None: View current clock settings if no parameter
  - □ INT: Internal clock
  - □ port: The indicated ports to receive the external clock. First port identifier is used for Master clock source, the second one is used for Secondary clock source.
- Example:
  - □ CLK:
    - View current clock settings
  - □ CLK INT:
    - Select the Internal oscillator as the Internal timing reference of Mercury
  - □ CLK 3A 1C
    - Select the third slot portA (3A) as the Master clock and first slot portC (1C) as the Secondary clock.

```
Mercury>clk
        Master:3A
        Secondary:invalid
        Active:holdover
Mercury>clk int
        Master:invalid
        Secondary:invalid
        Active:internal
Mercury>clk 3a 1c
        Master:3A
        Secondary:1c
        Active:holdover
```

Figure 3.10 CLK Command Screen

3.6.7 Clr Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Clear the status of the indicated port.
- Syntax: CLR [port]

- Param:
  - □ None: Clear all ports' status if no parameter
  - □ Port: Clear the indicated port status
- Example:
  - □ CLR: Clear all status for all ports in Mercury
  - □ CLR 3A: Clear port status for port 3A

```
Mercury>help clr
  Usage: Clear Port Status
 Syntax: CLR [port]
 Params: port - port identifier
  Notes: clear all ports if no parameter
Mercury>clr
Mercury>clr 3a
```

Figure 3.11 CLR Command Screen

3.6.8 Cls Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose: Clear the screen.
- Syntax:CLS
- Example:
  - □ CLS: Clear the screen

```
Mercury>help cls
  Usage: Clear Screen
 Syntax: CLS
Mercury>cls
```

Figure 3.12 CLS Command Screen

3.6.9 Craft Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Define the supervised craft port data rate. The available speed is 1.2 Kbps~115.2 Kbps for 800, 3600+, 3820, 1.2 Kbps~19.2 Kbps for 3600.
- Syntax: CRAFT [speed]
- Param:
  - □ None View current craft port speed
  - □ Speed Speed identifier
    0:1200
    1:2400
    2:4800
    3:9600

4:19200 (default)
5:38400
6:57600
7:115200

- Example:
  - □ CRAFT: View current craft port speed
  - □ CRAFT 6: Setup craft port speed to 57600bps

```
Mercury>help craft
  Usage: Setup Craft Speed
 Syntax: CRAFT speed
 Params: speed - speed identifier
         0 - 1200   1 - 2400   2 - 4800   3 - 9600
         4 - 19200  5 - 38400  6 - 57600  7 - 115200
  Notes: view craft speed if no parameter
Mercury>craft
        Craft speed 19200 bps
Mercury>craft 6
```

Figure 3.13 CRAFT Command Screen

3.6.10 CP Command

Accommodate: Mercury 800,3600, 3600+, 3820

- Purpose:
  - □ Call Profile command allows user to achieve the protection architecture such as 1+1 / 1:1 / N:1 protection. When system detects the specified alarm, Mercury will automatic execute the pre-defined profile, which includes the port parameters and the mapping table, and switch all the traffic to those ports. Now this **CP** command is available for T1 / E1 / Fiber / SDSL / G.SHDSL card. Please refer to Section 3.7 for example.
- Syntax: CP port [OFF:no] [ON:no] [SW:sw] [MAJ:alm] [MIN:alm]
- Param:
  - □ None View all call profiles if no parameter
  - □ port Port identifier for the indicated port
  - □ OFF When there is no alarm detected (or the alarm is cleared with system back to normal) on the indicated port, the following profile number will be executed automatically
  - □ ON When alarm is detected on the indicated port, the following profile number will be executed automatically
  - □ no Profile number that is created by command **"LOGB" "LOGE"** at first. Profile no **"0"** is disable the action when alarm is detected or cleared.
  - □ SW Profile execution switch to enable or disable the CP command
  - □ sw 0: disable 1: enable
  - □ MAJ Major alarm code for detection
  - □ MIN Minor alarm code for detection

□ Alm alarm code from 0000 ~ FFFF hex, refer to the following alarm table

■ Example:

□ CP

- View all call profiles

□ CP 1a off:1 on:2 sw:1 maj:0002 min:0080

- Enable the call profile function on port 1A, when system detects the E1 major alarm RCL with code "0002" or E1 minor alarm RRA with code "0080", then profile no. 2 will be executed. On the other hand, when the above alarms are cleared, the system will run profile no.1 automatically.

Caution:

1. Currently the CP function is only available for T1 / E1 / Fiber / SDSL card.
2. The trunk link should be connected to port A or C which can be set to derive the clock coming from another site if another Mercury will be receiving the clock from trunk link.
3. The switching time is less than 50 ms depending on the loading of the CPU.
4. Mercury supports 20 sets of user-defined profiles, each of them is 2k bytes, and can save about 100 command sets.

```
Mercury>help cp
  Usage: Setup Call Profile
 Syntax: CP port [PFF:no] [NO:no] [SW:sw] [MAJ:alm] [MIN:alm]
 Params: port - port identifier
          OFF - no alarm detection
           ON - alarm detection
           SW - profile execution switch
          MAJ - major alarm code for detection
          MIN - minor alarm code for detection
           no - profile number (0:disable)
           sw - 0:disable 1:enable
          alm - 0000~FFFF hex
  Notes: 1.view all call profiles if no parameter
         2.available for E1/T1/Fiber/SDSL/GSDSL only
Mercury>cp
         CH  TYPE  OFF ON   ALARM    SWITCH STATUS
        ==================Maj:Min=================
         1A 4E1-75   1  2 0002:0080  ENABLE  OFF
         2A 4E1-75   0  0 0002:0080 DISABLE  ON
         3A 2Fiber   0  5 0002:0010  ENABLE  ON
         3C 2Fiber   3  4 0002:0010 DISABLE  OFF
        ==========================================

Mercury>cp 1a off:1 on:2 sw:1 maj:0002 min:0001
```

Figure 3.14 CP Command Screen

Card Type	Major Alarm		Minor Alarm	
4E1(120/75) 2E1(120/75) 1E1(120/75)	Alarm code	Alarm type	Alarm code	Alarm type
	0x0001	LOS	0x0001	TXS
	*0x0002	RCL	0x0002	RXS
	0x0004	FAS	0x0004	FAS
	0x0008	CRC	0x0008	CRC
	0x0010	CV/BPV	0x0010	CV/BPV
	0x0020	EBT	0x0020	EBT
			0x0040	UAI
			*0x0080	RRA
4T1 2T1	0x0001	LOS	0x0001	TXS
	*0x0002	RCL	0x0002	RXS
	0x0004	FAS	0x0004	FAS
	0x0008	CRC	0x0008	CRC
	0x0010	CV/BPV	0x0010	CV/BPV
			0x0040	RBA
			*0x0080	RYA
1Fiber 1FiberCB 2Fiber	0x0001	LOS	0x0001	RCL-A
	*0x0002	RCL	0x0002	RCL-B
	0x0008	CV	0x0004	Frame-Err
	0x0008	CRC	0x0008	CV
	0x0010	CV/BPV	*0x0010	RCLOS
SDSL	0x0001	FAIL	0x0001	CRC
	*0x0002	LOS	*0x0002	DIS
	0x0004	CRC		

Table 3.15 Alarms are supported by CP command

Note:
Alarm code with the symbol "*" is the default value for CP command.

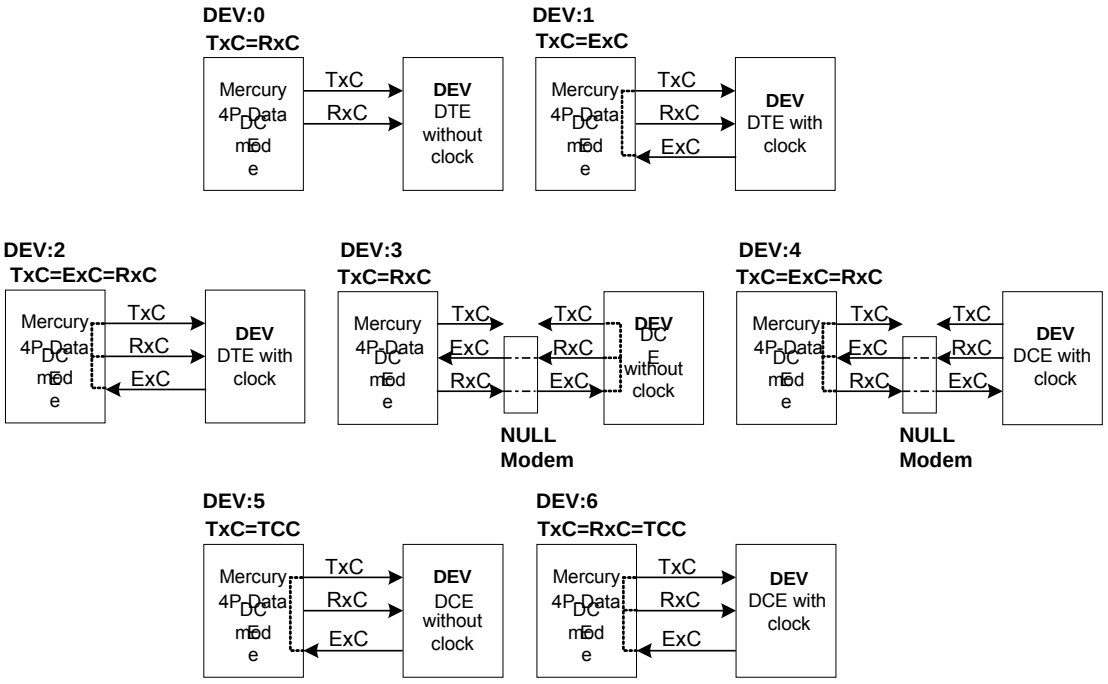
3.6.11 Data Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Define 4P-Data port parameters. This 4P-Data port can be software configurable to change its type to RS530A / RS530 / X21 / V35 interface. And all of the 4 data ports (A, B, C, D) can be set to derive the clock from outside equipment. The transmit speed (N x 64 Kbps) is determined by the "count" parameter (for 512 Kbps, 8 x 64 Kbps, so the count number is 8, and it will start from time slot 0 and end with 7).
- Syntax:
  - □ DATA port count [Type:type] [CTS:act] [DSR:act] [DCD:act] [RI:act] [DEV:dev] [INV:inv]
- Param:
  - □ Port: Port identifier for the indicated Data port
  - □ Count: Number of time slots to setup its data rate, starting from time slot 0
  - □ Type: Software configurable to select the interface type to RS530A/ RS530/ X21/ V35
  - □ Type: 0: N/A (default)
    1: RS530A
    2: RS530
    3: X21
    4: V35
  - □ CTS: Clear to Send signal (default act:1)
  - □ DSR: Data Set Ready signal (default act:1)
  - □ DCD: Data Carrier Detect signal (default act:1)
  - □ RI: Ring Indicator signal (default act:0)
  - □ act: 0:signal inactive 1:signal active
  - □ DEV The clock type for which device connected to and illustrated as following, and only valid for 4P-Data card
  - □ Dev 0: DTE without clock TxC=RxC (default)
    1: DTE without clock TxC=ExC
    2: DTE with clock TxC=RxC=ExC
    3: DCE without clock TxC=ExC
    4: DCE with clock TxC=RxC=ExC

5: DTE without clock TxC=TCC

6: DTE with clock TxC=ExC=TCC



□ INV: TxC and RxC clock polarity

□ Inv: 0: TxC normal & RxC normal (default)

1: TxC normal & RxC inverted

2: TxC inverted & RxC normal

3: TxC inverted & RxC inverted

■ Example:

□ DATA 4a 10 type:2 dev:4

- Setup 4P-Data card on port 4A to RS-530 type, speed 640 Kbps (count number is 10, start from time slot 0 and end to time slot 9). And set the clock mode to dev:4 DCE with clock and TxC=RxC=ExC.

□ DATA 4b 20 type:4

- Setup 4P-Data card on port 4B to V.35 type, speed 1280 Kbps (count number is 20, start from time slot 0 and end with time slot 19). The clock mode is default value dev:0 DTE without clock and TxC=RxC.

```
Mercury>help data
 Usage: Setup Data Parameters
Syntax: DATA port count [TYPE:type] [CTS:act] [DSR:act] [DCD:act]
              [RI:act][DEV:dev] [INV:inv]
Params: port - port identifier
        count - time-slot count TYPE - interface type
          CTS - CTS signal       DSR - DSR signal
          DCD - DCD signal        RI - RI signal
          DEV - the type of device connected to
          INV - TXC & RXC polarity
         type - 0:N/A 1:RS530A 2:RS530 3:X.21 4:V.35
          act - 0:signal inactive 1:signal active
          dev - 0:DTE without clock (TXC=RXC)
                1:DTE without clock (TXC=EXC)
                2:DTE with clock    (TXC=RXC=EXC)
                3:DCE without clock (TXC=EXC)
                4:DCE with clock    (TXC=RXC=EXC)
                5:DTE without clock (TXC=TCC)
                6:DTE with clock    (TXC=EXC=TCC)
          inv - 0:TXC normal/RXC normal   1:TXC normal/RXC inverted
                2:TXC inverted/RXC normal 3:TXC inverted/RXC inverted
        NOTE: 1.start timeslot be set '0'
Mercury>data 4a 10 type:2 dev:4
Mercury>stat 4a
TYPE:4DATA      CLK:YES ACTIVE:ALM & DAC
[Configuration]
        TYPE:RS530 LL:no RL:no Speed:640Kbps
        RTS:on DTR:on CTS:on DSR:on DCD:on RI:off
        Time-Slot:0~9 TXC:normal RXC:normal
        External Device:DCE with clock (TXC=RXC=EXC)
Mercury>data 4b 20 type:4
Mercury>stat 4b
TYPE:4DATA      CLK:YES ACTIVE:ALM & DAC
[Configuration]
        TYPE:V.35 LL:no RL:no Speed:1280Kbps
        RTS:on DTR:on CTS:on DSR:on DCD:on RI:off
        Time-Slot:0~19 TXC:normal RXC:normal
        External Device:DTE without clock (TXC=RXC)
```

Figure 3.16 DATA Command Screen

3.6.12 Date Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Set the Date for Mercury Internal clock
- Syntax: DATE yyyy mm dd
- Param:
  - □ None Display the current date for Mercury
  - □ Yyyy Year (0000~9999)
  - □ Mm Month (01~12)
  - □ dd Date (01~31)
- Example:
  - □ DATE:

- Display the current date in Mercury

□ DATE 2005 12 15:

- Setup the date to 2005/12/15

```
Mercury>date 2005 12 15
Mercury>date
        2005/12/15 10:52:20
```

Figure 3.17 Date Command Screen

3.6.13 Drop Command

Accommodate: Mercury 800, 3600, 3600+, 3820

■ Purpose:

□ The **DROP** command always comes with command **RP** (refer to section 3.6.35 **RP** Command), and it works in the Ring Protection mode to drop the required time slots to the associated point.

■ Syntax: DROP [mode] porta tsa portb tsb portd tsd [count]

■ Param:

□ mode Designate the data cross connect transmit mode, omitted for frame integrity as default value. Idle for sending idle code on the assign time-slots.

- L: low latency
- F: frame integrity (default)
- V: voice conversion
- I: idle

□ porta Identify the Ring In port (last port)

□ tsa Designate the start time slot of Ring In port

□ portb Identify the Ring Out port (next port)

□ tsb Designate the start time slot of Ring Out port

□ portd Identify the drop port whose connect to DTE. Drop port could be any module of Mercury.

□ tsd: Designate the start time slot of drop port

□ count Number of continuity time slot, omitted will be used as default value of 1 time slot

■ Example:

□ drop 1a 1 1c 1 1b 1 30

- drop port1a ts1~30, port1c ts1~30 to port1b ts1~30

```
Mercury>help drop
  Usage: Setup Add-drop Connection ts
 Syntax: DROP [mode] porta tsa portb tsb portd tsd [count]
 Params:  mode - L:low latency F:frame integrity I:idle
         porta - porta identifier (a->d)
           tsa - porta time-slot number
         portb - portb identifier (b->a)
           tsb - portb time-slot number
         portd - port drop identifier (d->b)
           tsd - port drop time-slot number
         count - number of time-slot connected
  Notes: 1. default value of 'count'is 1
         2. default mode is frame integrity if not specified
Mercury>drop 1a 1 1c 1 1b 1 30
Mercury>stat 1a
[Cross Connect Table]
  TS000  1C=000 1C=001 1C=002 1C=003 1C=004 1C=005 1C=006 1C=007
  TS008  1C=008 1C=009 1C=010 1C=011 1C=012 1C=013 1C=014 1C=015
  TS016  1C=016 1C=017 1C=018 1C=019 1C=020 1C=021 1C=022 1C=023
  TS024  1C=024 1C=025 1C=026 1C=027 1C=028 1C=029 1C=030 RP=CLK
```

Figure 3.18 DROP Command Screen

3.6.14 E1 Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Setup the E1 parameters
- Syntax: E1 port [Fr:fr] [CAS:cas] [TCRC:act] [RCRC:act] [CV:cv] [AIS:act] [SIDLE:sig] [DET:sig] [CHG:sig] [SA:sa] [SAD:val] [BAL:bal] [HAUL:haul]
- Param:
  - □ Port: Setup the assigned port
  - □ Fr: Configure the indicated E1 port to FAS (Frame Alignment Signal) or Unframed mode. When in FAS mode, it allows to select which of the available time slots can be used for data transmission. When in Unframed mode, E1 data uses the 2.048 Mbps bit rate E1 signal with no synchronization signal, and needs to assign 32 time slots.
  - □ fr: 0: fas (default) 1:unframe
  - □ CAS: Select CAS (Channel Associated Signaling) or CCS (Common Channel Signaling) under the FAS framing mode. In both CAS and CCS mode, time slot 0 is always indicated to a fixed synchronization pattern and frame alignment word. But in CAS mode, time slot 16 is usually indicated to channel signaling. So in CAS mode, time slot 0 and 16 are not used for data transmission, totally 30 time slots. In CCS mode, only time slot 0 can not used, totally 31 time slots.
  - □ cas: 0:ccs (default) 1:cas
  - □ TCRC: CRC (Cyclic Redundancy Check) on Tx port

- □ RCRC: CRC (Cyclic Redundancy Check) on Rx port
- □ act: 0:disable 1:enable (default)
- □ CV: Select CV (Code Violation) or BPV (Bipolar Violation)
- □ cv: 0:cv (default) 1:bpv
- □ AIS: Alarm Indication Signal (AIS). If the signal is cut off between two terminals (loss of port signal) or there is a local loss of synchronization to remote port signal (red alarm condition), this AIS is sent to inform the next terminal that data is not valid. The AIS signal is always an all-ones unframed signal. This function is always used for whole channel E1 to E1 / E1 to T1 / T1 to T1 cross connection.
- □ SIDLE: Signal Idle code, this is used to setup the digital idel code when connect to E1 PBX
- □ DET: Signal Detect code, this is used to check the ABCD bit code detected by system, then convert to required code by parameter "CHG".
- □ CHG: Signal Change code, this is comes with "DET", when system detect the ABCD bit code defined by "DET" command, then convert to the code set by "CHG"
- □ sig: ABCD bit value between 0 to 15.
- □ SA: Sa bit Tx switch
- □ sa: 0:disable 1:transparent 2:user definition
- □ SAD: Sa bit TX difinition.
- □ val: value between 0 and 31.
- □ BAL: Mercury 800 supports Balance (120 Ohm) or Unbalanced (75Ohm) connector and is software configurable. **(for Mercury 800 built-in E1 module only)**
- □ bal: 0:unbalance (default) 1:balance
- □ HAUL: Select Mercury 800 built-in E1 to Short haul or Long haul. For Short haul, there will be 6dB attenuation at 1024KHz. And for Long haul, there will be 30dB attenuation at 1024KHz. **(for Mercury 800 built-in E1 module only)**
- □ haul: 0:short (default) 1:long

■ Example:

- □ E1 3a fr:0 cas:1 tcrc:0 rcrc:0 bal:1 haul:1
  - Setup E1 port 3A to FAS, CAS mode, disable TCRC and RCRC, Balance (120 Ohm) mode and Long Haul.

```
Mercury>help e1
  Usage: Setup E1 Parameters
 Syntax: E1 port [Fr:fr] [CAS:cas] [TCRC:act] [RCRC:act] [CV:cv] [AIS:ais]
         [SIDLE:sig] [DET:sig] [CHG:sig] [BAL:bal] [HAUL:haul]
 Params: port - port identifier
          Fr  - frame mode
          CAS - ccs/cas
         TCRC - tx crc
         RCRC - rx crc
          CV  - cv/bpv
          AIS - Alarm Indication Signal
        SIDLE - Signal Idle
          DET - Signal Detect Number
          CHG - Signal Change Number
          fr  - 0:fas 1:unframe
          cas - 0:ccs 1:cas
          act - 0:disable 1:enable
          cv  - 0:cv 1:bpv
          ais - 0:disable 1:enable
          sig - value between 0 and 15(ABCD bit)
  Notes:      1. TCRC and RCRC are disable when changing to unframe.
              2. Unframe needs to assign 32 timeslots.
              3. 'BAL' and 'HAUL' is for Mercury 800 built-in E1 port only

Mercury>e1 3a fr:0 cas:1 tcrc:0 rcrc:0 bal:1 haul:1
Mercury>stat 3a
TYPE:2E1-120     CLK:YES ACTIVE:ALM & DAC
[Configuration]
        LL:no RL:no RCRC:no TCRC:no SIGNAL:CAS FRAME:FAS CV:CV AIS:off
        HAUL:long SIDLE:09h DET:00h CHG:00h
```

Figure 3.19 E1 Command Screen

3.6.15 EM Command

Accommodate: Mercury 800, 3600+, 3820

- Purpose
  - The EM Card is the module of the Mercury and can via a console to control it. The command as below:
- Usage Setup E&M Parameters
- Syntax EM Port [MOD:mod] [DL:act] [TSA:act] [TONE:act] [LAW:law] [Tgain:tgain] [Rgain:rgain]
- Params
  - Por Port identifier
  - MOD Setup E&M mode
  - DL Digital loopback
  - TSA TSA loopback
  - TONE 1KHz tone injection
  - LAW Setup PCM_CODING mode
  - Tgain Tx direction relative gain
  - Rgain Rx direction relative gain
  - Mod 0: 2-wire, 600 ohm (default)
    1: 2-wire, 900 ohm

2: 4-wire, 600 ohm

- □ act 0: off 1: on
- □ law 0: A-law (default) 1: u-law
- □ tgain: 0:0dBr 1:-1dBr 2:-2dBr 3:-3dBr
  4:-4dBr 5:-5dBr 6:-6dBr 7:-7dBr
  8:-8dBr 9:-9dBr 10:-10dBr 11:-11dBr
  12:-12dBr 13:-13dBr 14:-14dBr 15:1dBr
  16:2dBr 17:3dBr
- □ rgain: 0:-2dBr 1:-3dBr 2:-4dBr 3:-5dBr
  4:-6dBr 5:-7dBr 6:-8dBr 7:-9dBr
  8:-10dBr 9:-11dBr 10:-12dBr 11:-13dBr
  12:-1dBr 13:0dBr 14:1dBr 15:2dBr
  16:3dBr 17:4dBr

- Notes:
  - □ Parameter of tgain: 6~17 & rgain: 7~17 are for 4-wire, 600ohm mode only.
  - □ E&M don't support cross connect with FXS or FXO.

3.6.16 Fiber Command

Accommodate: Mercury 800, 3600+, 3820

- Purpose: Setup FIBER Parameters
- Syntax: FIBER port [LL:act] [RL:act] [SIG:act] [SIDLE:sig] [DET:sig] [CHG:sig]
- Parameters:
  - □ port: Port identifier
  - □ LL: Local loopback
  - □ RL: Remote loopback
  - □ SIG: Signaling mode
  - □ SIDLE: Signal Idle
  - □ DET: Signal Detect Number
  - □ CHG: Signal Change Number
  - □ act: 0:off 1:on
  - □ sig: value between 0 and 15(ABCD bit)
- Notes 'SIG', 'SIDLE', 'DET' and 'CHG' options are for FiberV card only
- Example:
  - □ FIBER 1a DET: 1 CHG: 2
    - Setup 1A Fiber card to detect signal Number 1 and change signal number to 2.

3.6.17 FXO Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose: The 4-port FXO telephone card can connect to your local PABX to extend the voice channel to remote FXS card in Mercury.

- Syntax FXO port [DL:act] [TSA:act] [TONE:act] [Tgain:tgain] [Rgain:rgain] [Roff:time]
- Param:
  - □ port: Setup the assigned port
  - □ DL: Digital loopback
  - □ TSA: TSA loopback, reserved for factory testing
  - □ TONE: 1KHz tone injection
  - □ act: 0: off (default) 1: on
  - □ Tgain: Tx direction relative gain
  - □ tgain: 0: 0 dBr (default)
    1:-1 dBr
    2:-2 dBr
    3:-3 dBr
    4:-4 dBr
    5:-5 dBr
  - □ Rgain Rx direction relative gain
  - □ Rgain 0: 0dBr (default)
    1:-1dBr
    2:-2dBr
    3:-3dBr
    4:-4dBr
    5:-5dBr
    6:-6dBr
  - □ Roff Ring off time
  - □ time 1 ~ 10 second(s), default is 6 seconds
- Example:
  - □ FXO 2a tone:1 tgain:3 rgain:4 roff:5
    - Setup 2A FXO card to Tx direction gain to -3dBr and Rx direction gain to -4dBr, Roff time to 5 seconds, and enable the 1 KHz tone injection.

```
Mercury>help fxo
  Usage: Setup FXO Parameters
 Syntax: FXO port [DL:act] [TSA:act] [TONE:act] [Tgain:tgain]
              [Rgain:rgain] [Roff:time]
 Params:  port - port identifier
            DL - digital loopback
           TSA - TSA loopback
          TONE - 1KHz tone injection
         Tgain - Tx direction relative gain
         Rgain - Rx direction relative gain
          Roff - Ring off time
           act - 0:off 1:on
         tgain - 0:0dBr 1:-1dBr 2:-2dBr 3:-3dBr 4:-4dBr 5:-5dBr
         rgain - 0:0dBr 1:-1dBr 2:-2dBr 3:-3dBr 4:-4dBr 5:-5dBr 6:-6dBr
          time - 1~10 second(s)
Mercury>fxo 2a tone:1 tgain:3 rgain:4 roff:5
Mercury>stat 2a
TYPE:4FXO       CLK:NO  ACTIVE:ALM & DAC
[Cross Connect Table]
  TS000 xxxxxxx
[Configuration]
        MODE:terminate STATUS:idle PCM_CODING:A-law DL:off
        TSA_LOOPBACK:off TONE_INJECTION:on TX_GAIN:-3dBr RX_GAIN:-4dBr
        RING_OFF_TIME:5second(s)
```

Figure 3.20 FXO Command Screen

3.6.18 FXS Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - The 4 port FXS telephone card can provide point to point Hot-Line application by cross connecting time slots to the specified voice channel. When the connection is established, make one site's hand set go off-hook will provide ring tone to the distant site handset. Establish the Hot-Line connection via E1 CAS (Common Associate Signaling) R2 mode; voice channel can be integrated to the E1 network, in this application the Hot-Line voice channel can be created and extended to the far end remote branch. This FXS card only supports A-law PCM coding and loop start signaling.
- Syntax FXS port [R:r] [DL:dl] [TTX:ttx] [RING:ring] [Tgain:tgain] [Rgain:rgain] [TSA:act] [TONE:act]
- Param:
  - port: setup the assigned port
  - R: setup the line impedance
  - r: 0: 600 Ohm (default) 1: 900 Ohm
  - DL: digital loopback
  - dl: 0: disable (default) 1: enable
  - TTX: teltex tone
  - ttx: 0: ttx off (default) 1: 12KHz ttx on 2: 16KHz ttx on
  - RING: ring frequency and cadency
  - Ring 0: 17 Hz, 1 sec on / 2 sec off

1: 17 Hz, 1 sec on / 3 sec off
2: 22 Hz, 1 sec on / 2 sec off
3: 22 Hz, 1 sec on / 3 sec off
4: 25 Hz, 1 sec on / 2 sec off (default)
5: 25 Hz, 1 sec on / 3 sec off
6: 30 Hz, 1 sec on / 2 sec off
7: 30 Hz, 1 sec on / 3 sec off

- □ Tgain: Tx direction relative gain
- □ tgain: 0: 0dBr (default)
  1: -1dBr
  2: -2dBr
  3: -3dBr
  4: -4dBr
  5: -5dBr
- □ Rgain: Rx direction relative gain
- □ rgain: 0: 0dBr (default)
  1: -1dBr
  2: -2dBr
  3: -3dBr
  4: -4dBr
  5: -5dBr
  6: -6dBr
- □ TSA: TSA loopback, reserved for factory testing
- □ TONE: 1KHz tone injection
- □ act: 0: off (default) 1: on

Note:

1. Param. “TSA” and “TONE” are only for 4-POTS-FXS card. And Param. “R” and “TTX” are only for 4-FXS/ 4-FXS-D card.
2. 4-POTS-FXS card support selection 2 & 3 for Param. “RING” only, and 4-FXS/ 4-FXS-D card support all selections from 0 to 7.

- Example:
  - □ FXS 1a law:0 r:1 start:0 ring:4 ttx:2 tgain:0 rgain:2
    - Setup 1A FXS card to 900 Ohm line impedance, 25 Hz 1 sec on / 2 sec off, 16KHx ttx on, Tx direction gain to 0dBr and Rx direction gain to -2dBr.

```
Mercury>help fxs
  Usage: Setup FXS Parameters
 Syntax: FXS port [R:r] [DL:dl] [TTX:ttx] [RING:ring] [Tgain:tgain]
           [Rgain:rgain]
 Params:  port - port identifier    RING - ring frequency&cadency
             R - impedance         Tgain - Tx direction relative gain
            DL - digital loopback  Rgain - Rx direction relative gain
           TTX - teltex tone           r - 0:600 ohm 1:900 ohm
            dl - 0:disable 1:enable
           ttx - 0:ttx off 1:12KHz ttx on 2:16KHz ttx on
          ring - 0:17 Hz,1sec on/2sec off 1:17 Hz,1sec on/3sec off
                 2:22 Hz,1sec on/2sec off 3:22 Hz,1sec on/3sec off
                 4:25 Hz,1sec on/2sec off 5:25 Hz,1sec on/3sec off
                 6:30 Hz,1sec on/2sec off 7:30 Hz,1sec on/3sec off
         tgain - 0:0dBr 1:-1dBr 2:-2dBr 3:-3dBr 4:-4dBr 5:-5dBr
         rgain - 0:0dBr 1:-1dBr 2:-2dBr 3:-3dBr 4:-4dBr 5:-5dBr 6:-6dBr
Mercury>fxs 1a r:1 ring:4 ttx:2 tgain:0 rgain:2
Mercury>stat 1a
TYPE:4FXS_D     CLK:NO  ACTIVE:ALM & DAC
[Cross Connect Table]
  TS000 xxxxxxx
[Configuration]
        MODE:terminate STATUS:idle PCM CODING:A-law DL:no
        IMPEDANCE:900ohm START:loop start RING:25Hz,1sec on/2sec off
        TX GAIN:0dBr RX GAIN:-2dBr TTX:16KHz ttx on
```

Figure 3.21 FXS Command Screen

3.6.19 Idle Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose: Edit the transmitted idle code when DS0 time slot is in idle mode.
- Syntax IDLE [code]
- Param:
  - □ None: View the current idle code
  - □ code: Hexadecimal value between 00 and FF
- Example:
  - □ IDLE View the current idle code
  - □ IDLE ff The idle time slot will be filled in 0xFF code

```
Mercury>help idle
 Usage: Setup idle code
Syntax: IDLE [code]
Params: code - hexadecimal value between 00 and FF
        NOTE: view idle code if no parameter
Mercury>idle
        idle code=7f
Mercury>idle ff
        idle code=ff
```

Figure 3.22 IDLE Command Screen

3.6.20 IDSL Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - Mercury Series Product supports 4-port IDSL card which always works in **LT** mode and connects to remote TAINET IDSL product such as Jupiter 2560 or DT-128 in NT mode. With 2-wire lines connection and 2B1Q modulation technology, it can extend the operation distance up to 7.8Km under 24 AWG(0.5mm) and provides up to 128 Kbps data transmission rate. The 4-port IDSL card also provides the AL, DL and RDL loopback testing for diagnostic. When the loopback testing activates, the front panel LED indicator will keep blinking. IDSL port time slot assignment table is as follows:

Time Slot	0	1	2	3
IDSL	B1	B2	Reserve	D (bit 7,6)

Table 3.13 IDSL port time slot assignment table

- Syntax: IDSL port [OP:op] [RDL:rdl]
- Param:
  - port Port identifier
  - OP Setup the operation mode such as,
  - op 0:link (default) 1:al 2:ssp 3:dt 4:dl 5:quiet
  - link Connect to the remote NTU
  - al Enable the analog loopback testing
  - Quiet Disconnect the line and make modem quiet
  - Dl Enable the digital loopback testing
  - ssp&dt Reserved for factory used
  - RDL Request remote NTU to enable the digital loopback, the link should be connected when performing the RDL testing
  - rdl 0:normal 1:2B+D 2:B1 3:B2
- Example:
  - IDSL 1a op:0
    - Setup IDSL port 1A to link mode
  - IDSL 1b op:1
    - Activate the AL loopback on IDSL port 1B

```
Mercury>help idsl
  Usage: Setup IDSL Parameters
 Syntax: IDSL port [OP:op] [RDL:rdl]
 Params: port - port identifier
           OP - operation mode
          RDL - remote digital loopback mode
           op - 0:link 1:al 2:ssp 3:dt 4:dl 5:quiet
          rdl - 0:normal 1:2B+D 2:B1 3:B2
  Notes: RDL operation is valid when connected(op:0).
Mercury>idsl 1a op:0
Mercury>idsl 1b op:1
Mercury>stat 1b
TYPE:4IDSL      CLK:NO  ACTIVE:ALM & DAC
[Configuration]
        MODE:al
```

Figure 3.23 IDSL Command Screen

3.6.21 Link Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Enable the local and remote loopback testing for most of the tributary cards. By the way, this **LINK** command can also enable / disable the alarm or cross connect service (DAC).
- Syntax: LINK port [LL:sw] [RL:sw] [ACT:act]
- Param:
  - □ port Setup the indicated port
  - □ LL Enable the local loopback, the outgoing signal is looped back through the internal digital time slot interchanged circuit. All DS0 time slots are looped back to the received path. This will check the time slot cross connected table, and the physical connection to the user equipment that provides the signal.
  - □ RL Enable the remote loopback, it returns the outside received signal back to the original user equipment. This will check the data port, including the interface, physical cable and connectors which connects to the remote user equipment
  - □ sw 0:disable
    1:enable
    2:enable with AIS
    (only available for LL command, the internal system will send a AIS “all-ones” signal to the line when active)
  - □ ACT Provide the functionality to enable/disable the alarm or DAC service, and this command is only invalid for A/μ law conversion card.
  - □ act 0:enable alarm and DAC (default)
    1:disable alarm

2:disable alarm and DAC (out of service)

- Example:
  - □ LINK 1b act:2
    - Disable the alarm and DAC function and move into out of service mode of port 1B
  - □ LINK 3a ll:1
    - Enable the local loopback for port 3A

```
Mercury>help link
  Usage: Setup Link Parameters
 Syntax: LINK port [LL:sw] [RL:sw] [ACT:act]
 Params: port - port identifier
           LL - local loopback
           RL - remote loopback
          ACT - setup alarm & DAC switch
           sw - 0:disable 1:enable 2:enable with AIS
          act - 0:alarm & DAC on 1:alarm off 2:alarm & DAC on
  Notes: 1. sw = 2 only valid for 'LL'
         2. 'ACT' option is only invalid for A/u conversion card
Mercury>link 1b act:2
Mercury>stat 1b
TYPE:4IDSL      CLK:NO  ACTIVE:NONE
Mercury>link 3a ll:1
Mercury>stat 3a
TYPE:1E1-75     CLK:YES ACTIVE:ALM & DAC
[Configuration]
        LL:yes RL:no RCRC:yes TCRC:yes SIGNAL:CCS FRAME:FAS CV:CV
        HAUL:short
```

Figure 3.24 LINK Command Screen

3.6.22 Logb Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ When performing this command, system will start to memorize and save the following entered commands into the memory. Stop and save into the specified profile number and profile name using command "**LOGE**".
- Syntax: LOGB
- Example
  - □ LOGB Start logging profile

```
Mercury>help logb
  Usage: Start Logging Profile
 Syntax: LOGB
Mercury>logb
        Start logging command scripts
```

Figure 3.25 LOGB Command Screen

3.6.23 Logd Command

Accommodate: Mercury 800, 3600+, 3820

- Purpose Delete specified profiles
- Syntax: LOGD prodile#1 [[profile#2] …]
- Param:
  - Profile# profile number between 1 and 20

3.6.24 Loge Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose: Stop and Save/Append the command into the specified profile number and profile name.
- Syntax LOGE [profile# proname] | [A profile#]
- Param:
  - profile# Specified profile number between 1 to 20
  - proname The profile name for the indicated profile number
  - A Appending existed profile
- Example:
  - LOGB
    - Starting logging command scripts
  - IDSL 1a op:0
    - Enable the IDSL port 1A to link mode
  - IDSL 1b op:4
    - Enable the DL loopback testing on port 1B
  - LINK 1c act:2
    - Disable the alarm and DAC function and move into out of service mode of port 1C
  - E1 3a fr:0 cas:0 tcrc:0 rcrc:0
    - Set E1 port 3A to CCS, FAS mode, disable the CRC on TX and RX port
  - CLK 3a 4a
    - Select port 3A as the Master clock and port 4A as the Secondary clock.
  - LOGE 10 M800
    - Stop and save the above commands into the 10^{th} profile with the name M800
  - LOGL
    - List all saved profiles inside the System currently

```
Mercury>help loge
  Usage: Stop & Save/Append Profile
 Syntax: LOGE [profile# proname] | [A profile#]
 Params: profile# - profile number between 1 and 20
          proname - name of profile for identification
                A - appending existed profile
Mercury>logb
        Start logging command scripts
Mercury>idsl 1a op:0
Mercury>idsl 1b op:4
Mercury>link 1c act:2
Mercury>e1 3a fr:0 cas:0 tcrc:0 rcrc:0
Mercury>clk 3a 4a
        Master:3A
        Secondary:4A
        Active:master
Mercury>loge 10 M800
        profile #10 save success!
Mercury>logl
Profile List:
        #01: test-chamber
        #02: test
        #03: demo
        #04: test
        #10: M800
```

Figure 3.26 LOGE Command Screen

3.6.25 Logi Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Select the saved profiles while system reboots. This allows supervisor to arrange for any of the profiles as the initial profiles using command "**LOGI**" when powering on or rebooting the system. Mercury will load the indicated profiles and execute all commands following the power on sequence.
- Syntax: LOGI [profile#1] [profile#2]
- Param:
  - □ None Remove the initialized profiles while system
  - □ rebooting
  - □ profile# Specified profile number between 1 to 20
- Example:
  - □ LOGI 10 1 4
    - Select profile 10, 1 and 4 as the initialized profile
  - □ LOGL
    - List all saved profiles inside the System currently, this command also shows which profile is selected for loading when system reboots.
  - □ LOGI
    - Remove the initialized profiles if no parameter

```
Mercury>help logi
  Usage: Select Profiles for Reboot
 Syntax: LOGI [profile#1] [profile#2] ...
 Params: profile#? - profile number between 1 and 20
  Notes: clear previous setting if no parameter
Mercury>logi 10 1 4
Mercury>logl
Profile List:
        #01: test-chamber
        #02: test
        #03: demo
        #04: test
        #10: M800
LOGI ITEM: #10 #01 #04
Mercury>logi
        initial profile list cleared
```

Figure 3.27 LOGI Command Screen

3.6.26 Login Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose:
  - The protection of Mercury Series System, the Login ID and Password are required for supervisor starting in the Access mode to control all sessions. When enter into Access mode; supervisor has full authority to operate the Mercury unit. The default ID and PW are listed in the following table, and they are also case sensitive.

	Login ID	Login Password
Mercury 800	TAINET	800
Mercury 3600	TAINET	3600
Mercury 3600+	TAINET	3600
Mercury 3820	TAINET	3820

Table 3.14 Login ID and Password for Mercury series

- Syntax LOGIN ID P/W
- Param:
  - ID The identification for logging into Access mode
  - P/W The password for the corresponding ID
- Example:
  - LOGIN TAINET 800
    - Enter into Access mode with default ID and Password.

```
Mercury>login TAINET ***
        enter access mode
```

Figure 3.28 Login Screen

3.6.27 Logl Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
- List all profile names which are saved in Mercury Series System
- Syntax LOGL
- Example:
  - □ LOGL List all saved profiles inside the System currently

```
Mercury>help logl
  Usage: List the Name of Profiles
 Syntax: LOGL
Mercury>logl
Profile List:
        #01: test-chamber
        #02: test
        #03: demo
        #04: test
        #10: M800
```

Figure 3.29 LOGL Command Screen

3.6.28 Logout Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Exit the Access mode and return back to Monitor mode. When in Monitor mode, it only allows user to view the current alarm history, port status and performance information for each port.
- Syntax LOGOUT
- Example:
  - □ LOGOUT Turn back to Monitor mode

```
Mercury>help logout
  Usage: Enter Monitor Mode
 Syntax: LOGOUT
Mercury>logout
        enter monitor mode
```

Figure 3.30 LOGOUT Command Screen

3.6.29 Logtf Command

Accommodate: Mercury 800, 3600+, 3820

- Purpose:
  - □ Upload/Download a Profile
- Syntax LOGTF mode address profile# [proname]
- Param:
  - □ Mode u: upload d:download
  - □ Address TFTP server IP address
  - □ Profile# profile number (1~20)
  - □ Proname profile name

3.6.30 Logr Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Select the profile and execute all commands within this specified profile.
- Syntax LOGR profile#1 [[profile#2] ...]
- Param:
  - □ profile# Specified profile number between 1 to 20
- Example:
  - □ LOGR 10 Run all commands inside profile 10

```
Mercury>help logr
  Usage: Run Specified Profiles
 Syntax: LOGR profile#1 [[profile#2] ...]
 Params: profile#? - profile number between 1 and 20
Mercury>logr 10 1
Mercury>idsl 1a op:0
Mercury>idsl 1b op:4
Mercury>link 1c act:2
Mercury>e1 3a fr:0 cas:0 tcrc:0 rcrc:0
Mercury>clk 3a 4a
        Master:3A
        Secondary:4A
        Active:master
```

Figure 3.31 LOGR Command Screen

3.6.31 Logv Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ Select the profile and display all commands within this specified profile.
- Syntax LOGV profile#
- Param:
  - □ profile#: Specified profile number between 1 to 20
- Example:
  - □ LOGV 10Display all commands inside profile 10

```
Mercury>help logv
  Usage: View Contents of a Profile
 Syntax: LOGV profile#
 Params: profile# - profile number between 1 and 20
Mercury>logv 10
profile #10: M800
> idsl 1a op:0
> idsl 1b op:4
> link 1c act:2
> e1 3a fr:0 cas:0 tcrc:0 rcrc:0
> clk 3a 4a
```

Figure 3.32 LOGV Command Screen

3.6.32 Net Command

- Accommodate: Mercury 800, 3600+, 3820
- Purpose:
  - □ Mercury Series Product supports Router module, and for Mercury 800, 3600+ and 3820, the router module is already built into the systems. The **NET** command is for entering the TCS (Terminal Configuration System) mode with a user-friendly configuration interface provided by the Router module itself for configuring and monitoring it. The default password is "**root**" for entering into Router module. For more detailed settings, please refer to the Manual of Router Module. For Mercury 3820 and 3600+, there is a different syntax for this **Net** command, and please refer to the following page.
- Syntax NET port
- Param:
  - □ Port The port number which Router module located
- Example:
  - □ NET 5A Enter into Router module on port 5A

```
Mercury>help net
  Usage: Setup Network Device
 Syntax: NET port
 Params: port - port identifier
Mercury>net 5a
Mercury>
              !!! Welcome to use MERCURY Router Module !!!

                   Please Enter Password : ****
```

Figure 3.33 NET Command Screen

- Accommodate: Mercury 3600+, 3820
- Purpose:
  - □ The **NET** command of Mercury 3600+ and 3820 allow the equipment to enter TCS mode provided by Router module (In Mercury 3820, it is located at 11A; in Mercury 3600+, it is located at 6A.). It also lets user enable the DAC sharing function with port10B of Mercury 3820 and port 5B of Mercury 3600+ if the user wants to make this router module perform in-band management function by cross connecting the WAN port to other interface and establish WAN connection to the remote router. When user wants to use the WAN port of the built-in router module, the user should enable the TDM bus sharing with port10B function first, then the TDM bus of port10B (5B) will be occupied by port11A (6A). In this case, port10B must be kept empty and cannot have any modules plugged into it. Only E1 card can be plugged into slot10 to share the TDM bus (DAC table) with router module on port11A. The time slots assignment for port11A router module must start from time slot 0.

- Syntax NET [port] | [[SW:sw] [COUNT:count]]
- Param:
  - □ None Display current DAC sharing status
  - □ port Move to the router module where it located
  - □ SW Enable/Disable the DAC sharing funcion with port 10B
  - □ sw 0: off (default) 1: on
  - □ COUNT Assign the time slot numbers, start from 0
  - □ count 0 ~ 31
- Example:
  - □ net sw:1 count:10
    - Enable port11A DAC sharing with port10B (with 10 time-slot bandwidth)
  - □ net
    - display current DAC sharing status

```
Mercury>help net
  Usage: Setup Network Device
 Syntax: NET [port] | [[SW:sw] [COUNT:count]]
 Params:  port - port identifier
            SW  - DAC switch
         COUNT - timeslot count
           sw  - 0:off 1:on
         count - timeslot 0~32
  Notes: 1. view 11A DAC switch and timeslot count if no parameter
         2. 11A DAC share with E1 only
Mercury>net sw:1 count:10
Mercury>stat 11a
TYPE:Rou_32c    CLK:NO  ACTIVE:ALM & DAC
[Cross Connect Table]
  TS000 xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx
  TS008 xxxxxxx xxxxxxx zzzzzzz zzzzzzz zzzzzzz zzzzzzz zzzzzzz zzzzzzz
  TS016 zzzzzzz zzzzzzz zzzzzzz zzzzzzz zzzzzzz zzzzzzz zzzzzzz zzzzzzz
  TS024 zzzzzzz zzzzzzz zzzzzzz zzzzzzz zzzzzzz zzzzzzz zzzzzzz zzzzzzz
[Configuration]
        Link:on  Console:off  Checksum Error:0  Code Violation:0
        DAC:on(32)  Count:10
Mercury>net
        11A DAC:on(32) Count:10
```

Figure 3.34 NET Command Screen

3.6.33 NMS Command

- Accommodate: Mercury 3600
- Purpose:
  - □ Set up which router module to handle the SNMP request from the NMS.
- Syntax NMS [port]
- Param:
  - □ port Port identifier for the indicated router module
- Example:
  - □ nms 5a Choose router module located on port5A to process the SNMP request from remote NMS

```
Mercury>help nms
 Usage: Setup NMS & SNMP link port
Syntax: NMS [port]
Params: port - router port identifier
        NOTE: view NMS & SNMP link port if no parameter
Mercury>nms 5a
        NMS link port = 5A
```

Figure 3.35 NMS Command Screen

3.6.34 PM Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose:
  - Display the contents of the performance monitoring reports for the specified port. The 15minute PM and Daily PM reports are available through this command and are based on the data stored in Mercury Series Product memory.
- Syntax PM [port] [VIEW:view] | [CLR:clr]
- Param:
  - port The port identifier
  - VIEW Display the PM data of the indicated port for the current 15minute/1day period and the previous thirty-two/seven 15minute/1day period reports.
  - view 0:15min PM history 1:1day PM history
  - CLR Clear the 15minute/1day PM report, and for Access mode only
  - clr 0:15min PM history
    1:1day PM history 2:15min&1day PM history
- Example:
  - PM view:1 View the 1day PM history for all ports
  - PM 3a view:0 View the 15minute PM history for port 3A
  - PM clr:2 Clear all 15minute&1day PM history for all ports
  - PM 4a clr:0 Clear 15minute PM history for port 4A

```
Mercury>help pm
  Usage: Performance Monitor
 Syntax: PM [port] [VIEW:view] | [CLR:clr]
 Params: port - port identifier
         VIEW - view 15min/1day PM history
          CLR - clear 15min/1day PM history
         view - 0:15min PM history 1:1day PM history
          clr - 0:15min PM history 1:1day PM history
                2:15min & 1day PM history
  Notes: 1. VIEW or CLR all PM history if no port parameter
         2. Either of VIEW and CLR parameters must be required
         3. 'CLR' for access mode only
Mercury>pm 3a view:0
[15min PM history]
  Period   CH  TYPE     Unavailable   Error Seconds   Severely ES
=hh:mm:ss============================================================
 10:00:00  3A 1E1-75   00593 6.6E-01  00000 0.0E+00  00000 0.0E+00
 10:15:00  3A 1E1-75   00900 1.0E+00  00000 0.0E+00  00000 0.0E+00
 10:30:00  3A 1E1-75   00900 1.0E+00  00000 0.0E+00  00000 0.0E+00
       <Press SPACE key for more or ESC to abort>
Mercury>pm clr:2
Mercury>pm 4a clr:0
```

Figure 3.36 PM Command Screen

3.6.35 RP Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose:
  - Setup the ring protection mode and its clocking. Constructing the E1 / T1 / Fiber ring protection feature can provide an always alive transmission path to prevent failure on the specified link. Currently Mercury Series support 4 rings within 1 device, this function allows user to set 4 individual rings to different locations, or set 4 rings to become 1 big ring and extend the bandwidth. All interfaces of that ring should be of with same interface type. This automatic redundant path protection function can select the live path automatically to protect the data transmission if the primary link malfunctions. It can also provide the time slot drop on the multiple nodes of the ring protect associated point. The **RP** command always comes with command **DROP** (refer to section 3.6.13 **DROP** Command) and the ring protection requires a start node, which is in the **Master** mode; all other nodes connected to chain act in **Slave** mode. This mechanism will automatically distinguish all node connections. If one of the links fails due to cable faults or problems, the Main Ring can be wrapped onto the Backup Ring. Wrapping is a term that is used to indicate that the Backup Ring is being used in addition to the Main Ring. The Backup Ring is connected to the Main Ring. The Main Ring or a portion of the Main Ring is still being used. Wrapping is only associated with the Last Port and Next Port connectors on the extremity Mercury units. Ring will automatically recover when the faults have been fixed.

- Syntax RP no mode last next [ts]
- Param:
  - □ no The number of ring protection (1~4)
  - □ mode Identify the role of Mercury acting on the nodes. Normal mode will deactivate the ring protection function.
    - n: normal (default)
    - m: master
    - s: slave
  - □ last Last port identifier for indicated Ring IN port
  - □ next Next port identifier for indicated Ring OUT port
  - □ ts
    - Identify the clock operating mode
    - 0: disable, manual clock settings will able to assign the differnet clock source at slave nodes system by user himself.
    - Or identify which time-slot number to be carried with clock source. T1:1 ~ 24, E1:1~31 (avoid TS16 if under CAS framing), Fiber:0~127. This auto mode will guide the entire ring nodes to follow the same clock source from Master node.
- Example:
  - □ RP 1 m 3a 4a
    - Setup Mercury as the Master node in the 1st Ring, and port 3a is the last port and port 4a is the next port.

```
Mercury>help rp
  Usage: Setup Ring Protection
 Syntax: RP no mode last next [ts]
 Params:  mode - n:normal m:master s:slaver
          last - last port identifier
          next - next port identifier
            ts - clock transmission timeslot
                 0:disable; or T1:1~24 E1:1~31 FIBER:0~127
  Notes: 1. view current setup if no parameter
         2. for T1, E1 and FIBER card only
Mercury>rp 1 m 3a 4a
        MODE:master CLOCK MODE:manual
        LAST PORT:3A NEXT PORT:4A
        CLOCK TIMESLOT:31
        RING PROTECT:on
```

Figure 3.37 RP Command Screen

Caution:
There are some limitations associated with Ring Protection. Ring Protection requires the equipment to operate under frame mode. We suggest the user choose one time slot to carry the clock source. This will guide all of the ring nodes to follow the same clock source coming from the Master node. This function robs one time slot from the system. E1 therefore has only 30 time slots available on CCS mode and 29 time slots available on CAS mode, while T1 has 23 time slots available. So far the Ring Protection system is limited to only one ring in the entire network, and only ports A and C on the Mercury in Salve Mode can be the Ring nodes.

3.6.36 RS530 Command

- Accommodate: Mercury 3600
- Purpose:
  - Define RS530 port parameters. The DTE transmit speed (N x 64 Kbps) is determined by the "sts" starting time slot and "ets" end time slot. (for 512 Kbps, 8 x 64 Kbps, it may start from time slot 1 to time slot 8. So the parameter "sts" is 1, and "ets" is 8). The valid time slot number is between 1 and 31.
- Syntax RS530 port sts [ets] [CTS:act] [DSR:act] [DCD:act] [RI:act] [INV:inv]
- Param:
  - port Port identifier for the indicated RS530 port
  - sts The start time slot number
  - ets The end time slot number
  - CTS RS530 Clear to Send signal (default act:1)
  - DSR RS530 Data Set Ready signal (default act:1)
  - DCD RS530 Data Carrier Detect signal (default act:1)
  - RI RS530 Ring Indicator signal (default act:0)
  - act 0:signal inactive 1:signal active
  - INV TxC and RxC clock polarity
  - Inv 0: TxC normal & RxC normal (default)
    1: TxC normal & RxC inverted
    2: TxC inverted & RxC normal
    3: TxC inverted & RxC inverted
- Example:
  - RS530 2a 1 6 dsr:0
    - Set up the speed for RS530 card on port 2A to 384 Kbps, start from time slot 1 and end with time slot 6. Deactivate the DSR signal.

```
Mercury>help rs530
 Usage: Setup RS530 parameters
Syntax: RS530 port sts [ets] [CTS:act] [DSR:act] [DCD:act] [RI:act]
              [INV:inv]
Params: port - port identifier
         sts - start time-slot number
         ets - end time-slot number
         CTS - RS530 CTS signal
         DSR - RS530 DSR signal
         DCD - RS530 DCD signal
          RI - RS530 RI signal
         INV - TXC and RXC polarity
         act - 0:signal inactive 1:signal active
         inv - 0:TXC normal & RXC normal   1:TXC normal & RXC inverted
               2:TXC inverted & RXC normal 3:TXC inverted & RXC inverted
       NOTE: 1. valid time-slot number is between 1 and 31
             2. 'ets' is optional if one time-slot selected
Mercury>rs530 2a 1 6 dsr:0
Mercury>stat 2a
TYPE:1RS530     CLK:NO  ACTIVE:ALM & DAC
[Configuration]
        RL:no Speed:384 Kbps
        RTS:off DTR:off CTS:on DSR:off DCD:on RI:off
        Time-Slot:01 02 03 04 05 06
        Connection:active
        TXC:normal RXC:normal
```

Figure 3.38 RS530 Command Screen

3.6.37 Sdsl Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose:
  - To specify the SDSL port location of module, setup the operation mode, frame type, testing diagnosis and connection speed. Mercury Series Product supports single port SDSL card which can be set to work as **LTU / NTU / To 1300** mode. With 2-wire lines connection and CAP modulation technology, the operational distance can be extended for data rate up to 2.048 Mbps. The SDSL card also provides the Local and Remote loopback testing for diagnostic. When the loopback testing is activated, the front panel LED indicator will keep blinking.
- Syntax SDSL port [MOD:mod] [TEST:test] [FR:fr] [EOC:eoc] [count]
- Param:
  - port Port identifier for the indicated SDSL port
  - MOD The mode of SDSL card type. It can be set to “LTU” “NTU” mode, or “To 1300” if connect to remote stand alone Xstream 1300.
  - mod 0: LTU 1: NTU (default) 2: To 1300
  - TEST Enable the loopback testing function for diagnoistic
  - test 0: normal (default) 1: local loopback 2: remote loopback
  - FR Configure the indicated SDSL port to Frame mode or Unframed mode. In Frame mode, it starts from time slot 0 and must setup the “ets” to specify the data rate. When in Unframe mode, the data rate is 2.048 Mbps.

- □ fr 0: frame (default) 1: unframed
- □ EOC Enable the EOC channel for remote control device.
- □ eoc 0:off 1:on
- □ count timeslot count (1~31)

■ Example:

□ sdsl 2a mod:2 fr:0 15

- Setup SDSL card located on port2A to LTU type, Frame mode, and speed is 1024 Kbps (start from time slot 1 and the "ets" is 15)

```
Mercury>help sdsl
  Usage: Setup SDSL Parameters
 Syntax: SDSL port [MOD:mod] [TEST:test] [FR:fr] [ets]
 Params:  port - port identifier
           MOD - setup LTU/NTU/To 1300 mode
          TEST - test function
            FR - frame mode
           mod - 0:LTU 1:NTU 2:To 1300
          test - 0:normal 1:local loopback 2:remote loopback
            fr - 0:frame 1:unframe
           ets - end time-slot (1~31)
Mercury>sdsl 2a mod:0 fr:0 15
Mercury>stat 2a
TYPE:1SDSL      CLK:YES ACTIVE:ALM & DAC
[Configuration]
        MODE:LTU LL:no RL:no SPECTRUM-TEST:no FRAME:frame EOC:on
        S/N: 38db RCV_GAIN: 0db TX_POWER: 7dbm
        REMOTE_RCV_GAIN: 0db REMOTE_TX_POWER: 8dbm
        Time-slot:00 01 02 03 04 05 06 07
                  08 09 10 11 12 13 14 15
```

Figure 3.39 SDSL Command Screen

3.6.38 Secc Command

■ Accommodate: Mercury 800, 3600, 3600+, 3820

■ Purpose:

□ The **SECC** command is going to reconfirm the newer Login ID and PW after they are first entered in by **SECE** command.

■ Syntax: SECC No. ID P/W [mode]

■ Param:

- □ No. The user number from 1 to 5, there are 5 sets of ID and PW can be set in system
- □ ID The identification for log into Access mode
- □ P/W The password for the corresponding ID
- □ mode
  - There are two modes for this specified user, Supervisor has full authority to operate Mercury including add and modify the newer Login ID and PW. When an operator is assigned as Normal user, he can also fully

operate Mercury, but cannot add newer Login ID and PW, but can only modify his own ID and PW.

- S: Supervisor
- N: Normal User (default)

```
Mercury>help secc
  Usage: Setup ID & P/W(confirm)
 Syntax: SECC No. ID P/W [mode]
 Params:  No.- user number
          ID - identification
         P/W - password
        mode - S:supervisor N:normal user
  Notes: 1. Method of ID & P/W Modification
          Step 1: use SECE to select new user No., ID & P/W
          Step 2: use SECC to confirm new user No., ID & P/W
         2. ID & P/W are case sensitive
```

Figure 3.40 SECC Command Screen

3.6.39 Sece Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose:
  - To change or add ID and PW for enter into Access mode. There are 5 sets of ID and PW, and both of them are case sensitive. Two classes of privileges are Supervisor and Normal user, one of which can be chosen for each set. After modifying or adding the new ID and PW using Sece Command, please execute **SECC** command to reconfirm the changes. Once you have made the change, please memorize it and **DO NOT** forget the new ID and PW, otherwise you must send your Mercury back to TAINET for service while the ID and PW will be lost forever.
- Syntax SECE No. ID P/W [mode]
- Param:
  - No. The user number from 1 to 5, there are 5 sets of ID and PW can be set in system
  - ID The identification for log into Access mode
  - P/W The password for the corresponding ID
  - Mode There are two modes for this specified user, Supervisor has full authority to operate Mercury including adding and modifying the newer Login ID and PW. When operator is assigned as Normal user, he can also fully operate Mercury, but cannot add the newer Login ID and PW, only can modify his own ID and PW.
    - S: Supervisor
    - N: Normal User (default)
- Example:
  - SECE 5 Test test n

- Add a newer "Normal" user with No "5", ID is "Test" and PW is "test"

□ SECC 5 Test test n

- Confirm the new ID and PW

□ USER

- Display all user ID and PW in Mercury

```
Mercury>help secc
  Usage: Setup ID & P/W(confirm)
 Syntax: SECC No. ID P/W [mode]
 Params:  No.- user number
          ID - identification
         P/W - password
        mode - S:supervisor N:normal user
  Notes: 1. Method of ID & P/W Modification
          Step 1: use SECE to select new user No., ID & P/W
          Step 2: use SECC to confirm new user No., ID & P/W
         2. ID & P/W are case sensitive
Mercury>sece 5 Test **** n
        use SECC to confirm new ID & password
Mercury>secc 5 Test **** n
        new ID & password is confirmed and changed
Mercury>user
 No.  ID          Password    User Mode     Active
=======================================================
  1
  2
  3   TAINET      800         Supervisor
  4
  5   Test        test        Normal
=======================================================
```

Figure 3.41 SECE Command Screen

Caution:
Once the Login ID and PW are changed, please memorize them, otherwise the Mercury must be sent back to TAINET for servicing before operation can be restored. Forgotten ID and PW will be lost forever.

3.6.40 SHDSL Command

Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose: Setup SHDSL parameters
- Syntax: SHDSL port [MOD:mod] [TEST: test] [FR:fr] [PSD: psd] [TM:tm] [count] [SIG:act] [SIDLE:sig] [DET:sig] [CHG:sig]
- Param:
  - □ Port port identifier
  - □ MOD Setup LTU/NTU mode

- □ TEST Test function
- □ FR Frame mode
- □ PSD Power spectrum density
- □ TM Transmission mode
- □ SIG Signaling mode
- □ SIDLE Signal Idle
- □ DET Signal Detect Number
- □ CHG Signal Change Number
- □ mod 0: LTU 1:NTU
- □ test 0: disable
  1: local loopback
  2: remote loopback (LTU mode only)
- □ fr 0:frame 1:unframed
- □ psd 0:symmetric 1:asymmetric
- □ tm 0:annex_a 1:annex_b
- □ count timeslot count (1~31) (LTU mode only)
- □ act 0:off 1:on
- □ sig value between 0 and 15 (ABCD bit)

■ Note:

- □ Remote loopback and time-slot count (S) for LTU mode only.
- □ Timeslot '0' is used to transmit signaling data in signaling mode.

3.6.41 Sigidl Command

■ Accommodate: Mercury 800, 3600, 3600+, 3820

■ Purpose: Set up idle signaling code ABCD bit for FXS and FXO only.

■ Syntax: SIGIDL [code]

■ Param:

- □ None View current idle signal setting if no parameter
- □ Code Hexadecimal value between 0 and F (0000ABCD bit)

```
Mercury>help sigidl
 Usage: Setup idle signal
Syntax: SIGIDL [code]
Params: code - hexadecimal value between 0 and F(0000ABCD bit)
        NOTE: 1. view idle signal code if no parameter
              2. idle signal code for t1 and e1 only
Mercury>sigidl
        idle signal code=09
```

Figure 3.42 SIGIDL Command Screen

3.6.42 Stat Command

■ Accommodate: Mercury 800, 3600, 3600+, 3820

■ Purpose:

□ Display the current status information that is stored in the alarm buffer including the configuration and cross-connect table for a selected port.

- Syntax STAT [port]
- Param.:
  - □ None Show the status for all ports
  - □ port Port identifier for the selected port
- Example:
  - □ STAT View status for all plugged in ports in Mercury
  - □ STAT 3a View port 3A status

```
Mercury>stat
 CH   TYPE   CLK   TOTAL      UAR      ER     SER     CV/BPV     ALARM   DAC
================hour:mm:ss=====================================Maj:Min=====
 1A 4IDSL    NO  0007:15:36 1.0E+00 0.0E+00 0.0E+00        N/A 0001:0000 ON
 1B 4IDSL    NO  0007:15:36 5.2E-03 0.0E+00 0.0E+00        N/A    OFF    OFF
 1C 4IDSL    NO  0007:15:36 1.8E-01 0.0E+00 0.0E+00        N/A    OFF    OFF
 1D 4IDSL    NO  0007:15:35 1.0E+00 0.0E+00 0.0E+00        N/A 0001:0000 ON
 3A 1E1-75   YES 0007:15:31 1.0E+00 0.0E+00 0.0E+00          3 0002:0000 ON
 4A 1E1-75   YES 0007:15:31 1.0E+00 0.0E+00 0.0E+00          1 0003:0000 ON
 5A NRouter  NO  0007:15:35 0.0E+00 0.0E+00 0.0E+00        N/A 0000:0000 ON
================================================================================
Mercury>stat 3a
TYPE:1E1-75     CLK:YES ACTIVE:ALM & DAC
[Cross Connect Table]
  TS000  1A=000 1A=001 1A=002 xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
  TS008  xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
  TS016  xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
  TS024  xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
[Performance Monitor]
        Elasped: 0007:20:52
            PM       UA       ES       SES         CV
        ================================================
          15-min    00666    00000    00000    0000000000
         00:11:06  1.0E+00  0.0E+00  0.0E+00
        ------------------------------------------------
           1-hour   00666    00000    00000    0000000000
         00:11:06  1.0E+00  0.0E+00  0.0E+00
        ------------------------------------------------
           1-day    26452    00000    00000    0000000003
         07:20:52  1.0E+00  0.0E+00  0.0E+00
        ================================================
[Alarm]
        MAJ:RCL         MIN:
[Configuration]
        LL:yes RL:no RCRC:no TCRC:no SIGNAL:CCS FRAME:FAS CV:CV HAUL:short
```

Figure 3.43 STAT Command Screen

3.6.43 T1 Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose: Setup T1 parameters
- Syntax: T1 port [CO:co] [Fr:fr] [LI:li] [RRL:rrl] [DRL:drl] [SIDLE:sig] [DET:sig] [CHG:sig] [AIS:ais]
- Param:

- □ port Setup the assigned port
- □ CO Select the line code format for the indicated T1 port to AMI (Alternate Mark Inverting) or B8ZS (Bipolar Unframed mode).
- □ co 0:B8ZS (default) 1:AMI
- □ Fr Select the framing mode to ESF (Extend Super Frame), D4 (also called Super Frame, SF) or Unframed mode. The D4 framing consists of 12 T1 frames and ESF framing consists of 24 T1 frames. These two types of super frames are used to enhance the system supervision capabilities. When in Unframed mode, T1 data uses the 1.544 Mbps bit rate T1 signal with no framed structure, and needs to assign 24 time slots.
- □ fr 0:ESF (default) 1:D4 2:Unframe
- □ LI Line Driver, also called Line Built Out. For T1 line interface, the internal equalizer can be set to equivalent cable distance from 0 feet to 800 feet.
- □ li 0:0ft
  1:133ft(default)
  2:266ft
  3:399ft
  4:533ft
  5:655ft
  6:800ft
- □ RRL Request remote site Mercury Series Product to start or stop the T1 line remote loopback
- □ rrl 0:remote loopback stop 1:remote loopback start (default)
- □ DRL Enable or Disable the function to accept remote site loopback testing request or not
- □ drl 0:remote loopback off 1:remote loopback on (default)
- □ AIS Alarm Indication Signal (AIS). If the signal is cut off between two terminals (loss of port signal) or local loss of synchronization to remote port signal (red alarm condition), this AIS is sent to inform the next terminal that data is not valid. The AIS signal is always an all-ones unframed signal. This function is always used for whole channel E1 to E1 /or E1 to T1 /or T1 to T1 cross connection.
- □ ais 0:disable (default) 1:enable
- □ SIDLE Signal Idle code, this is used to setup the digital idel code when connect to E1 PBX
- □ DET Signal Detect code, this is used to check the ABCD bit code detected by system, then convert to required code by parameter “CHG”.

□ CHG Signal Change code, this is comes with "DET", when system detect the ABCD bit code defined by "DET" command, then convert to the code set by "CHG"

□ sig ABCD bit value between 0 to 15.

- Example:
  - □ T1 2b co:0 fr:0 li:2
    - Setup T1 port 2B to B8ZS line coding, ESF framing mode, and Line indicator to 266feet.

```
Mercury>help t1
  Usage: Setup T1 Parameters
 Syntax: T1 port [CO:co] [FR:fr] [LI:li] [RRL:rrl] [DRL:drl] [AIS:ais]
         [SIDLE:sig] [DET:sig] [CHG:sig]
 Params: port - port identifier
           CO - line code
           FR - frame mode
           LI - line driver
          RRL - control remote loopback
          DRL - detect remote loopback
          AIS - Alarm Indication Signal
        SIDLE - Signal Idle
          DET - Signal Detect Number
          CHG - Signal Change Number
           co - 0:B8ZS 1:AMI
           fr - 0:ESF 1:D4 2:unframe
           li - 0:0ft 1:133ft 2:266ft 3:399ft 4:533ft 5:655ft 6:800ft
          rrl - 0:remote loopback stop 1:remote loopback start
          drl - 0:remote loopback off 1:remote loopback on
          ais - 0:disable 1:enable
          sig - value between 0 and 15(ABCD bit)
  Notes: RRL is used to notify remote device to start/stop
         remote loopback operation.
Mercury>t1 2b co:0 fr:0 li:2
Mercury>stat 2b
TYPE:2T1        CLK:YES ACTIVE:ALM & DAC
[Configuration]
        LL:no RL:yes(RRL) CODE:b8zs FRAME:esf LINE:133 ft DRL:on AIS:off
        SIDLE:09h DET:00h CHG:00h
```

Figure 3.44 T1 Command Screen

3.6.44 Thre Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose:
  - □ Setup PM (Performance Monitoring) alarm threshold.
    - Default value is 0 to disable the PM alarm threshold reporting.
  - □ 15 min UA, ES, SES, CV threshold (1 ~ 900 sec, 0 = disable)
  - □ 1 hour UA, ES, SES, CV threshold (1 ~ 3600 sec, 0 = disable)
  - □ 1 day UA, ES, SES, CV threshold (1 ~ 86400 sec, 0 = disable)
  - □ All CV threshold (1-2E+9 bit, 0 = disable)
- Syntax: THRE type [UA:ua] [ES:es] [SES:ses] [CV:cv]
- Param:

- □ None Display current PM threshold if no parameter
- □ Type Choose which of the PM type you want to change its threshold. There are 3 periods of types: 0:15min 1:1hour 2:1day
- □ UA Unavailable seconds, is any second in which a failed signal exists. A failed signal state is declared when 10 consecutive Severely Errored Seconds (SES) occur, and is cleared after 10 consecutive seconds of data are processed without a SES
- □ ua Current 15min/1hour/1day UA threshold
- □ ES Error Seconds is any second containing one or more CRC error, controlled slip, or OOF events.
- □ es Current 15min/1hour/1day ES threshold
- □ SES Severely error seconds, is a second with 2 to 319 CRC error events, or one or more OOF events.
- □ ses Current 15min/1hour/1day SES threshold
- □ CV Code violation or Bipolar violation, the total number of code violation or bipolar violation counted in the last minute.
- □ cv Current CV threshold

■ Example:

- □ THRE 0 ua:100 es:100:
  - Set up UA and ES of 15 min PM threshold to 100 sec
- □ THRE
  - View current PM threshold setting

```
Mercury>help thre
  Usage: Setup PM Threshold
 Syntax: THRE type [UA:ua] [ES:es] [SES:ses] [CV:cv]
 Params: type - 0:15min 1:1hour 2:1day
           UA - Unavailable second
           ES - Error Second
          SES - Severely Error Second
           CV - CV/BPV
           ua - 15min/1hour/1day UA threshold
           es - 15min/1hour/1day ES threshold
          ses - 15min/1hour/1day SES threshold
           cv - 15min/1hour/1day CV threshold
  Notes: 1. view current setup if no parameter
         2. 15min ua, es and ses threshold (1~900sec,0=disable)
            1hour ua, es and ses threshold (1~3600sec,0=disable)
            1day ua, es and ses threshold (1~86400sec,0=disable)
            all cv threshold (1-2E+9 bit,0=disable)
Mercury>thre 0 ua:100 es:100
Mercury>thre
[PM threshold]
  TYPE      UA     ES    SES      CV/BPV
=========================================
 15 min    100    100      0           0
-----------------------------------------
 1 hour      0      0      0           0
-----------------------------------------
 1 day       0      0      0           0
=========================================
```

Figure 3.45 THRE Command Screen

3.6.45 Time Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose: Set the Time for Mercury Internal clock
- Syntax: TIME hh mm ss
- Param:
  - □ None Display the current time for Mercury
  - □ hh Hour (00~23)
  - □ mm Minute (00~59)
  - □ ss Second (00~59)
- Example:
  - □ TIME
    - Display the current time in Mercury
  - □ TIME 12 10 30
    - Setup the time to 12:10:30

```
Mercury>time
        2002/03/08 12:06:44
Mercury>time 12 10 30
```

Figure 3.46 TIME Command Screen

3.6.46 User Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose: List all the user ID and Password and display their status.
- Syntax USER
- Example:
  - □ USER
    - List all users' ID, PW and their status for reference

```
Mercury>help user
  Usage: View User Status
 Syntax: USER
Mercury>user
 No.  ID          Password    User Mode     Active
=====================================================
  1
  2
  3   TAINET      800         Supervisor
  4
  5   Test        test        Normal
=====================================================
```

Figure 3.47 USER Command Screen

3.6.47 V24 Command

- Accommodate: Mercury 800, 3600+, 3820
- Purpose:
  - □ Setup 4P-V24 card parameters. It supports 4 physical RS-232 interface in DCE mode to connect to the low speed (1200, 2400, 4800, 9600, 19200) data terminal. Each of the channels can be software selectable to occupy 1 time slot (64 Kbps) individually or can be combined with a few of the channels into 1 time slot to save bandwidth. It supports Sync mode in Internal clock so that the outside equipment should follow Mercuy's clock. For Async mode, it supports 7 or 8 data bits, 1 stop bit, none parity and none flow control data format.
- Syntax: V24 port [MOD:mod] [SPD:spd] [DCD:dcd] [CTS:cts] [INV:inv] [LL:act] [RL:act] [CC:cc]
- Param:
  - □ port port identifier for the indicated port
  - □ MOD The data format for selected port. Both Synchronous and Asynchronous formats are supported. For Async mode, data bits can be selected to 7 or 8 bits.
  - □ mod 0: Sync 1: Async7 2: Async8 (default)
  - □ SPD Port speed for the indicated the port
  - □ spd 0: 1200 1: 2400 2: 4800 3: 9600 4: 19200 (default)
  - □ DCD DCD signal

- □ dcd 0: force on 1: on when sync (default) 2: remote RTS 3: off
- □ CTS Channel CTS signal
- □ cts 0: force on 1: local RTS (default)
- □ INV TxC and RxC clock polarity
- □ inv 0: normal (default) 1: inverted
- □ LL Local loopback
- □ RL Remote loopback
- □ act 0: disable (default) 1: enable
- □ CC Enable the port combined funciton, when enable this funciton, the combined port will occupy 1 time slot and share the bandwidth of 64 Kbps. So each of the assigned combinative ports can up to 9600bps only while choosing "cc" to 3 or 4.
- □ cc 0: none (default)
  1: ab combined
  2: ab combined & cd combined
  3: abc combined
  4: abcd combined

■ Example:

□ V24 6a mod:2 spd:3 cc:3

- Setup the 4P-V24 card on port 6A to speed 9600bps and Async mode, 8 data bits (1 stop bit, none parity and none flow control). Enable the combined function for port 6A, 6B and 6C that will occupy 1 time slot, so that the maximum speed for port 6A, 6B and 6C only can up to 9600bps.

□ V24 6b mod:1 spd:0 dcd:1 cts:1

- Setup port 6B to speed 1200bps and Async mode, 7 data bits (1 stop bit, none parity and none flow control), the DCD signal will be on when it is in sync with remote site V.24 card, and CTS signal will follow the local RTS signal.

□ V24 6c mod:0 spd:2

- Setup port 6C to speed 4800bps and Sync mode.

□ V24 6d mod:0 spd:4

- Setup port 6D to speed 19200bps and Sync mode.

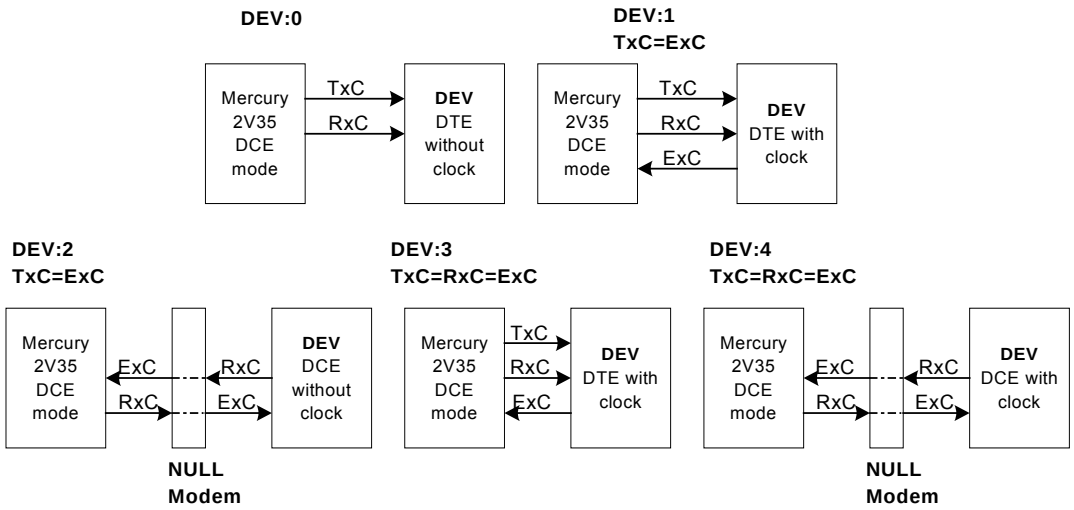
```
Mercury>help v24
  Usage: Setup V24 Parameters
 Syntax: V24 port [MOD:mod] [SPD:spd] [DCD:dcd] [CTS:cts] [INV:inv]
           [LL:act] [RL:act] [CC:cc]
 Params: port - port identifier     MOD - channel mode
          SPD - channel speed       DCD - channel DCD signal
          CTS - channel CTS signal  INV - channel clock polarity
           LL - local loopback       RL - remote loopback
           CC - combined channel
          mod - 0:sync 1:async7 2:async8
          spd - 0:1200 1:2400 2:4800 3:9600 4:19200
          dcd - 0:force on 1:on when sync 2:remote RTS 3:off
          cts - 0:force on 1:local RTS
          inv - 0:normal 1:inverted
          act - 0:disable 1:enable
           cc - 0:none 1:ab combined 2:ab combined,cd combimed
                3:abc combined 4:abcd combined
  Notes: 1.The ports which combined means that the transmitted data of
            these ports are in the same timeslot.
         2.In abc combined state,the speed of a,b,c port are up to 9600bps
         3.In abcd combined state,the speed of all ports are up to 9600bps
Mercury>v24 6a mod:2 spd:3 cc:3
Mercury>v24 6b mod:1 spd:0 dcd:1 cts:1
Mercury>v24 6c mod:0 spd:2
Mercury>v24 6d mod:0 spd:4
Mercury>stat 6a
TYPE:4V24       CLK:NO  ACTIVE:ALM & DAC
[Configuration]
        MODE:async8  SYNC:loss  REMOTE SIGNALLING:0  SPEED:9600bps
        RTS:off  DCD:on when sync  CTS:local RTS  CLOCK:normal
        LL:no  RL:no  CC:abc
Mercury>stat 6b
[Configuration]
        MODE:async7  SYNC:loss  REMOTE SIGNALLING:0  SPEED:1200bps
        RTS:off  DCD:on when sync  CTS:local RTS  CLOCK:normal
        LL:no  RL:no  CC:abc
Mercury>stat 6c
[Configuration]
        MODE:sync  SYNC:loss  REMOTE SIGNALLING:0  SPEED:4800bps
        RTS:off  DCD:on when sync  CTS:local RTS  CLOCK:normal
        LL:no  RL:no  CC:abc
Mercury>stat 6d
[Configuration]
        MODE:sync  SYNC:loss  REMOTE SIGNALLING:0  SPEED:19200bps
        RTS:off  DCD:on when sync  CTS:local RTS  CLOCK:normal
        LL:no  RL:no  CC:abc
```

Figure 3.48 V24 Command Screen

3.6.48 V35 Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose:
  - □ Define V.35 port parameters. The DTE transmit speed (N x 64 Kbps) is determined by the "sts" starting time slot and "ets" end time slot. (for 512 Kbps, 8 x 64 Kbps, it may start from time slot 1 to time slot 8. So the parameter "sts" is 1, and "ets" is 8). The valid time slot number is between 1 and 31, but for 2V35 card it is between 0 and 31, time slot 0 can be used for 2V35 card only.

- Syntax: V35 port sts [ets] [CTS:act] [DSR:act] [DCD:act] [RI:act] [DEV:dev] [INV:inv]
- Param:
  - □ port Port identifier for the indicated V.35 port
  - □ sts The start time slot number
  - □ ets The end time slot number
  - □ CTS V.35 Clear to Send signal (default act:1)
  - □ DSR V.35 Data Set Ready signal (default act:1)
  - □ DCD V.35 Data Carrier Detect signal (default act:1)
  - □ RI V.35 Ring Indicator signal (default act:0)
  - □ act: 0:signal inactive 1:signal active
  - □ DEV The clock type for which device connected to and illustrated as following, and only valid for 2V35 card
  - □ Dev 0: DTE without clock (default)
    1: DTE with clock
    2: DCE without clock
    3: DTE with clock and TxC=RxC=ExC
    4: DCE with clock and TxC=RxC=ExC
  - □ INV TxC and RxC clock polarity
  - □ Inv 0:TxC normal & RxC normal (default)
    1: TxC normal & RxC inverted
    2: TxC inverted & RxC normal
    3: TxC inverted & RxC inverted
- Example:
  - □ V35 1a 1 10 dev:3
    - Setup the speed for V.35 card on port 1A to 640 Kbps, start from time slot 1 and end with time slot 10. Set the clock mode to dev:3 DTE with clock and TxC=RxC=ExC.



```
Mercury>help v35
 Usage: Setup V.35 parameters
Syntax: V35 port sts [ets] [CTS:act] [DSR:act] [DCD:act] [RI:act]
           [DEV:dev] [INV:inv] [SW:decimal value]
Params: port - port identifier
         sts - start time-slot number
         ets - end time-slot number
         CTS - V.35 CTS signal
         DSR - V.35 DSR signal
         DCD - V.35 DCD signal
          RI - V.35 RI signal
         DEV - the type of device connected to
         INV - TXC and RXC polarity
         act - 0:signal inactive 1:signal active
         dev - 0:DTE without clock 1:DTE with clock
               2:DCE without clock 3:DTE with clock && TC=RC=EXC
               4:DCE with clock && TC=RC=EXC
         inv - 0:TXC normal & RXC normal   1:TXC normal & RXC inverted
               2:TXC inverted & RXC normal 3:TXC inverted & RXC inverted
        NOTE: 1. valid time-slot number is between 1 and 31
                 (time-slot 0 for 2V35 only)
              2. 'ets' is optional if one time-slot selected
              3. 'DEV' options are ONLY valid for 2V35 port
              4. 'SW' option is reserved for maintenance
Mercury>v35 1a 1 10 dev:3
Mercury>stat v35
        1st parameter error
Mercury>stat 1a
TYPE:1V35       CLK:NO  ACTIVE:ALM & DAC
[Configuration]
        RL:no Speed:640 Kbps
        RTS:off DTR:off CTS:on DSR:on DCD:on RI:off
        Time-Slot:01 02 03 04 05 06 07 08
                  09 10
        Connection:active
        TXC:normal RXC:normal
```

Figure 3.49 V.35 Command Screen

3.6.49 X50 Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose:
  - □ Setup X.50 MUX parameters. It supports 5 physical RS-232 interfaces to connect to the low speed (2400, 4800, 9600, 19200) data terminal, and all those 5 channels will occupy 1 time slot (64 Kbps). According to the definition of ITU-T standards X.50 division 3, it allows 8-bit envelope to be a phase frame for the 12.8 Kbps channels to repeat every 5th 8-bit envelope in a 64 Kbps data rate. Due to some of the bits are used for phase frame information and signaling resident in these 12.8 Kbps channels, these bearer channel rates are for 2400 to 9600 bps only. However, if the data rate is selected to be19200 bps, this will occupy 2 phases, and only channels 1 & 2 can be set to speed of 19200. If channel 1 is selected to run at 19200 bps, channel 3 must be disabled. If channel 2 is selected, then channel 4 must be disabled.
  - □ MUX_5C: 5 channels and supports Sync mode only.

- □ MUX_4C: 4 channels, Sync mode for all channels and Async mode only support channel 1 & 2.
- □ DAC_2C: 2 channels and both support Sync and Async mode. Only this card supports TS/PH DACS functions.

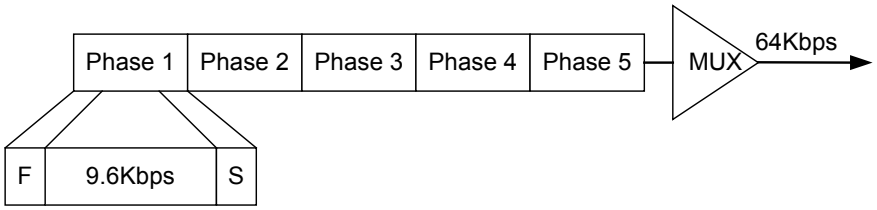


Figure 3.50 X.50 Concept diagram

- Syntax: X50 port chan [MOD:mod] [SPD:spd] [DCD:dcd] [CTS:cts] [DEV:dev] [INV:inv] [SIG:sig] [LL:act] [RL:act] [HC:hc] [PH:ph]
- Param:
  - □ port Port identifier for the indicated X.50 port
  - □ chan The selected channel for the indicated port
  - □ MOD The channel format for the selected channel. Synchronous and Asynchronous are both supported. For Async mode, data bits can be selected to 7, 8 or 9 bits
  - □ mod 0: sync (default) 1: async7 2: async8 3: async9
  - □ SPD Channel speed for the indicated channel
  - □ spd 0: stop (default) 1: 2400 2: 4800 3: 9600 4: 19200
  - □ DCD Channel DCD signal
  - □ dcd 0: force on
    1: on when sync
    2: remote RTS (default)
    3: off
  - □ CTS Channel CTS signal
  - □ cts 0: force on 1: local RTS (default)
  - □ DEV Select this channel to be DCE or DTE type
  - □ dev 0: DTE (default) 1: DCE
  - □ INV TxC and RxC clock polarity
  - □ inv 0: normal (default) 1: inverted
  - □ SIG Signaling action
  - □ sig 0: '0' (default) 1: '1' 2: RTS state
  - □ LL Local loopback
  - □ RL Remote loopback
  - □ act 0: disable (default) 1: enable
  - □ HC Hook channel
  - □ hc 0: no hook (default) 1-2: channel

- □ PH Phase number
- □ ph 0~4 (default: 0)

■ Example:

- □ X50 1A 1 MOD: 0 SPD: 3
- □ X50 1A 2 MOD: 0 SPD: 4
  - Setup X50_5C card that located on slot 1A, channel 1 to Sync mode with speed 9600bps; and channel 2 to Sync mode with speed 19200bps. (for this example, X50_5C only supports Sync mode, and when channel 2 is set to 19200bps, then channel 4 cannot be used, and must be disabled)

```
Mercury>help x50
 Usage: Setup X.50 MUX parameters
Syntax: X50 port chan [MOD:mod] [SPD:spd] [DCD:dcd] [CTS:cts] [DEV:dev]
            [INV:inv] [SIG:sig] [LL:act] [RL:act] [HC:hc] [PH:ph]
Params: port - port identifier       chan - channel number
         MOD - channel mode           SPD - channel speed
         DCD - channel DCD signal     CTS - channel CTS signal
         DEV - channel device type    INV - channel clock polarity
         SIG - signalling action       LL - local loopback
          RL - remote loopback         HC - hook channel
          PH - phase number           sig - 0:'0' 1:'1' 2:RTS state
         inv - 0:normal 1:inverted    cts - 0:force on 1:local RTS
         dev - 0:DTE 1:DCE            act - 0:disable 1:enable
          hc - 0:no hook 1-2:channel   ph - 0 - 4
         mod - 0:sync 1:async7 2:async8 3:async9
         spd - 0:stop 1:2400 2:4800 3:9600 4:19200
         dcd - 0:force on 1:on when sync 2:remote RTS 3:off
        NOTE: 1. X50_5C:5 channels  X50_4C:4 channels  X50_2C:2 channels
              2. ONLY channel 1, 2 of X50_4C, and X50_2C support async mode
              3. speed 19200 ONLY valid for channel 1, 2
              4. channel 3 SHOULD be disabled if channel 1 select speed 19200
              5. channel 4 SHOULD be disabled if channel 2 select speed 19200
              6. ONLY X50_2C support HC/PH DACS functions
Mercury>x50 1a 1 mod:0 spd:3
Mercury>x50 1a 2 mod:0 spd:4
Mercury>stat 1a
TYPE:X50_5C     CLK:NO  ACTIVE:ALM & DAC
[Cross Connect Table]
  TS000   xxxxxx
[Configuration]
  System Status:  SYNC:LOSS  REMOTE SIGNALLING:0  LOCAL SIGNALLING:RTS
  Channel Status:
 (1) MODE: sync  RTS:Off  DCD:On when sync  CTS:On   DEVICE:DTE
      CLOCK:Normal   SPEED:9600   LL:No   RL:No
 (2) MODE: sync  RTS:Off  DCD:On when sync  CTS:On   DEVICE:DTE
      CLOCK:Normal   SPEED:19200  LL:No   RL:No
 (3) MODE: sync  RTS:Off  DCD:On when sync  CTS:On   DEVICE:DTE
      CLOCK:Normal   SPEED:stop   LL:No   RL:No
 (4) MODE: sync  RTS:Off  DCD:On when sync  CTS:On   DEVICE:DTE
      CLOCK:Normal   SPEED:stop   LL:No   RL:No
 (5) MODE: sync  RTS:Off  DCD:On when sync  CTS:On   DEVICE:DTE
      CLOCK:Normal   SPEED:stop   LL:No   RL:No
```

Figure 3.51 X.50 Command Screen

3.6.50 XC Command

■ Accommodate: Mercury 800, 3600, 3600+, 3820

- Purpose:
  - □ This port assignment performs the cross connections of all the time slots between two ports.
- Syntax: XC [mode] porta portb
- Param:
  - □ Mode There are 4 modes for selection.
    - L: low latency is for some case that you need to transmit data with lower delay, but does not care about the data internal structure.
    - F: frame integrity is for sometimes the transmitted data is in serial data type, and need to keep the integrity of the serial data. (default)
    - V: voice conversion is to convert the voice signal and its signaling while the A/μ card is inserted.
    - I: idle is to clear the original cross connected table and return to the idle mode.
  - □ porta the indicated source porta
  - □ portb the indicated destination portb
- Example:
  - □ XC 3a 4a port 3A cross connect to port 4A
  - □ XV 3a view port 3A time slot assignment table
  - □ XC I 3a 4a clear the cross connection between port 3A and 4A

```
Mercury>help xc
  Usage: Setup Connection Port
 Syntax: XC [mode] porta portb
 Params:  mode - L:low latency F:frame integrity V:voice conversion I:idle
         porta - port identifier
         portb - port identifier
  Notes: 1. default mode is frame integrity if not specified
         2. make sure you have installed A/u conversion card
            if voice conversion mode is selected
Mercury>xc 3a 4a
Mercury>xv 3a
  ACTIVE:ALM & DAC
  -------------------------- Port:3A -------------------------
  TS000  4A=000 4A=001 4A=002 4A=003 4A=004 4A=005 4A=006 4A=007
  TS008  4A=008 4A=009 4A=010 4A=011 4A=012 4A=013 4A=014 4A=015
  TS016  4A=016 4A=017 4A=018 4A=019 4A=020 4A=021 4A=022 4A=023
  TS024  4A=024 4A=025 4A=026 4A=027 4A=028 4A=029 4A=030 4A=031
  ------------------------------------------------------------
  '-': low latency, '=': frame integrity, '*': voice conversion
  'o': loopback, 'x': idle, 'z': DACS ch loss, '&': combined channel
Mercury>xc i 3a 4a
```

Figure 3.52 XC Command Screen

3.6.51 XSLT Command

- Accommodate: Mercury 3600
- Purpose:

- □ Enable the extension slot 5 for Mercury 3600. When enabling this command, channel 5A will occupy the whole bandwidth of channel 4D.

- Syntax: XSLT [sw]
- Param:
  - □ sw 0: disable (default) 1: enable
- Example:
  - □ xslt 1 Enable the extension slot 5

```
Mercury>help xslt
 Usage: Setup extended slot(slot #5)
Syntax: XSLT [sw]
Params: sw - 0:disable 1:enable
Mercury>xslt 1
        Extended slot is enabled
```

Figure 3.53 XSLT Command Screen

3.6.52 XT Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose:
  - □ The time slot assignment performs the cross connection between the specified ports and their time slot.
- Syntax: XT [mode] [porta tsa] | [fp] [portb tsb] | [fp] [count]
- Param:
  - □ mode There are 4 modes for selection.
    - L: low latency. Low latency is for some case that you need to transmit data with lower delay, but does not care about the data internal structure.
    - F: frame integrity is for sometimes the transmitted data is in serial data type, and need to keep the integrity of the serial data. (default)
    - V: voice conversion is to convert the voice signal and its signaling while the A/μ card is inserted.
    - I: idle is to clear the original cross connected table and return to the idle mode.
  - □ porta The indicated source porta
  - □ tsa The indicated time slot number in porta
  - □ portb The indicated destination portb
  - □ tsb The indicated time slot number in portb
  - □ count Number of time slot should be connected with each other. Default value is 1.
  - □ Fp fp is available in T1, E1, Fiber and IDSL card. It is for user to assign 1 time slot to transfer and view the remote site Mercury's front panel LED indicators and Alarm status at local site via this assigned time slot.
- Example:

□ XT 1a 1 3a 1 2

- Cross connect port 1A time slot 1&2 to port 3A time slot 1&2, so the count is 2

□ XT 3a 11 4a 21 10

- Cross connect port 3A time slot 11~20 to port 4A time slot 21~30 sequentially, totally 10 time slots for each port, so the count is 10

□ XT 3a 31 fp

- Setup port 3A time slot 31 to transmit the remote site Mercury's front panel status

□ XV 3a

- View port 3A time slot assignment table

```
Mercury>help xt
  Usage: Setup Connection Timeslot
 Syntax: XT [mode] [porta tsa]|[fp] [portb tsb]|[fp] [count]
 Params:  mode - L:low latency F:frame integrity V:voice conversion I:idle
         porta - port identifier
           tsa - time-slot number
         portb - port identifier
           tsb - time-slot number
           fp  - front panel
         count - number of timeslot connected
  Notes: 1. default value of 'count' is 1
         2. default mode is frame integrity if not specified
         3. make sure you have installed A/u conversion card
            if voice conversion mode is selected
         4. press "up+right" key to see remote front panel
         5. fp is available for T1, E1, Fiber and IDSL card
Mercury>xt 1a 1 3a 1 2
Mercury>xt 3a 11 4a 21 10
Mercury>xt 3a 31 fp
Mercury>xv 3a
  ACTIVE:ALM & DAC
  -------------------------- Port:3A ------------------------
  TS000  xxxxxx 1A=001 1A=002 xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
  TS008  xxxxxx xxxxxx xxxxxx 4A=021 4A=022 4A=023 4A=024 4A=025
  TS016  4A=026 4A=027 4A=028 4A=029 4A=030 xxxxxx xxxxxx xxxxxx
  TS024  xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx FP=000
  -----------------------------------------------------------
  '-': low latency, '=': frame integrity, '*': voice conversion
  'o': loopback, 'x': idle, 'z': DACS ch loss, '&': combined channel
```

Figure 3.54 XT Command Screen

3.6.53 XV Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose: Display the cross connect table for the indicated port.
- Syntax: XV [port] | [fp]
- Param:
  - □ port Port identifier for the indicated port
  - □ fp The remote front panel display function
- Example:

- □ XV 3a View port 3A time slot assignment table
- □ XV 1a View port 1A time slot assignment table
- □ XV 4a View port 4A time slot assignment table
- □ XV fp View the indicated port for fp function

```
Mercury>help xv
  Usage: View Connection Table
 Syntax: XV [port] | [fp]
 Params: port - port identifier
          fp  - front panel
Mercury>xv 3a
  ACTIVE:ALM & DAC
  -------------------------- Port:3A -------------------------
  TS000  xxxxxx 1A=001 1A=002 xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
  TS008  xxxxxx xxxxxx xxxxxx 4A=021 4A=022 4A=023 4A=024 4A=025
  TS016  4A=026 4A=027 4A=028 4A=029 4A=030 xxxxxx xxxxxx xxxxxx
  TS024  xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx FP=000
  ------------------------------------------------------------
  '-': low latency, '=': frame integrity, '*': voice conversion
  'o': loopback, 'x': idle, 'z': DACS ch loss, '&': combined channel
Mercury>xv 1a
  ACTIVE:ALM & DAC
  -------------------------- Port:1A -------------------------
  TS000  xxxxxx 3A=001 3A=002
  ------------------------------------------------------------
  '-': low latency, '=': frame integrity, '*': voice conversion
  'o': loopback, 'x': idle, 'z': DACS ch loss, '&': combined channel
Mercury>xv 4a
  ACTIVE:ALM & DAC
  -------------------------- Port:4A -------------------------
  TS000  xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
  TS008  xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
  TS016  xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx 3A=011 3A=012 3A=013
  TS024  3A=014 3A=015 3A=016 3A=017 3A=018 3A=019 3A=020 xxxxxx
  ------------------------------------------------------------
  '-': low latency, '=': frame integrity, '*': voice conversion
  'o': loopback, 'x': idle, 'z': DACS ch loss, '&': combined channel
Mercury>xv fp
  -------------------------- Port:FP -------------------------
  TS000   3A=031
  ------------------------------------------------------------
  '-': low latency, '=': frame integrity, '*': voice conversion
  'o': loopback, 'x': idle, 'z': DACS ch loss, '&': combined channel
```

Figure 3.55 XV Command Screen

Explanation of cross connect symbols:

The XV command is for displaying the cross connect table for the indicated port. And following are the explanation of cross connect symbols that will indicate different actions of each time slots on that port.

- ■ '-': low latency
  - □ The indicated time slot crossed to another time slot under low latency mode when executing the cross connect command with parameter mode **'L'**. This is

in some case that the data transmit with lower delay, and does not care about the internal structure of data.

- '=': frame integrity
  - The indicated time slot crossed under frame integrity mode when executing the cross connect command with parameter mode **'F'**. Therefore, this will keep the data with original frame structure and the inegrity of the serial data.
- '*': voice conversion
  - The indicated time slot crossed under the voice conversion mode. This symbol will show while executing the cross connect command with parameter mode **'V'** for voice application.
- 'o': loopback
  - This symbol will show you the indicated channel is under the loopback mode. The incoming signal is loopback to the received signal through the DXC data pump by executing the command **XC port[a] port[a]**, refer to Section 4.4.2 Loopback function.
- 'x': idle
  - The indicated time slot is under idle state and does not connect to any destination. Executing the cross connect command with parameter mode **'I'**.
- 'z': DACs ch loss
  - This symbol shows the indicated channel is occupied by another channel, and always happens when enable the extension slot 5 for Mercury 3600 by executing the **XSLT** command, refer to Section 3.7.43 XSLT Command.
- '&': combined channel
  - This symbol shows the channel is combined with others for 4P-V24 card while executing the **V24** command with parameter **'CC'**, refer to Section 3.7.39 V24 Command.
- '▉': uni-directional channel
  - This symbols show that this connection to the additional ports is a simplex connection, so that the additional ports can receive the data carried by the user-selected time slots transmitted by the port designated as source, but cannot transmit data to the source port (the source port can only receive data from the port designed as its destination). Refer to Section 3.7.48 XCS and 3.7.49 XTS Command.

3.6.54 XCS Command

- Accommodate: Mercury 800, 3600, 3600+, 3820
- Purpose:
  - The one-way port assignment command, to do the uni-directional mapping from a specified port to another port.
- Syntax XCS [mode] porta portb
- Param:

□ mode

- There are 3 modes for selection.
- L: low latency is for some case that you need to transmit data with lower delay, but does not care about the data internal structure.
- F: frame integrity is for sometimes the transmitted data is in serial data type, and need to keep the integrity of the serial data. (default)
- I: idle is to clear the original cross connected table and return to the idle mode.

□ porta The indicated source porta

□ portb The indicated destination portb

■ Example:

□ XCS 3a 4a

- Uni-directional cross connection from port 3A to port 4A. So the destination port 4A can only receive the data from source port 3A but can not transmit the data to port 3A.

□ XV 4a View port 4A time slot assignment table

□ XCS i 3a 4a Cleared the uni-directional crossed from port 3A to port 4A

```
Mercury>help xcs
 Usage: Setup one-way DACS port
Syntax: XCS [mode] portA portB
Params:  mode - L:low latency F:frame integrity I:idle
        portA - source port identifier
        portB - destination port identifier
Mercury>xcs 3a 4a
Mercury>xv 4a
  ACTIVE:ALM & DAC
  -------------------------- Port:4A ---------------------------
  TS000    3A=000 3A=001 3A=002 3A=003 3A=004 3A=005 3A=006 3A=007
  TS008    3A=008 3A=009 3A=010 3A=011 3A=012 3A=013 3A=014 3A=015
  TS016    3A=016 3A=017 3A=018 3A=019 3A=020 3A=021 3A=022 3A=023
  TS024    3A=024 3A=025 3A=026 3A=027 3A=028 3A=029 3A=030 3A=031
  ------------------------------------------------------------
  '-': low latency, '=': frame integrity, '*': voice conversion
  'o': loopback,    'x': idle             'z': Dacs ch loss
  '  ': mark timeslot is one-way cross   '&': combined channel
Mercury>xcs i 3a 4a
```

Figure 3.56 XCS Command Screen

3.6.55 XTS Command

■ Accommodate: Mercury 800, 3600, 3600+, 3820

■ Purpose:

□ The one-way time slot assignment command, to do the uni-directional mapping between a specified port and its time slot.

■ Syntax: XTS [mode] [porta tsa] [portb tsb] [count]

■ Param:

□ Mode There are 3 modes for selection.

- L: low latency is for some case that you need to transmit data with lower delay, but does not care about the data internal structure.
- F: frame integrity is for sometimes the transmitted data is in serial data type, and need to keep the integrity of the serial data. (default)
- I: idle is to clear the original cross connected table and return to the idle mode.

□ porta The indicated source porta

□ tsa The indicated time slot number in porta

□ portb The indicated destination portb

□ tsb The indicated time slot number in portb

□ count Number of time slot should be connected

■ Example:

□ XTS 1a 1 3a 5 5

- Uni-directional cross connection from port 1A time slot 1~5 to port 3A time slot 5~9, and the count is 5. So the destination port 3A time slot 5~9 can only receive the data from source port 1A time slot 1~5, but can not transmit the data to 1A.

□ XV 3a View port 3A time slot assignment table

```
Mercury>help xts
 Usage: Setup one-way DACS time-slot
Syntax: XTS [mode] [portA tsA] [portB tsB]|[count]
Params:  mode - L:low latency F:frame integrity I:idle
        portA - source port identifier
          tsA - ts. number at source port
        portB - destination port identifier
          tsB - ts. number at destination port
        count - number of ts. connected
Mercury>xts 1a 1 3a 5 5
Mercury>xv 3a
  ACTIVE:ALM & DAC
  --------------------------- Port:3A ---------------------------
  TS000   xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx  1A=001  1A=002 1A=003
  TS008   1A=004  1A=005 (xxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
  TS016   xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
  TS024   xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
  ------------------------------------------------------------
  '-': low latency, '=': frame integrity, '*': voice conversion
  'o': loopback,    'x': idle             'z': Dacs ch loss
  '  ': mark timeslot is one-way cross   '&': combined channel
```

Figure 3.57 XTS Command Screen

3.7 Application and Settings

3.7.1 FXO/FXS/SDSL card

■ Description:

■ Extend the Voice card to remote site via SDSL connection.

■ Structure:

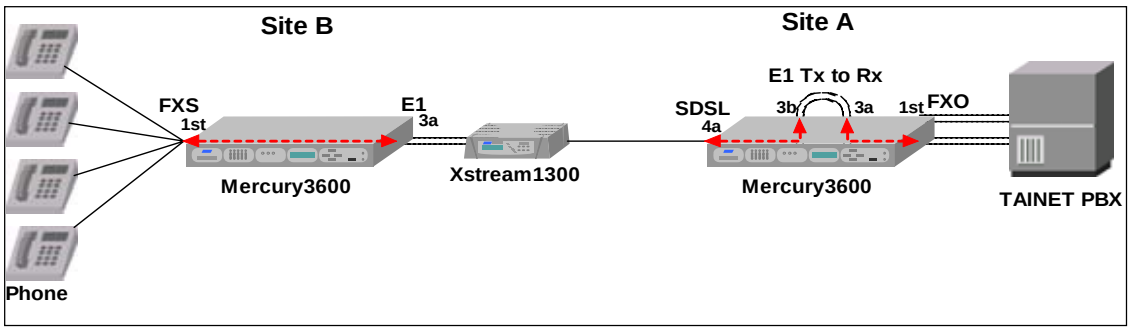


Figure 3.58 Voice Card Application Diagram

- Configurations:
  - Site A
    - Clk int
      Setup to internal clock
    - E1 3a cas:1
      E1 card that crossed to FXO card should be set to CAS mode
    - E1 3b cas:0
      The physical connection of E1 port must to set to CCS mode
    - Xt v 1a 0 3a 1
      Cross connect FXO to E1 with mode "v"
    - Sdsl 4a mod:2 31
      Setup SDSL card to mod:2-to 1300, frame mode, and end of time slot is 31
    - Xt 3b 1 4a 1
      Cross connect E1 to SDSL card, treat as data
    - Xt 3b 16 4a 16
      Cross connect the signaling time slot 16 to SDSL card and send to remote site B
  - Site B: Xstream 1300 modem (load profile 8: NTU-E1-Fr-Rcv)
    - Clk 3a
      Setup the clock received from port3A
    - E1 3a cas:1
      E1 card that crossed to FXS card should be set to CAS mode
    - Xt v 1a 0 3a 1
      Cross connect FXS to E1 with mode "v"

3.7.2 Fiber Applications

- Description:

□ Extend the operation distance through the fiber optical card which can carry 4E1 (128 time slots) capacity.

□ Fiber-1: Signal port fiber card (totally 128 time slots)

□ Fiber-2: Dual ports fiber card (totally 256 time slots, 128 ts/port)

□ Fiber-b: 1+1 fiber for backup (totally 128 time slots)

■ Structure:

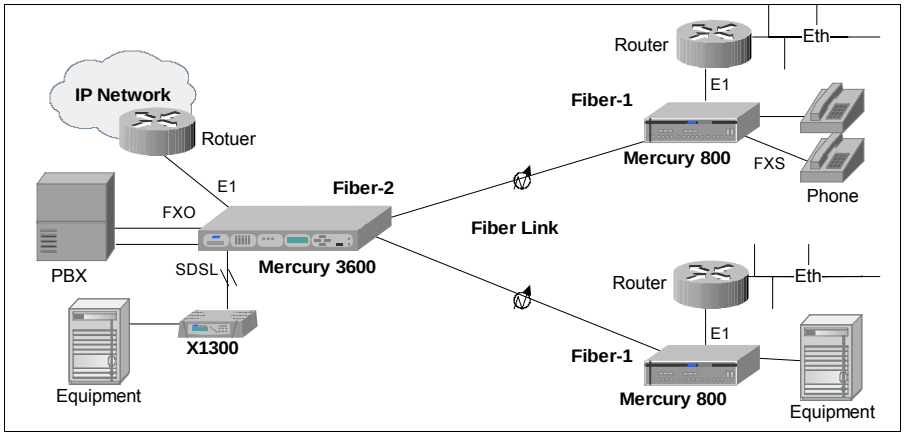


Figure 3.59 Fiber 2 Application Diagram

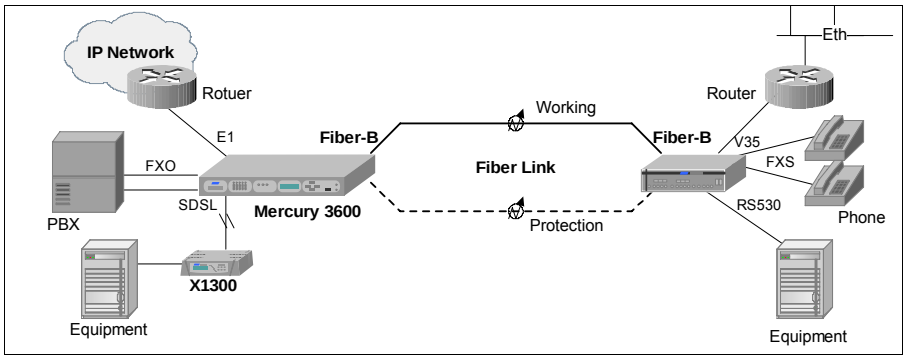


Figure 3.60 Fiber-B Application Diagram

■ Configurations:

□ There is no necessary to setup the parameters of fiber module. Just cross connect the dedicated port to fiber module by using "XT" or "XC" command.

3.7.3 Built-in Ch-router for Mercury 3820

■ Description:

□ Build up the IP network from the built-in Ch-router of Mercury 3820 at CO site to the router of Mercury 3600 at CPE site, and to provide the IP network for VoIP application with Venus 2804 gateway. At CPE site, connect the voice port of Venus 2804 to Mercury 3600 FXO card. Extend the distance through the E1 network established by ADM 7500, then pass the voice signal to FXS card of Mercury 3820 at CO site.

■ Structure:

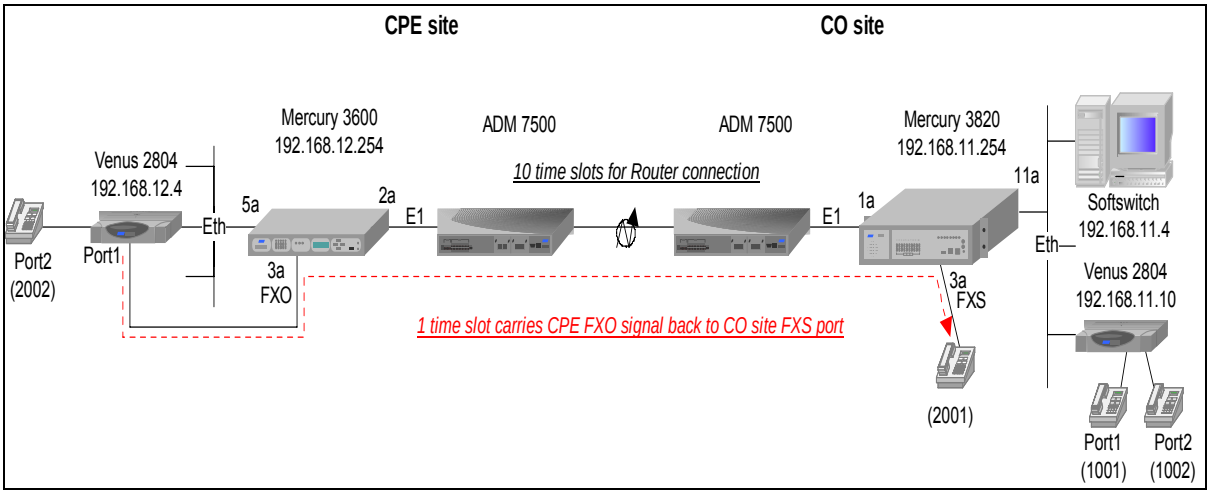


Figure 3.61 Router Application Diagram

- Configurations:
  - CO site
    - Clk 1a Setup to internal clock
    - E1 1a cas:1 E1 card that crossed to FXS cards should be set to CAS mode
    - Net sw:1 count:10 Enable the TDM bus sharing for built-in Ch-router (with 10 time slots bandwidth) to port 10B
    - Xt v 3a 0 1a 17 Cross connect the FXS (ts0) to E1 (ts17)
    - Xt 11a 0 1a 1 10 Cross connect 10 time slots for Ch-router
  - CPE site
    - Clk 2a Setup the clock received from port2A
    - E1 2a cas:1 E1 card that crossed to FXS cards should be set to CAS mode
    - Xt v 3a 0 2a 17 Cross connect the FXO (ts0) to E1 (ts17)
    - Xt 5a 0 2a 1 10 Cross connect 10 time slots for router used

3.7.4 1 + 1 Revertive Protection

- Description:
  - Mercury provides the protection facility such as 1 + 1 Revertive protection, which is shown in the following figure. The data coming from port 1B will send to port 1A and 1C simultaneously, but only receive the uni-directional data from port 1A during normal stage (1B←→1A, 1B→1C). When Loop1 fails, port 1A detects the alarm criteria which can be set by user, system will execute the pre-defined profile 2 and change the uni-directional connection from 1A→1B to 1C→1B, then all the traffic will be transmitted and received through port 1B and 1C (1B←→1C, 1B→1A). System will keep detecting the alarm on port 1A. If the alarm is cleared, system will reload profile 1 and revert back to original traffic path.

■ Structure:

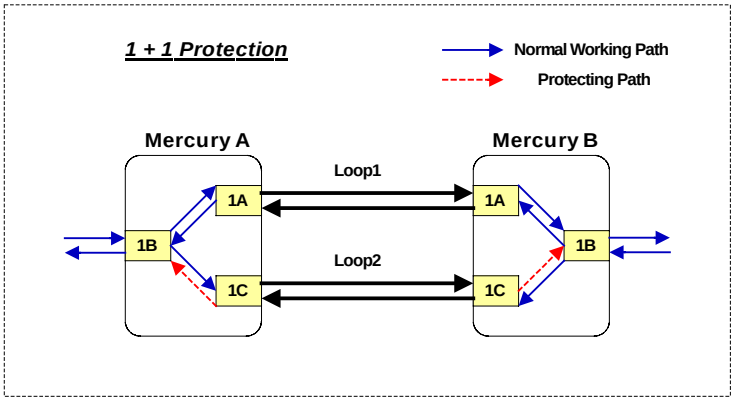


Figure 3.62 1 + 1 Protection

Actions on Port 1A	
Alarm off → on	Alarm on → off
Run profile 2	Run profile 1
xcs 1c 1b	xcs 1a 1b

able 3.15 CP states table

■ Configurations:

□ Mercury A

- Clk int Setup to internal clock

□ Mercury B

- Clk 1a 1c Setup the master clock received from port 1A, the slave clock is from port 1C

□ Mercury A&B

- Xc 1a 1b Cross port 1A to port 1B
- Xcs 1b 1c Uni-directional cross from source port 1B to destination port 1C
- Cp 1a off:1 on:2 sw:1 Enable the call profile facility on port 1A, if the criteria of Major or Minor alarm are detected, system will execute profile 2 and change the traffic to Loop2. If the alarm is cleared on port 1A, system will execute profile 1 to change the traffic back to Loop1.

■ Profiles saved in both Mercury A&B

□ Logb

- Starting logging command scripts

□ Xcs 1a 1b

- Uni-directional cross from source port 1A to destination port 1B

□ Loge 1 loop1

- Stop and save the above commands into the 1st profile with the name "loop1".

□ Logb

- Starting logging command scripts

□ Xcs 1c 1b

- Uni-directional cross from source port 1C to destination port 1B

□ Loge 2 loop2

- Stop and save the above commands into the 2nd profile with the name "loop2".

Note:
In this case, the parameter alarm code for **CP** command uses default value. Users may refer to table 3-7-2 the alarm code list to set their own criteria.

3.7.5 1 + 1 Non-Revertive Protection

■ Description:

□ Mercury provides the protection facility such as 1 + 1 Non-Revertive protection. Same as previous sections, the data coming from port 1B will be sent to port 1A and 1C simultaneously, but only receive the uni-directional data from port 1A during normal stage (1B←→1A, 1B→1C). When Loop1 fails, port 1A detects the alarm criteria which can be set by user, system will execute the pre-defined profile 2 and change the uni-directional connection from 1A→1B to 1C→1B, then all the traffic will be transmitted and received though port 1B and 1C (1B←→1C, 1B→1A). But the system will keep the traffic through port 1B to 1C and not revert back to original path Loop1 even if the alarm is cleared. Only when Loop2 fails and port 1C detects the alarm, then the system will execute another profile and switch all traffic back to the original Loop1.

■ Structure:

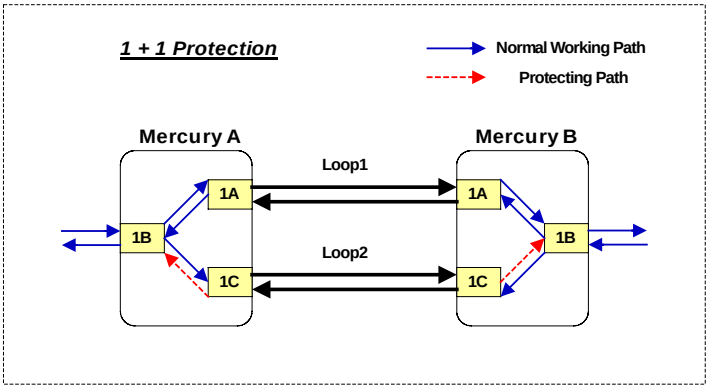


Figure 3.63 CP Command 1 + 1 protection

Actions on Port 1A	
Alarm off → on	Alarm on → off
Run profile 2	No Actions
xcs 1c 1b	

Actions on Port 1C	
Alarm off → on	Alarm on → off
Run profile 1	No Actions
xcs 1a 1b	

Table 3.16 Alarm statues for CP command

- Configurations:
  - □ Mercury A
    - Clk int Setup to internal clock
  - □ Mercury B
    - Clk 1a 1c Setup the master clock received from port 1A, the slave clock is from port 1C
  - □ Mercury A&B
    - Xc 1a 1b Cross port 1A to 1B
    - Xcs 1b 1c Uni-directional cross from 1B to 1C
    - Logr 1 Run profile 1 when following profiles are created
- Profiles saved in both Mercury A&B
  - □ Logb
    - Starting logging command scripts
  - □ Xcs 1a 1b
    - Uni-directional cross from 1A to 1B
  - □ Cp 1a off:0 on:2 sw:1
    - Enable the call profile facility on port 1A, if the criteria of Major or Minor alarm are detected, system will execute profile 2. The traffic will stay in Loop1 even if the alarm on port 1A is cleared.

□ Cp 1c off:0 on:1 sw:0
- Disable the call profile facility and alarm detection on port 1C.

□ Loge 1 loop1
- Stop and save the above commands into the 1st profile with the name "loop1".

□ Logb
- Starting logging command scripts

□ Xcs 1c 1b
- Uni-directional cross from 1C to 1B

□ Cp 1a off:0 on:2 sw:0
- Disable the call profile facility and alarm detection on port 1A.

□ Cp 1c off:0 on:1 sw:1
- Enable the call profile facility on port 1C, if the criteria of Major or Minor alarm is detected, system will execute profile 1. The traffic will stay in Loop2 even if the alarm on port 1C is cleared.

□ Loge 2 loop2
- Stop and save the above commands into the 2nd profile with the name "loop2".

Note:
In this case, the parameter alarm code for **CP** command uses default value. Users may refer to table 3-7-2 the alarm code list to set their own criteria.

3.7.6 1 : 1 Revertive Protection with Priority

■ Description:

□ Mercury provides the protection facility such as 1 : 1 Revertive protection with Priority which is attached in the following figure. The data coming from port 1B through Main Loop has more important data with higher priority than the lower priority data coming from 1D through Protect Loop. If the Main Loop fails, port 1A detects the alarm criteria which can be set by user, and system will execute the pre-defined profile 2 and switch the higher priority data to pass through the Protect Loop. At that time the lower priority data on 1D will be cut out. System will keep detecting the alarm on port 1A, if the alarm is cleared, profile 1 will be reloaded and all traffic will be reverted back to original status. This application will prevent any loss of important data and keep it always alive.

■ Structure:

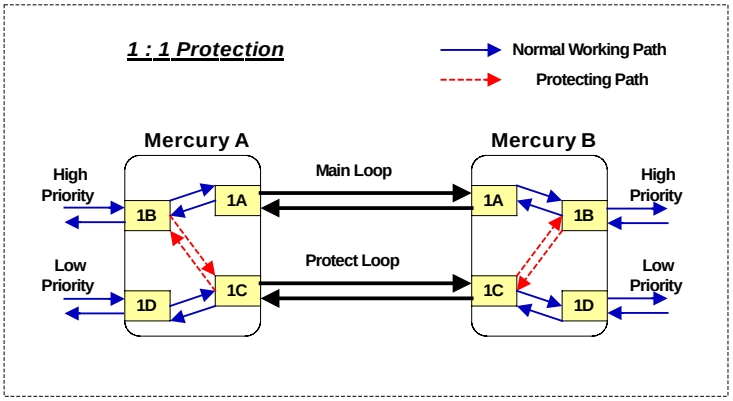


Figure 3.64 1:1 Revertive Protection with priority

Actions on Port 1A	
Alarm off → on	Alarm on → off
Run profile 2	Run profile 1
xc 1b 1c	xc 1a 1b
	xc 1c 1d

Table 3.17 Alarm status for CP Command

■ Configurations:

□ Mercury A

- Clk int Setup to internal clock

□ Mercury B

- Clk 1a 1c Setup the master clock received from port 1A, the slave clock is from port 1C

□ Mercury A&B

- Logr 1 Run profile 1 when following profiles are created

■ Profiles saved in both Mercury A&B

□ Logb

- Starting logging command scripts

□ Xc 1a 1b

- Cross port 1A to 1B (higher priority data)

□ Xc 1c 1d

- Cross port 1C to 1D (lower priority data)

□ Cp 1a off:1 on:2 sw:1

- Enable the call profile facility on port 1A, if the criteria of Major or Minor alarm is detected, system will execute profile 2 and change the higher priority traffic to Protect Loop. If the alarm is cleared on port 1A, system will execute profile 1 to change the traffic back to Main Loop.

□ Loge 1 Mainloop

- Stop and save the above commands into the 1st profile with the name "Mainloop".

□ Logb

- Starting logging command scripts

□ Xc 1b 1c

- Cross port 1B to 1C (higher priority data)

□ Loge 2 Protectloop

- Stop and save the above commands into the 2nd profile with the name "Protectloop".

Note:
In this case, the parameter alarm code for **CP** command uses default value. User may refer to table 3-7-2 the alarm code list to set your own criteria.

3.7.7 N : 1 Revertive Protection

■ Description:

□ Mercury provides the protection facility such as N : 1 Revertive protection which is attached in the following figure. Main Loop1 and Main Loop2 share the same backup link- Protect Loop, if Main Loop1 fails, the traffic will switch to the Protect Loop, and system will also disable the CP function and alarm detection on port 1C. When 1A alarm disappears, traffic will switch back to Main Loop1 and will also enable the CP function on 1C as before.

■ Structure:

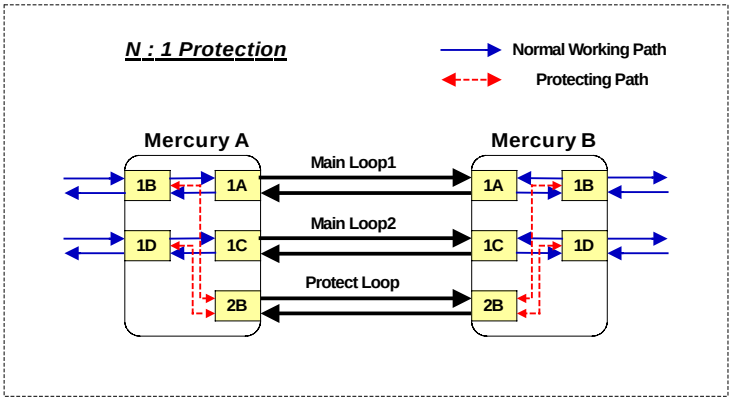


Figure 3.65 N:1 Revertive Proction

Actions on Port 1A	
Alarm off → on	Alarm on → off
Run profile 1	Run profile 2
xc 1b 2b	xc 1b 1a
cp 1c sw:0	cp 1c sw:1

Actions on Port 1C	
Alarm off → on	Alarm on → off
Run profile 3	Run profile 4
xc 1d 2b	xc 1d 1c
cp 1a sw:0	1p 1a sw:1

Table 3.18 Alarm status for CP Command

■ Configurations:

□ Mercury A

- Clk int Setup to internal clock

□ Mercury B

- Clk 1a 1c Setup the master clock received from port 1A, the slave clock is from port 1C

□ Mercury A&B

- Xc 1b 1a Cross port 1B to 1A
- Xc 1d 1c Cross port 1D to 1C
- Cp 1a off:2 on:1 sw:1

  Enable the call profile facility on port 1A. If Major or Minor alarm is detected, system will execute profile 1 and change the traffic from Main Loop1 to Protect Loop. If the alarm is detected on port 1A, system will execute profile 2 to change the traffic back to Main Loop1.
- Cp 1c off:4 on:3 sw:1

  Enable the call profile facility on port 1C. If Major or Minor alarm is detected, system will execute profile 3 and change the traffic from Main Loop2 to Protect Loop. If the alarm is detected on port 1C, system will execute profile 4 to change the traffic back to Main Loop2.

■ Profiles saved in both Mercury A&B

□ Logb
- Starting logging command scripts

□ Xc 1b 2b
- Cross port 1B to 2B(switch to Protect Loop)

□ Cp 1c sw:0
- Disable the call profile facility and alarm detection on port 1C.

□ Loge 1 ML1toPL
- Stop and save the above commands into the 1st profile with the name "ML1toPL"

□ Logb
- Starting logging command scripts

□ Xc 1b 1a
- Cross port 1B to 1A(back to Main Loop1)

□ Cp 1c sw:1
- Enable the call profile facility and alarm detection on port 1C.

□ Loge 2 PltoML1
- Stop and save the above commands into the 2nd profile with the name "PLtoML1"

□ Logb
- Starting logging command scripts

□ Xc 1d 2b
- Cross port 1D to 2B(switch to Protect Loop)

□ Cp 1a sw:0
- Disable the call profile facility and alarm detection on port 1A.

□ Loge 3 ML2toPL
- Stop and save the above commands into the 3rd profile with the name "ML2toPL"

□ Logb
- Starting logging command scripts

□ Xc 1d 1c
- Cross port 1D to 1C(back to Main Loop2)

□ Cp 1a sw:1
- Enable the call profile facility and alarm detection on port 1A.

□ Loge 4 PltoML2
- Stop and save the above commands into the 4th profile with the name "PLtoML2"
-
-
-

Note:
In this case, the parameter alarm code for CP command uses default value. Users may refer to Table 3-7-2, the alarm code list to set their own alarm criteria.

3.7.8 Ring protection - I

- Description:
  - Constructing the E1 / T1 / Fiber ring protection feature can provide an always alive transmission to prevent the failure on the specified link. It can also provide the time slot drop on the multiple nodes of the ring protect associated point.
- Structure:

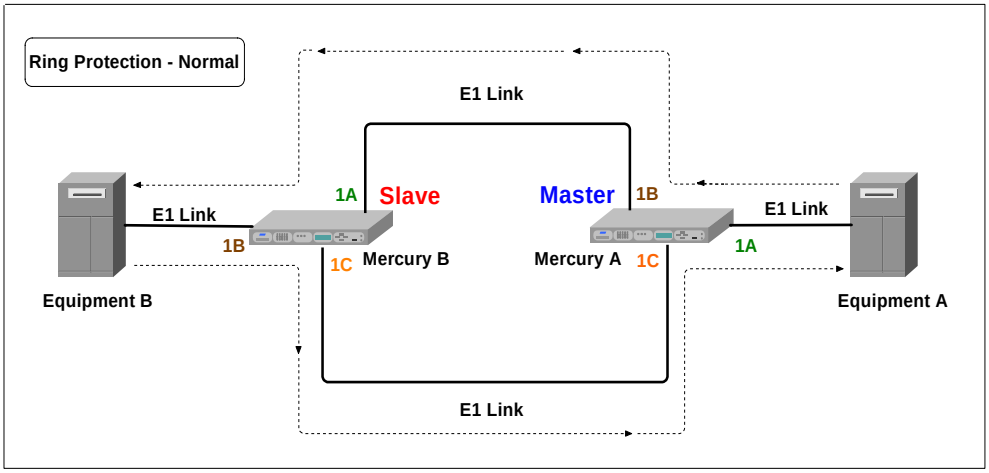


Figure 3.66 Ring Protection-1

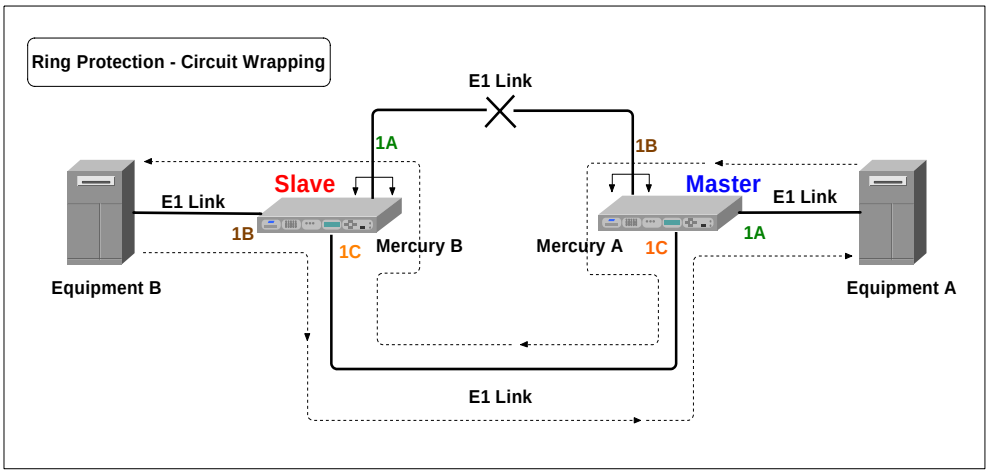
- Configurations:
  - Site A
    - Clk 1a Setup the clock received from port1A
    - E1 1a fr:0 cas:0 tcrc:0 rcrc:0, E1 1b fr:0 cas:0 tcrc:0 rcrc:0, E1 1c fr:0 cas:0 tcrc:0 rcrc:0
      Setup E1 card on port1A/1B/1C
    - Rp 1 m 1c 1b 31
      Setup the Ring Protection in Master mode, port1C as last port, 1B as next port, and time slot 31 for clock transmission.
    - Drop f 1c 1 1b 1 1a 1 30
      Drop the time slot 1 to 30 from ring in-port (last port, 1C), ring out-port (next port, 1B) to the destination port 1A.
  - Site B

- E1 1a fr:0 cas:0 tcrc:0 rcrc:0, E1 1b fr:0 cas:0 tcrc:0 rcrc:0, E1 1c fr:0 cas:0 tcrc:0 rcrc:0

  Setup E1 card on port1A/1B/1C

- Rp s 1a 1c 31

  Setup the Ring Protection in Slave mode, port1A as last port, 1C as



  next port, and time slot 31 for clock transmission.

- Drop f 1a 1 1c 1 1b 1 30

  Drop the time slot 1 to 30 from ring in-port (last port, 1A), ring out-port (next port, 1C) to the destination port 1B.

3.7.9 Ring protection - II

■ Description:

□ Ring protection with 4 nodes as illustrated below. The configuration listed below is only related to how to build up the ring and how to drop / insert the data from tributary card into the E1 trunk. Here the clock is generating by the Mercury at Site A.

■ Structure:

Figure 3.67 Ring Protection -2

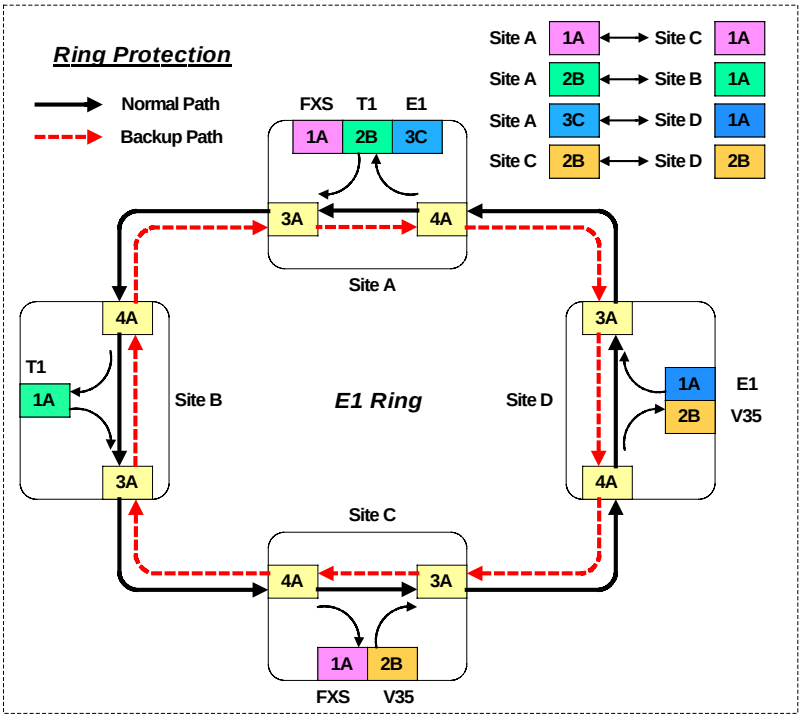


Figure 3.68 Ring protection diagram

E1 Ring - time slot allocation		
Source	Destination	TS
Site A port 1A	Site C port 1A	1
Site A port 2B	Site B port 1A	2 ~ 15
CAS signalling		16
Site A port 3C	Site D prot 1A	17 ~ 23
Site C port 2B	Site D port 2A	24 ~ 30
Default clock transfering in Ring		31

Table 3.19 E1 Ring – time slot allocation

- Configurations:
  - □ Site A/B/C/D
    - E1 3a cas:1, E1 4a cas:1

      Setup the E1 link port3A/4A on the ring to CAS mode for voice application.
  - □ Site A
    - Rp 1 m 4a 3a

      Setup the Ring Protection in Master mode, port4A as last port, 3A as next port (and default time slot 31 for clock transmission).
    - Drop v 4a 1 3a 1 1a 1

      Drop the time slot 1 from ring in-port (last port, 4A), ring out-port (next port, 3A) to the destinated port 1A with voice parameter.
    - Drop 4a 2 3a 2 2b 2 14

      Drop the time slot 2 to 15 from ring in-port (last port, 4A), ring

out-port (next port, 3A) to the destinated port 2B.

- Drop 4a 17 3a 17 3c 17 7

  Drop the time slot 17 to 23 from ring in-port (last port, 4A), ring out-port (next port, 3A) to the destinated port 3C.

□ Site B

- Rp 1 s 4a 3a

  Setup the Ring Protection in Slave mode, port4A as last port, 3A as next port (and default time slot 31 for clock transmission)

- Xt v 4a 1 3a 1

  Time slot 1 in E1 ring is for voice application, and remember to pass this voice signalling to its destination

- Drop 4a 2 3a 2 1a 2 14

  Drop the time slot 2 to 15 from ring in-port 4A, out-port 3A to the destinated port 1A.

□ Site C

- Rp 1 s 4a 3a

  Setup the Ring Protection in Slave mode, port4A as last port, 3A as next port (and default time slot 31 for clock transmission)

- Drop v 4a 1 3a 1 1a 1

  Drop the time slot 1 from ring in-port 4A, out-port 3A to the destinated port 1A with voice parameter “v”

- Drop 4a 24 3a 24 2b 24 7

  Drop the time slot 24 to 30 from ring in-port 4A, ring out-port 3A to the destinated port 2B.

□ Site D

- Rp 1 s 4a 3a

  Setup the Ring Protection in Slave mode, port4A as last port, 3A as next port (and default time slot 31 for clock transmission)

- Xt v 4a 1 3a 1

  Time slot 1 in E1 ring is for voice application, and remember to pass this voice signaling to its destination

- Drop 4a 17 3a 17 1a 17 6

  Drop the time slot 17 to 23 from ring in-port 4A, out-port 3A to the destination port 1A

- Drop 4a 24 3a 24 2b 24 7

  Drop the time slot 24 to 30 from ring in-port 4A, ring out-port 3A to the destinated port 2B.

Chapter 4. Maintenance

ABOUT THIS CHAPTER

This Chapter describes the alarm message, performance monitoring and loop testing function for diagnostic.

4.1 Status of Alarm Message Description

This section provides information on the alarms generated by each module, specifies their type, and provides instructions for using the module-specific diagnostic functions. The Mercury maintains an alarm buffer. The buffer can store one alarm event of each type, and a maximum of 100 alarms can be displayed on the terminal. This section will present the alarm messages displayed on the terminal by module, and lists the actions required to correct the alarm condition. To correct the reported problem, perform the corrective actions in the order given in the table, until the problem is rectified. If problem cannot be corrected by carrying out the listed actions, the Mercury has to be checked by qualified technical support personnel.

4.1.1 E1 Module

Table 4.1 lists the alarm messages generated by the E1 module, specifies their class (major or minor), type (alarm or performance monitoring), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
LOS	Loss of Synchronous – Local lost of multi-frame synchronization alarm on the specified link	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified E1 module. 3. Replace the E1 module.	Alarm	Major
RCL	Receive Carrier Loss – Receive carrier data loss from the remote equipment.	Check cable connection to the link connector has been plug properly.	Alarm	Major
FAS	Frame Alignment Synchronization Loss – Detected FAS error occur over critical limited (> 8 bits/sec.), Only on E1 links operating with G732S framing.	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified E1 module. 3. Replace the E1 module.	Alarm	Major
CRC	CRC errors – Error detected in the E1 link receive signal.	Have the E1 link checked.	Alarm	Major

Message	Description	Corrective Actions	Type	Class
	(> 2 bits/sec.) Updated once per second. Only on E1 links operating with G732S frame plus CRC.			
CV/BPV	Code Violation/Bipolar Violation error – Detected error occur over critical limited (> 2048 bits/sec.). Updated once per second.	Have the link checked.	Alarm	Major
EBT	E-Bit error – The E-bit error rate of the link receive signal (> 1000 bits/sec.). Only on E1 links operating with G732S framing.	Problem in network facilities.	Alarm	Major
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severe Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting Unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Minor
TXS	Transmit Elastic Store Slip – Detected Tx clock slip.	Problem at unstable clock source.	Alarm	Minor
RXS	Receive Elastic Store Slip – Detected Rx clock slip.	Problem at unstable clock source.	Alarm	Minor
FAS	Frame Alignment Synchronization Loss – Detected FAS error occur over critical limited (< 8 bits/sec.), Only on E1 links operating with G732S framing.	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified E1 module. 3. Replace the E1 module.	Alarm	Minor
CRC	CRC errors – Error detected	Have the E1 link checked.	Alarm	Minor

Message	Description	Corrective Actions	Type	Class
	in the E1 link receive signal. (< 2 bits/sec.) Updated once per second. Only on E1 links operating with G732S frame plus CRC.			
CV/BPV	Code Violation/Bipolar Violation error – Detected error occur over critical limited (< 2048 bits/sec.). Updated once per second.	Have the link checked.	Alarm	Minor
EBT	E-Bit error – The E-bit error rate of the link receive signal (< 1000 bits/sec.). Only on E1 links operating with G732S framing.	Problem in network facilities.	Alarm	Minor
UA1	Receive Unframed All One – Unframed "all ones" sequence in received in the link data stream.	Problem at the remote equipment.	Alarm	Minor
RRA	Receive Remote Alarm – Receive the remote loss of frame synchronization alarm on the specified link.	Problem at the remote equipment.	Alarm	Minor
15-CV	15 Minutes Code/Bipolar Violation – Code/Bipolar Violation over specify threshold.	Informative alert.	P.M.	Minor
1H-CV	1 hour Code/Bipolar Violation – Code/Bipolar Violation over specify threshold.	Informative alert.	P.M.	Minor
1D-CV	1 day Code/Bipolar Violation – Code/Bipolar Violation over specify threshold.	Informative alert.	P.M.	Minor
ALM-OFF	Alarm Off – Alarm report has been switch off at specified port.	Informative message – no action required.	State	Minor
ALM&DAC-OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.1 E1 alarm message

4.1.2 T1 Module

Table 4.2 lists the alarm messages generated by the T1 module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
LOS	Loss of Synchronous – Local lost of multi-frame	1. Check cable connections to the link connector.	Alarm	Major

Message	Description	Corrective Actions	Type	Class
	synchronization alarm on the specified link	2. Check line and/or other communication equipment providing the link to the specified T1 module. 3. Replace the T1 module.		
RCL	Receive Carrier Loss – Receive carrier data loss from the remote equipment.	Check cable connection to the link connector has been plug properly.	Alarm	Major
FAS	Frame Alignment Synchronization Loss – Detected FAS error occur over critical limited (> 8 bits/sec.), Only on T1 links operating with D4/ESF framing.	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified T1 module. 3. Replace the T1 module.	Alarm	Major
CRC	CRC errors – Error detected in the T1 link receive signal. (> 2 bits/sec.) Updated once per second. Only on T1 links operating with D4/ESF frame plus CRC.	Have the T1 link checked.	Alarm	Major
CV	Code Violation error – Detected error occur over critical limited (> 2048 bits/sec.). Updated once per second.	Have the link checked.	Alarm	Major
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting	Informative alert.	P.M.	Major

Message	Description	Corrective Actions	Type	Class
	Errored Seconds over 1 day threshold.			
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Minor
TXS	Transmit Elastic Store Slip – Detected Tx clock slip.	Problem at unstable clock source.	Alarm	Minor
RXS	Receive Elastic Store Slip – Detected Rx clock slip.	Problem at unstable clock source.	Alarm	Minor
FAS	Frame Alignment Synchronization Loss – Detected FAS error occur over critical limited (< 8 bits/sec.), Only on T1 links operating with D4/ESF framing.	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specify T1 module. 3. Replace the T1 module.	Alarm	Minor
CRC	CRC errors – Error detected in the T1 link receive signal. (< 2 bits/sec.) Updated once per second. Only on T1 links operating with D4/ESF frame plus CRC.	Have the T1 link checked.	Alarm	Minor
CV	Code Violation error – Detected error occur over critical limited (< 2048 bits/sec.). Updated once per second.	Have the link checked.	Alarm	Minor
EBT	E-Bit error – The E-bit error rate of the link receive signal (< 1000 bits/sec.).	Problem in network facilities.	Alarm	Minor
RBA	Receive Blue Alarm – Receive the unframed “all ones” signal.	Problem at the remote equipment.	Alarm	Minor
RYA	Receive Yellow Alarm - Receive the remote loss of frame synchronization alarm on the specified link.	Problem at the remote equipment.	Alarm	Minor
15-CV	15 Minutes Code/Bipolar Violation – Code/Bipolar Violation over specify threshold.	Informative alert.	P.M.	Minor
1H-CV	1 hour Code/Bipolar Violation – Code/Bipolar Violation over specify	Informative alert.	P.M.	Minor

Message	Description	Corrective Actions	Type	Class
	threshold.			
1D-CV	1 day Code/Bipolar Violation – Code/Bipolar Violation over specify threshold.	Informative alert.	P.M.	Minor
ALM-OFF	Alarm Off – Alarm report has been switch off at specified port.	Informative message – no action required.	State	Minor
ALM&DAC-OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.2 T1 alarm message

4.1.3 Fiber Optical Module (Fiber 1, Fiber 2, Fiber B)

Table 4.3 lists the alarm messages generated by the Fiber Optic module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
LOS	Loss of Synchronous – Local lost of multi-frame synchronization alarm on the specified link	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified FOM module. 3. Replace the FOM module. 4. Check the clock settings.	Alarm	Major
RCL	Receive Carrier Loss – Receive carrier data loss from the remote equipment.	Check cable connection to the link connector has been plug properly.	Alarm	Major
CV	Code Violation error – Detected the particular code error over critical limited (> 2048 bits/sec.). Updated once per second.	Have the fiber link checked.	Alarm	Major
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major

Message	Description	Corrective Actions	Type	Class
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severey Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
RCL-A	Receive Carrier Loss on Primary link – Receive carrier data loss from the remote FOM module. For Fiber-B module only.	Problem at unstable clock source.	Alarm	Minor
RCL-B	Receive Carrier Loss on Backup link – Receive carrier data loss from the remote FOM module. For Fiber-B module only.	Problem at unstable clock source.	Alarm	Minor
Frame-Err	Frame Error – Detected the particular framing error occurs on the Rx.	Have the fiber link checked.	Alarm	Minor
R-LOS	Remote fiber LOS	Problem at the remote equipment.	Alarm	Minor

Table 4.3 Fiber Optical module alarm message

4.1.4 High Speed Data Module (2-V35)

Table 4.4 lists the alarm messages generated by the 2-V35 module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
LOS	Loss of Synchronous – Local lost of synchronization alarm on the specified link	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment	Alarm	Major

Message	Description	Corrective Actions	Type	Class
		providing the link to the specified data module. 3. Replace the data module.		
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
TXS	Transmit Elastic Store Slip – Detected Tx clock slip.	Problem at unstable clock source.	Alarm	Minor
RXS	Receive Elastic Store Slip – Detected Rx clock slip.	Problem at unstable clock source.	Alarm	Minor
ALM-OFF	Alarm Off – Alarm report has been switch off at specified port.	Informative message – no action required.	State	Minor
ALM&DAC- OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.4 2-V35 module alarm message

4.1.5 X.50 Low Speed Sync and Async Data Module

Table 4.5 lists the alarm messages generated by the X.50 module, specifies their class

(Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
LOS	Loss of Synchronous – Local lost of synchronization alarm on the specified link	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified data module. 3. Replace the data module.	Alarm	Major
FAS	Frame Alignment Synchronization Loss – Detected FAS error occur over critical limited (< 8 bits/sec.).	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified X.50 module. 3. Replace the X.50 module.	Alarm	Major
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second	Informative alert.	P.M.	Major

Message	Description	Corrective Actions	Type	Class
	over 1 day threshold.			
FAS	Frame Alignment Synchronization Loss – Detected FAS error occur over critical limited (< 8 bits/sec.).	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified X.50 module. 3. Replace the X.50 module.	Alarm	Minor
TXS1	Transmit Elastic Store Slip – Detected Tx clock slip on port 1.	Problem at unstable clock source.	Alarm	Minor
TXS2	Transmit Elastic Store Slip – Detected Tx clock slip on port 2.	Problem at unstable clock source.	Alarm	Minor
TXS3	Transmit Elastic Store Slip – Detected Tx clock slip on port 3.	Problem at unstable clock source.	Alarm	Minor
TXS4	Transmit Elastic Store Slip – Detected Tx clock slip on port 4.	Problem at unstable clock source.	Alarm	Minor
TXS5	Transmit Elastic Store Slip – Detected Tx clock slip on port 5.	Problem at unstable clock source.	Alarm	Minor
ALM-OFF	Alarm Off – Alarm report has been switch off at specified port.	Informative message – no action required.	State	Minor
ALM&DAC- OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.5 X.50 module alarm message

4.1.6 Channelized Router & Non-Channelized Router Module

Table 4.6 lists the alarm messages generated by the Router module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
LOL	Loss of Link – Local lost of synchronization alarm on the specified link	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified data module. 3. Replace the data module.	Alarm	Major

Message	Description	Corrective Actions	Type	Class
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
ALM-OFF	Alarm Off – Alarm report has been switch off at port.	Informative message – no action required.	State	Minor
ALM&DAC- OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.6 Router module alarm message

4.1.7 IDSL LT Module

Table 4.7 lists the alarm messages generated by the IDSL module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
LOS	Loss of Signal – Local lost of signal on the specified link	1. Check cable connections to the link connector. 2. Check line and/or other	Alarm	Major

Message	Description	Corrective Actions	Type	Class
		communication equipment providing the link to the specified data module. 3. Replace the data module.		
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
HAND	Hand shake – hand shake in progress with specify port.	Checked the line or remote IDSL equipment didn't act as NT mode.	Alarm	Minor
DT	Data Through test mode – To diagnosis the line performance, R&D debug using only.	Informative testing alert.	Alarm	Minor
SSP	Send Single Pulses test mode – To diagnosis the line performance, R&D debug using only.	Informative testing alert.	Alarm	Minor
SLIP	Slip – Detecting elastic clock slip.	Problem at unstable clock source.	Alarm	Minor

Message	Description	Corrective Actions	Type	Class
QUIET	Quiet – Analogy output disable on the specify port.	Informative alert.	State	Minor
ALM-OFF	Alarm Off – Alarm report has been switch off at port.	Informative message – no action required.	State	Minor
ALM&DAC- OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.7 IDSL module alarm message

4.1.8 FXS Voice Module

Table 4.8 lists the alarm messages generated by the FXS voice module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
MICO-FAIL	MICO Fail – 2015 chipset initial failed given PCM to IOM-2 signal convert error.	Replace the FXS module.	Alarm	Major
PCM-LOS	PCM Lost – Detected PCM signal lost.	1. Check cable connections to the FXS connector. 2. Check clock source on network facilities. 3. Replace the data module.	Alarm	Major
3265-FAIL	3265 Chipset fail – Fail on reading & writing with PEB 3265 chipset over two times during re-boot.	Re-boot system. Check any unsettled voltage on the phone line. 3. Replace the FXS module.	Alarm	Major
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour	Informative alert.	P.M.	Major

Message	Description	Corrective Actions	Type	Class
	threshold.			
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
SPIKE	SPIKE – Detected fail on reading & writing with PEB 3265 chipset over two times, system still working after initialization.	Re-boot system. Check any unsettled voltage on the phone line.	Alarm	Minor
FRAME-INT	Frame Interrupt – Detected frame interrupt during operation.	Have the clock source and link checked.	Alarm	Minor
3265-RETRY	3265 Retry – Access 3265 chipset timeout, re-try effort is taken.	Re-boot system.	Alarm	Minor
ALM-OFF	Alarm Off – Alarm report has been switch off at port.	Informative message – no action required.	State	Minor
ALM&DAC-OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.8 FXS voice module alarm message

4.1.9 SDSL Module

Table 4.9 lists the alarm messages generated by the SDSL module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
FAIL	Fail – System fail on register.	Replace the SDSL module.	Alarm	Major
LOS	Lost of Synchronous – Local lost of synchronous on SDSL link.	Have the link checked. Check the operating mode on the network equipment. NTU, LTU or connect with	Alarm	Major

Message	Description	Corrective Actions	Type	Class
		Xstream 1300. Replace the SDSL module.		
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
CRC	CRC errors – CRC error detected in the SDSL link receive signal.	Have the SDSL link checked.	Alarm	Minor
DIS	Disconnect – SDSL card persisted on the handshake situation.	Check the operating mode on the network equipment. NTU, LTU or connect with Xstream 1300. Have the remote equipment check.	Alarm	Minor
ALM-OFF	Alarm Off – Alarm report has been switch off at specified port.	Informative message – no action required.	State	Minor
ALM&DAC-OFF	Alarm and DAC Off – Alarm report and DAC function has been switch	Informative message – no action required.	State	Minor

Message	Description	Corrective Actions	Type	Class
	off at specified port.			

Table 4.9 SDSL alarm message

4.1.10 2/4P-Data Module

Table 4.10 lists the alarm messages generated by the 2/4P-Data module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
LOS	Loss of Synchronous – Local lost of synchronization alarm on the specified link	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified data module. 3. Replace the data module.	Alarm	Major
No-CLK	No clock source input from the indicated port.	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified data module. 3. Replace the data module.	Alarm.	Major
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major

Message	Description	Corrective Actions	Type	Class
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
TXS	Transmit Elastic Store Slip – Detected Tx clock slip.	Problem at unstable clock source.	Alarm	Minor
RXS	Receive Elastic Store Slip – Detected Rx clock slip.	Problem at unstable clock source.	Alarm	Minor
ALM-OFF	Alarm Off – Alarm report has been switch off at specified port.	Informative message – no action required.	State	Minor
ALM&DAC-OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.10 4P-Data module alarm message

4P-V24 ModuleTable 4.11 lists the alarm messages generated by the 4P-V24 module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
LOS	Loss of Synchronous – Local lost of synchronization alarm on the specified link	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified data module. 3. Replace the data module.	Alarm	Major
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major

Message	Description	Corrective Actions	Type	Class
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
FAS	Frame Alignment Synchronization Loss	1. Check cable connections to the link connector. 2. Check line and/or other communication equipment providing the link to the specified module. 3. Replace the module.	Alarm	Minor
SLIP	Transmit Elastic Store Slip – Detected Tx clock slip on indicated port.	Problem at unstable clock source.	Alarm	Minor
ALM-OFF	Alarm Off – Alarm report has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.11 4P-V24 module alarm message

4.1.11 4-POTS-FXO Voice Module

Table 4.12 lists the alarm messages generated by the 4-POTS-FXO voice module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major

Message	Description	Corrective Actions	Type	Class
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
ALM-OFF	Alarm Off – Alarm report has been switch off at port.	Informative message – no action required.	State	Minor
ALM&DAC - OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.12 4-POTS-FXO voice module alarm message

4.1.12 4-POTS-FXS Voice Module

Table 4.13 lists the alarm messages generated by the 4-POTS-FXS voice module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Description	Corrective Actions	Type	Class
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major

Message	Description	Corrective Actions	Type	Class
15-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
ALM-OFF	Alarm Off – Alarm report has been switch off at port.	Informative message – no action required.	State	Minor
ALM&DAC-OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.13 4-POTS-FXS Voice Module

4.1.13 1P-SHDSL-V

Table 4.3 lists the alarm messages generated by the 1P-SHDSL-V module, specifies their class (Major or Minor), type (Alarm, Performance Monitoring and State), and explains their meaning.

Message	Desciption	Corrective	Type	Class
LOS	Loss of signal	1. Check cable connections to the link connector.	Alarm	Major

		2. Check the operating mode on the network equipment. NTU, LTU or connect with Scorpio 1400. 3. Replace the SHDSL module.		
15-ES	Errored Seconds – Counting Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-SES	Severely Errored Seconds – counting Severely Errored Seconds over 15 minutes threshold.	Informative alert.	P.M.	Major
15-UA	Unavailable Second – Counting Unavailable Second over 15 minutes threshold.	Informative alert.	P.M.	Major
1H-ES	Errored Seconds – Counting Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 hour threshold.	Informative alert.	P.M.	Major
1H-UA	Unavailable Second – Counting unavailable Second over 1 hour threshold.	Informative alert.	P.M.	Major
1D-ES	Errored Seconds – Counting Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-SES	Severely Errored Seconds – Counting Severely Errored Seconds over 1 day threshold.	Informative alert.	P.M.	Major
1D-UA	Unavailable Second – Counting Unavailable Second over 1 day threshold.	Informative alert.	P.M.	Major
DIS	Disconnect – SHDSL card persisted on the handshake Situation.	Check the operating mode on the network equipment. NTU, LTU or connect with Scorpio 1400. Have the remote equipment check.	Alarm	Minor
ALM-OFF	Alarm Off – Alarm report has been switch off at specified port.	Informative message – no action required.	State	Minor
ALM&DAC -OFF	Alarm and DAC Off – Alarm report and DAC function has been switch off at specified port.	Informative message – no action required.	State	Minor

Table 4.14 1P-SHDSL-V alarm messages

4.2 Performance Monitoring Diagnostics

This section describes the performance evaluation and monitoring functions provided by the Mercury.

The performance parameters defined for Mercury statistics are listed below:

- Current errored seconds (ES)
  - An errored second is any second containing one or more minor alarm events.
- Current severely errored seconds (SES)
  - A severely errored second is any second containing one or more Major alarm events.
- Current unavailable seconds (UA)
  - An unavailable second is any second in which a failed signal state exists. A failed signal state is declared when 10 consecutive severely errored seconds (SES) occur, and is cleared after 10 consecutive seconds of data are processed without a SES.
- Current code variation errored (CV)
  - The code variation will count any error bit detection derived from the data stream transmitted end-to-end, the code variation will only be performed on E1, T1 and FOM module.
- Displaying the performance data
  - The performance data can be displayed on the craft terminal by means of the STAT and PM command, by using parameter CLR, you can reset all the performance diagnostics registers or to the specified port only.

4.3 Diagnostic with Loop Test function

4.3.1 Power-up Self-test

When the system is powered up, a complete self-test routine is performed such as follows:

- Checking all I/O port
- ROM
- SRAM
- FLASH memory
- Cross connect action
- Real-time clock
- Installed Modules

The self-test helps to validate system's integrity. During the system self test, "Ready" LED will be extinguished until the self-test has been completed.

4.3.2 Loopback function

The Mercury I/O modules support two types of user-controlled loopback: local (analog) loopback and remote (digital) loopback.

The available test and loopback functions are described in the following paragraphs. The loopback is identified by the designation displayed on a craft terminal and front panel LED of Mercury.

The loopback supported by I/O modules with E1, T1, 2P-V35, 4P-Data, Fiber, 1P-V35 and RS530 module are described below.

4.3.2.1 Local Loop

When activated on a selected port, the local loopback connects the port transmit signal to the input of the receive path. The test signal is provided by the equipment, which is routed by the DXC data pump to that port. This equipment must receive its own transmission.

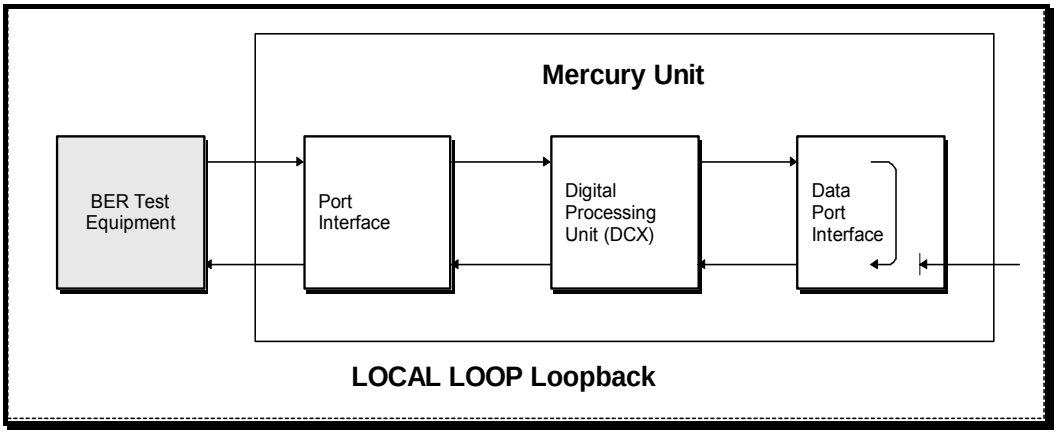


Figure 4.1 Local Loop back

This loopback test is activated by the LINK command.

Syntax: LINK port [LL: act]

4.3.2.2 REMOTE LOOP

When activated on a selected port, the remote loopback returns the received signal towards the remote user equipment connected to the same port. The remote loopback is performed by connecting the port receiving the signal, after regeneration, to the transmit path. The test signal is provided by user's equipment, which is connected to the remote end of the link, and it must receive its own transmission.

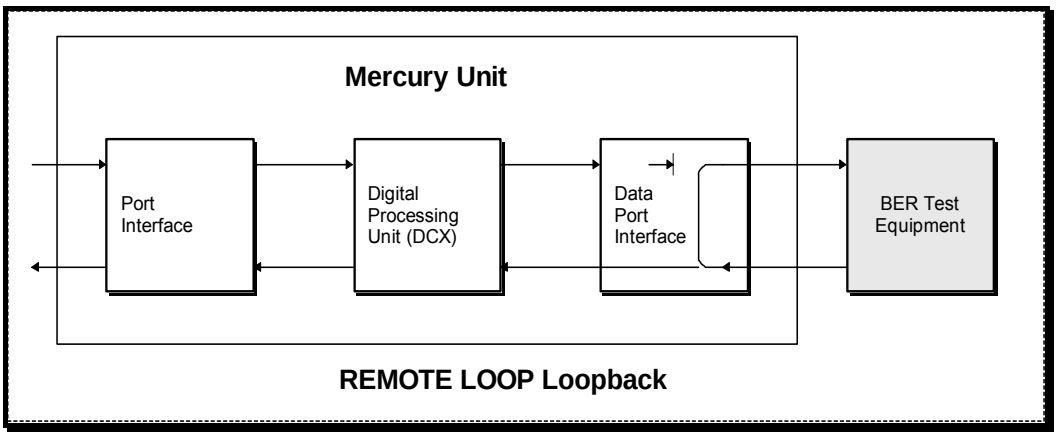


Figure 4.2 Remote Loop back

This loopback test is activated by the LINK command.

Syntax: LINK port [RL: act]

4.3.2.3 PAYLOAD LOOP

Payload loopback shows as below diagram. The incoming signal is looped back to the receive path through the DXC data pump. This loopback is used for constructing the loop to verify if the modules are currently working in the Mercury.

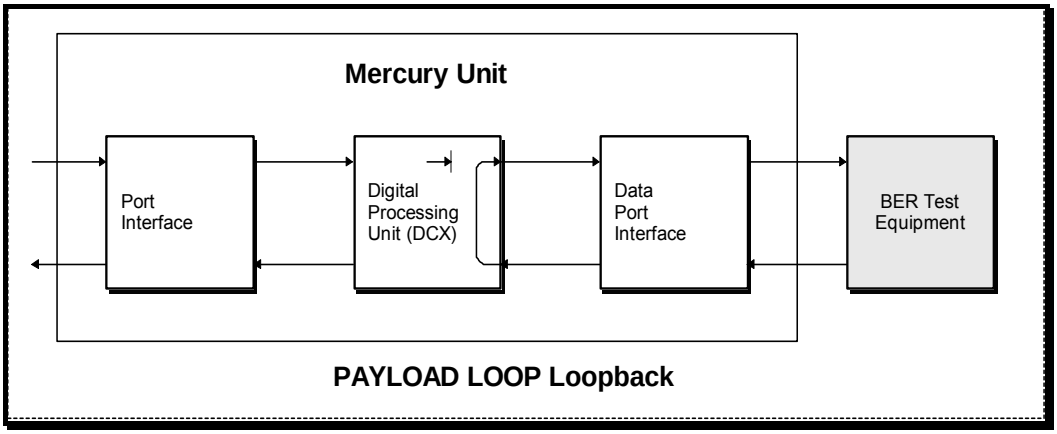


Figure 4.3 Payload Loop back

This loopback test is activated by the XC command.

Syntax: XC port [a] port [a]

4.4 Verifying the Mercury Operation

To trouble shoot the system more easily, user needs to know the exact configuration of the network. Standard network troubleshooting procedures involving sectionalizing the network and performing loopback tests on each section of the network should be followed. This helps the user to determine whether the Mercury is defective.

The procedures outlined here will depend on the test equipment and other equipment the user may have on hand.

The list of these procedures starts from the simple to more complicated procedures. Once all the procedures have been done, we may conclude that the Mercury equipment is at fault.

To check if the Mercury is defective or not, specialized equipment such as a BERT (bit error rate test) set is needed.

4.4.1 Quick Verify the Equipment

Check if the text displayed on LCD of the Mercury shows up normally. If not, then the Mercury has failed.

Secondly, remove all the line connections to Mercury. Disconnect the power, and re-apply the power a few seconds later. Observe the power-up self-test sequence. If this fails, then Mercury is defective.

Check if the LEDs show any abnormal display in order to verify the cables and cards are installed correctly and properly.

Especially for initial installation, excessive errors may be caused due to:

- Incorrect configuration of either the Mercury or the equipment at the other end of the line
- Faulty line installation, which results in excessive noise, cross talk, or impedance mismatch, especially under electrically noisy environments such as central offices, so the use of shielded cables is mandatory.

If a spare Mercury is available, replace the one being used with the spare. User must carefully configure the spare one to be exactly the same as the working one.

If the substitution clears the problem, then the original unit being replaced by the spare may be the culprit.

A good practice is to reconfigure the original one and swap out the substitute unit once more. If both units show problems, then the problem could probably be elsewhere.

4.4.2 Loopback by wiring

Without a spare, Loopback wiring is handy for diagnosis. Thus, a set of cable, one for each of the interface types, is needed for completing the tests. These cable are wired so that signals from the Mercury are looped back by hard wire to the receive pin of the interface. Replace the line with loopback cable. Observe if the line is in sync. If not, then the Mercury has failed. Next perform a PRBS/QRSS test towards the line. If this fails, then the Mercury is defective.

Note that if a far end terminal is available, then the first test should be a local line Loopback for us to see if the line is good. If all the tests with loopback wiring have been passed, then the problem could be elsewhere.

4.4.3 Using BERT Test Set

If a BERT (Bit Error Rate Test) set such as the WG PFA-35 is available, then a comprehensive suite of tests can be performed to examine the conditions of the Mercury. With a BERT, each port of the Mercury can be tested individually.

The user must configure the BERT in exactly the same way that the Mercury is configured. If all the configurations match for both sides, and one of the ports fails, then the corresponding module of the Mercury is defective.

Chapter 5. Router Configuration

ABOUT THIS CHAPTER

This Chapter describes how to setup the Router interface that is already built in on board. For free future product updates and information please visit our online web site *http://www.tainet.net*

5.1 Specification

There are two model of Router Module for Mercury Series Products.

- *Channelize Router Module* (Ch-R, order number: 000077-0003)
  - The **Channelize Router Module** makes fractional E1 framing properly, and supports multiple WAN applications with up to 32 PPP links. It supports PPP function with static routes only.
- *Non-Channelize Router Module* (N-R, order number: 000077-0002)
  - **Non-Channelize Router Module**, it has the same configuration and similar application relative to the previous leased line xDSL modem. It supports Routing / Bridge access, PPP / Frame Relay WAN protocol, static / RIP routing protocol, NAT / NAPT and filter function.

For Mercury series product, the Non-Channelize Router module is built into Mercury 800 and a 16-channels Channelize Router module (32 timeslots totally) is built into Mercury 3820 for SNMP agent function.

5.1.1 Software

5.1.1.1 PPP (RFC 1661, RFC 1662)

5.1.1.2 Frame Relay (for N-R only)

- Multi-protocol Interconnect over Frame Relay (RFC 1490)
- HDLC packet-based format link layer,
- Three generally implemented specification of Local Management Interfaces (LMI)
  - ANSI: T1.617; Annex D
  - CCITT (ITU-T): Q.933; Annex A
  - LMI: (Frame Relay Forum implementation agreement)
- The one multi-connection of virtual link by Data Link Connection Identifier (DLCI), and Permanent Virtual Circuit (PVC) only

5.1.1.3 Routing

TCP/IP with RIP1 (RFC 1058), RIP2 (RFC 2543) or static routing on the LAN/WAN, up to 16 static routes with default route and the option to not advertise routes. (for Ch-R, only supports static routes, no RIP supported)

5.1.1.4 Ethernet Bridge (for N-R only)

- Automatic learning and aging (3000 MAC address LAN table)
- 1500 frames per second filtering and forwarding rate

5.1.1.5 Dynamic Host Configuration Protocol (for N-R only)

DHCP Server: an automatic assignment of IP address, mask, default gateway, DNS server address, and WINS server address to work stations (RFC 2131, RFC 2132)

5.1.1.6 IP Address Translation (for N-R only)

NAT/NAPT (Network Address and Network Address Port Translation) (RFC 3022):

Provide enhanced security and flexibility by "hiding" all IP address on the LAN behind a single static IP on the Internet. Sophisticated extension NAT that provides security of a NAT "wall" to hide LAN IP addresses while providing flexible use of all addresses offered by Internet Service Provider (ISP)

5.1.1.7 Security (for N-R only)

Static IP Filter (Incoming and Outgoing)

5.1.1.8 Management

- SNMPv1 (RFC 1157) and MIB II (RFC 1213)
- TELNET (RFC 854)
- ICMP Ping (RFC 792)
- Local management through Console port

5.1.1.9 Firmware Upgrade

TFTP (RFC 1350)

5.1.2 Hardware

5.1.2.1 LAN Interface

Ethernet 10 Base-T (RJ-45)

5.1.2.2 WAN Interface

- Provides private interface connected to Main-board (DIN 3*16)

- Through put: 440 pps for Router Module, 575 pps for Router-C Module

5.1.2.3 AUX Interface (for N-R only)

- Provides RS-232 DTE interface (RJ-45)
- Synchronous (up to 128 Kbps) and Asynchronous (up to 115200 bps) data format

5.1.2.4 Processor

- 32.768 MHz Motorola MC68EN360 (QUICC)
- 1 MByte Flash memory and 4 Mbyte DRAM

5.1.2.5 Operating Environment

- Temperature: 0ºC to 50ºC
- Humidity: 5% ~ 90%, non-condensing

5.2 Feature of Router Module

Your Router Module is packed with a number of features that give it the flexibility to provide a complete networking solution for small and medium size businesses, or remote offices.

- Easy to Install
  - □ Your Router Module is designed for quick, intuitive and easy installation.
- Frame Relay Support
  - □ Frame relay for N-R employs a simple form of packet switching that perfectly suits today's powerful PCs, workstations and servers. Its high throughput and reliability easily copes with bandwidth-hungry business applications.
- Full-duplex Ethernet LAN interface
  - □ The Router Module with 10 Mbps auto-negotiating LAN interface enables fast data transfer in either half-duplex or full duplex mode depending on your Ethernet network.
- Protocols Supported
  - □ TCP / IP (Transmission Control Protocol/Internet Protocol).
  - □ Point-to-Point Protocol (PPP over HDLC) (RFC1661,RFC1662).
  - □ Frame Relay (Multi-protocol over Frame Relay, for N-R only) (RFC1490)
  - □ NAT (Network Address Translation, for N-R only).
- DHCP Support
  - □ DHCP (Dynamic Host Configuration Protocol) allows N-R to automatically assign TCP / IP settings to workstations on your network. Your Router Module can act as a DHCP server.
- NAT provide Static NAT and NAPT for Internet Access

- The NAT feature for N-R allows multiple user Internet access for the cost of a single IP account. The NAPT (Network Address Port Translation) support popular Internet application, such as ICQ, IRC RealAudio, VDOLive and PPTP. No configuration is needed to support these applications.

- Full Network Management
  - SNMP (Simple Network Management Protocol) support.
  - Accessing TCS (Terminal Configuration System) through a telnet connection.
- Filters
  - The IP filtering functions for N-R allows administrator added network security and management.

5.3 Application of Router Module

5.3.1 Internet Access

For SOHO (Small Office / Home Office) environment, the Router Module offers the NAT feature that allows multiple users on the LAN (Local Area Network) to access the Internet concurrently for the cost effective solution.

Auxiliary port can provide the Internet access with another PPP encapsulation link to the branch office or remote node by low speed modem such as analog modem or IDSL modem. See Figure 5.1.

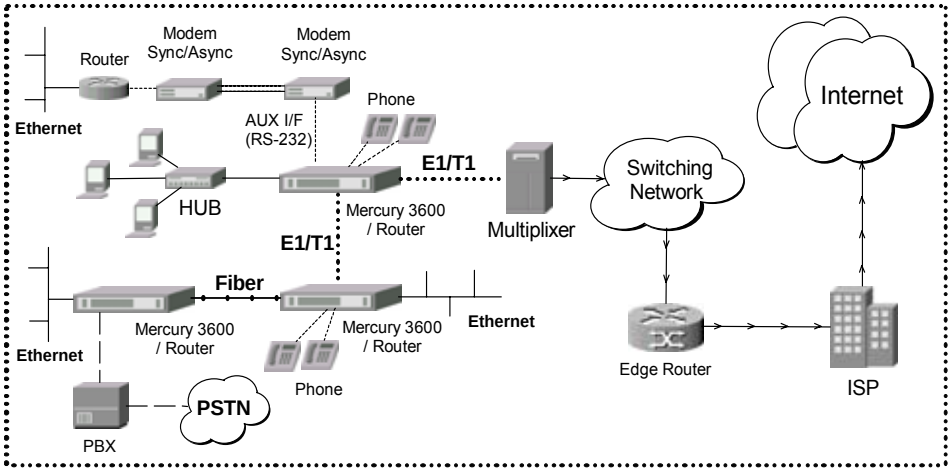


Figure 5.1 Internet Access with Mercury 3600

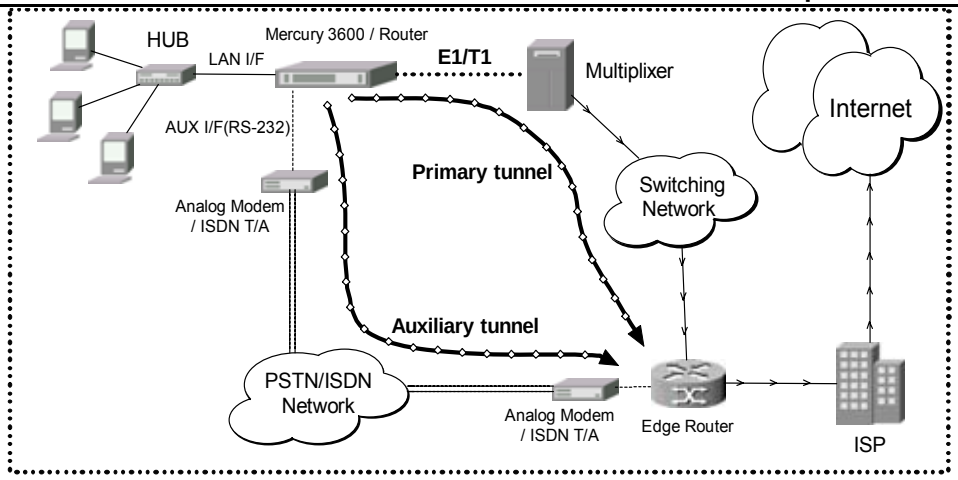


Figure 5.2 Auxiliary PPP connection

5.3.2 LAN-to-LAN

You can use the Mercury Series Product with Router Module to connect two or more geographically dispersed networks over the DSL loops (future) or E1/T1 TDM (Time Division Multiplexer) network via cross connect Router Module and serial interface. Mercury with Router can also operate in Frame Relay network.

Typical LAN-to-LAN applications for your Mercury are shown as follows.

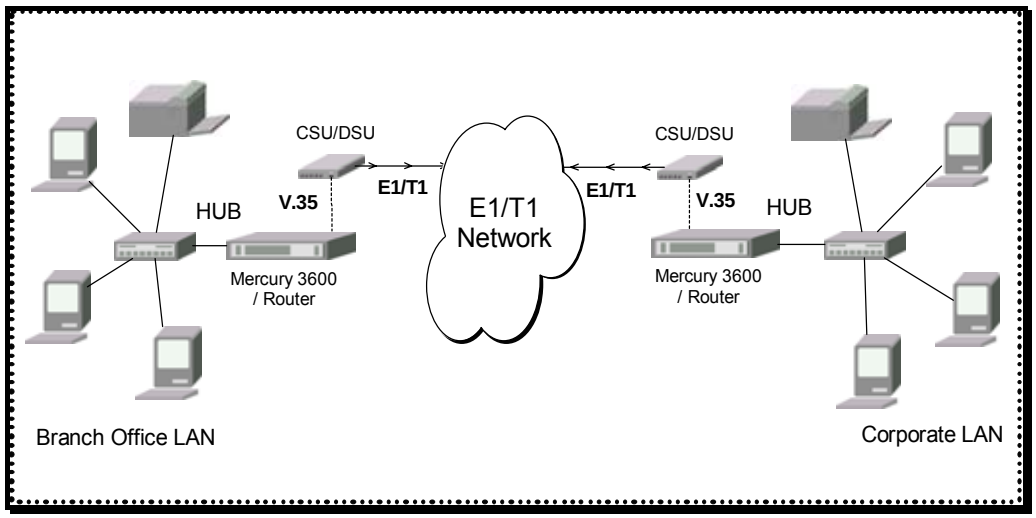


Figure 5.3 LAN-to-LAN Connectivity via PPP

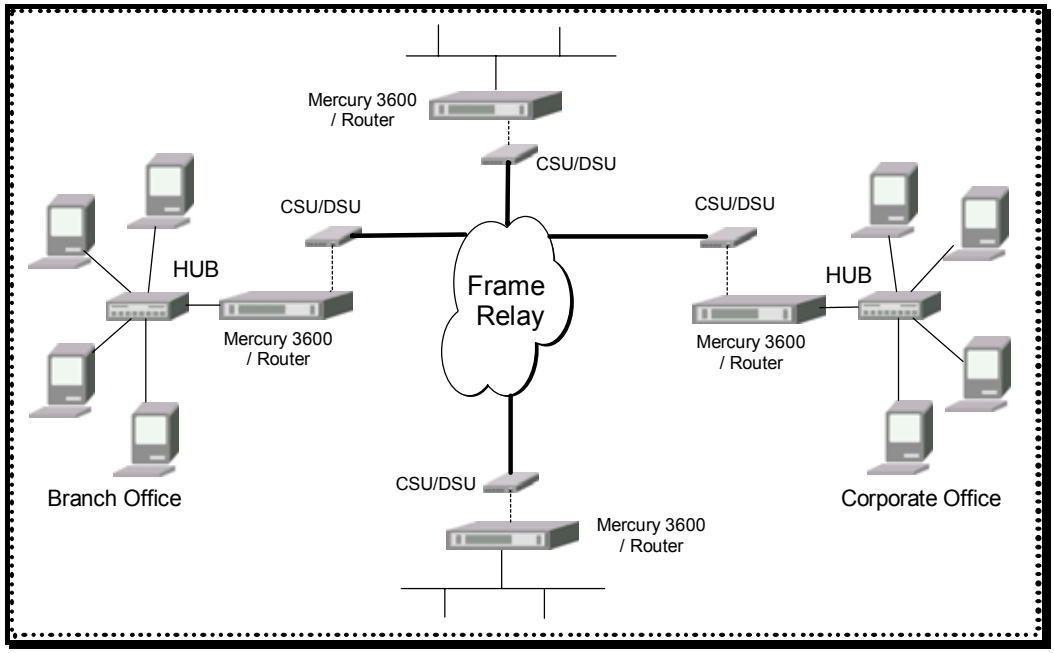


Figure 5.4 LAN-to-LAN Connectivity via Frame Relay

5.3.2.1 EMS

Collocate Router Module with Mercury Series Product to provide the NMS (Network Management System) function for the administrator. This includes:

- SNMP network management (refer to Section 5.6.8).
- Command Line management via TELNET.

Using UDP port 2000 to access into CLM (Command Line Management) of Mercury Series Product.

E.g. telnet aaa.aaa.aaa.aaa 2000 (aaa is the IP address of Router Module)

5.4 Configure Router Module from a PC

Access to the TCS can be done by two ways, console port session or Telnet session.

Access to the TCS via Console can be done via using VT-100 compatible terminal connect to Mercury's craft port or via an asynchronous lease line modem. If your router has been assigned an IP address, access to TCS by establishing a Telnet session onto the assigned IP address of the router “telnet [IP address]”.

5.4.1 Access via Console Mode

If you are configuring your router from a PC (not a dumb terminal), you need a type of communications software called terminal emulation software. The PC uses this software to send commands to your Router Modem. Table 5.1 lists some common names for this software, based on the type of PC you are using.

PC Operation System	Software
Windows 95,98,ME or NT	HyperTerm (included with Windows software)
Windows 3.1	Terminal (included with Windows software)
Macintosh	ProComm, VersaTerm (supplied separately)

Table 5.1 The lists of the emulated terminal software

You can use the terminal emulation to change settings for the type of device that is connected to the PC, in this case, configure the software to the following settings, so your PC can communicate with your Router Module, The default password for Console access is “root”, refer to section 5.6.2 to change your Console password.

	Craft port Type	Baud Rate	Data Bits	Parity	Stop bit	Flow Control
Mercury 3600	DCE	19200	8	No	1	None
Mercury 800/3820	DTE	19200	8	No	1	None

Table 5.2 The craft port settings for Mercury 800/3600/3820

After the Router Module has been successfully connected to your network, and has been assigned an IP address to the Router interface, you can then establish a TELNET session.

5.4.2 Access via Telnet Mode

If your Router Module has been assigned an IP address, access to TCS by establishing a TELNET session onto the assign IP address of Router “telnet [IP address]”.

The default username and password for TELNET access are both “root”. You can change username and password later on. Please refer to Section 5.6.2 for more detail.

Caution:
If the IP address is changed during configuration and the changes are saved, your TELNET session onto the router is broken. You can then telnet to the new IP address assigned during the configuration.

The Router Module is assigned a default IP address when shipped (192.168.254.254 with Network Mask 255.255.255.0). This IP address can be used to access the router via LAN as follows:

If you temporarily reconfigure a terminal to use the same network number as the default IP address (for example, the terminal could be assigned the IP address 192.168.254.1 with a network mask of 255.255.255.0).

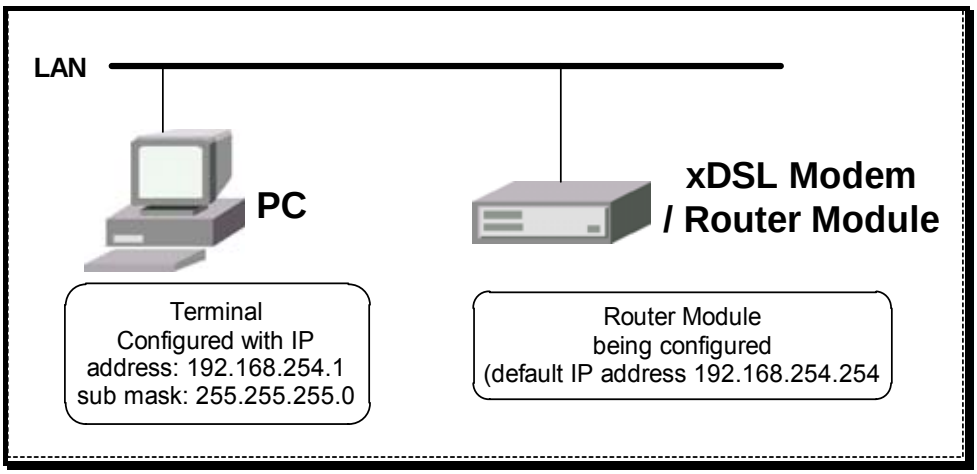


Figure 5.5 Access via Telnet functionality

Caution:

The IP address must not be in use by another device or a conflict may occur. The default IP address must not be used as the permanent IP address.

Router Module will not allow you to access TCS by Console or TELNET simultaneously.

It is up to you to determine which is the easiest way to access TCS to perform the initial configuration.

5.5 Navigating the TCS Interface

The TCS (Terminal Configuration System) is the interface that you use to configure your Router Module.

There are several operations you should become familiar with before attempting to modify the configuration.

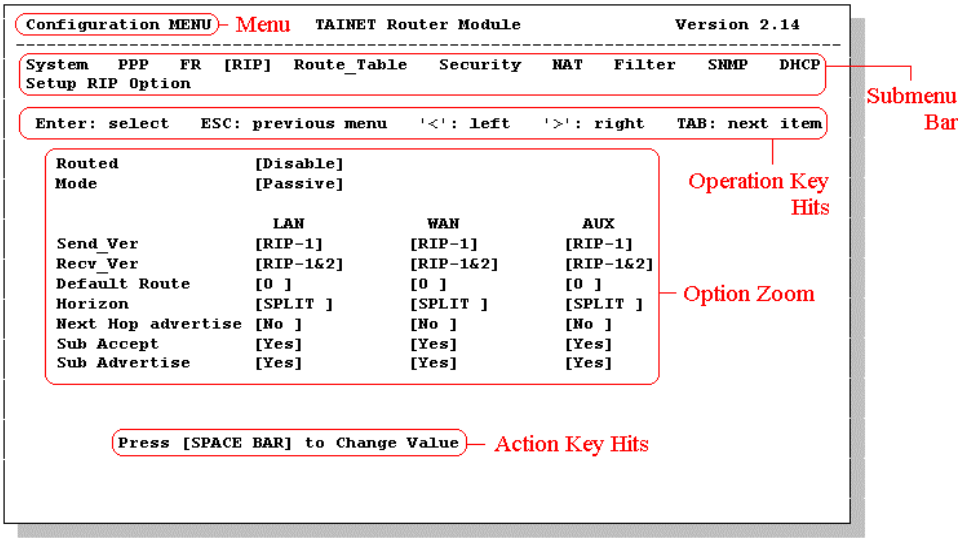


Figure 5.6 Describe the operation window when access into Router module

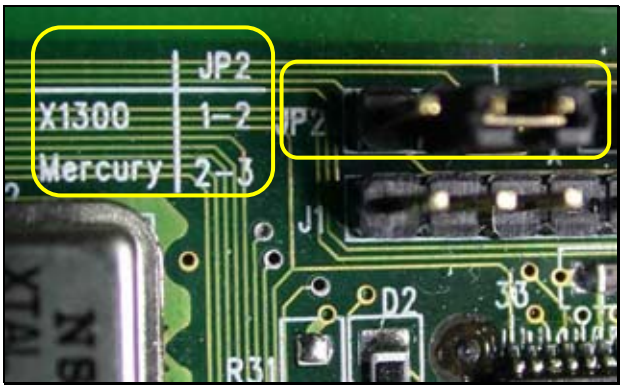
Operation	Key	Description
Move down to sub-menu	[ENTER]	To access in to a submenu.
Move up to previous menu	[ESC]	Press the [ESC] key to move back to the previous menu.
Move the Cursor	[<],[>],[TAB]	Use [<] or [>] to move cursor left and right or up and down, press [TAB] to move cursor sequence.
Enter information	Fill in, or press [SPACE BAR] to toggle.	You need to fill in two types of fields. The First requires you to type in the appropriate information. The second allows you to cycle through the available choices by pressing the [SPACE BAR].
Confirm your Configuration	[ENTER]	Save your configuration by selecting “YES” at the pop up “Confirm?” message. In most cases it will take you to the previous menu.
Exit the TCS	[ESC]	To exit the TCS interface, press [ESC] at the Main Menu prompt and pop up message “Logout” select “YES”.

Table 5.3 The operations of router module

5.6 Configuration of Router module (N-R)

5.6.1 The Description of N-R Configuration

The N-Router module for Mercury 800, named Router-L, can also be equipped into TAINET MSDSL modem Xstream 1300 with different jump connection on its main board. On Router-L’s main board, there is a Jump selection JP2 as shown in the following figure; for M800, please short Pin 2&3, and for Xstream 1300, please just short pin 1&2.



	JP2
X1300 modem	1-2
Mercury 800	2-3

Figure 5.7 N-R Jumper Configuration

System Setup	
Traffic Types	This field allows you to choose the traffic mode of your Router Module, Routing or Bridging.
LAN Setup	
IP Address	The IP address is a unique 4-byte (32-bit) numeric value used to identify a network and a local host on the network. Each IP address consists of four sets of decimal numbers separated by the period (e.g. 192.72.243.1). Each address is composed of two parts: a network part and a host part. The network part identifies the unique subnet that contains the host; the host part identifies the actual host device.
IP NetMask	The IP address netmask (also 32 bits, written in dotted decimal notation) is used in conjunction with an IP address to specify which bits of the address make up the network part and which the host part. A one (1) in a mask bit location means the corresponding bit in the IP address is part of the network value; a zero (0) means the corresponding bit is part of the host value.
MAC Address	Shown the Ethernet Address of your Router Module.
WAN Setup	
WAN Protocol	Selected the WAN protocol, Frame Relay or PPP encapsulation.
PPP, FrRelay and AUX Setup	
Local IP <PPP>	This parameter identifies the IP address for local WAN interface when the protocol is selected PPP.
IP NetMask <PPP>	The IP net mask for WAN when protocol is selected PPP.
Remote IP <PPP>	This parameter identifies the IP address for the WAN port on a remote router when the protocol is selected PPP.
Local IP <FR>	This parameter identifies the IP address for local WAN interface when the protocol is selected Frame Relay.
IP NetMask <FR>	The IP net mask for WAN when protocol is selected Frame Relay.
Remote IP <FR>	This parameter identifies the IP address for the WAN port on a remote router when the protocol is selected Frame Relay.

LMI type <FR>	A management protocol called LMI (Local Management Interface) provides information about the status of PVC-to-network access devices. It defines management frames for monitoring the integrity of a link and whether a link is active or not.(Carrier provide)
DLCI number <FR>	The specific DLCI (Data Link Connection Identifier) for each PVC, which is a path, number of a portion of the PVC (the DLCI changes for each hop through the network), not the address of the destination. It is a logical identifier with local significance only. Identifiers can range from 16 to 991.
AUX Port	Enable or Disable the AUX interface.
Local IP <AUX>	This parameter identifies the IP address for local AUX interface.
IP NetMask <AUX>	The IP net mask for AUX interface.
Remote IP <AUX>	This parameter identifies the IP address for the AUX port on a remote router.
AUX Port Speed	Selected the AUX port speed and data format, AUX interface is using PPP encapsulation.
Routing Table	
Default Gateway	In this field, enter the IP of the remote node that is the gateway for the static route.
Device Control	
Warm Start	Use this field to reload the new parameter, ***this is requiring when any value in LAN Setup, WAN Setup and AUX Setup has been modified.***
Restore Default	This field will restart the system and restore the factory default parameters.
Monitor	
LAN Rx Packets	The number of received packets from LAN port.
LAN Tx Packets	The number of transferred packets from LAN port.
LAN Rx Errors	The number of packets that are received from the LAN port with specific errors. (CRC error, frame error, missed packet, unknown or unsupported protocol, etc.)
LAN <RIP>	This field shows the current RIP status of LAN interface.
WAN Rx Packets	The number of received packets from WAN port.
WAN Tx Packets	The number of transferred packets from WAN port.
WAN Rx Errors	The number of packets that received from the WAN port with specific errors. (CRC error, frame error, missed packet, unknown or unsupported protocol, etc.)
WAN <RIP>	This field shows the current RIP status of WAN interface.
AUX Rx Packets	The number of received packets from AUX port.
AUX Tx Packets	The number of transferred packets from AUX port.
AUX Rx Errors	The number of packets that received from the AUX port with specific errors. (CRC error, frame error, missed packet, unknown or unsupported protocol, etc.)
AUX <RIP>	This field shows the current RIP status of AUX interface.
DHCP Server	This field identifies the DHCP Server function has enabled or disabled.
SNMP Agent	This field identifies SNMP Agent function has enabled or disabled
IP Filter	This field identifies IP Filter function has enabled or disabled.
NAT	This field identifies NAT function has enabled or disabled.

Diagnosis	
Ping	In this field, enter the IP address you wish to ping, " **.** " shows device is successful receiving responses from destination IP, " **!** " shows a failure.

Table 5.4 Description of Router Setting

Caution:

BE SURE TO WARM START YOUR ROUTER MODULE IF YOU HAVE CHANGED THE SETTING OF ANY PARAMETERS UNDER SYSTEM SETUP, LAN SETUP, WAN SETUP, PPP SETUP, FRRELAY SETUP AND AUX

Note:

Each sub-menu contains the individual selectable items. Some of the sub-menu trees might be changed and come after later version. User could download the updated software through Tainet's Internet Web site.
http://www.tainet.net/tech/upgrade_fam.htm

5.6.2 Change the System Password

Make a preliminary inspection of the shipping container before unpacking, Evidence of damage should be noted and reported immediately to the nearest Tainet representative. You should change the password to protect your Router Module and prevent unauthorized user.

The passwords are separated into two-part: "Console" and "Telnet".

To change the System Password, enter the Configuration menu and select *Security*.

```
 Configuration MENU          TAINET Router Module              Version 2.14
-------------------------------------------------------------------------------
System   PPP   FR   RIP   Route_Table  [Security]  NAT   Filter   SNMP   DHCP
Edit Console & Telnet Password

 Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

        Console Port Password        [root    ]

        Telnet                       [Enable ]

        Telnet Username              [root    ]

        Telnet Password              [root    ]

        Front Panel Config           [Disable]
```

Figure 5.8 The sub-menu to change the system password

Step 1. Enter your new Console password (up to 10 characters), and press [ENTER]. The cursor will now move down to "Telnet" selection.

Step 2. At Telnet selection press [SPACE BAR] to enable or disable this field, to

change the Telnet username and password please select enable. If you don't want to activate the Telnet connection, select disable.

Step 3. Change Telnet Username and Password.

Step 4. Enable or disable the front panel control, select disable to lock the front panel. This will allow user to only view front panel display status.

Step 5. After you have changed the password properly, the confirm menu will pop-up, select "YES" for confirmation. If you have changed any parameter in this menu, the TCS will require you to restart the Router Module to make the new setting effective.

5.6.3 Organization of TCS menu tree

The TCS (Terminal Configuration System) is user friendly configuration interface. To use TCS you can configure and monitor the Router Module for advanced management.

The following diagram will help you easily understand the TCS Organization menu.

5.6.3.1 Main Menu

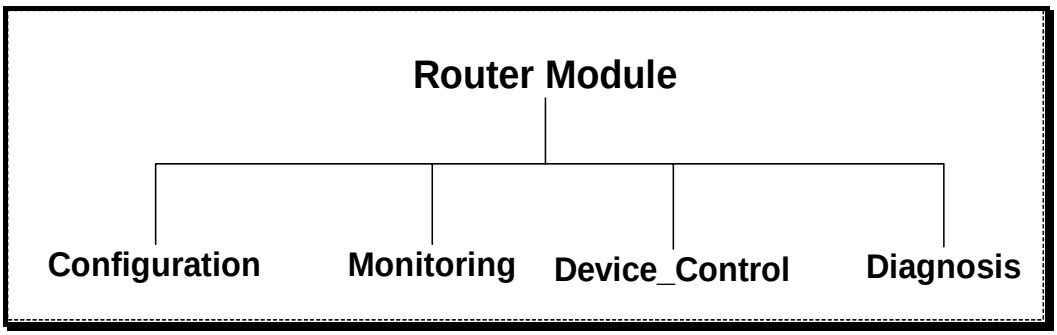


Figure 5.9 The main menu tree in router module

There are four categories in Main Menu:

- Configuration:
  - This menu includes all configuration of WAN and LAN, and some advanced management. The detailed settings of this menu will be discussed in later sections.
- Monitoring:
  - Use monitoring menu to view system status, interface statistics and routing table.
- Device Control:
  - The device control menu allows you to restore the default parameter, upgrade Mercury's firmware, or warm start your Router Module to running the current parameters.
- Diagnosis:

- In the diagnosis menu you can use ICMP ping echo to perform diagnostic checks on your network or view current software version of BOOT ROM and FLASH.

5.6.3.2 Configuration Menu

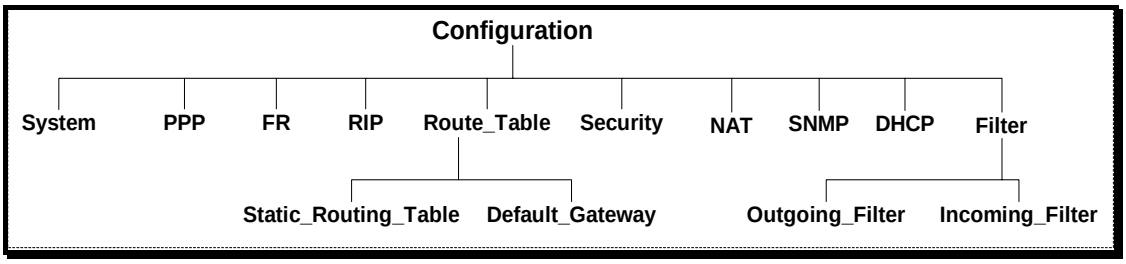


Figure 5.10 The sub-menu tree of Configuration menu

Configuration Menu includes most general settings and features for your Router Module; you will find more detailed settings in a later session.

- System:
  - This field includes the Ethernet IP and AUX interface setup, and also allows you to choose the WAN interface encapsulation and traffic type.
  - You can activate the DHCP server and SNMP agent in this field.
- PPP:
  - Setup your PPP encapsulation for WAN interface in this field.
  - You can activate the NAT and Filter feature in here.
- FR Setup the Frame Relay encapsulation for WAN interface in this field.
- RIP:
  - Router Module supports both RIP version 1 and version 2 routing protocol for your LAN, WAN and AUX interfaces.
- Route_Table:
  - Configure the static routing table and default route for your network in this field.
- Security:
  - This field allows you to change the Username and Password for Console and TELNET access.
- NAT Setup the Static NAT and NAPT in this field.
- SNMP Enable the SNMP function in this field.
- DHCP Setup the DHCP Server in this field.
- Filter Generate your Routing Access List in this field.

5.6.3.3 Monitoring menu

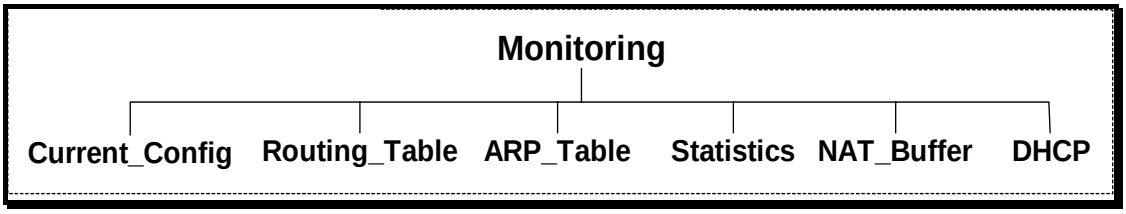


Figure 5.11 The sub-menu tree of Monitoring menu

- Current_Config:

```
 Monitoring MENU             TAINET Router Module                Version 2.14
-------------------------------------------------------------------------------
[Current_Config]  Routing_Table   ARP_Table   Statistics   NAT_Buffer   DHCP
 View Current Configuration

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

              LAN Status               [ UP ]
              LAN IP Address           172.16.15.254
              LAN IP NetMask           255.255.240.0
              Active MAC Address       0090bb910521

              WAN Type/Status          [ PPP ]/[ UP ]
              WAN Local IP Address     192.168.0.1
              WAN IP NetMask           255.255.255.255
              WAN Remote IP Address    192.168.0.2

              AUX Status               [ PPP ]/[ DOWN ]
              AUX Local IP Address     0.0.0.0
              AUX IP NetMask           0.0.0.0
              AUX Remote IP Address    0.0.0.0

              Press any key to return.
```

Figure 5.12 The sub-menu to view current configuration

Using current configuration submenu to diagnosis the type and status of each interface.

■ Routing Table:

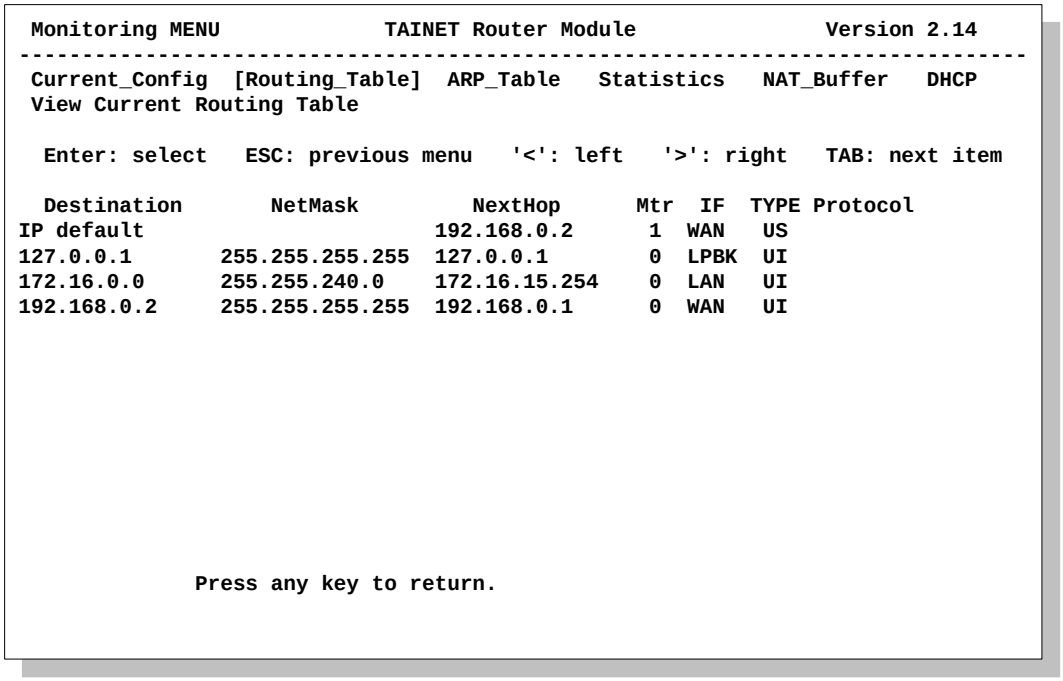


Figure 5.13 The sub-menu to show the current routing table

The Routing table shows all the routing information, and it includes Static Routes, RIP v1 and RIP v2.

The next table will describe the fields.

Field	Description
Destination	It specifies the IP network address of the final destination. If "0.0.0.0" appears in the field, this entry specifies the "Default Gateway" of route information.
NetMask	It represents the IP netmask of the destination IP address.
NextHop	It represents the IP address of the next router for transmission of the IP datagram to the destination network segment.
IF	Identify the IP routing to the corresponding interface
Type Protocol	First character (Status) U: The route is valid (up) and in use. D: The route is invalid (down) and has a metric of 16 (RIP infinity) Second character (Source) I: The route is a direct connection R: the route is established from RIP information. S: The route is a static route.
Mtr	The metric represents the cost of transmission for routing purposes.

Table 5.5 Descriptions of the Field

■ ARP_Table:

```
 Monitoring MENU             TAINET Router Module                Version 2.14
-------------------------------------------------------------------------------
 Current_Config   Routing_Table  [ARP_Table]  Statistics   NAT_Buffer   DHCP
 View Current ARP Table

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

           IP                  MAC-Addr
    172.16.5.74              0080c8469a5f
    172.16.5.41              00d05926d6e1
    172.16.5.106             0080c8e95c78









             Press any key to return.
```

Figure 5.14 The sub-menu to view the ARP table

The ARP table lists the LAN MAC addresses, which are learned by the Router Module. The Router Module learns a device MAC address when IP traffic is generated between the router and other devices.

■ Statistics:

```
 Monitoring MENU             TAINET Router Module                Version 2.14
-------------------------------------------------------------------------------
 Current_Config   Routing_Table   ARP_Table  [Statistics]  NAT_Buffer   DHCP
 View Device Statistics

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

                              LAN        WAN        AUX
    Rx Octets :             11265415  201421296          0
    Rx Right Packets :         75398     179206          0
    Rx Broadcast Packets :     82521          0          0
    Rx Discarded Packets :         0          0          0
    Rx Error Packets :             1          0          0
    Rx Unknow Protocols :      12725          0          0
    Tx Octets :            201682346    5207276          0
    Tx Packets :              135856     117713          0
    Tx Broadcast Packets :         2          0          0
    Tx Discarded Packets :         0          0          0

    Rx Throughput Octets :       286         24          0
    Tx Throughput Octets :       400         25          0

              Press any key to return.
```

Figure 5.15 The sub-menu for current statistics

The Statistics provides a snapshot view of interface packets flow count, the screen will automatically refresh to provide the current status.

- NAT Buffer

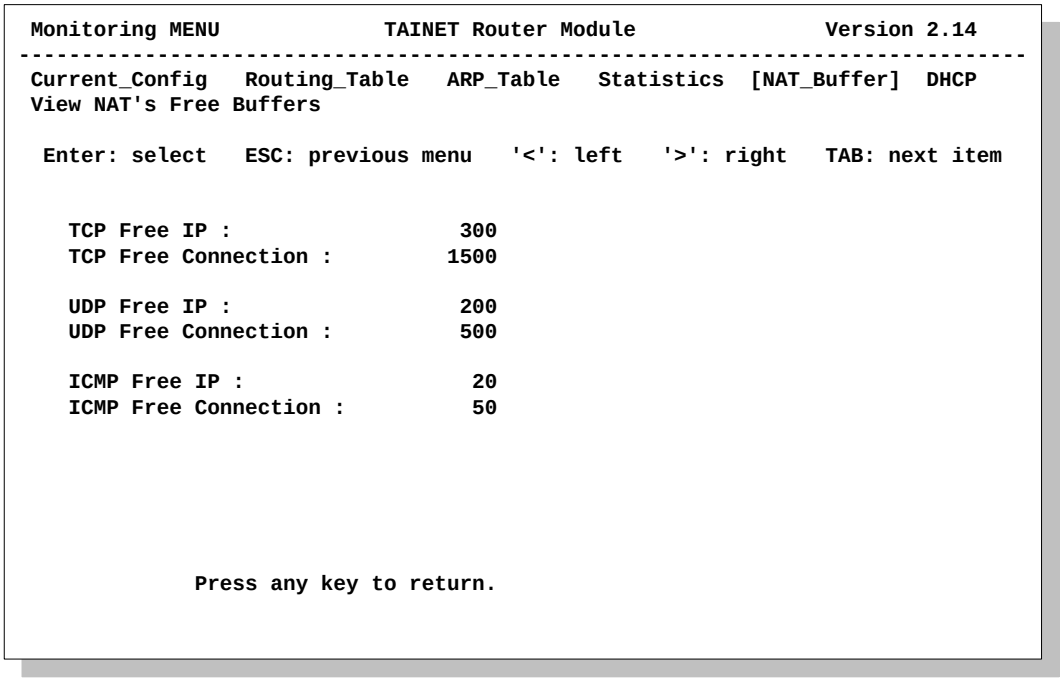


Figure 5.16 The sub-menu to show current NAT Buffer

Field	Description
TCP Free IP	The remaining IP address available for NAT process with TCP protocol, maximum IP allows for TCP are 300.
TCP Free Connection	The remaining connections available for NAT process with TCP protocol, maximum connections allow for TCP are 1500.
UDP Free IP	The remaining IP address available for NAT process with UDP protocol, maximum IP allows for UDP are 200.
UDP Free Connection	The remaining connections available for NAT process with UDP protocol, maximum connections allow for UDP are 500.
ICMP Free IP	The remaining IP address available for NAT process with ICMP protocol, maximum IP allows for ICMP are 20.
ICMP Connection	The remaining connections available for NAT process with ICMP protocol, maximum connections allow for ICMP are 50.

Table 5.6 NAT Buffer description

- DHCP Table:

```
 Monitoring MENU            TAINET Router Module              Version 2.14
-------------------------------------------------------------------------------
 Current_Config   Routing_Table   ARP_Table   Statistics   NAT_Buffer  [DHCP]
 View Dynamic Leases Currently in Use

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

  IP Address Currently Used in The Dynamic Leases:
  ------------------------------------------------------------------------
    IP Address      Ethernet Address     Lease Time Remaining    Lease Time









              Press any key to return.
```

Figure 5.17 The sub-menu for DHCP table

The DHCP table shows the IP lease situation, and you can view the remaining time for the IP address, which has been dynamically and statically leased. It also shows the corresponding MAC address and IP assigned lease time.

5.6.3.4 Device Control

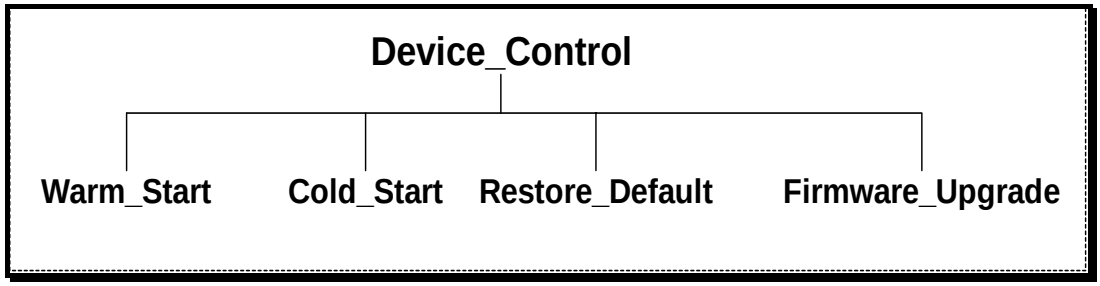


Figure 5.18 The sub-menu tree of Device_Control menu

Device Control menu allows you to restore the default parameters and update the firmware.

- Warm_Start:

This command will cause the system to restart and reload the new parameters, it also interprets the WAN and LAN connection.

- Cold_Start:

Cold start will reboot the Router Module; this command can be used if and only if you have updated the firmware.

- Restore_Default:

This command will restart the system and restore the factory default parameters.

■ Firmware_Upgrade:

This function allows you to update the Router software using a TFTP Server; refer to chapter 9 for more detailed procedures.

5.6.3.5 Diagnosis Menu

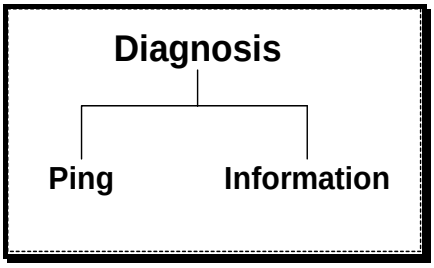


Figure 5.19 The sub-menu tree of Diagnosis menu

There are two submenus included in diagnosis menu: Ping and Information.

■ Ping:

```
 Diagnosis MENU              TAINET Router Module              Version 2.14
------------------------------------------------------------------------------
[Ping]  Information   Debug
 IP Connectivity

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

         Target IP Address            [172.16.5.41    ]

         Repeat Count                 [5   ]

         Datagram Size                [100]

         Timeout in seconds           [2 ]

                    5 of 5 0.01 seconds

          Success : 5 / 5 = 100% ; Average Time : 0.01 seconds

                    Max : 0.01 seconds, Min : 0.01 seconds


                   Press any key to continue.
```

Figure 5.20 The Ping command for Diagnosis in Diagnosis menu

When you encounter an IP routing problem such as not being able to communicate with a remote host, or if you simply want to verify connectivity, you can use the ping command to help you perform diagnosis on it.

■ Information:

This option shows the current version of BOOT ROM and FLASH firmware.

5.6.4 LAN and WAN Configuration

This chapter will show you how to configure the LAN as well as the WAN of your Router Module with PPP and Frame Relay connection.

5.6.4.1 Ethernet Setup

You can have TCP/IP setup for your Router Module at *Configuration – System* menu.

```
 Configuration MENU          TAINET Router Module              Version 2.14
-------------------------------------------------------------------------------
[System]  PPP   FR   RIP   Route_Table   Security   NAT   Filter   SNMP   DHCP
 Setup LAN Local IP, SubNetMask & WAN Protocol & AUX IP, SubNetMask, Remote IP

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

         Traffic Types                [IP Routing       ]

         LAN IP Address               [172.16.14.1    ]
         LAN IP NetMask               [255.255.240.0  ]

         WAN Protocol                 [PPP        ]

         AUX Port / Speed             [Disable    ]   [Sync_External]
         AUX Local IP Address         [0.0.0.0        ]
         AUX IP NetMask               [0.0.0.0        ]
         AUX Remote IP Address        [0.0.0.0        ]

         SNMP                         [Disable]
         DHCP Daemon                  [Disable]
          Press [SPACE BAR] to Change Value
```

Figure 5.21 System Encapsulate

Traffic Types indicate whether your Router module is in Bridge Mode or Routing Mode.

Under System encapsulate option, you enable it to configure LAN interface with an IP address and a subnet mask. The IP address should be your router Ethernet IP address.

5.6.4.2 Setting up the WAN PPP link

```
 Configuration MENU          TAINET Router Module              Version 2.14
-------------------------------------------------------------------------------
 System  [PPP]  FR   RIP   Route_Table   Security   NAT   Filter   SNMP   DHCP
 Setup WAN Local IP, SubNetMask, Remote IP over PPP

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

         PPP Local IP Address         [10.0.0.1       ]

         PPP IP NetMask               [0.0.0.0        ]

         PPP Remote IP Address        [10.0.0.2       ]

         NAT                          [Disable]

         Filter                       [Disable]
```

Figure 5.22 PPP configure for WAN interface

At *Configuration – PPP* you can configure the WAN port data mode and PPP encapsulation.

The WAN LED on Router rear panel can help you with diagnosis of the WAN port PPP link and see whether it is successfully connected and whether PPP protocol is up. You can also check it from *Monitoring Menu – Current Config* to make sure the PPP link is UP.

If you have set up the physical WAN port connection and configured the PPP encapsulation with proper static, but the WAN LED goes out and the *Current Config* shows WAN status is down, then you have to focus on both the setting of PPP encapsulation and the physical connection. When WAN LED is lit it means "Serial is up and protocol is up". The following are the examples of WAN PPP setting.

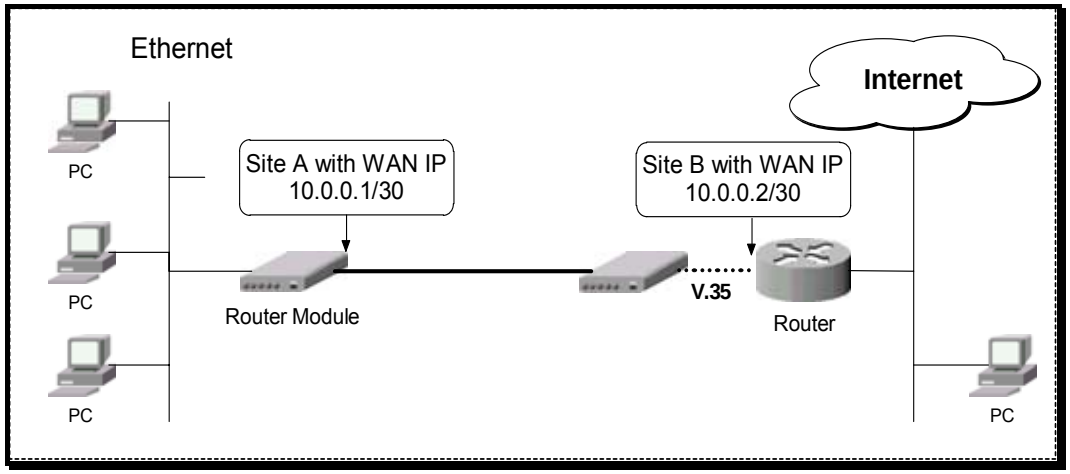


Figure 5.23 WAN port Point-to-Point connection

The above diagram is the WAN PPP link; configuration of your Router Module could be like follow.

Site A (10.0.0.1/30)			**Site B (10.0.0.2/30)**		
Traffic Types	IP ROUTING		**Traffic Types**	**IP Routing**	
Encapsulate <PPP>	Local IP address	10.0.0.1	Encapsulate <PPP>	Local IP address	10.0.0.2
	Net Mask	255.255.255.252		Net Mask	255.255.255.252
	Remote IP address	0.0.0.0		Remote IP address	0.0.0.0

Table 5.7 Example of PPP settings (1)

The standard PPP encapsulate can be set up as above table or you can assign the IP to the remote site.

Site A (10.0.0.1/30)			Site B (10.0.0.2/30)		
Traffic Types	**IP Routing**		**Traffic Types**	**IP Routing**	
Encapsulate <PPP>	Local IP address	0.0.0.0	Encapsulate <PPP>	Local IP address	10.0.0.2
	Net Mask	0.0.0.0		Net Mask	255.255.255.252
	Remote IP address	0.0.0.0		Remote IP address	10.0.0.1

Table 5.8 Example of PPP settings (2)

Note:
The IP shown this section are examples. You should substitute the IP values shown with values that are appropriate for your network.
The configuration for Table 5.8 is the example to setup the client-server mode for WAN PPP. The WAN IP at site A will be the remote IP assigned at site B router.

■

■ Unnumbered Setting

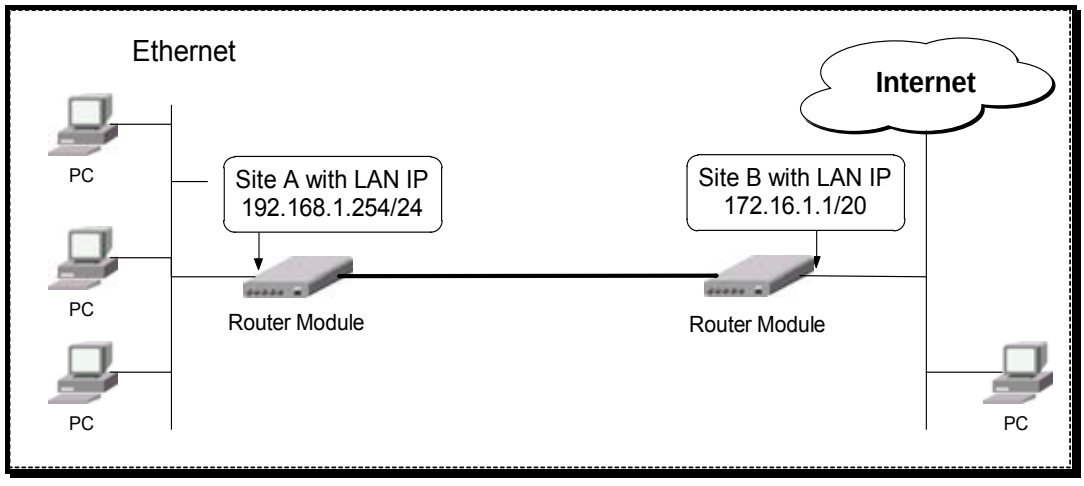


Figure 5.24 WAN IP unnumbered setting

Site A (unnumbered)			Site B (unnumbered)		
Traffic Types	**IP Routing**		**Traffic Types**	**IP Routing**	
Encapsulate <PPP>	Local IP address	192.168.1.254	Encapsulate <PPP>	Local IP address	172.16.1.1
	Net Mask	255.255.255.255		Net Mask	255.255.255.255
	Remote IP address	0.0.0.0		Remote IP address	0.0.0.0

Table 5.9 IP unnumbered configuration

IP unnumbered configuration allows you to enable IP processing on a serial interface without assigning it an explicit IP address.

Configure the PPP Local IP Address the same as the Router LAN IP and assign Net Mask IP to 255.255.255.255 will now enable the WAN IP unnumbered.

5.6.4.3 Setting up the Auxiliary PPP link

```
 Configuration MENU          TAINET Router Module                Version 2.14
-------------------------------------------------------------------------------
[System]  PPP   FR   RIP   Route_Table   Security   NAT   Filter   SNMP   DHCP
 Setup LAN Local IP, SubNetMask & WAN Protocol & AUX IP, SubNetMask, Remote IP

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

         Traffic Types                [IP Routing       ]

         LAN IP Address               [172.16.14.254  ]
         LAN IP NetMask               [255.255.240.0  ]

         WAN Protocol                 [PPP        ]

         AUX Port / Speed             [Enable     ]   [Sync_External]
         AUX Local IP Address         [100.0.0.1      ]
         AUX IP NetMask               [255.255.255.0  ]
         AUX Remote IP Address        [100.0.0.2      ]

         SNMP                         [Disable]
         DHCP Daemon                  [Disable]
```

Figure 5.25 PPP configure for AUX interface

Auxiliary serial interface operates at standard RS-232/V.24 DTE. You should find the RJ-45 cable and RJ-45-to-RS-232M adapter when you unpack, it supports both Asynchronous and Synchronous data transmission format. Asynchronous selectable data rates are: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps; 8 data bits, none parity, 1 stop bit and none flow control. Synchronous data transmission supports up to 128 Kbps.

Caution:
Upon pressing the front panel PPP / Craft button to change to normal craft mode or auxiliary PPP mode, please remember to enable the setting by removing and re-connecting the power adapter to reset the system. All settings for Mercury 800 and 3820 may be lost if they are not stored into profile in advance.

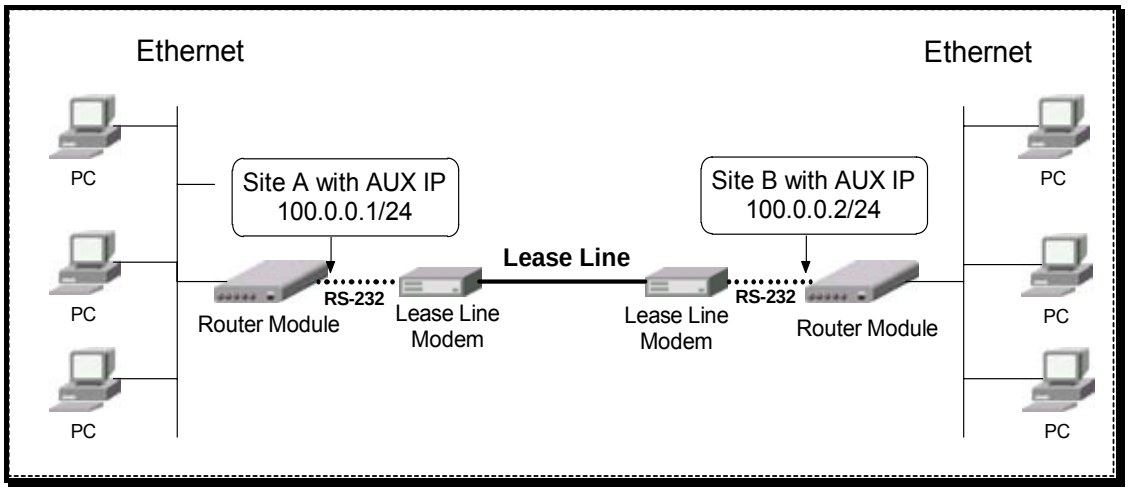


Figure 5.26 AUX PPP link

Site A (100.0.0.1/24)			**Site B (100.0.0.2/24)**		
Traffic Types	**IP Routing**		**Traffic Types**	**IP Routing**	
Encapsulate <PPP>	Local IP address	100.0.0.1	Encapsulate <PPP>	Local IP address	100.0.0.2
	Net Mask	255.255.255.0		Net Mask	255.255.255.0
	Remote IP address	0.0.0.0		Remote IP address	0.0.0.0

Table 5.10 Example of AUX port PPP setting (1)

The standard PPP encapsulate can be set up as above table or you can assign the IP to the remote site.

Site A (100.0.0.1/24)			**Site B (100.0.0.2/24)**		
Traffic Types	**IP Routing**		**Traffic Types**	**IP Routing**	
Encapsulate <PPP>	Local IP address	100.0.0.1	Encapsulate <PPP>	Local IP address	0.0.0.0
	Net Mask	255.255.255.0		Net Mask	0.0.0.0

	Remote IP address	100.0.0.2		Remote IP address	0.0.0.0

Table 5.11 Example of AUX port PPP setting (2)

■ Unnumbered Setting

IP unnumbered can be configured for AUX interface as well.

Configure the AUX Local IP Address the same as the Router LAN IP and assign Net Mask IP to 255.255.255.255 will now enable the AUX IP unnumbered.

5.6.4.4 Frame Relay Setup

Configuring Frame Relay on a Router Module includes the mapping of IP addresses to DLCIs and telling the router which virtual circuits are connected.

Enable the Frame Relay Encapsulation by changing the WAN protocol to Frame Relay. See the following Figure 5.27.

```
 Configuration MENU          TAINET Router Module              Version 2.14a
-------------------------------------------------------------------------------
[System]  PPP   FR   RIP   Route_Table   Security   NAT   Filter   SNMP   DHCP
 Setup LAN Local IP, SubNetMask & WAN Protocol & AUX IP, SubNetMask, Remote IP

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

         Traffic Types                [IP Routing       ]

         LAN IP Address               [172.16.14.254  ]
         LAN IP NetMask               [255.255.240.0  ]

         WAN Protocol                 [Frame Relay]
```

Figure 5.27 Frame Relay WAN Encapsulation

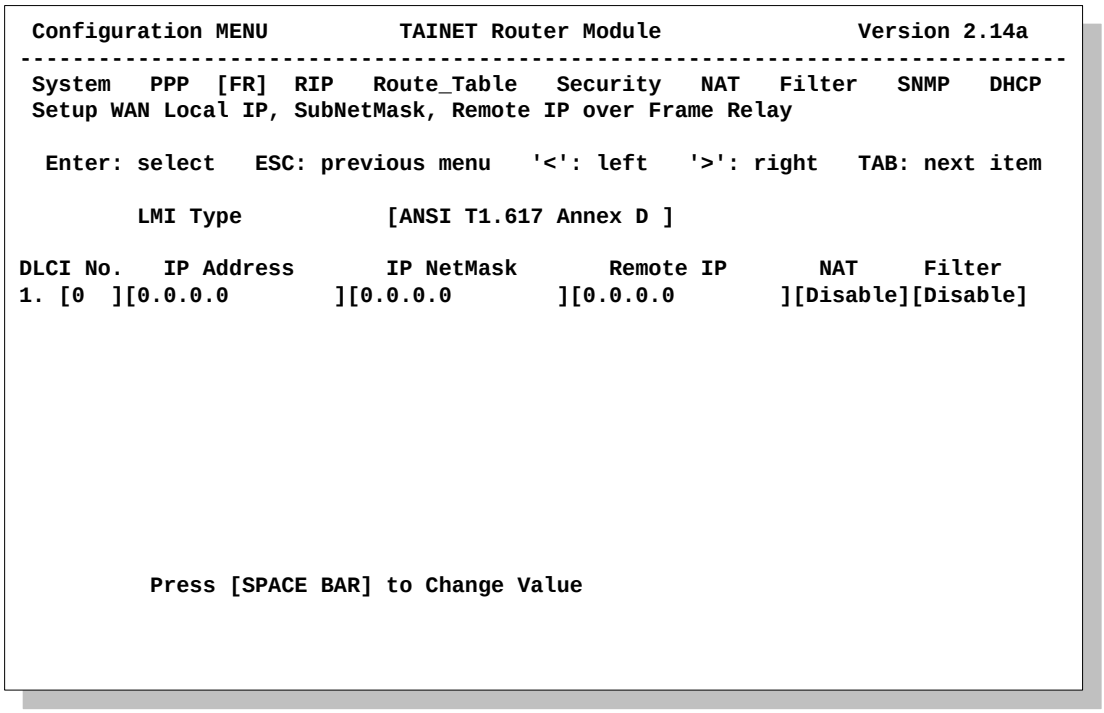


Figure 5.28 Frame Relay Encapsulations to setup LMI and DLCI

5.6.4.5 Encapsulation

The Router Module supports IP over Frame Relay encapsulation as described in RFC 1490, which is the method for carrying network interconnect traffic over a frame relay backbone. It also describes a simple fragmentation procedure for carrying large frames over a frame relay network with a smaller MTU.

5.6.4.6 LMI

The carrier also gives you the LMI (Local Management Interface) types; The LMI is a set of enhancements to the basic Frame Relay specification. LMI includes support for keepalives, a multicast mechanism, global addressing, and a status mechanism. Your Router Module supports three LMI standards: *ANSI T1.617 Annex D*, *CCITT Q.933a Annex A* and *LMI by Frame Relay Forum*.

5.6.4.7 DLCI

The carrier gives you a specific DLCI (Data Link Connection Identifier) number, for each PVC, that is a path number of a portion (the DLCI changes for each hop through the network), not the address of the destination. It is a logical identifier with local significance only. Identifiers can range from 16 to 991.

5.6.4.8 Manipulation Frame Relay via WAN

```
 Configuration MENU          TAINET Router Module                Version 2.14a
-------------------------------------------------------------------------------
 System   PPP  [FR]  RIP   Route_Table   Security   NAT   Filter   SNMP   DHCP
 Setup WAN Local IP, SubNetMask, Remote IP over Frame Relay

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

         LMI Type           [ANSI T1.617 Annex D ]

DLCI No.   IP Address       IP NetMask       Remote IP       NAT     Filter
1. [110][10.0.0.1       ][255.255.255.0  ][168.192.0.1    ][Disable][Disable]
```

Figure 5.29 An example of manipulation Frame Relay

DLCI parameter table allows you to configure the remote IP nodes. Information of DLCI parameters should match those of the Frame Relay switch.

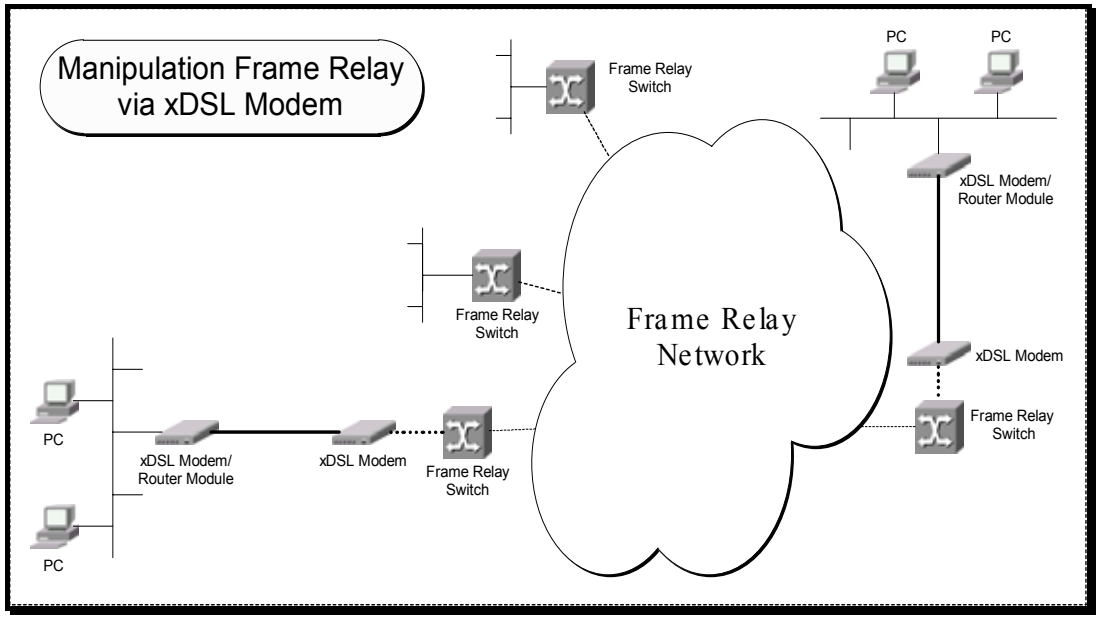


Figure 5.30 Manipulation Frame Relay via xDSL Modem

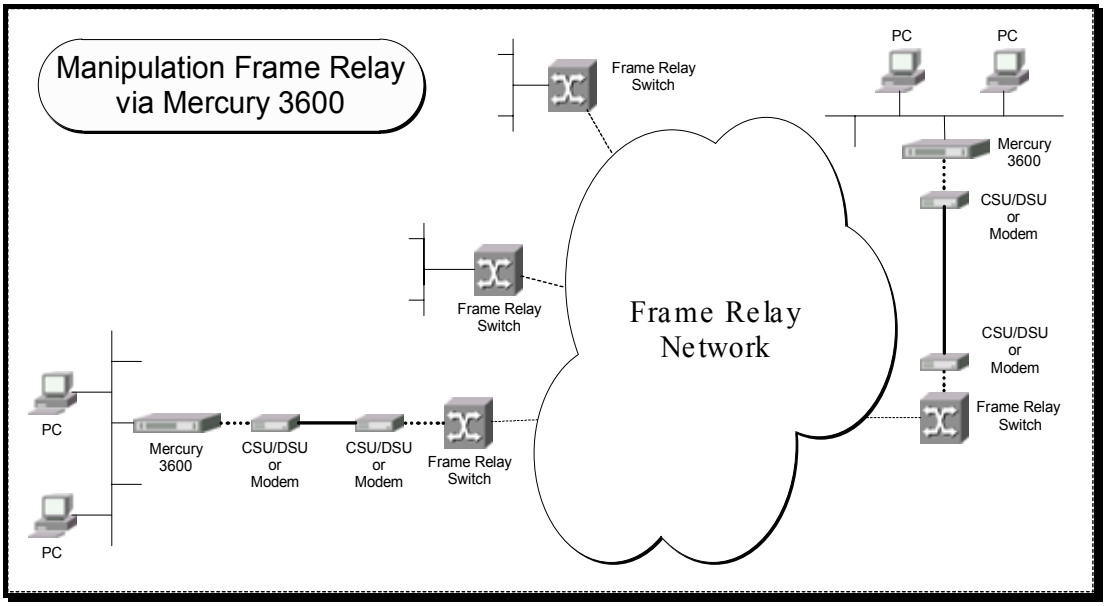


Figure 5.31 Manipulation Frame Relay via Mercury Series Product

5.6.5 Bridging and Routing Access Configuration

This section shows you how to configure Router Module to act as Bridge, perform Internet routing, set up RIP.

5.6.5.1 Bridging Ethernet Setup

Bridging is based on the forwarding decision using the MAC (Media Access Control), or hardware address, while routing does it on the network layer (IP or IPX) address. Compared to routing, bridging generates more traffic for the same network layer protocol and it also demands more CPU cycles and memory.

For efficiency reasons, run bridging mode to support protocols other than IP on your network.

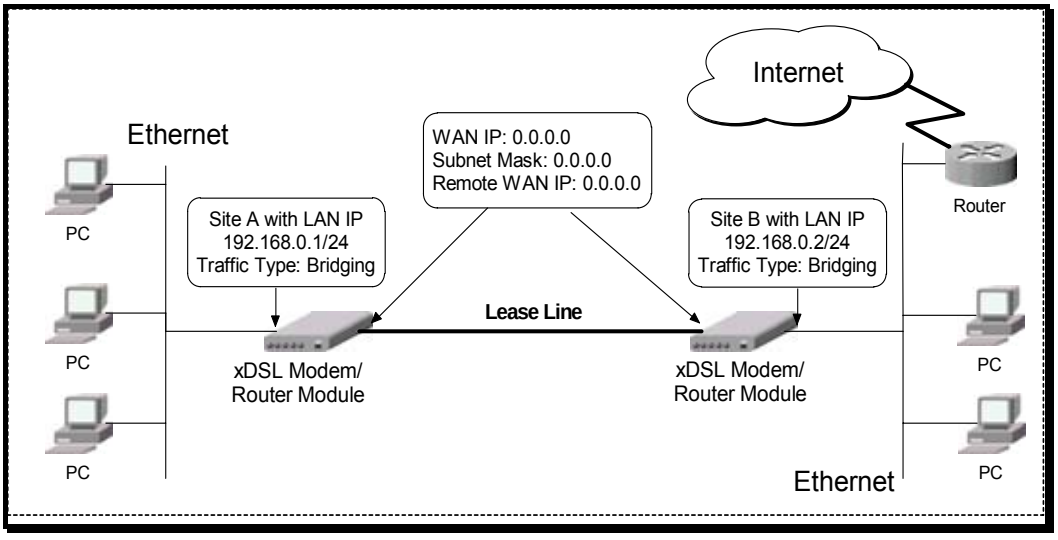


Figure 5.32 Application of Bridging Ethernet

In bridging mode; you can still assign a specific IP to Router LAN interface, this will

allow you to telnet into Router Module for further configuration. Bridging function can be configured at *Configuration – System – Traffic Types*.

```
 Configuration MENU          TAINET Router Module              Version 2.14a
--------------------------------------------------------------------------------
[System]  PPP   FR   RIP   Route_Table   Security   NAT   Filter   SNMP   DHCP
 Setup LAN Local IP, SubNetMask & WAN Protocol & AUX IP, SubNetMask, Remote IP

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

         Traffic Types                [Ethernet Bridging]

         LAN IP Address               [192.168.0.1    ]
         LAN IP NetMask               [255.255.255.0  ]
```

Figure 5.33 The sub-menu to setup Ethernet Bridging

When operating in Bridging mode, the rear panel WAN LED will go into a flash state, as the WAN interface detects data flowing across it.

5.6.5.2 RIP function Setup

Routing Information Protocol (RIP) is a distance vector protocol for use in intra-domain (on the interior of a gateway). There are actually two versions of RIP in the TCP/IP protocol suite. Version 1 is the original. Version 2 is the updated version. Version 2 is used almost exclusively because of its enhanced capabilities.

Your Router Module supports both RIP-1 and RIP-2, RIP-1 is universally supported; but RIP-2 carries more information. RIP-1 is probably adequate for most networks, unless you have an unusual network topology.

Configuration can be performed on a per-interface basis. You can enable or disable RIP for each interface, WAN, AUX and LAN. The following table describes the RIP option of your Router Module.

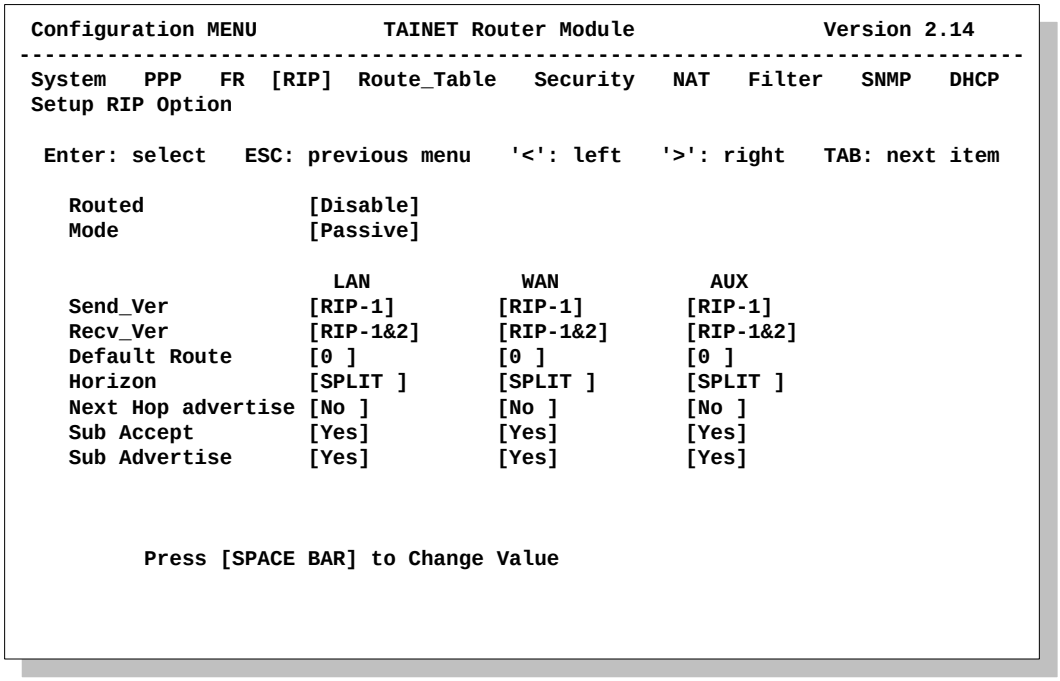


Figure 5.34 The sub-menu of RIP function

Routed: Enable or Disable the RIP function for all interfaces.	
*** Disable**	Disable the RIP routing protocol.
Enable	Enable the RIP routing protocol.
Mode: The interface can execute passive or active RIP. When executing passive RIP, the interface revises its routing table based on the routing update information it receives, but does not advertise self-routing information to other routers. When configured for active RIP at specific interface that acts as a full router; it not only listens for updates but also advertises its routing table information every 30 seconds.	
*** Passive**	Enable Passive RIP. (Receive RIP packet only)
Active	Enable Active RIP. (Receive and send RIP table)
Send_Version: Controls the version(s) of RIP advertisements. Available with active RIP only.	
OFF	Disable the version(s) of RIP advertisement.
*** RIP-1**	Enable the RIP version 1 advertisement.
RIP-2	Enable the RIP version 2 advertisement.
Reveive_Version: Controls the version(s) of RIP updates that are accepted.	
OFF	Disable the version(s) of RIP upgrades that are accepted.
RIP-1	Enable the version of RIP-1 upgrades that are accepted.
RIP-2	Enable the version of RIP-2 upgrades that are accepted.
*** RIP-1&2**	Enable the versions of RIP-1 and RIP-2 upgrades that are accepted.
Default Route: Controls and sets the Mercury (or Tainet WANpro product) to advertise itself as the default router.	
*** 0**	Disable
1~15	Enable and specify the number of hops to a destination.
Horizon: Controls the spilt horizon and poison reverse mechanisms. Available with active RIP only.	
*** SPLIT**	Split horizon
POISON	Poison reverse
Next Hop Advertise: Specify whether or not the next hop value is included in the RIP version 2 advertisements. Available with active RIP only.	

YES	Next hop value will not be included in the RIP version 2 advertisements.
*** NO**	Next hop value will not be included in the RIP version 2 advertisements.
Sub Accept: Control whether or not subnet routes are accepted in updates.	
*** YES**	Subnet routes will be accepted in updates.
NO	Subnet routes will not be accepted in updates.
Sub Advertise: Controls whether or not the RIP advertises subnets. Available with active RIP only.	
*** YES**	RIP advertises subnets.
NO	RIP does not advertise subnets.
Note: A "*" denotes the default value of RP parameter.	

Table 5.12 RIP Setup Menu – Handle Routing Protocol configuration

- Router Module firmware version before and include 2.13

Router Module sends both of RIP-1 and RIP-2 in broadcasting mode, if you have third party router connected with Router Module in the same network segment or remote node, please configure the third party router RIP-2 to broadcasting mode, therefore the third party router can receive the RIP-2 form Route Module, because it does not support RIP-2 with multicasting mode.

Generally if RIP-2 operates in multicasting mode, it does not listen to the RIP-2 broadcasting and so will not receive the RIP-2 packets. However, if one router uses broadcasting, then all routers on your network must use broadcasting.

- For Router Module Firmware version after 2.13

RIP-2 protocol supports multicasting, so be sure you have turned off *Next Hop Advertise*, example on CISCO Router needs to configure *Neighbor Route* so routing protocol can be built up in between.

5.6.5.3 Configuring Static Routes & Default Routes

Routes between network segments sometimes have to be added manually. There are several advantages that static routes have over dynamic routes. One advantage is that there are fewer overheads for the router, since it doesn't have to perform calculations on the fly and send out router updates.

Each remote node specifies only the network to which the gateway is directly connected, and the Router Module has no knowledge of the networks beyond. For instance, the Router Module knows about network B in the following diagram through remote node Router 1. However, the Router Module is unable to route a packet to network C because it doesn't know that there is a route through remote node Router 1 (via Router 2). The static routes are for you to tell the Router Module about the networks beyond the remote nodes.

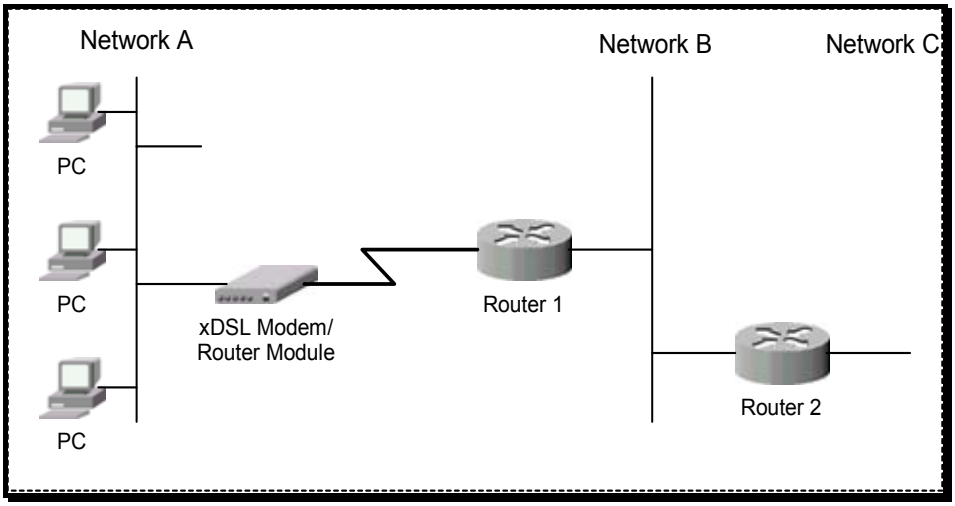


Figure 5.35 An application of the router

Configuring static routes and default gateway can be finding at *Configuration – Routing Table* menu.

```
 Route_Table MENU            TAINET Router Module                Version 2.14
-------------------------------------------------------------------------------
[Static_Routing_Table]  Default_Gateway
 Edit Static Routing Table

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item
```

Figure 5.36 The sub-menu of routing table

```
 Route_Table MENU            TAINET Router Module                Version 2.14
-------------------------------------------------------------------------------
[Static_Routing_Table]  Default_Gateway
 Edit Static Routing Table

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item
   Destination Address      Net Mask            Next Hop       Metric
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
    [               ]   [               ]   [               ]   [  ]
```

Figure 5.37 The sub-menu of setting the Static routes

Static routes are those routes that you define in the Router Module manually. Static routes exist permanently unless you change them. You may use static routes to

establish fixed connections and to augment the RIP routing table.

The maximum capacity of Router Module routing index list can number up to 15.

Field	Description
Destination	This parameter specifies the IP network address of the final destination. Routing is always based on network number. If you need to specify a route to a single host, use a subnet mask of 255.255.255.255 in the subnet mask field to force the network number to be identical to the host ID.
Net Mask	Enter the subnet mask for this destination.
Next Hop	Enter the IP address of the next hop (router). This is an immediate neighbor of your Mercury (or Tainet WANpro product) that will forward the packet to the destination. On the LAN, the next hop must be a router on the same segment as your Mercury (or Tainet WANpro product); over WAN, the next hop must be the IP address of one of the remote nodes.
Metric	The metric represents the cost of transmission for routing purposes. IP routing uses hop count as the measurement of cost, and has a minimum of 1 for directly connected networks. Enter a number that approximates the cost for this link. The number need not be precise, but it must be between 1 and 15. In practice, 2 or 3 is usually a good number.

Table 5.13 Descriptions the parameter of Static Routes

5.6.5.4 Configuring Default Gateway

Imagine in large network and internetworks every router cannot know the exact route to every other router. This is why the default gateway (sometimes called default route) is useful. The default route specifies where to send non-local packets. The router will know what to do with it. If the next router doesn't know the necessary route, it sends the packet to its own default gateway, and this process continues on until the destination network is reached. Configuration of default gateway is performed by Configuration – Routing Table – Default_Gateway

```
 Route_Table MENU            TAINET Router Module                Version 2.14
-------------------------------------------------------------------------------
 Static_Routing_Table  [Default_Gateway]
 Edit Default Gateway Table

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item



         Primary Default Gateway      [172.16.15.254  ]
```

Figure 5.38 The sub-menu of setting Default Gateway

5.6.6 NAT & IP Filter

This section shows you how NAT work with your Mercury (or Tainet WANpro product) and discusses the function of IP filter.

5.6.6.1 NAT Setting

We can classify IP addresses in two kinds: local (private) and global (public). Local IP addresses cannot be used on the Internet and are mostly used on Local Area Networks (LANs). Public addresses are valid on the Internet and must be properly registered so information can be sent to them. Configuration of NAT can be found under the *Configuration Menu –NAT*.

```
 Configuration MENU          TAINET Router Module                Version 2.14
-------------------------------------------------------------------------------
 System   PPP   FR   RIP   Route_Table   Security  [NAT]  Filter   SNMP   DHCP
 Setup NAT Configuration

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item
  Network Address Port Translation (NAPT):
    Public IP  [0.0.0.0        ]          Netmask  [0.0.0.0        ]
                              Porxy Port List
    Protocol  PORT        IP               Protocol  PORT        IP
     [TCP]   [0   ] [0.0.0.0        ]      [TCP]   [0   ] [0.0.0.0        ]
     [TCP]   [0   ] [0.0.0.0        ]      [TCP]   [0   ] [0.0.0.0        ]
     [TCP]   [0   ] [0.0.0.0        ]      [TCP]   [0   ] [0.0.0.0        ]
     [TCP]   [0   ] [0.0.0.0        ]      [TCP]   [0   ] [0.0.0.0        ]
      ICMP          [0.0.0.0        ]
  Static Network Address Translation (static NAT):
        Public IP  <->  Private IP             Public IP  <->  Private IP
  [0.0.0.0        ]<->[0.0.0.0        ]  [0.0.0.0        ]<->[0.0.0.0        ]
  [0.0.0.0        ]<->[0.0.0.0        ]  [0.0.0.0        ]<->[0.0.0.0        ]
  [0.0.0.0        ]<->[0.0.0.0        ]  [0.0.0.0        ]<->[0.0.0.0        ]
  [0.0.0.0        ]<->[0.0.0.0        ]  [0.0.0.0        ]<->[0.0.0.0        ]
```

Figure 5.39 The sub-menu of NAT configuration menu

NAT, described in RFC 3022, allows local IP addresses on the LAN to be converted into global IP addresses on the Internet. Router Module uses *NAPT (Network Address Port Translation)* device which maps ALL the local IP addresses into a SINGLE global IP address as assigned by an ISP. The PAT will perform a mapping of global port numbers to the several hosts of local servers.

The advantage of this scheme, in addition to those mentioned above is cost savings; only one ISP account and IP address is required.

In addition, the PAT scheme provides privacy since the internal LAN is unavailable to hosts on the Internet; all they can see is the single IP address interface provided by the PAT device.

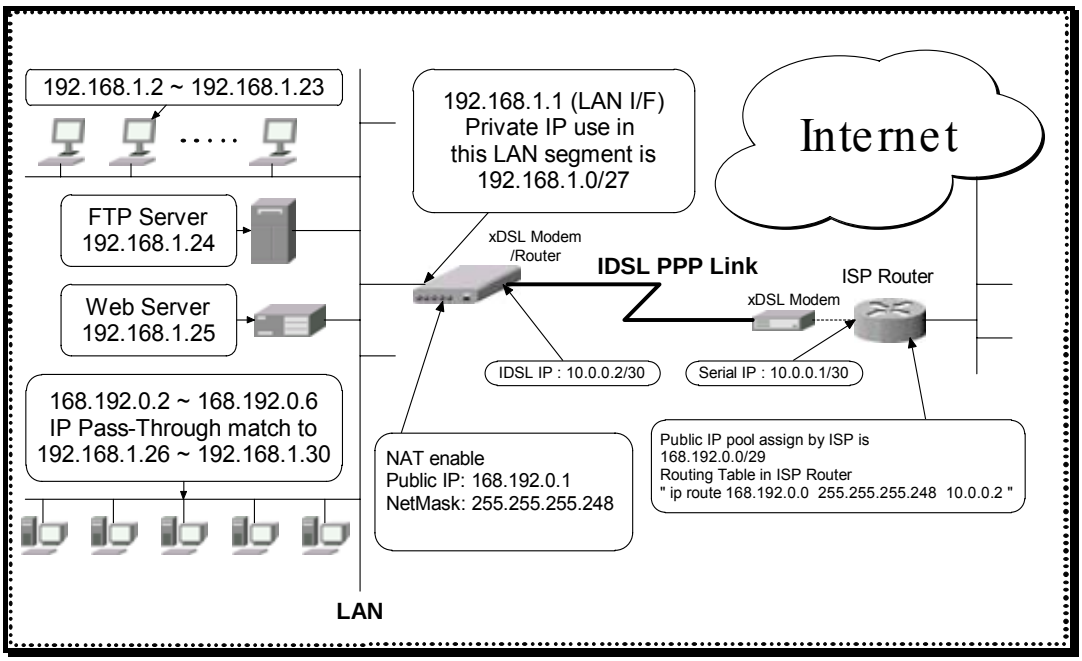


Figure 5.40 Example of NAT Application

With *Proxy Port List* function you can view inside servers for different services they perform, e.g. web or FTP, visible to the outside users, even though NAT makes your whole inside network appear as a single entity to the outside world. The port number and protocol identify the service, e.g. web service is on port 80 TCP and TFTP is on port 69 UDP. The protocol supported in this feature are TCP, UDP and ICMP.

Static NAT function maintains a simple one-to-one mapping between a local and global IP address for each host on the LAN. The main benefit of this is to avoid reconfiguration of local IP addresses on each host.

Figure 5-7-13 shows you how NAT work with the public and private IP. Assume you have applied the network segment of public IP from your ISP, say 168.192.0.0/29, the public IP for you to use is between 168.192.0.0 ~ 168.192.0.7, so you have only 5 public IP (one for router, another two for net ID and broadcast) for your LAN. But in reality you have a total of 30 computers in your LAN including workstations and a few servers.

NAT will help you resolve this situation; the configuration of this example is as follows.

Step 1. Selected the public IP for PAT

Choose one IP between 168.192.0.1 ~ 168.192.0.6 for PAT. The Net Mask should match the network segment that ISP assigns to you.

```
Configuration MENU          TAINET Router Module              Version 2.14
-------------------------------------------------------------------------------
System   PPP   FR   RIP   Route_Table   Security  [NAT]  Filter   SNMP   DHCP
Setup NAT Configuration

 Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item
 Network Address Port Translation (NAPT):
   Public IP  [168.192.0.1        ]          Netmask  [255.255.255.248        ]
```

Figure 5.41 Choose the NAPT

Note:
For some LAN-to-WAN applications, the IP used for NAPT are mostly chosen based on WAN IP address (serial interface). In this case you can leave both Public IP and Net Mask as 0.0.0.0, the Router Module will then automatically take on the WAN IP as your NAPT.

Step 2. Proxy Port List

Use this function to make a Server visible to the outside world, specify the port number of service and then assign inside IP address for Server behind NAT.

Enter the protocol and port number in the field and the inside IP address of the server in the Proxy IP.

```
Configuration MENU          TAINET Router Module              Version 2.14t
-------------------------------------------------------------------------------
System   PPP   FR   RIP   Route_Table   Security  [NAT]  Filter   SNMP   DHCP
Setup NAT Configuration

 Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item
 Network Address Port Translation (NAPT):
   Public IP  [168.192.0.1    ]          Netmask  [255.255.255.248]
                          Porxy Port List
   Protocol  PORT        IP              Protocol  PORT        IP
    [TCP]   [21  ] [192.168.1.24   ]      [TCP]   [80  ] [192.168.1.25   ]
    [TCP]   [0   ] [0.0.0.0        ]      [TCP]   [0   ] [0.0.0.0        ]
    [TCP]   [0   ] [0.0.0.0        ]      [TCP]   [0   ] [0.0.0.0        ]
    [TCP]   [0   ] [0.0.0.0        ]      [TCP]   [0   ] [0.0.0.0        ]
     ICMP          [0.0.0.0        ]
```

Figure 5.42 Proxy Port List Setup

The most often used port numbers are shown in the following Table. Please refer to RFC 1700 for further information about port numbers.

Services	Port Number
FTP (File Transfer Protocol)	21
Telnet	23
SMTP (simple Mail Transfer Protocol)	25

DNS (Domain Name System)	53
HTTP (Hyper Text Transfer protocol or Web)	80

Table 5.14 Most often used port numbers

Step 3. Configuring the Static NAT

Assign the remaining public IP to the workstation or server in your LAN.

```
 Configuration MENU          TAINET Router Module              Version 2.14t
-------------------------------------------------------------------------------
 System   PPP   FR   RIP   Route_Table   Security  [NAT]  Filter   SNMP   DHCP
 Setup NAT Configuration

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item
  Network Address Port Translation (NAPT):
    Public IP  [168.192.0.1    ]          Netmask  [255.255.255.248]
                            Porxy Port List
    Protocol  PORT        IP              Protocol  PORT        IP
     [TCP]   [21  ] [192.168.1.24   ]      [TCP]   [80  ] [192.168.1.25   ]
     [TCP]   [0   ] [0.0.0.0        ]      [TCP]   [0   ] [0.0.0.0        ]
     [TCP]   [0   ] [0.0.0.0        ]      [TCP]   [0   ] [0.0.0.0        ]
     [TCP]   [0   ] [0.0.0.0        ]      [TCP]   [0   ] [0.0.0.0        ]
      ICMP          [0.0.0.0        ]
  Static Network Address Translation (static NAT):
        Public IP  <->  Private IP             Public IP  <->  Private IP
  [168.192.0.2    ]<->[192.168.1.26   ]  [168.192.0.6    ]<->[192.168.1.30   ]
  [168.192.0.3    ]<->[192.168.1.27   ]  [0.0.0.0        ]<->[0.0.0.0        ]
  [168.192.0.4    ]<->[192.168.1.28   ]  [0.0.0.0        ]<->[0.0.0.0        ]
  [168.192.0.5    ]<->[192.168.1.29   ]  [0.0.0.0        ]<->[0.0.0.0        ]
```

Figure 5.43 Static NAT Configuring

5.6.6.2 IP Filter Setting

Your Router Module uses filters to decide whether or not to allow passage of a packet. IP filters are divided into incoming and outgoing filters, depending on the direction of the packet relative to a serial port (WAN port). To enable the IP Filter, find it under Configuration Security – Filter.

There is a filter table for each incoming and outgoing filter, this allows you to configure specific IP traffic permitted to access your LAN.

```
 Filter MENU                 TAINET Router Module              Version 2.14t
-------------------------------------------------------------------------------
[Incoming_Filter]  Outgoing_Filter
 Incoming Filter Config

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item
```

Figure 5.44 The sub-menu of Incoming_Filter settings

There are two kinds of Filters, incoming and outgoing. Incoming Filter controls the access of IP packets incoming from WAN to LAN, Outgoing Filter controls the IP

packets outgoing from LAN to WAN.

Field	Description	Option
Type	Enable or Disable the specify access list.	Yes No
Source IP	Enter the Source IP Address of the packet you wish to filter.	Leave 0.0.0.0 if don't care
Destination IP	ENTER THE DESTINATION IP ADDRESS OF THE PACKET YOU WISH TO FILTER.	Leave 0.0.0.0 if don't care
Mask-Bit	Enter the IP subnet mask (Octet Prefix) to apply destination or source IP address.	E.g. 255.255.255.0 equal /24
Protocol	Protocol refers to the upper layer protocol.	ALL TCP UDP ICMP
Port	Enter the destination port of the packet that you wish to filter.	Leave 0 if don't care 1~655535

Table 5.15 Filter rule menu fields

```
 Filter MENU                TAINET Router Module            Version 2.14t
--------------------------------------------------------------------------------
[Incoming_Filter]  Outgoing_Filter
 Incoming Filter Config

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

  Type        Source IP    MASK-Bit Destination IP  MASK-Bit Protocol Port
[No    ]  [0.0.0.0        ]  [0 ]  [0.0.0.0        ]  [0 ]  [ALL ]  [0    ]
[No    ]  [0.0.0.0        ]  [0 ]  [0.0.0.0        ]  [0 ]  [ALL ]  [0    ]
[No    ]  [0.0.0.0        ]  [0 ]  [0.0.0.0        ]  [0 ]  [ALL ]  [0    ]
[No    ]  [0.0.0.0        ]  [0 ]  [0.0.0.0        ]  [0 ]  [ALL ]  [0    ]
[No    ]  [0.0.0.0        ]  [0 ]  [0.0.0.0        ]  [0 ]  [ALL ]  [0    ]
[No    ]  [0.0.0.0        ]  [0 ]  [0.0.0.0        ]  [0 ]  [ALL ]  [0    ]
[No    ]  [0.0.0.0        ]  [0 ]  [0.0.0.0        ]  [0 ]  [ALL ]  [0    ]
[No    ]  [0.0.0.0        ]  [0 ]  [0.0.0.0        ]  [0 ]  [ALL ]  [0    ]
[No    ]  [0.0.0.0        ]  [0 ]  [0.0.0.0        ]  [0 ]  [ALL ]  [0    ]
[No    ]  [0.0.0.0        ]  [0 ]  [0.0.0.0        ]  [0 ]  [ALL ]  [0    ]

[Permit]           Any.

          Press [SPACE BAR] to Change Value
```

Figure 5.45 The sub-menu of Incoming Filter

The bottom row of filter access list indicates the ac cess mode. For example, if you have set this field to "Permit Any" for Incoming Filter, then the corresponding serial port (WAN) will allow everything except IP packets labeled "Yes" on the list of incoming filter table. The same logic applies to the "Deny Any" command.

IP Filter table allows you to configure the specified field. Leaving the field to the default "0" or "0.0.0.0" means "all included" or "don't care."

5.6.7 DHCP Configuration

This section discusses the DHCP application and SNMP (Simple Network Management Protocol) for network management and monitoring.

5.6.7.1 DHCP Configuration

Dynamic Host Configuration Protocol (DHCP) is used for the dynamic distribution of IP address to client machines, which allows the individual clients (workstations) to obtain the TCP/IP configuration at start-up from centralized DHCP server.

The Mercury (or Tainet WANpro product) has built-in DHCP server capability, the DHCP function can be found under *Configuration System* menu. Here you can configure the DHCP server settings for IP default gateway, DNS server and WINS server.

Enable *Fixed Leases Address Map* allows you to assign up to 8 permanent IP leases to clients by entering the client's NIC (Network Interface Card) Ethernet Address (MAC address).

```
 Configuration MENU          TAINET Router Module              Version 2.14
--------------------------------------------------------------------------------
 System   PPP   FR   RIP   Route_Table   Security   NAT   Filter   SNMP  [DHCP]
 DHCP Daemon Configuration

  Enter: select   ESC: previous menu   '<': left   '>': right   TAB: next item

         Default Lease Time(in secs)  [86400     ]
         Gateway                      [172.16.15.254  ]
         DNS Server                   [0.0.0.0        ]
         WINS Server                  [0.0.0.0        ]

  IP Address Pool for Dynamic Leases
         Range from                   [0.0.0.0        ]
                  to                  [0.0.0.0        ]
  IP-Ethernet Address Mapping for Fixed Leases
      IP Address     Ethernet Address         IP Address     Ethernet Address
   [0.0.0.0        ]  [000000000000]       [0.0.0.0        ]  [000000000000]
   [0.0.0.0        ]  [000000000000]       [0.0.0.0        ]  [000000000000]
   [0.0.0.0        ]  [000000000000]       [0.0.0.0        ]  [000000000000]
   [0.0.0.0        ]  [000000000000]       [0.0.0.0        ]  [000000000000]
```

Figure 5.46 The sub-menu of DHCP settings

Field	Description
Default Lease Time (Secs)	This field specifies an IP address lease time for clients. It is base on seconds and the default value is 86400 (24 hrs).
Gateway	Those fields specify an IP default gateway, DNS server and WINS server to Windows 95/98, Windows NT and other
DNS Server	

Field	Description
WINS Server	systems that support the DHCP client. The default value for Gateway is the LAN IP address of this device.
IP address pool for Dynamic Leases	Setup the dynamic IP scope in this field, IP will be assigned to client machines in this range.
IP-Ethernet Address Mapping for Fixed Leases	Assign the fixed IP to special clients or other server machines, e.g. servers for mail, FTP, telnet, web, etc. that you may have to their known Ethernet address.

Figure 5.47 Descriptions of DHCP parameters

Note:
There aren't any configurations about Network Mask for clients, because Router Module will use the Network Mask value from configuration item of the LAN encapsulation.

The fix IP address should not be include inside the IP address pool range of dynamic leases, else there will be an IP conflict in your network.

■ The Default Lease Time suggestion:
If you have some hosts move in and move out frequently, a short lease time is preferred.

If hosts in your network are stable, a long lease time can also reduce the packet exchange between server & clients.

5.6.8 SNMP

Your Router Module supports SNMP (Simple Network Management Protocol) agent functionality, which allows a manager station to monitor the Router Module through the network.

Enabling the SNMP function will activate the Router Module as SNMP agent for Mercury Series Product.

5.6.8.1 Configuring SNMP

The "SNMP" enabling function can be found in *Configuration - System*.

Setting up the community and Trap Destination can be performed in *Configuration –SNMP*.

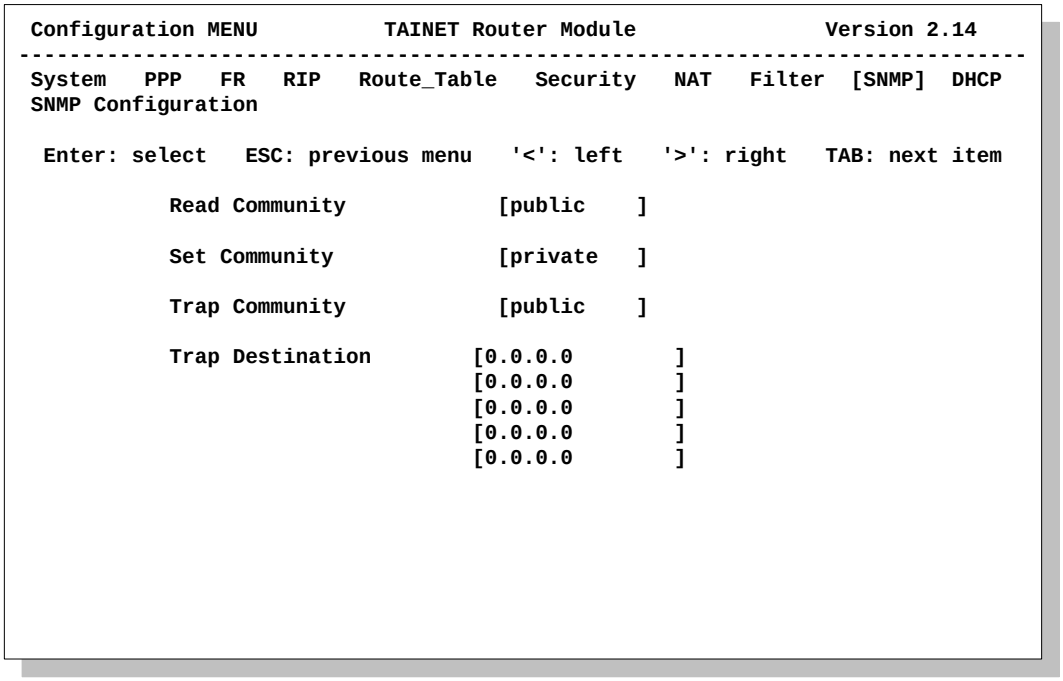


Figure 5.48 The sub-menu of SNMP settings

Router Module provides "GET" value with SNMP, and Get Community has a default setting of "public", which is the standard SNMP terminology for password. The default Community for “SET” is “private”.

Trap Destination provides the Alarm messages of Mercury to the specified IP host.

5.6.9 System Maintenance

This section covers the diagnostic method that helps you maintain your Router Module.

5.6.9.1 System Status

System status can be monitored under *Monitoring* menu. This menu presents all system information to allow easy diagnosis of the problem. For details of each field please refers to Section 5.9.3 in this menu.

5.6.9.2 Upgrade the Firmware Using TFTP Server

Mercury 800, 3600+, and 3820 allow the use of TFTP to upgrade their Flash firmware. The router module with the latest firmware version supports this upgrade function too. Please keep in mind that TFTP upload is only available if TCP/IP is configured on your Router module. Some of the newer modules are supported with newer Boot version that can only be upgraded using EPROM writer.

- Files require:

TFTPServer1-1.exe (CISCO TFTP Server freeware)

Vxxx.bin (binary firmware, upload file)

Step 1: Setup the TFTP server.

Run TFTPServer1-1.exe and install it to your workstation. Launch the TFTP server.

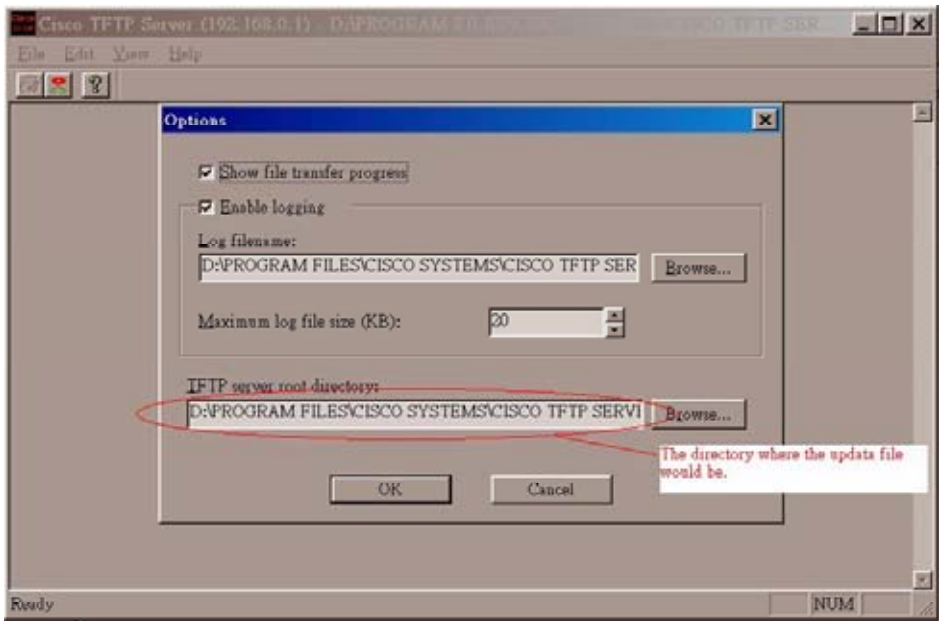


Figure 5.49 TFTP Server settings

Note:
User can use any TFTP software. But in these sections we use Cisco TFTP as an example.

Step 2: Configure the TFTP Server.

Press the option button at top-left corner, and then locate the root directory where the upgrade firmware is stored.

Step 3: Telnet to the Router configuration management Terminal.

Telnet to the Router Configuration manual, and select *Device Control* → *Firmware_Upgrade.*

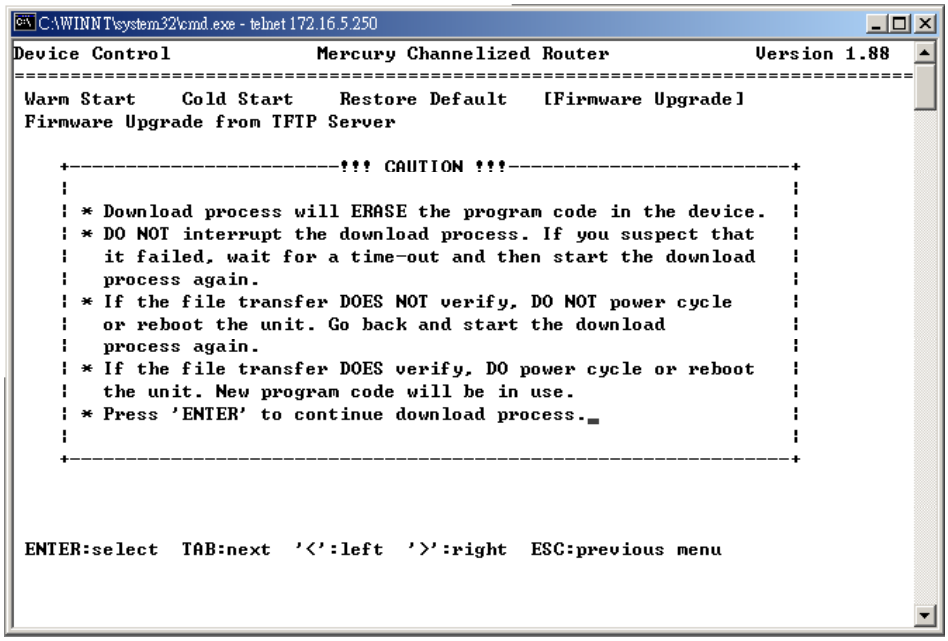


Figure 5.50 Firmware update

Step 4: Start uploading firmware file.

Input the IP of TFTP server workstation, and the firmware file name.

Continue to press "Enter" and begin uploads.

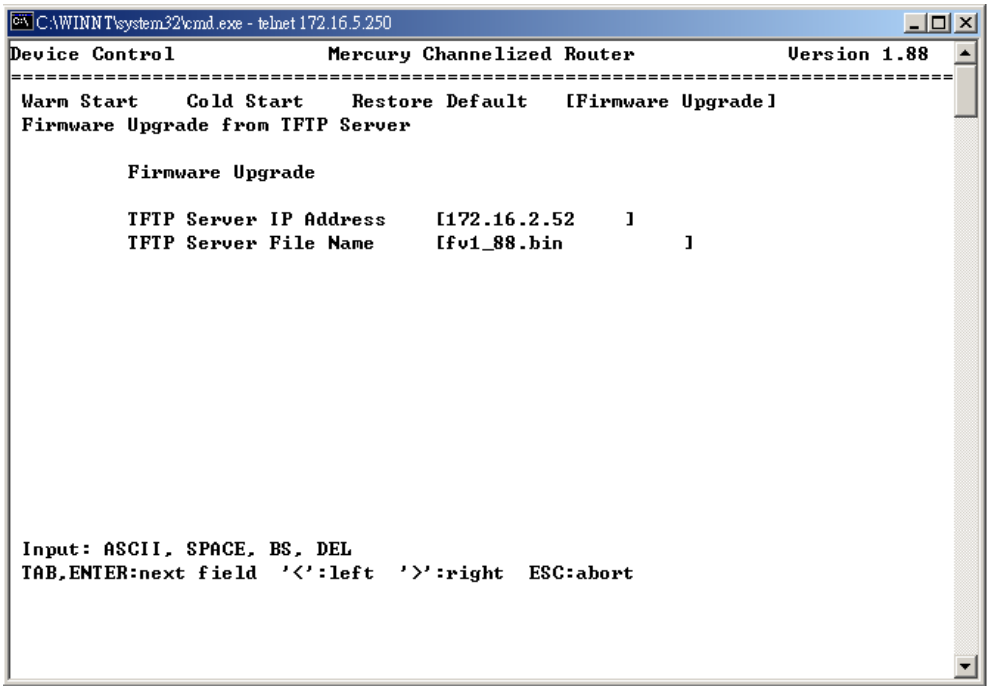


Figure 5.51 TFTP Server settings

Step 5: Restart Router Module.

After file transfer is complete, select " Cold_Start " to restart the Router Module.

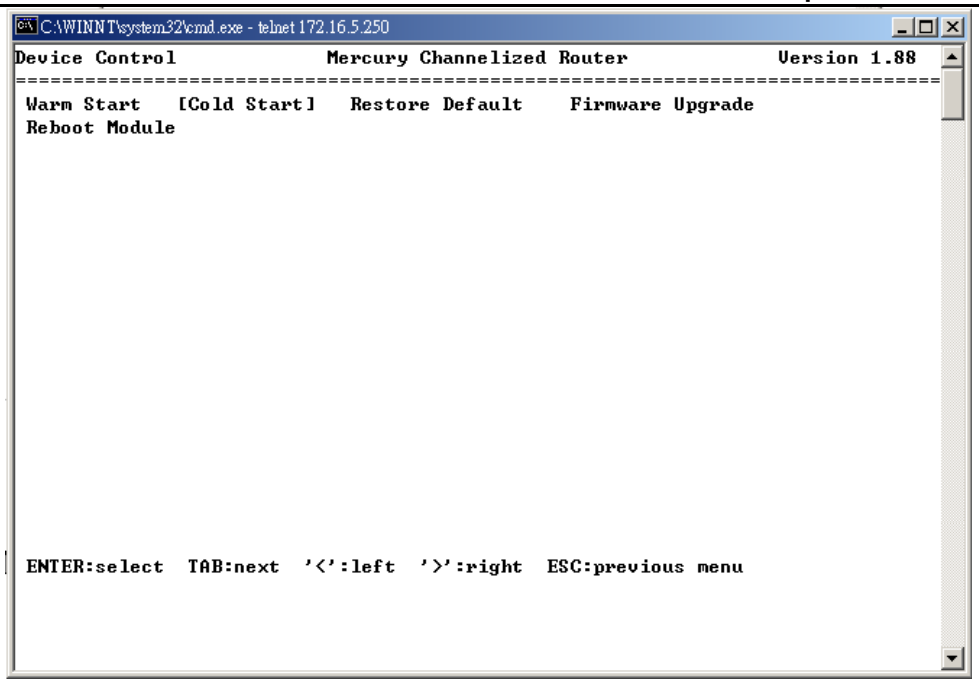


Figure 5.52 Restart Router Module

5.7 Configuration of Channelize Router module (Ch-R)

5.7.1 Menu Tree of Ch-R

Following Figure 5.53 shows the main menu tree of Channelize router module.

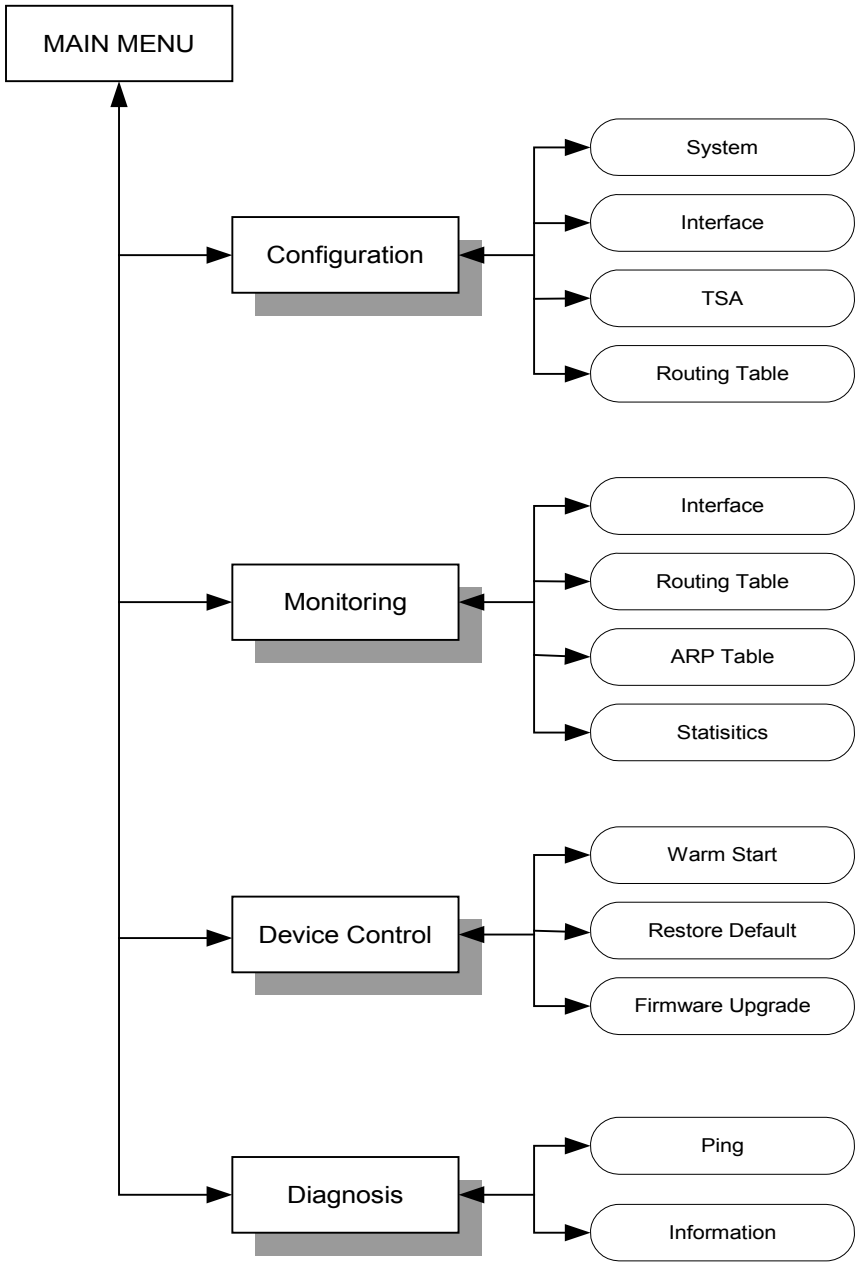


Figure 5.53 Main menu tree of Ch-R module

5.7.2 Main Menu

When accessing the Ch-r module, the default log in username and password are both "root". After entering into the system, the main menu is illustrated as a TCS (Terminal Configuration System) interface for easy configuration. This is shown below.

```
!!! Welcome to Access Mercury Channelized Router !!!

username : root
password : root
```

Figure 5.54 Access username and password

There are four categories in the Main Menu:

- Configuration:

This menu includes all configuration of WAN and LAN, and some advanced management. The detailed settings of this menu will be discussed in later sections.

- Monitoring:

Use the monitoring menu to view system status, interface statistics and routing table.

- Device Control:

The device control menu allows you to restore the default parameters or warm start your Router Module using the current parameters.

- Diagnosis:

In the diagnosis menu you can use ICMP ping echo to perform diagnosis on your network.

```
MAIN                        Mercury Channelized Router            Version 1.05d
================================================================================
[Configuration]   Monitoring    Device Control    Diagnosis
 System    AUX Port    Interface    TSA    Routing Table    SNMP




 ENTER:select  TAB:next  '<':left  '>':right  ESC:previous menu
```

Figure 5.55 The main menu tree in Ch-r module

5.7.3 Configuration Menu

Configuration Menu includes most general settings and features for your Router Module; you will find more detailed setting information in the following sections.

- System:

This field includes the Ethernet IP and AUX interface setup, and also allows you to choose the WAN interface encapsulation and traffic type.

You can activate the DHCP server and SNMP agent in this field.

- AUX Port:

Set up your PPP encapsulation for WAN interface in this field.

You can activate the NAT and Filter feature here.

- Interface:

Setup the PPP local, remote IP and its net mask. You can activate each WAN interface here.

- TSA:

Time Slot Assignment for each WAN port.

- Routing Table:

Configure the static routing table and default route for your network in this field.

- SNMP:

Enable the SNMP function in this field.

```
Configuration              Mercury Channelized Router            Version 1.05d
================================================================================
[System]   AUX Port    Interface    TSA    Routing Table    SNMP
 System Configuration




 ENTER:select  TAB:next  '<':left  '>':right  ESC:previous menu
```

Figure 5.56 The sub menu tree of Configuration menu

5.7.3.1 Ethernet Setup

You can have TCP/IP setup for your Ch-router module at *Configuration – System* menu.

```
Configuration              Mercury Channelized Router            Version 1.05d
================================================================================
[System]   AUX Port    Interface    TSA    Routing Table    SNMP
 System Configuration

          LAN Parameters
             Ethernet MAC         0090BB104491
             LAN IP Address      [172.16.8.119   ]
             LAN IP NetMask      [255.255.240.0  ]
             Default Gateway     [0.0.0.0        ]

          System Functions
             SNMP Agent          [disable]
             Telnet              [enable ]
             Front Panel         [disable]

          System Security
             Console Password    [root    ]
             Telnet Username     [root    ]
             Telnet Password     [root    ]

 Input: '0' - '9', '.', SPACE, BS, DEL
 TAB,ENTER:next field  '<':left  '>':right  ESC:abort
```

Figure 5.57 System configuration

Ethernet MAC	The Ethernet Interface Media Access Control (MAC) address of LAN port.
LAN IP Address	The IP address is a unique 4-byte (32-bit) numeric value used to identify a network and a local host on that network. Each IP address consists of four sets of decimal numbers separated by periods (e.g. 192.72.243.1). Each address is composed of two parts: a network part and a host part. The network part identifies the unique subnet containing the host; the host part identifies the actual host device.
LAN IP NetMask	An IP address net mask (also 32 bits, written in dotted decimal notation) is used in conjunction with an IP address to specify which bits of the address make up the network part and which make up the host part. A one (1) in a mask bit location means the corresponding bit in the IP address is part of the network value; a zero (0) means the corresponding bit is part of the host value.
Default Gateway	The Default Gateway IP address (also 32 bits, written in dotted decimal notation). When Channelize Router Module receives a packet for an unknown destination, it forwards that packet to the default gateway as long as has been defined.
SNMP Agent	Simple Network management protocol Enable or Disable. SNMP V1 agent, Support ISO standard MIB-II.
Telnet	Enable or Disable the TELNET management of the Module.
Front Panel	Enable or Disable user change the setting from LCD display. In some Device Platform not supply Front Panel function like Mercury 3600, etc.
Console Password	Type your password. The password can be up to eight characters in length.
Telnet Username	Type your TELNET username. The username can be up to eight characters in length.
Telnet Password	Type your TELNET password. The password can be up to eight characters in length.

Table 5.16 Descriptions of System parameters

5.7.3.2 AUX port Setup

The built-in Ch-Router for Mercury 3820 supports AUX port. The AUX port works by PPP encapsulation. User may press the front panel button Craft/PPP to switch between these two modes.

```
Configuration              Mercury Channelized Router             Version 1.07
================================================================================
 System   [AUX Port]   Interface    TSA    Routing Table    SNMP
 AUX Port Configuration

          AUX Port Parameters
             AUX Port                 [console]
             AUX Speed                [Sync_External]

             AUX Local IP Address     [192.168.10.1   ]
             AUX IP NetMask           [255.255.255.0  ]
             AUX Remote IP Address    [192.168.10.2   ]



 Input: '0' - '9', '.', SPACE, BS, DEL
 TAB,ENTER:next field  '<':left  '>':right  ESC:abort
```

Figure 5.58 AUX port Configuration

AUX port	Current status of AUX port
AUX speed	Selected the AUX port speed and data format, AUX interface is using PPP encapsulation.
AUX Local IP	The IP address of Local AUX interface.
AUX Netmask	IP net mask for AUX port.
AUX Remote IP	The IP address for the AUX port on a remote router.

Table 5.17 Descriptions of AUX port parameters

5.7.3.3 WAN Setup

You can setup the WAN parameters for your Ch-router module in the *Configuration – Interface* menu.

```
Configuration              Mercury Channelized Router             Version 1.05d
================================================================================
 System    AUX Port   [Interface]   TSA    Routing Table    SNMP
 Interface Configuration


                      +----------Interface-----------+
                      |<WAN-01> WAN-02  WAN-03  WAN-04 |
                      | WAN-05  WAN-06  WAN-07  WAN-08 |
                      | WAN-09  WAN-10  WAN-11  WAN-12 |
                      | WAN-13  WAN-14  WAN-15  WAN-16 |
                      +--------------------------------+



 TAB:next  '>':forward  '<':backward  ENTER:select  ESC:abort
```

Figure 5.59 WAN Interface Configuration

When selecting WAN interface, the menu allows the administrator to configure the network parameters of the Ch-r module for each WAN interface.

```
Configuration              Mercury Channelized Router            Version 1.05d
================================================================================
 System    AUX Port   [Interface]   TSA    Routing Table    SNMP
 Interface Configuration


                    Interface Name        WAN-01

                    Local IP Address     [192.168.1.1    ]
                    Remote IP Address    [192.168.1.2    ]
                    NetMask              [255.255.255.0  ]
                    Connection           [enable ]
                    Status                err prov.


 Input: '0' - '9', '.', SPACE, BS, DEL
 TAB,ENTER:next field  '<':left  '>':right  ESC:abort
```

Figure 5.60 PPP settings of WAN-1

Local IP Address	The IP address is a unique 4-byte (32-bit) numeric value used to identify a network and a local host on that network.
Remote IP Address	The IP address is a unique 4-byte (32-bit) numeric value used to identify a network and a local host on that network.
NetMask	An IP address net mask (also 32 bits, written in dotted decimal notation) is used in conjunction with an IP address to specify which bits of the address make up the network part and which make up the host part.
Connection	Enable or Disable the WAN interface.
Status	Closed : The WAN interface is Disabled. No T.S. : No access to any Time Slot on the WAN interface. No prev. : Time slot access to the WAN interface is not available on the Device Platform. Err prev. : Time slot access to the WAN interface has error on the Device Platform. Up : Link status of protocol on the WAN interface Down : Link status of protocol on the WAN interface.

Table 5.18 Descriptions of WAN port parameters

5.7.3.4 Time Slot Assignment Setup

This menu allows administrator to assign the time slots of the Ch-r module for the WAN interface in the *Configuration – TSA* menu.

```
Configuration              Mercury Channelized Router            Version 1.05d
================================================================================
 System    AUX Port    Interface   [TSA]   Routing Table    SNMP
 Time Slot Assignment

  Time Slot  00      01      02      03      04      05      06      07
     Access <WAN-01> WAN-01  WAN-01  WAN-02  WAN-02  none    none    none
  Provision  yes     yes     yes     no      no      no      no      no

  Time Slot  08      09      10      11      12      13      14      15
     Access  none    none    none    WAN-03  WAN-03  none    none    WAN-16
  Provision  no      no      no      yes     yes     no      no      yes

  Time Slot  16      17      18      19      20      21      22      23
     Access  WAN-16  WAN-16  WAN-16  WAN-16  none    none    none    none
  Provision  yes     yes     yes     yes     no      no      no      no

  Time Slot  24      25      26      27      28      29      30      31
     Access  none    none    none    none    none    none    none    none
  Provision  no      no      no      no      no      no      no      no


 TAB:next  '>':forward  '<':backward  ENTER:select  ESC:done
```

Figure 5.61 Sub menu of TSA settings for Ch-r module

```
Configuration              Mercury Channelized Router            Version 1.05d
================================================================================
 System    AUX Port    Interface   [TSA]   Routing Table    SNMP
 Time Slot Assignment

  Time Slot  00      01      02      03      04      05      06      07
     Access  WAN-01  W +----------Interface-----------+    none    none
  Provision  no      n |<none>   WAN-01  WAN-02  WAN-03 |    no      no
                       | WAN-04  WAN-05  WAN-06  WAN-07 |
  Time Slot  08      0 | WAN-08  WAN-09  WAN-10  WAN-11 |    14      15
     Access  none    n | WAN-12  WAN-13  WAN-14  WAN-15 |    none    WAN-16
  Provision  no      n | WAN-16                         |    no      no
                       +--------------------------------+
  Time Slot  16      17      18      19      20      21      22      23
     Access  none    none    none    none    none    none    none    none
  Provision  no      no      no      no      no      no      no      no

  Time Slot  24      25      26      27      28      29      30      31
     Access  none    none    none    none    none    none    none    none
  Provision  no      no      no      no      no      no      no      no


 TAB:next  '>':forward  '<':backward  ENTER:select  ESC:abort
```

Figure 5.62 The sub menu of TSA selection

The following table describes in details the TSA Configuration items.

Time Slot	The Time Slot number.
Access	Access Time Slot to the specified WAN interface.
Provision	Yes : Time Slot be assigned to Channelize Router Module on Device Platform. No : Time Slot none be assigned to Channelize Router Module on Device Platform. Na : Time Slot is not available.

Table 5.19 Descriptions of TSA parameters

5.7.3.5 Routing Table Setup

This menu allows configuration of the static Routing Table of the Ch-r module for packet forwarding. This setting is in *Configuration – Routing Table* menu.

```
Provisiononon              Mercury Channelized Router            Version 1.05d
================================================================================
 System    AUX Port    Interface    TSA   [Routing Table]   SNMP
 Routing Table Configuration

     Destination      NetMask          Nexthop          Provision

1   [192.168.254.0  ][255.255.255.0  ][192.168.1.1    ][yes]
2    192.168.253.0    255.255.255.0    192.168.2.1      yes
3    0.0.0.0          0.0.0.0  +-confirm?-+ .0          no
4    0.0.0.0          0.0.0.0  |<YES> NO  | .0          no
5    0.0.0.0          0.0.0.0  +----------+ .0          no
6    0.0.0.0          0.0.0.0          0.0.0.0          no
7    0.0.0.0          0.0.0.0          0.0.0.0          no
8    0.0.0.0          0.0.0.0          0.0.0.0          no
9    0.0.0.0          0.0.0.0          0.0.0.0          no
10   0.0.0.0          0.0.0.0          0.0.0.0          no
11   0.0.0.0          0.0.0.0          0.0.0.0          no
12   0.0.0.0          0.0.0.0          0.0.0.0          no


 Input: SPACE to select
 TAB:next  '>':forward  '<':backward  ENTER:select  ESC:abort
```

Figure 5.63 The sub menu of Routing Table setting

Static routes are those routes that you define in the Ch-r module manually. Static routes exist permanently unless you change them. The following describes the details of the Routing Table.

Destination	The IP address is an unique 4-byte (32-bit) numeric value used to identify a network and a local host on that network.
NetMask	An IP address net mask (also 32 bits, written in dotted decimal notation) is used in conjunction with an IP address to specify which bits of the address make up the network part and which make up the host part.
Nexthop	The IP address is a unique 4-byte (32-bit) numeric value used to identify a network and a local host on that network. The next hop must be one of the following: a valid IP address on a remote LAN or the IP address at the remote end of a PPP link.
Provision	Enable or Disable this route column in Routing Table.

Table 5.20 Descriptions of Routing Table parameters

5.7.3.6 SNMP Setup

The router module supports SNMP agent functionality, which allows a manager station to monitor this device through the IP network. Enable the SNMP function will activate the Router module as SNMP agent for Mercury Series Product. This settings are in the

Configuration – SNMP menu.

```
Configuration              Mercury Channelized Router            Version 1.05d
================================================================================
 System    AUX Port    Interface    TSA    Routing Table   [SNMP]
 SNMP Configuration

          SNMP Community
             Read Community    [public    ]
             Set  Community    [private   ]
             Trap Community    [public    ]

          Trap Destination
             IP Address1       [172.16.5.58    ]
             IP Address2       [0.0.0.0        ]
             IP Address3       [0.0.0.0        ]
             IP Address4       [0.0.0.0        ]
             IP Address5       [0.0.0.0        ]




 Input: ASCII, SPACE, BS, DEL
 TAB,ENTER:next field  '<':left  '>':right  ESC:abort
```

Figure 5.64 The sub-menu of SNMP settings

Read Community	To provide “GET” function with SNMP, and GET Community has a default of “public”.
Set Community	To provide “SET” function with SNMP, and SET Community has a default of “private”.
Trap Community	To provide the TRAP alarm with SNMP, and TRAP Community has a default of “public”.
Trap Destination	To Indicate the specified IP host for alarm trap messages.

Table 5.21 Descriptions of SNMP parameters

5.7.4 Monitoring Menu

Monitoring Menu displays the current status for your Ch-r module; you will find more detail descriptions on later sections.

- Interface:

This field allows the user to view the status of each interface of Ch-r module.

- Routing Table:

Displays current active routes for each interface.

- ARP Table:

Shows the ARP list for LAN interface.

- Statistics:

Provides a snapshot view of interface performance.

```
Monitoring                Mercury Channelized Router           Version 1.05d
================================================================================
[Interface]   Routing Table    ARP Table    Statistics
 View Interface Status




 ENTER:select  TAB:next  '<':left  '>':right  ESC:previous menu
```

Figure 5.65 The sub-menu tree of Monitoring menu

5.7.4.1 Interface Status

The Interface status shows current link status for each WAN link, and this status is in the *Monitoring – Interface* menu.

```
Monitoring                Mercury Channelized Router           Version 1.05d
================================================================================
[Interface]   Routing Table    ARP Table    Statistics
 View Interface Status

     Iface   Link       Local           NetMask          Remote

1    WAN-01  up         192.168.1.1     255.255.255.0    192.168.1.2
2    WAN-02  no prev.   192.168.2.1     255.255.255.0    192.168.2.2
3    WAN-03  closed     0.0.0.0         255.255.255.255  0.0.0.0
4    WAN-04  no T.S.    192.168.3.1     255.255.255.0    192.168.3.2
5    WAN-05  closed     0.0.0.0         255.255.255.255  0.0.0.0
6    WAN-06  closed     0.0.0.0         255.255.255.255  0.0.0.0
7    WAN-07  down       192.168.7.1     255.255.255.0    192.168.7.2
8    WAN-08  closed     0.0.0.0         255.255.255.255  0.0.0.0
9    WAN-09  closed     0.0.0.0         255.255.255.255  0.0.0.0
10   WAN-10  closed     0.0.0.0         255.255.255.255  0.0.0.0
11   WAN-11  closed     0.0.0.0         255.255.255.255  0.0.0.0
12   WAN-12  closed     0.0.0.0         255.255.255.255  0.0.0.0


 SPACE:refresh page  '<':page up  '>':page down  ESC:abort
```

Figure 5.66 The sub-menu to view the Interface status

Iface	To identify the Network interface include LAN and WAN interface.
Link	Closed : The WAN interface is disabled. No T.S. : No access to any Time Slot on the WAN interface. No prev. : Time slot access to the WAN interface is not available on Device Platform. Err prev. : Time slot access to the WAN interface has error on Device Platform. Up : Link status of protocol in the WAN interface Down : Link status of protocol in the WAN interface.
Local	The IP address is a unique 4-byte (32-bit) numeric value used to identify a network and a local host on that network.

NetMask	An IP address net mask (also 32 bits, written in dotted decimal notation) is used in conjunction with an IP address to specify which bits of the address make up the network part and which make up the host part.
Remote	The IP address is a unique 4-byte (32-bit) numeric value used to identify a network and a local host on that network.

Table 5.22 Descriptions of Interface status of Monitoring menu

5.7.4.2 Routing Table Status

The routing list shows current routing status, and this status is in the *Monitoring – Routing Table* menu.

```
Monitoring                  Mercury Channelized Router            Version 1.05d
================================================================================
 Interface   [Routing Table]   ARP Table    Statistics
 View Routing Table

     Destination      NetMask          Nexthop          iface   type

1    127.0.0.1        255.255.255.255  127.0.0.1        LPBK    U
2    172.16.0.0       255.255.240.0    172.16.8.119     LAN     U



 SPACE:refresh page  '<':page up  '>':page down  ESC:abort
```

Figure 5.67 The sub-menu to view current routing status

Destination	It specifies the IP network address of the final destination. If "0.0.0.0" appears in the field, this entry specifies the "Default Gateway" of route information.
NetMask	It represents the IP net mask of the destination IP address.
Nexthop	It represents the IP address of the next router for transmission of the IP datagram to the destination network segment.
Iface	Identifies IP routing to the corresponding interface.
Type	First character (Status) **U:** The route is valid (up) and in use. **D:** The route is invalid (down) and has a metric of 16 (RIP infinity) Second character (Source) **I:** The route is a direct connection. **R:** The route is established from RIP information. **S:** The route is a static route.

Table 5.23 Descriptions of Routing Table of Monitoring menu

5.7.4.3 ARP Table Status

The ARP table lists the LAN MAC addresses, which are learned by the Ch-r module. The router module learns a device MAC address when IP traffic is generated between the router and other devices, and this table is found in the *Monitoring – ARP table* menu.

```
Monitoring                Mercury Channelized Router            Version 1.05d
================================================================================
 Interface    Routing Table   [ARP Table]   Statistics
 View ARP Table

     IP Address       Ethernet MAC

1    172.16.3.58      00E0181B4E2E
2    172.16.6.135     00E0192C5EA4




 SPACE:refresh page  '<':page up  '>':page down  ESC:abort
```

Figure 5.68 The sub-menu to view current ARP table

IP Address	The IP address of the "learned" LAN devices.
Ethernet MAC	This field lists the Media Access Control (MAC) addresses of the "learned" LAN devices.

Table 5.24 Descriptions of ARP Table of Monitoring menu

5.7.4.4 Statistics of Ch-r module

The Statistics provides a snapshot view of packet flow on all interfaces. This table can be viewed from the *Monitoring – Statistics* menu.

```
Monitoring                Mercury Channelized Router            Version 1.05d
================================================================================
 Interface    Routing Table    ARP Table   [Statistics]
 View Interface Statistics

     Iface   RX:octets   pkts        err pkts    TX:octets   pkts

1    WAN-01  1070320     15278       0          1104464     15533
2    WAN-02  1070320     15278       0          1104464     15533
3    WAN-03  0           0           0           0           0
4    WAN-04  1063241     10215       0          1125411     10323
5    WAN-05  0           0           0           0           0
6    WAN-06  0           0           0           0           0
7    WAN-07  0           0           0           0           0
8    WAN-08  0           0           0           0           0
9    WAN-09  0           0           0           0           0
10   WAN-10  0           0           0           0           0
11   WAN-11  0           0           0           0           0
12   WAN-12  0           0           0           0           0



 SPACE:refresh page  '<':page up  '>':page down  ESC:abort
```

Figure 5.69 The sub-menu to view the statistics of each interface

Ifece	To identify the Network interface, including LAN and WAN interface.
RX octets	Number of octets received by the LAN or WAN interface.
RX pkts	Number of correct packets received by the LAN or WAN interface.
RX err pkts	Number of errored packets received by the LAN or WAN interface.
TX octets	Number of octets received by the LAN or WAN interface.
TX pkts	Number of correct packets transmitted by the LAN or WAN interface.

Table 5.25 Descriptions of Statistics of Monitoring menu

5.7.5 Device Control Menu

Device Control menu allows you to warm / cold start the system, restore back to default parameter values, and update the firmware. You will find more detailed descriptions in the following sections.

- Warm Start:

This command will cause the system to restart and reload the new parameters. It also interprets the WAN and LAN connections.

- Cold Start:

Cold start will reboot the Ch-r module. This command will be used if and only if you have updated the firmware.

- Restore Default:

This command will restart the system and restore the factory default parameters.

- Firmware Upgrade:

This function allows you to update the Ch-r firmware using a TFTP server.

```
Device Control             Mercury Channelized Router            Version 1.05d
================================================================================
[Warm Start]   Cold Start    Restore Default    Firmware Upgrade
 Restart Module




 ENTER:select  TAB:next  '<':left  '>':right  ESC:previous menu
```

Figure 5.70 The sub-menu tree of Device Control menu

5.7.5.1 Warm Start

The Warm Start will restart the system and reload the new settings. This command is

available in the *Device Control – Warm Start* menu.

```
Device Control             Mercury Channelized Router            Version 1.05d
================================================================================
[Warm Start]   Cold Start    Restore Default    Firmware Upgrade
 Restart Module

                              +-restart--+
                              |<YES> NO  |
                              +----------+


 TAB:next  '>':forward  '<':backward  ENTER:select  ESC:abort
```

Figure 5.71 The sub-menu of Warm Start menu

5.7.5.2 Cold Start

The Cold Start will reboot the system as if you powering off the system then back on again. After you upgrade the firmware, you may execute this command. This is available in the *Device Control – Cold Start* menu.

```
Device Control             Mercury Channelized Router            Version 1.05d
================================================================================
 Warm Start   [Cold Start]   Restore Default    Firmware Upgrade
 Reboot Module

                              +--reboot--+
                              |<YES> NO  |
                              +----------+


 TAB:next  '>':forward  '<':backward  ENTER:select  ESC:abort
```

Figure 5.72 The sub-menu of Cold Start menu

5.7.5.3 Restore Default

This command will restart the system and restore the factory parameters. This is available in the *Device Control – Restore Default* menu.

```
Device Control             Mercury Channelized Router            Version 1.05d
================================================================================
 Warm Start    Cold Start   [Restore Default]   Firmware Upgrade
 Restore Parameters to Factory Default


                              +-restore--+
                              |<YES> NO  |
                              +----------+


 TAB:next  '>':forward  '<':backward  ENTER:select  ESC:abort
```

Figure 5.73 The sub-menu of Restore Default menu

5.7.5.4 Firmware Upgrade

This Ch-r module runs the download program and downloads the updated code to the

FLASH. To start the download process, the process must begin by first erasing the program code already in the FLASH. Please closely follow the instructions. This command is available in the *Device Control – Firmware Upgrade* menu. Also please refer to section 5.6.9.2.

Before you run this function, contact your local sales representative, service representative, or distributor directly to seek out additional technical assistance.

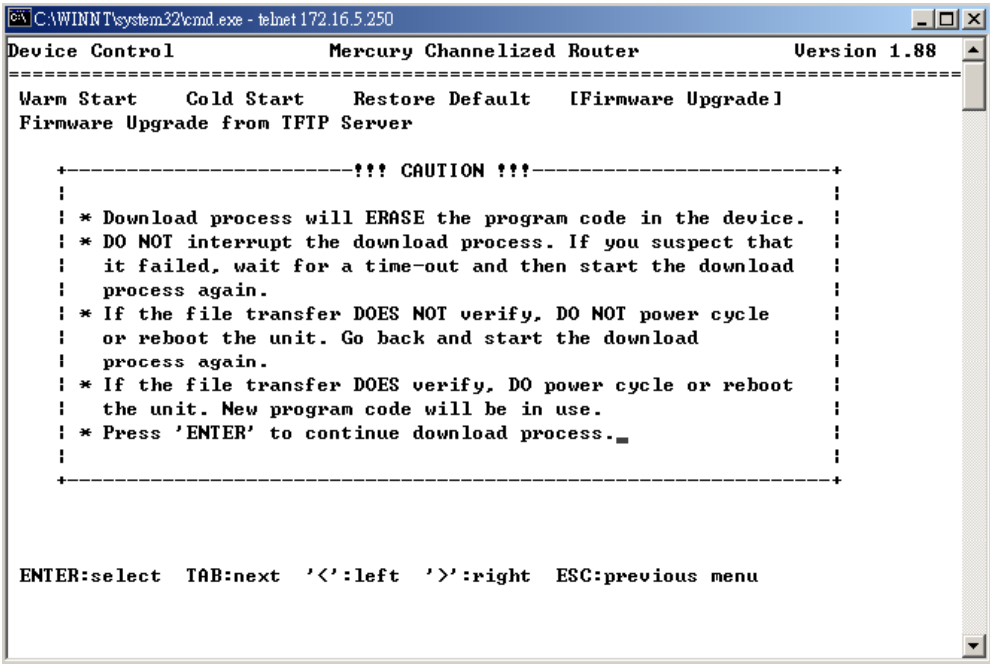


Figure 5.74 The sub-menu of Firmware Upgrade menu

The following describes the details of the Firmware Upgrade in the Device Control menu.

TFTP Server IP Address	The IP address is a unique 4-byte (32-bit) numeric value used to identify a TFTP Server.
TFTP Server File Name	The file name of new program code in the TFTP Server.

Table 5.26 Descriptions of Firmware Upgrade Table of Device Control menu

TFTP is an UDP/IP client-server application. The unit is a client TFTP which starts running after the old firmware code is erased. Operating on the opposite side of the client will be a TFTP server connected to the LAN or WAN interface via an IP network.

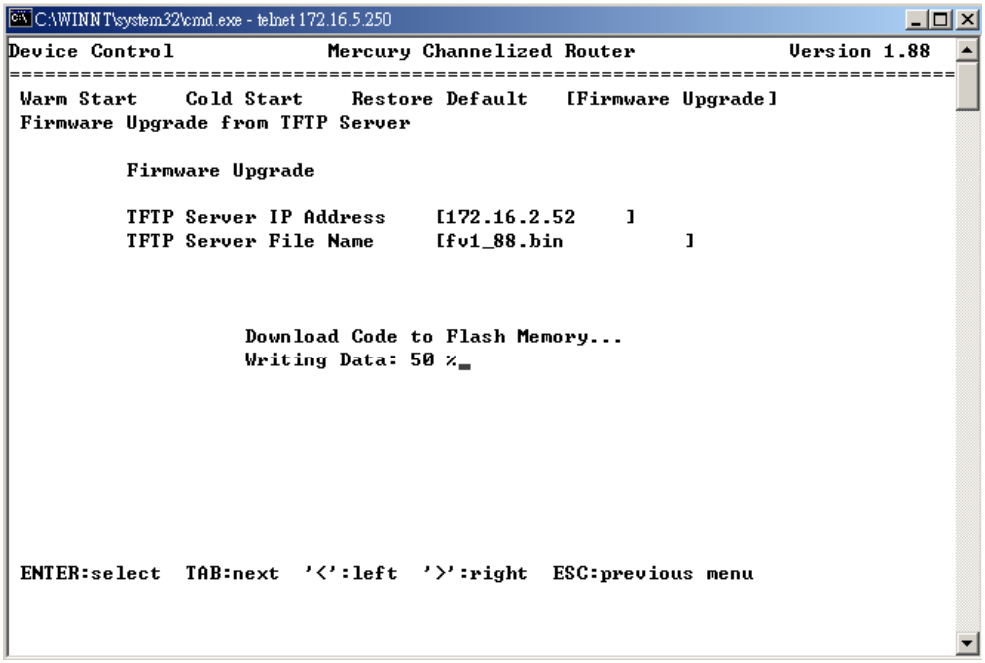


Figure 5.75 The Firmware Upgrade menu

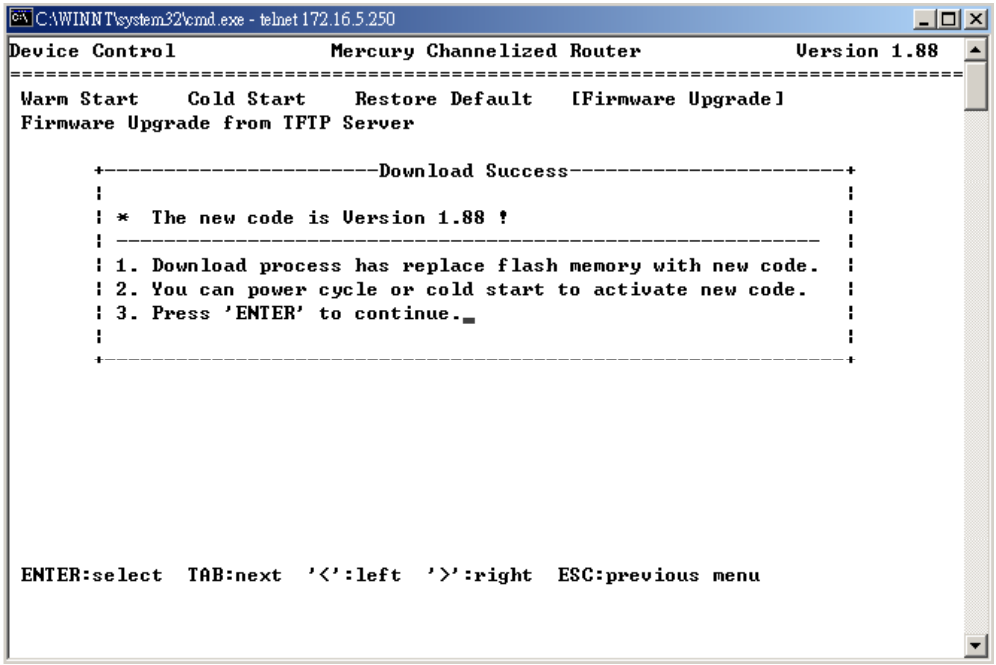


Figure 5.76 Success to upgrade the Firmware

After file transfer is complete, follow the instructions and “Cold Start” the Ch-r module.

5.7.6 Diagnosis Menu

There are two submenus included in the Diagnosis menu. More detailed descriptions are as follows:

- Ping:

This command will help you verify the connectivity with remote host.

- Information:

This option shows the current version of BOOT ROM and FLASH firmware.

```
Diagnosis                  Mercury Channelized Router             Version 1.07
================================================================================
[Ping]   Information
 IP Connectivity




 ENTER:select  TAB:next  '<':left  '>':right  ESC:previous menu
```

Figure 5.77 The sub menu tree of Diagnosis menu

5.7.6.1 Ping command

When you encounter an IP routing problem such as not being able to communicate with a remote host, or if you simply want to verify the connectivity, you can use the ping command to help you perform diagnosis. This command is available from the *Diagnosis – Ping* menu.

```
Diagnosis                  Mercury Channelized Router             Version 1.07
================================================================================
[Ping]   Information
 IP Connectivity

               Host Reachability

               Target IP Address     [172.16.3.58    ]
               Datagram Size         [100]
               Timeout in Seconds    [2]

               PING 172.16.3.58 with 100 bytes of data

               Reply from 172.16.3.58: bytes=100 time=8ms
               Reply from 172.16.3.58: bytes=100 time=8ms
               Reply from 172.16.3.58: bytes=100 time=8ms
               Reply from 172.16.3.58: bytes=100 time=8ms
               Reply from 172.16.3.58: bytes=100 time=8ms

 Press any key to continue!
```

Figure 5.78 The sub menu of Ping menu

Target IP Address	The IP address is a unique 4-byte (32-bit) numeric value used to identify a network and a local host on that network.
Datagram Size	The payload size of TCP datagram.

Timeout in Seconds	Timeout in seconds to wait for each reply.

Table 5.27 Descriptions of Ping parameters of Information menu

Ping measures the round-trip time to the destination. Round-trip time is useful for understanding bandwidth and load conditions on the network. If the network has slower links or heavier traffic load, the round-trip time will be longer. Heavy network loads can result in ping failures.

5.7.6.2 Information of Ch-r module

This menu shows the current version of BOOT ROM and FLASH firmware, and can get the real-time firmware code version in ROM or FLASH memory. If the FLASH code version shows "****", this means the code is invalid. This usually occurs when user runs the 'Firmware Update' function but does not complete it. You must contact your local sales representative, service representative, or distributor directly for help to resolve this condition.

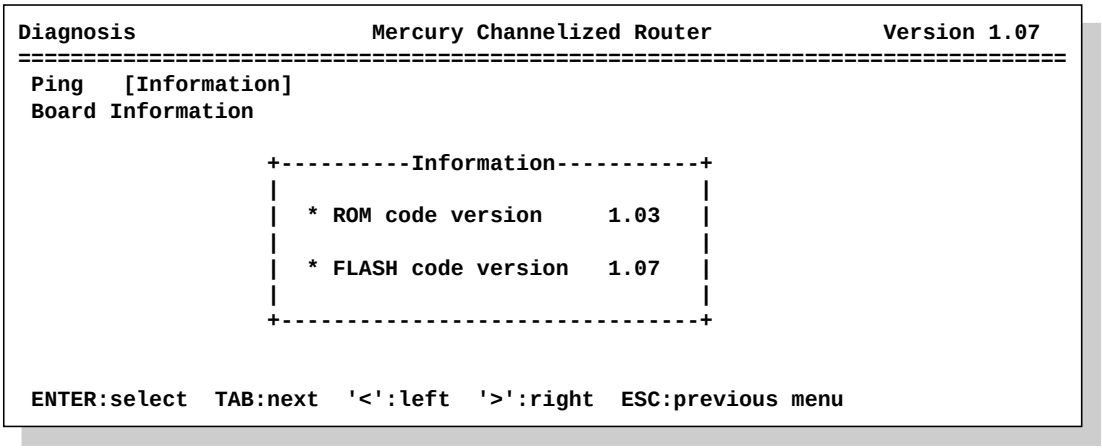


Figure 5.79 The sub menu of Information menu

Appendix A Introduction

A.1 Mercury 800/3820 Craft port Interface (RJ-45 to DB-9 Adapter with Null modem inside)

Mercury 800 / 3820's Craft port uses the RJ-45 connector, and pin descriptions for the RJ-45 to DB-9 are as shown in the following table. The RS-232 / V.28 electric signal interface.

RJ-45 pin	DB9 pin (Female)
2	1
7	
3	2
5	3
None	4 (NC)
4	5
None	6 (NC)
6	7
	8
None	9 (NC)

Table A-1 RJ-45 to DB-9 Adapter for Mercury 800/3820 Craft port

A.2 Mercury 800/3820 PPP port Interface (RJ-45 to DB-25 Adapter)

Mercury 800 / 3820's PPP port uses the RJ-45 connector, and pin descriptions for the RJ-45 to DB-25 are shown in the following table. RS232/V.28 electric signal interface.

RJ-45 pin	Description	DB25 pin (male)	source
1	Transmit clock	15	DCE
2	Request to send	4	DTE
3	Transmitted data	2	DTE
4	Signal ground	7	Common
5	Received data	3	DCE
6	Carrier detect	8	DCE
7	Clear to send	5	DCE
8	Receive clock	17	DCE

Table A-2 PPP port pin assignment for Mercury 800/3820

A.3 Mercury 3600 Craft port Interface (DB-9 Connector)

Mercury 3600's Craft port uses DB-9 connector, and pin descriptions for DB-9 lists are shown in the following table. RS232 / V.28 electric signal interface.

Description	DB9 pin (male)	Source
Transmitted data	2	DTE
Received data	3	DCE
Signal ground	5	Common
Clear to send	7	DCE
Request to send	8	DTE

Table A-3 Craft port pin assignment for Mercury 3600

A.4 Mercury Series Alarm port (DB-9 Female)

For Mercury 800's PCB Hardware version (V1.2) and Mercury 3600:

DB9 (female)	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
Signal	-	MinL	MajL	MinB	MajB	MinL	MajL	MinB	MajB

Table A-4 Craft port pin assignment for Mercury 3600

For Mercury 800's PCB Hardware version (V1.3 or above) and Mercury 3820:

DB9 (female)	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
Signal	MajB	MinB	MajL	MinL	-	MajB	MinB	MajL	MinL

Table A-5 Alarm port pin assignment for Mercury 800/3600/3820

A.5 Mercury 800/3820 On Board Ethernet port (RJ-45)

RJ-45	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
Signal	TPO+(o)	TPO-(o)	TPi+(i)	N/C	N/C	TPi-(i)	N/C	N/C	N/C

Table A-6 On Board Ethernet port for Mercury 800/3820

A.6 Mercury 800 On Board E1 120 Ohm interface (Balance)

RJ-45	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
Signal	Rtip+	Rring-	-	Ttip+	Tring-	-	-	-	-

Table A-7 On Board E1 120 Ohm port for Mercury 800

A.7 E1-2/4C-B/U and T1-2/4C-B interface

The E1 / T1 interface uses a D-sub25 connector. Pin descriptions are shown in the following table:

Pin number	Description	Pin number	Description
1	-	14	PortD transmit +
2	PortD transmit –	15	-
3	PortD receiver +	16	PortD receiver –
4	-	17	PortC receiver –
5	PortC receiver +	18	-
6	PortC transmit –	19	PortC transmit +
7	-	20	PortB transmit +

8	PortB transmit –	21	-
9	PortB receiver +	22	PortB receiver –
10	-	23	PortA receiver –
11	PortA receiver +	24	-
12	PortA transmit –	25	PortA transmit +
13	-		

Table A-8 4E1/4T1 interface pin assignment

A.8 E1-2/4C-B and T1-2/4C-B RJ-48 pin definition for Interface

Pin number	Description
1	Receiver -
2	Receiver +
3	-
4	Transmit -
5	Transmit +
6	-
7	-
8	-

Table A-9 RJ-48 E1/T1 pin definition

A.9 2P-V35 Interface

The 2P-V35 interface uses a SCSI II D-sub50 connector. Pin descriptions are listed in the following table:

SCSI II pin number.		Name	V.35 Pin	Function
	DB-25			
1/26	1	FG	A	Chassis ground
7/32	7	SG	B	Signal ground
4/29	4	RTS	C	Request To Send
5/30	5	CTS	D	Clear To Send
6/31	6	DSR	E	Data Set Ready
8/33	8	DCD	F	Data Carrier Detect
20/45	20	DTR	H	Data Terminal Ready
22/47	22	RI		Ring Indicator
3/28 16/41	3 16	RD	R T	Receive Data(a) Receive Data(b)
17/42 9/34	17 9	RCLK	V X	Receive Timing(a) Receive Timing(b)
2/27 14/39	2 14	SD	P S	Transmitted Data(a) Transmitted Data(b)
24/49 11/36	24 11	EXC	U W	Terminal Timing(a) Terminal Timing(b)
15/40 12/37	15 12	TCLK	Y AA	Transmit Timing(a) Transmit Timing(b)
18/43 21/46	18 21	TCC		DCE Timing(a) DCE Timing(b)

Table A-10 SCSI-II→DB-25 →V.35 CABLE PIN definition

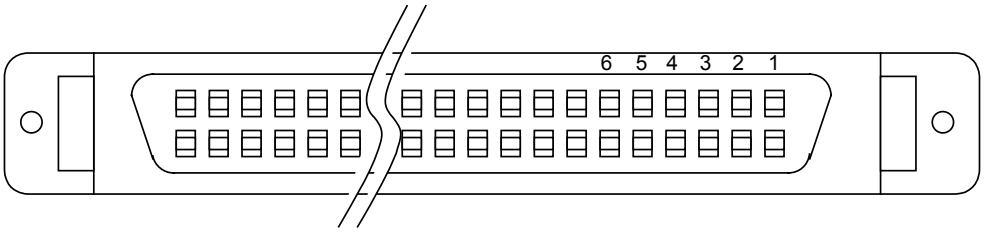


Figure A-1 SCSI-II

A.10 1P-V35 Interface

The V.35 single port interface for Mercury 3600 uses a 34 pin standard connector. Pin descriptions are shown in the following table:

Pin number	Description	Pin number	Description
A	Chassis ground	B	Signal ground
C	Request to send	D	Clear to send
E	Data set ready	F	Data carrier detect
H	Data terminal ready	J	Ring indicator
K	-	L	-
M	-	N	-
P	Transmitted data(a)	R	Receiver data(a)
S	Transmitted data(b)	T	Receiver data(b)
U	Terminal timing(a)	V	Receiver timing(a)
W	Terminal timing(b)	X	Receiver timing(b)
Y	Transmit timing(a)	Z	-
AA	Transmit timing(b)	BB	-
CC	-	DD	-
EE	-	FF	-
HH	-	JJ	-
KK	-	LL	-
MM	-	NN	-

Table A-11 Single port V.35 PIN definition for Mercury 3600

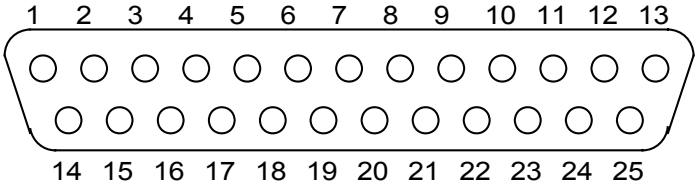


Figure A-2 DB25

A.11 RS530 Interface

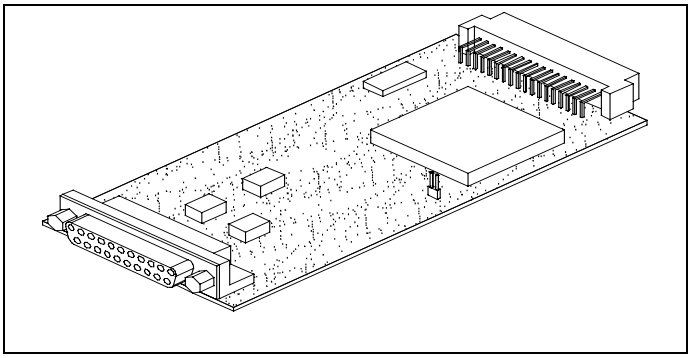


Figure A-3 RS-530 Data Interface module for Mercury 3600

The RS-530 interface for Mercury 3600 uses a 25 pin standard connector. The pin descriptions are shown in the following table:

Pin number	Description	Pin number	Description
1	Shield	14	Transmitted (B)
2	Transmitted Data (A)	15	Transmit Signal Element (A)
3	Received Data (A)	16	Received Data (B)
4	Request to Send (A)	17	Receiver Signal Element Timing (A)
5	Clear to Send (A)	18	Local Loopback
6	DCE Ready (A)	19	Request to Send (B)
7	Signal Ground	20	DTE Ready (A)
8	Received Line Signal Detector (A)	21	Remote Loopback
9	Receiver Signal Element Timing (B)	22	DCE Ready (B)
10	Received Line Signal Detector (B)	23	DTE Ready (B)
11	Ext. Transmit Signal Element Timing (B)	24	Ext. Transmit Element Timing (A)
12	Transmit Signal Element Timing (B)	25	Test Mode
13	Clear to Send(B)		

Table A-12 Single Port RS-530 PIN definition for Mercury 3600

A.12 X21 Interface

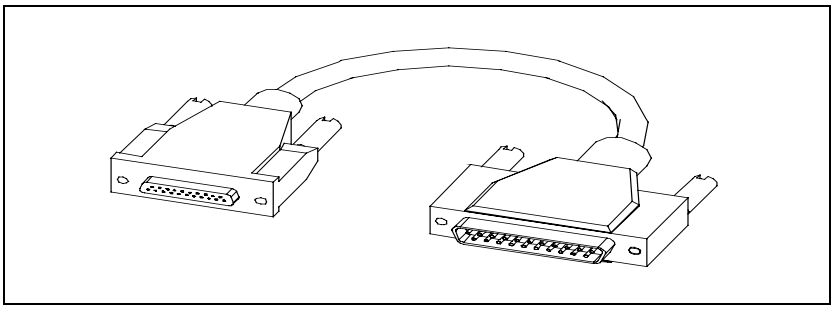


Figure A-4 RS-530/ X.21 Adapting Cable for Mercury 3600

The X.21 interface for Mercury 3600 only uses a 15 pin standard connector. The pin descriptions are shown in the following table:

Pin number	Description	Pin number	Description
1	Shield	9	Transmit(B)
2	Transmit(A)	10	Control(B)
3	Control(A)	11	Receive(B)
4	Receive(A)	12	Indication(B)
5	Indication(A)	13	Signal Timing(B)
6	Signal Timing(A)	14	-
7	-	15	-
8	GND		

Table A-13 X.21 PIN definition for Mercury 3600

A.13 V36/RS-449 Interface

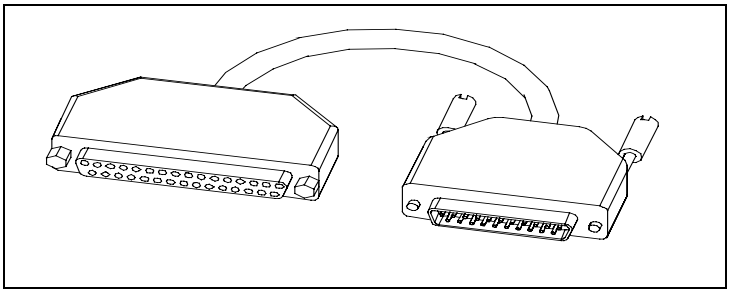


Figure A-5 RS-530/ RS-449 Adapting Cable for Mercury 3600

The V.36/RS-449 interface for Mercury 3600 uses a 37 pin standard connector. The pin descriptions are shown in the following table:

Pin number	Description	Pin number	Description
1	Shield	20	Receive Common
2	Signal Rate Indicator	21	Unassigned
3	Unassigned	22	Send Data (B)
4	Send Data (A)	23	Send Timing (B)
5	Send Timing (A)	24	Receive Data (B)
6	Receive Data (A)	25	Request to Send (B)
7	Request to Send (A)	26	Receive Timing (B)

8	Receive Timing (A)	27	Clear to Send (B)
9	Request to Send (A)	28	Terminal in Service
10	Local Loopback	29	Data Mode (B)
11	Data Mode (A)	30	Terminal Ready (B)
12	Terminal Ready (A)	31	Receiver Ready (B)
13	Receiver Ready (A)	32	Select Standby
14	Remote Loopback	33	Signal Quality
15	Incoming Call	34	New Signal
16	Select Frequency	35	Terminal Timing (A)
17	Terminal Timing (A)	36	Standby Indicator
18	Test Mode	37	Send Common
19	Signal Ground		

Table A-14 V.36/ RS-449 PIN definition for Mercury 3600

A.14 A/U Law Interface

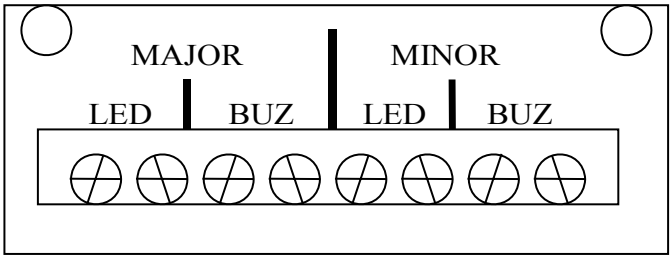


Figure A-6 A/U Interface

		Pin number	Description
Major	**LED**	1	Major alarm indicator common point
		2	Major alarm indicator normal open point
	Buzzer	3	Major alarm buzzer common point
		4	MAJOR ALARM BUZZER COMMON POINT
Minor	**LED**	5	MINOR ALARM INDICATOR COMMON POINT
		6	Minor alarm indicator normal open point
	Buzzer	7	Minor alarm buzzer common point
		8	Minor alarm buzzer common point

Table A-15 A/U card 8 pin terminal block

A.15 X50-MUX-5C, X50-MUX-4C, X50-DACS-2C Interface

The X.50 interface uses SCSI II D-sub50 connector. Pin descriptions are shown in the table bellow:

SCSI –II pin number	Description	
1/11/21/31/41	Receiver data (a)	
2/12/22/32/42	Transmitted data (a)	
3/13/23/33/43	Receiver timing (a)	
4/14/24/34/44	Data set ready	Follow DTR
5/15/25/35/45	Terminal timing (a)	
6/16/26/36/46	Data carrier detect	

7/17/27/37/47	Clear to send	
8/18/28/38/48	Request to send	
9/19/29/39/49	Data terminal ready	
10/20/30/40/50	Signal ground	

Table A-16 X.50 Interface SCSI-II PIN assignment

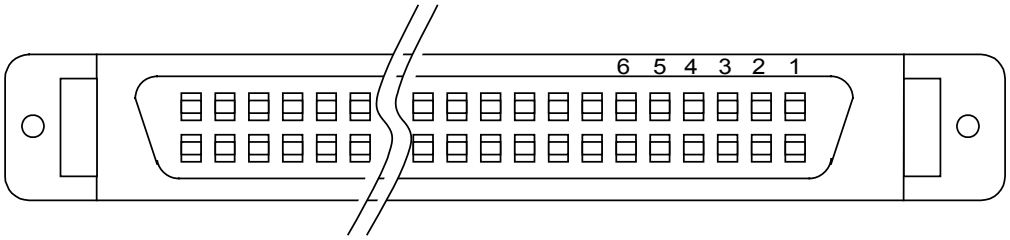


Figure A-7 SCSI-II

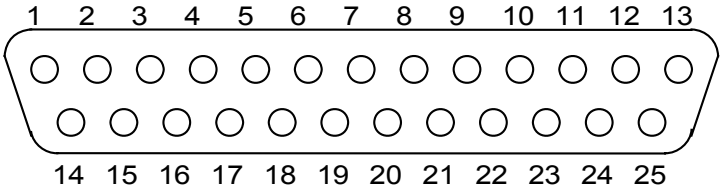


Figure A-8 DB25

A.16 4-IDSL Interface

IDSL can be connected via ISDN U-interface using RJ-11 connector. Pin definitions are shown below.

Pin Number	Signal
1	N.C
2	N.C
3	TX/RX
4	TX/RX
5	N.C
6	N.C

Table A-17 IDSL Line pin assignment

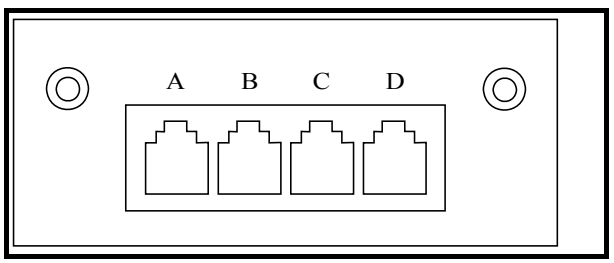


Figure A-9 IDSL Front Panel

A.17 SDSL Interface

The SDSL line interface is using a RJ-45 connector. The pin out descriptions are shown as follows.

Pin Number	Signal
1	N.C.
2	N.C.
3	N.C.
4	Tip
5	Ring
6	N.C.
7	N.C.
8	N.C.

Table A-18 SDSL Interface PIN assignment

A.18 Router Interface

LED Message:

- ACT: The Router Module is active and ready.
- AUX: The protocol layer link status for AUX port.
- LAN: LAN port active and ready. When transmitting data on LAN port, the LED will flash.
- WAN: The protocol layer link status for WAN port.

Ethernet port can be connected via Ethernet 10-Base-T interface. Pin definitions are listed in Table A-19.

Pin Number	Signal	Description
1	TPTX+	TP Driver Output
2	TPTX-	-
3	TPRX+	TP Receive Input
6	TPRX-	-
7	N.C	-
8	N.C	-

Table A-19 Ethernet interface for router module

PPP port is located on the back plane of the router card. It's a RJ-45 connector, with RS-232 / V.28 electric signal interface. The pin definition is listed in the following Table:

SIGNAL FUNCTION	SOURCE	Panel socket RJ-45	Adaptor DB-25 (Male)	Input / Output
Signal Ground	COMMON	4	7	------
Transmitted Data	DTE	3	2	Output
Received Data	DCE	5	3	Input
Request to Send	DTE	2	4	Output
Clear To Send	DCE	7	5	Input
Carrier Detect	DCE	6	8	Input

Transmit Clock	DCE	1	15	Input
Receive Clock	DCE	8	17	Input

Table A-20 RJ-45 TO DB25 PIN DEFINATION (AUX)

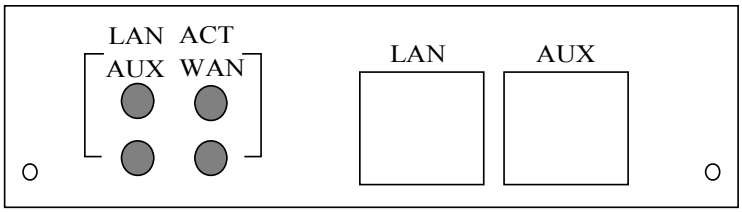


Figure A-10 Router-C Interface

Ethernet port can be connected via Ethernet 10-Base-T interface. Pin definition is listed in Table A-21.

Pin Number	Signal	Description
1	TPTX+	TP Driver Output
2	TPTX-	-
3	TPRX+	TP Receive Input
6	TPRX-	-
7	N.C	-
8	N.C	-

Table A-21 Pin definition of Ethernet interface of Router-C

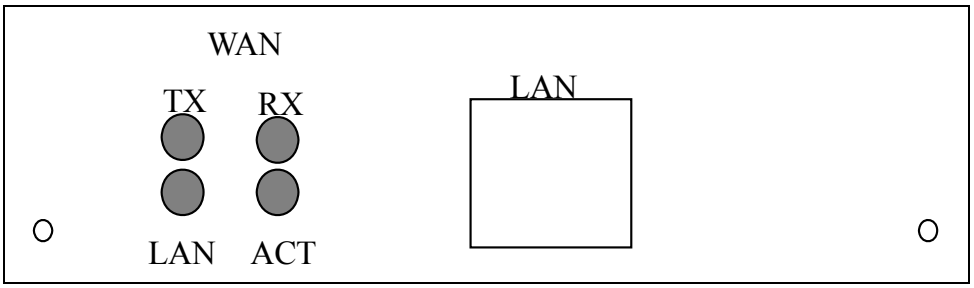


Figure A-11 Router-C Module Interface

A.19 4-FXS, 4-FXS-D Interface

RJ-11 Pin Number	Signal
1	N.C
2	N.C
3	Tip
4	Ring
5	N.C
6	N.C

Table A-22 FXS interface PIN assignment

Four 6-pin RJ-11 connectors or one 8-pin Terminal block per card

Power consumption: Max power consumption < 9 watts (4 channels are FXS mode, and all active, off hook)

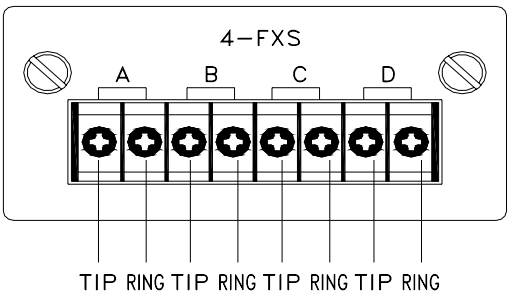


Figure A-12 4-FXS rear panel (terminal block)

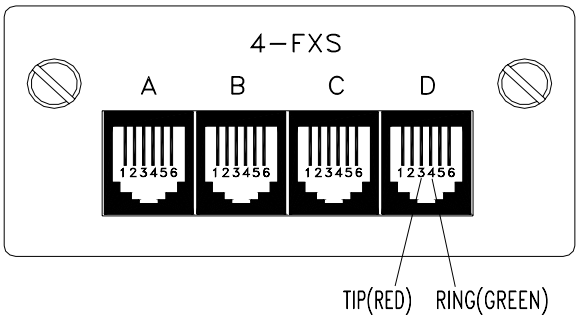


Figure A-13 4-FXS rear panel (RJ-11)

A.20 2/4P-Data Interface

The 2/4P-Data Module uses a 2 SCSI-II D-sub50 connector. The pin descriptions are shown as follows.

CONNECT		Name	V35	Function
SCSI II	DB25			
1/26/51/76	1	FG	A	Classis ground
7/32/57/82	7	SG	B	Signal ground
4/29/54/79	4	RTS	C	Request To Send
5/30/55/80	5	CTS	D	Clear To Send
6/31/56/81	6	DSR	E	Data Set Ready
8/33/58/83	8	DCD	F	Data Carrier Detect
20/45/70/95	20	DTR	H	Data Terminal Ready
22/47/72/97	22	RI		Ring Indicator
3/28/53/78	3	RD(A)	R	Receive Data (a)
16/41/66/91	16	RD(B)	T	Receive Data (b)
17/42/67/92	17	Rxc(A)	V	Receive Timing (a)
9/34/59/84	9	Rxc(B)	X	Receive Timing (b)
2/27/52/77	2	TD(A)	P	Transmitted Data (a)
14/39/64/89	14	TD(B)	S	Transmitted Data (b)
24/49/74/99	24	Exc(A)	U	Ext. Transmit Timing (a)
11/36/61/86	11	Exc(B)	W	Ext. Transmit Timing (b)
15/40/65/90	15	Txc(A)	Y	Transmit Timing (a)
12/37/62/87	12	Txc(B)	AA	Transmit Timing (b)
18/43/68/93	18	Tcc(A)		DCE timing (a)
21/46/71/96	21	Tcc(B)		DCE timing (b)

Table A-23 SCSI-II → DB-25 CABLE PIN assignment

A.21 4P-V24 Interface

The 4P-V24 interface uses SCSI II D-sub50 connector. The pin out descriptions areas follows:

SCSI-II pin number	Description	DB-25
1/11/21/31	Receiver data (port A/B/C/D)	3
2/12/22/32	Transmitted data (port A/B/C/D)	2
3/13/23/33	Receiver timing and Terminal timing (DCE) (port A/B/C/D)	17, 15
4/14/24/34	Data set ready (port A/B/C/D)	6
5/15/25/35	Terminal timing (DTE) (port A/B/C/D)	24
6/16/26/36	Data carrier detect (port A/B/C/D)	8
7/17/27/37	Clear to send (port A/B/C/D)	5
8/18/28/38	Request to send (port A/B/C/D)	4
9/19/29/39	Data terminal ready (port A/B/C/D)	20
10/20/30/40	Signal ground (port A/B/C/D)	7

Table A-24 4P-V24 Interface SCSI-II PIN assignment

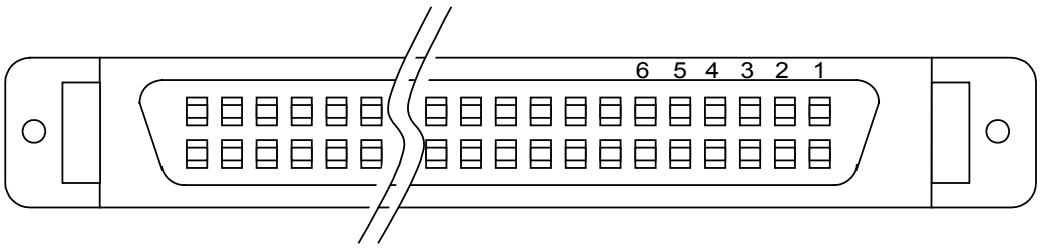


Figure A-14 SCSI-II

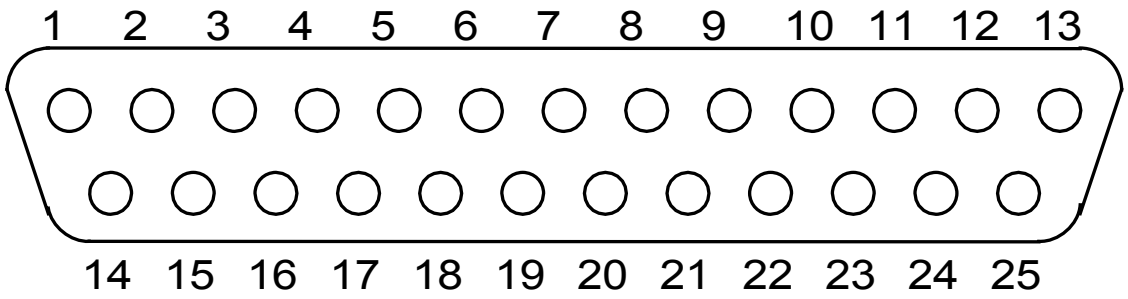


Figure A-15 DB25

A.22 4-POTS-Voice (FXO, FXS) Interface

The 4-POTS-FXO / FXS interface uses DB44 connector and are described bellow:

The marked symbol * is reserved for future use.

Pin Number	Description	Pin Number	Description	Pin Number	Description
1	TIP1	16	*M11	31	*M12
2	*E11	17	*E12	32	*IRING1A
3	RING1	18	*ITIP1A	33	N.C.
4	N.C.	19	*N.C.	34	N.C.
5	TIP2	20	*M21	35	*M22

6	*E21	21	*E22	36	*IRING2A
7	RING2	22	*ITIP2A	37	N.C.
8	N.C.	23	N.C.	38	N.C.
9	TIP3	24	*ITIP3A	39	*IRING3A
10	*E31	25	*E32	40	*M32
11	RING3	26	*M31	41	N.C.
12	*N.C.	27	N.C.	42	N.C.
13	TIP4	28	*ITIP4A	43	*IRING4A
14	*E41	29	*E42	44	*M42
15	RING4	30	*M41		

Table A-25 4-POTS-FXO/FXS Interface DB44 PIN assignment

CONNECT		Name	Function
DB44(PIN)	RJ-11(PIN)		
1/3	3/4	Channel 1	Tip/Ring
5/7	3/4	Channel 2	Tip/Ring
9/11	3/4	Channel 3	Tip/Ring
13/15	3/4	Channel 4	Tip/Ring

Table A-26 Adaptor cable DB44 to RJ-11 x 4 PIN assignment

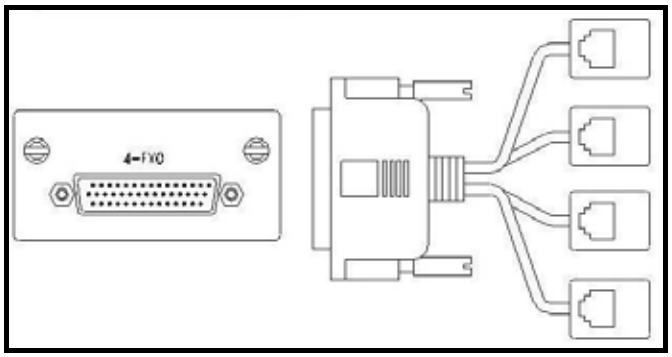


Figure A-16 4-POTS-FXO/FXS DB44 to 4 x RJ-11 adaptor

A.23 1P-SHDSL-V interface

The 1P-SHDSL-V interface uses RJ-45 connector as interface, the detail pin assignment as described bellow:

PIN Number	Signal
1	N.C
2	N.C
3	N.C
4	Tip
5	Ring
6	N.C
7	N.C
8	N.C

Table A-27 1P-SHDSL-V RJ-45 PIN assignment

A.24 4P-POTS E&M interface

The 4P-POTS E&M interface uses RJ-45 connector as interface, the detail pin assignment as described bellow:

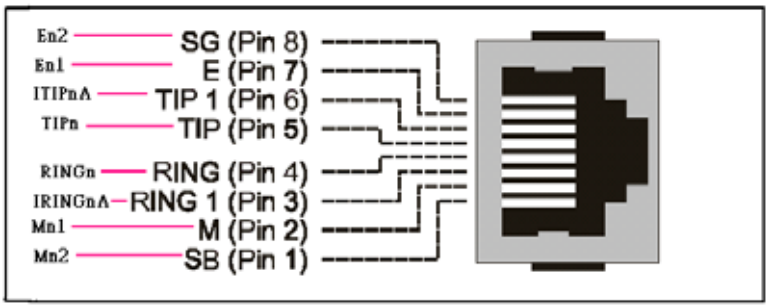


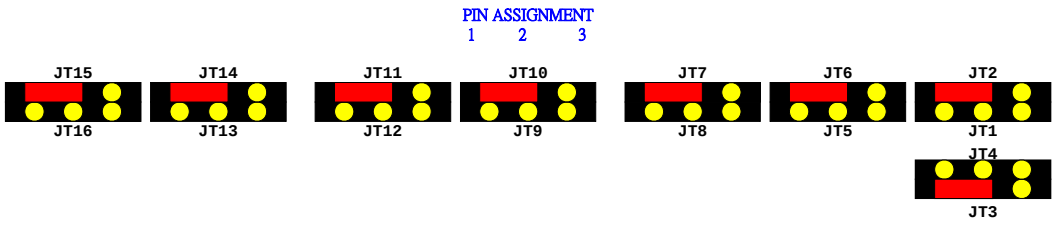
Figure A-17 Pin Assignment of RJ-45 Conncetor

E&M SIGNALINT TYPE CONFIGURE

The 4P-POTS E&M Card can support E&M I-V type signaling. The signaling type selected by Jumper and the configuration of any type is illustrate as below:

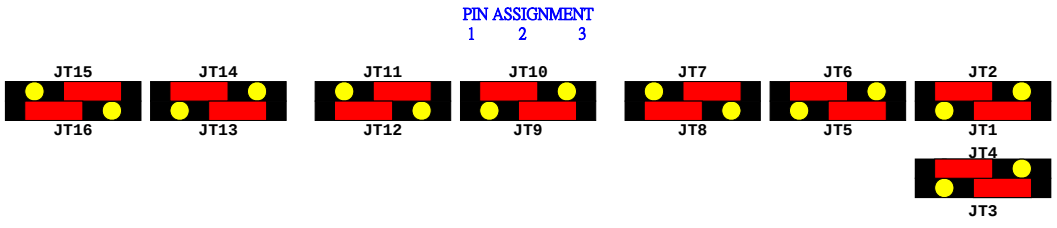
TYPE I

Channel	1				Channel	2			
Header	JT1	JT2	JT3	JT4	Header	JT5	JT6	JT7	JT8
Jump Pin	X	1-2	1-2	X	Jump Pin	X	1-2	1-2	X
Channel	3				Channel	4			
Header	JT9	JT10	JT11	JT12	Header	JT13	JT14	JT15	JT16
Jump Pin	X	1-2	1-2	X	Jump Pin	X	1-2	1-2	X



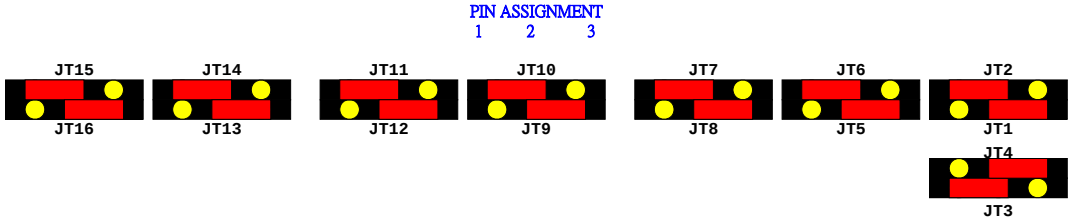
TYPE II

Channel	1				Channel	2			
Header	JT1	JT2	JT3	JT4	Header	JT5	JT6	JT7	JT8
Jump Pin	2-3	1-2	2-3	1-2	Jump Pin	2-3	1-2	2-3	1-2
Channel	3				Channel	4			
Header	JT9	JT10	JT11	JT12	Header	JT13	JT14	JT15	JT16
Jump Pin	2-3	1-2	2-3	1-2	Jump Pin	2-3	1-2	2-3	1-2



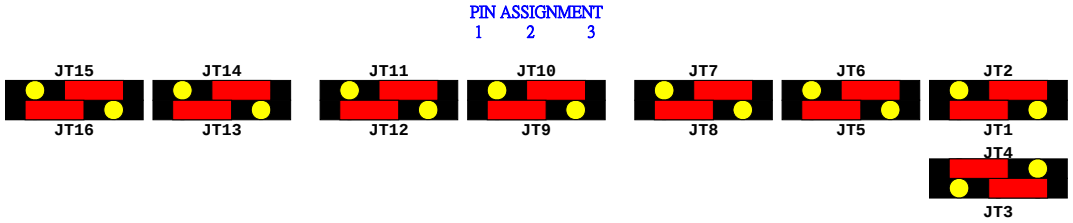
TYPE III

Channel	1				Channel	2			
Header	JT1	JT2	JT3	JT4	Header	JT5	JT6	JT7	JT8
Jump Pin	2-3	1-2	1-2	2-3	Jump Pin	2-3	1-2	1-2	2-3
Channel	3				Channel	4			
Header	JT9	JT10	JT11	JT12	Header	JT13	JT14	JT15	JT16
Jump Pin	2-3	1-2	1-2	2-3	Jump Pin	2-3	1-2	1-2	2-3



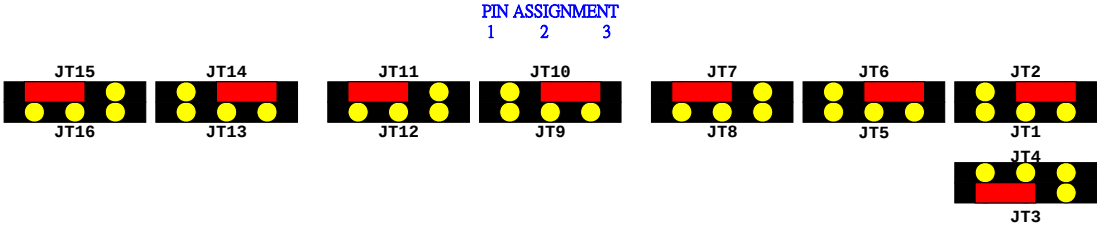
TYPE IV

Channel	1				Channel	2			
Header	JT1	JT2	JT3	JT4	Header	JT5	JT6	JT7	JT8
Jump Pin	1-2	2-3	2-3	1-2	Jump Pin	1-2	2-3	2-3	1-2
Channel	3				Channel	4			
Header	JT9	JT10	JT11	JT12	Header	JT13	JT14	JT15	JT16
Jump Pin	1-2	2-3	2-3	1-2	Jump Pin	1-2	2-3	2-3	1-2



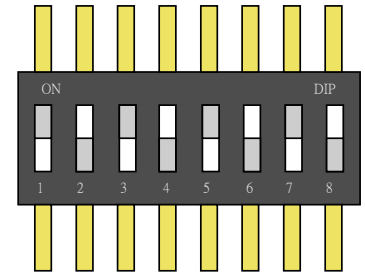
TYPE V

Channel	1				Channel	2			
Header	JT1	JT2	JT3	JT4	Header	JT5	JT6	JT7	JT8
Jump Pin	X	2-3	1-2	X	Jump Pin	X	2-3	1-2	X
Channel	3				Channel	4			
Header	JT9	JT10	JT11	JT12	Header	JT13	JT14	JT15	JT16
Jump Pin	X	2-3	1-2	X	Jump Pin	X	2-3	1-2	X

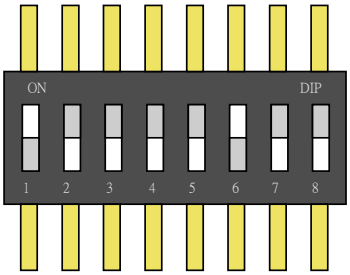


■ 2W/4W AND IMPEDANCE SELECTION

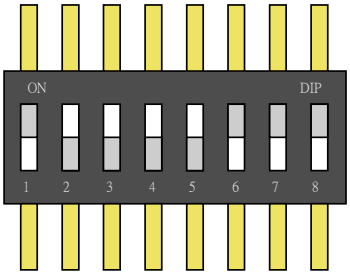
It used a DIP Switch to configure a 2-Wire mode or 4-Wire mode in this circuit. And connected into 600ohm or 900ohm in 2-Wire mode or into 600ohm in 4-wire mode.



2-Wire 600Ω



2-Wire 900Ω



4-Wire 600Ω

Figure A-18 2W/4W AND IMPEDANCE SELECTIOR

Appendix B Ordering Information

B.1 Mercury 800 Order Information

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
BASE UNIT				
800	00010-00003	MERCURY 800 BASE UNIT ASSEMBLY		
800	00010-00023	MERCURY 800 BASE UNIT WITH DC		
Card				
/E1-4CB-L	00010-00004	MERCURY 800 4E1(120Ω)		
	33010-00025		DB25 (M)→ 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/E1-4CU-L	00010-00005	MERCURY 800 4E1(75Ω)		
	33010-00024		DB25 (M)→ 8BNC cable	
	33010-00026		DB25 (M)→ 8BNC (F) cable	
	09100-60047			BNC (F)→(F) connector
	33010-00006			DB25 (M) → (F) cable 1.8m
/T1-4CB-L for PTT	00010-00006	MERCURY 800 4T1(100Ω)		
	33010-00025		DB25 (M)→ 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/E1-2CB-L	00010-00007	MERCURY 800 2E1(120Ω)		
	33010-00025		DB25 (M)→ 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/E1-2CU-L	00010-00008	MERCURY 800 (75Ω)		
	33010-00026		DB25 (M)→ 8BNC (F) cable	
	33010-00024		DB25 (M)→ 8BNC cable	

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	09100-60047			BNC (F) → (F) connector
	33010-00006			DB25 (M) → (F) cable 1.8m
/T1-2CB-L for PTT	00010-00009	MERCURY 800 2T1(100Ω)		
	33010-00025		DB25 (M)→ 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/A-MU-L	00010-00010	MERCURY 800 A/μ BOARD		
/4IDSL-L	00010-00011	MERCURY 800 4IDSL (RJ-11)		
/X50-MUX-5C-L	00010-00012	MERCURY 800 X.50 BOARD		
	33010-00022		SCSI II → 5DB25 (F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/X50-MUX-4C-L	00010-00013	MERCURY 800 X.50 BOARD		
	33010-00022		SCSI II → 5DB25 (F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/X50-DACS-2C-L	00010-00014	MERCURY 800 X.50 BOARD		
	33010-00022		SCSI II → 5DB25 (F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/2P-V35-L	00010-00015	MERCURY 800 2V35 BOARD		
	33010-00002			DB25 (M) →V.35 (F) cable
	33010-00006			DB25 (M) → (F) cable 1.8m
	33010-00013			DB25 (M) → V.35 (M) cable
	35014-00011			DCE→DCE sync null modem
/4-FXS-D-L	00010-00016	4 FXS VOICE CARD – RJ-11		

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	35015-00002			PHONE BOX RJ-11
/FIBER-B-L	00010-00017	WITH 1+1 BACKUP for MERCURY 800		
/FIBER-1-L	00010-00018	SINGLE PORT FIBER for MERCURY 800		
/FIBER-2-L	00010-00019	DAUL PORT FIBER for MERCURY 800		
/XCODE-L	00010-00020	MERCURY 800 XCODE		
/4-POTS-FXO-L	00010-00024	4 FXO VOICE CARD		
/SDSL-L	00010-00025	MERCURY 800 SDSL		
	33008-00009		RJ-45 8P8C TWIST PAIR	
/2P-SHDSL-L	00010-00038	DAUL PORT G.SHDSL		
/2P-DATA-L	00010-00027	MERCURY 800 2P-DATA		
	33010-00002			DB25 (M) → V35 (F) CABLE
	33010-00006			DB25 (M) → (F) CABLE 1.8M
	33010-00013			DB25 (M) → V35 (M) CABLE
	33010-00023			DB25 (M) → DB15 (F) 20cm FOR X.21
	33010-00004			DB25 (M) → DB37 (F) FOR RS-449
	33010-00011			DCE → DCE SYNC NULL MODEM
/4P-V24-L	00010-00028	MERCURY 800 4P-V24		
	33010-00006			DB25 (M) → (F) CABLE 1.8M
	33010-00011			DCE → DCE SYNC NULL MODEM
<<NOTE: VERIFICATION NEEDED FROM R&D AND TECH SUPPORT FOR PARTS LISTED BELOW>>				
/ROUTER-L	00007-70001	ROUTER MODULE		
	33008-00011			RJ-45 PHONE WIRE (GRAY)/8P8C 2M 24AWG TWIST CROSS
	35014-00011			DCE→DCE sync null modem /DB25P (M)-DB25P (F)
	35015-00001			RJ-45 PHONE BOX
/ROUTER-C	00007-70006	CHANNELIZE ROUTER		
	33008-00011			RJ-45 PHONE WIRE (GRAY)/8P8C 2M 24AWG TWIST CROSS
	35014-00011			DCE→DCE sync null modem/DB25P (M)-DB25P (F)

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	35015-00001			RJ-45 PHONE BOX
/4P-POTS-FXS-L				
/1P-SHDSL-VL				
/FIBER-1VL				

Table B-1 Mercury 800 Order Information

B.2 Mercury 3600 Order Information

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
Base Unit				
3600	00008-40001	MERCURY 3600 ASSEMBLY		
	00008-40009			AC-2 secondary power
3600	00008-40010	MERCURY 3600 ASSEMBLY WITH DC		
	00008-40008			DC-2 secondary power
Card				
/E1-4CB	00008-40002	MERCURY 4E1 BOARD (120Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/T1-4CB	00008-40003	MERCURY 4T1 BOARD (100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/E1-4CU	00008-40004	MERCURY 4E1 BOARD (75Ω)		
	33010-00024		DB25 (M) → 8BNC cable	
	33010-00026		DB25 (M) → 8BNC cable (F)	
	09100-60047			BNC (F) → (F) connector
	33010-00006			DB25 (M) → (F) cable 1.8m
/E1-2CU	00008-40005	MERCURY 2E1 BOARD (75Ω)		

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	33010-00024		DB25 (M) → 8BNC cable	
	33010-00026		DB25 (M) → 8BNC cable (F)	
	09100-60047			BNC (F) → (F) connector
	33010-00006			DB25 (M) → (F) cable 1.8m
/E1-2CB	00008-40006	MERCURY 2E1 BOARD (120Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/T1-2CB	00008-40007	MERCURY 2T1 BOARD (100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/A-MU	00008-40011	MERCURY A/μ BOARD		
/2P-V35	00008-40012	MERCURY 2V35 BOARD		
	33010-00002			DB25 (M) → V.35 (F) cable
	33010-00006			DB25 (M) → (F) cable 1.8m
	33010-00013			DB25 (M) → V.35 (M) cable
	35014-00011			DCE→DCE sync null modem
/4IDSL	00008-40013	MERCURY 4IDSL BOARD (RJ-11)		
/X50-MUX-5C	00008-40014	MERCURY X.50 BOARD		
	33010-00022		SCSI II → 5DB25(F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/X50-MUX-4C	00008-40017	MERCURY X.50 BOARD		
	33010-00022		SCSI II → 5DB25(F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	35014-00011			DCE→DCE sync null modem
/X50-DACS-2C	00008-40018	MERCURY X.50 BOARD		
	33010-00022		SCSI II → 5DB25(F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/4IDSL	00008-40019	MERCURY 4IDSL BOARD (TB)		
/4-FXS	00008-40021	MERCURY 4VOICE BOARD (RJ-11)		
	35015-00002			PHONE BOX RJ-11
/T1-4CB FOR PTT	00008-40024	MERCURY 4T1 BOARD (100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/FIBER-B	00008-40025	FIBER WITH 1+1 BACKUP		
/FIBER-1	00008-40026	SIGNAL OPTICAL FIBER		
/FIBER-2	00008-40027	DAUL PORT FIBER		
/XCODE	00008-40028	MERCURY XCODE BOARD		
/T1-2CB FOR PTT	00008-40029	MERCURY 2T1 BOARD (100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/SDSL	00008-40030	MERCURY SDSL BOARD		
	33008-00009		**RJ-45 8P8C TWIST PAIR**	
/4P-DATA	00008-40031	MERCURY 4P-DATA BOARD		
	33010-00002			DB25 (M) →V.35 (F) cable
	33010-00006			DB25 (M) → (F) cable 1.8m
	33010-00013			DB25 (M) → V.35 (M) cable
	33010-00023			DB25 (M) → DB15 (F) 20cm 26AW FOR X.21
	33010-00004			DB25 (M) → DB37 (F) FOR RS449
	35014-00011			DCE → DCE sync null modem

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
/4P-V24	00008-40032	MERCURY 4P-V24 BOARD		
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→ DCE sync null modem
/4P-POTS-FXO	00008-40033	MERCURY 4P-FXO CARD		
/2P-DATA	00008-40034	MERCURY 2P-DATA CARD		
	33010-00002			DB25 (M) →V.35 (F) cable
	33010-00006			DB25 (M) → (F) cable 1.8m
	33010-00013			DB25 (M) → V.35 (M) cable
	33010-00023			DB25 (M) → DB15 (F) 20cm 26AW FOR X.21
	33010-00004			DB25 (M) → DB37 (F) FOR RS449
	35014-00011			DCE → DCE sync null modem
/R530-3A	00006-50226	Nx64K (N=1..31) to 2 Mbps		
	33010-00003			DB25 (M) → DB15 (F) cable
	33010-00004			DB25 (M) → DB37 (F) cable
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/V35-3A	00006-50227	Nx64K (N=1..31) to 2 Mbps		
	33010-00013			DB25 (M) → V.35 (M) cable
/V36-3A	00006-50228	Nx64K(N=1..31) to 2 Mbps		
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/X21-3A	00006-50229	Nx64K (N=1..31) to 2 Mbps		
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/ROUTER	00007-70002	ROUTER MODULE		
	33008-00011			RJ-45 PHONE WIRE (GRAY)/8P8C 2M 24AWG TWIST CROSS
	35014-00011			DCE→DCE sync null modem/ DB25P (M)-DB25P (F)
	35015-00001			RJ-45 PHONE BOX
/ROUTER-C	00007-70003	CHANNELIZE ROUTER		

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	33008-00011			RJ-45 PHONE WIRE (GRAY)/8P8C 2M 24AWG TWIST CROSS
	35014-00011			DCE→DCE sync null modem/ DB25P (M)-DB25P (F)
	35015-00001			RJ-45 PHONE BOX
Power Module				
/DC-2	00008-40008	MERCURY DC MODULE		
/AC-2	00008-40009	MERCURY AC MODULE		

Table B-2 Mercury 3600 Order Information

B.3 Mercury 3600+ Ordering Information

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
Base Unit				
3600+	00010-50001	MERCURY 3600+ BASE UNIT		
3600+	00010-50003	MERCURY 3600+ BASE UNIT WITH DC		
Card				
/E1-4CB	00008-40002	MERCURY 4E1 BOARD (120Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/T1-4CB	00008-40002	MERCURY 4T1 BOARD (100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/E1-4CU	00008-40004	MERCURY 4E1 BOARD (75Ω)		

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	33010-00024		DB25 (M) → 8BNC cable	
	33010-00026		DB25 (M) → 8BNC cable (F)	
	09100-60047			BNC (F) → (F) connector
	33010-00006			DB25 (M) → (F) cable 1.8m
/E1-2CU	00008-40005	MERCURY 2E1 BOARD (75Ω)		
	33010-00024		DB25 (M) → 8BNC cable	
	33010-00026		DB25 (M) → 8BNC cable (F)	
	09100-60047			BNC (F) → (F) connector
	33010-00006			DB25 (M) → (F) cable 1.8m
/E1-2CB	00008-40006	MERCURY 2E1 BOARD (120Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/T1-2CB	00008-40007	MERCURY 2T1 BOARD (100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/A-MU	00008-40011	MERCURY A/μBOARD		
/2P-V35	00008-40012	MERCURY 2V35 BOARD		
	33010-00002			DB25 (M) -> V.35 (F) cable
	33010-00006			DB25 (M) → (F) cable 1.8m
	33010-00013			DB25 (M) →V.35 (M) cable
	35014-00011			DCE→DCE sync null modem
/4IDSL	00008-40013	MERCURY 4IDSL BOARD (RJ-11)		
/X50-MUX-5C	00008-40014	MERCURY X.50 BOARD		
	33010-00022		SCSI II → 5DB25 (F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	35014-00011			DCE→DCE sync null modem
/X50-MUX-4C	00008-40017	MERCURY X.50 BOARD		
	33010-00022		SCSI II → 5DB25(F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/X50-DACS-2C	00008-40018	MERCURY X.50 BOARD		
	33010-00022		SCSI II →5 DB25 (F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/4IDSL	00008-40019	MERCURY 4IDSL BOARD (TB)		
/T1-4CB FOR PTT	00008-40024	MERCURY 4T1 BOARD(100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/FIBER-B	00008-40025	FIBER WITH 1+1 BACKUP		
/FIBER-1	00008-40026	SIGNAL OPTICAL FIBER		
/FIBER-2	00008-40027	DAUL PORT FIBER		
/XCODE	00008-40028	MERCURY XCODE		
/2P-SHDSL	00008-40051	DAUL PORT G.SHDSL		
/T1-2CB FOR PTT	00008-40029	MERCURY 2T1 BOARD (100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/4P-V24	00008-40032	MERCURY 4P-V24 BOARD		
	33010-00006			DB25 (M) -> (F) cable 1.8m
	35014-00011			DCE->DCE sync null modem
/4-POTS-FXO	00008-40033	MERCURY 4P-FXO CARD		
/2P-DATA	00008-40034	MERCURY 2P-DATA CARD		
	33010-00002			DB25 (M) → V35 (F) CABLE

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	33010-00006			DB25 (M) → (F) CABLE 1.8M
	33010-00013			DB25 (M) → V35 (M) CABLE 1.8M
	33010-00023			DB25 (M) → DB15 (F) 20cm FOR X.21
	33010-00004			DB25 (M) → DB37 (F) FOR RS449
	35014-00011			DCE → DCE SYNC null modem
/4-FXS-D	00010-20005	MERCURY 3820 4FXSD (RJ-11)		
	35015-00002			PHONE BOX RJ-11
/ROUTER	00007-70002	ROUTER MODULE		
	33008-00011			RJ-45 PHONE WIRE (GRAY)/8P8C 2M 24AWG TWIST CROSS
	35014-00011			DCE→DCE sync null modem/ DB25P (M)-DB25P (F)
	35015-00001			RJ-45 PHONE BOX
/ROUTER-C	00007-70003	CHANNELIZE ROUTER		
	33008-00011			RJ-45 PHONE WIRE (GRAY)/8P8C 2M 24AWG TWIST CROSS
	35014-00011			DCE→DCE sync null modem/ DB25P (M)-DB25P (F)
	35015-00001			RJ-45 PHONE BOX
Power				
	50001-00059	AC-DC POWER I/P:110-230V O/P:5V/6A	33001-00001	AC POWER CORD/ 3-PIN 10A/125V 6 FEET
	50001-00060	DC-DC POWER I/P:-48V O/P:5V/6A		

B.4 Mercury 3820 Ordering Information

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
Base Unit				
3820	00010-20003	MERCURY 3820 BASE UNIT		
3820	00010-20004	MERCURY 3820 BASE UNIT WITH DC		
Card				

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
/E1-4CB	00008-40002	MERCURY 4E1 BOARD (120Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/T1-4CB	00008-40002	MERCURY 4T1 BOARD (100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/E1-4CU	00008-40004	MERCURY 4E1 BOARD (75Ω)		
	33010-00024		DB25 (M) → 8BNC cable	
	33010-00026		DB25 (M) → 8BNC cable (F)	
	09100-60047			BNC (F) → (F) connector
	33010-00006			DB25 (M) → (F) cable 1.8m
/E1-2CU	00008-40005	MERCURY 2E1 BOARD (75Ω)		
	33010-00024		DB25 (M) → 8BNC cable	
	33010-00026		DB25 (M) → 8BNC cable (F)	
	09100-60047			BNC (F) → (F) connector
	33010-00006			DB25 (M) → (F) cable 1.8m
/E1-2CB	00008-40006	MERCURY 2E1 BOARD (120Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/T1-2CB	00008-40007	MERCURY 2T1 BOARD (100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/A-MU	00008-40011	MERCURY A/μBOARD		
/2P-V35	00008-40012	MERCURY 2V35 BOARD		
	33010-00002			DB25 (M) -> V.35 (F) cable
	33010-00006			DB25 (M) → (F) cable 1.8m
	33010-00013			DB25 (M) →V.35 (M) cable
	35014-00011			DCE→DCE sync null modem
/4IDSL	00008-40013	MERCURY 4IDSL BOARD (RJ-11)		
/X50-MUX-5C	00008-40014	MERCURY X.50 BOARD		
	33010-00022		SCSI II → 5DB25 (F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/X50-MUX-4C	00008-40017	MERCURY X.50 BOARD		
	33010-00022		SCSI II → 5DB25(F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/X50-DACS-2C	00008-40018	MERCURY X.50 BOARD		
	33010-00022		SCSI II →5 DB25 (F) cable	
	33010-00006			DB25 (M) → (F) cable 1.8m
	35014-00011			DCE→DCE sync null modem
/4IDSL	00008-40019	MERCURY 4IDSL BOARD (TB)		
/T1-4CB FOR PTT	00008-40024	MERCURY 4T1 BOARD(100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/FIBER-B	00008-40025	FIBER WITH 1+1 BACKUP		
/FIBER-1	00008-40026	SIGNAL OPTICAL FIBER		
/FIBER-2	00008-40027	DAUL PORT FIBER		
/XCODE	00008-40028	MERCURY XCODE		

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
/2P-SHDSL	00008-40051	DAUL PORT G.SHDSL		
/T1-2CB FOR PTT	00008-40029	MERCURY 2T1 BOARD (100Ω)		
	33010-00025		DB25 (M) → 4 RJ-48 cable	
	33008-00010			RJ-45 CABLE 24AWG 2M
	33010-00006			DB25 (M) → (F) cable 1.8m
	35015-00001			RJ-45 PHONE BOX
/4P-V24	00008-40032	MERCURY 4P-V24 BOARD		
	33010-00006			DB25 (M) -> (F) cable 1.8m
	35014-00011			DCE->DCE sync null modem
/4-POTS-FXO	00008-40033	MERCURY 4P-FXO CARD		
/2P-DATA	00008-40034	MERCURY 2P-DATA CARD		
	33010-00002			DB25 (M) → V35 (F) CABLE
	33010-00006			DB25 (M) → (F) CABLE 1.8M
	33010-00013			DB25 (M) → V35 (M) CABLE 1.8M
	33010-00023			DB25 (M) → DB15 (F) 20cm FOR X.21
	33010-00004			DB25 (M) → DB37 (F) FOR RS449
	35014-00011			DCE → DCE SYNC null modem
/4-FXS-D	00010-20005	MERCURY 3820 4FXSD (RJ-11)		
	35015-00002			PHONE BOX RJ-11
/ROUTER	00007-70002	ROUTER MODULE		
	33008-00011			RJ-45 PHONE WIRE (GRAY)/8P8C 2M 24AWG TWIST CROSS
	35014-00011			DCE→DCE sync null modem/ DB25P (M)-DB25P (F)
	35015-00001			RJ-45 PHONE BOX
/ROUTER-C	00007-70003	CHANNELIZE ROUTER		
	33008-00011			RJ-45 PHONE WIRE (GRAY)/8P8C 2M 24AWG TWIST CROSS
	35014-00011			DCE→DCE sync null modem/ DB25P (M)-DB25P (F)
	35015-00001			RJ-45 PHONE BOX
Power				

Product Code	*Part Number*	*Description*	*Main (Option) Equipment*	*Annex (Option) Equipment*
	50001-00059	AC-DC POWER I/P:110-230V O/P:5V/6A	33001-00001	AC POWER CORD/ 3-PIN 10A/125V 6 FEET
	50001-00060	DC-DC POWER I/P:-48V O/P:5V/6A		

Table B-3 Mercury 3820 Ordering Information

Appendix C Trouble Report

Company	
Local Representation	
Purchase Order No	
Equipment Serial No	
Software Version	

Please describe: 1. Testing Network Structure 2. Configuration
3. Testing Network Equipment 4. Trouble Description

E-MAIL:	
TEL:	FAX:
Signature:	Date: / /

TAINET COMMUNICATION SYSTEM CORP. FAX: 886-2-2658-3232

E-MAIL: *sales@tainet.net*

Table C-1 Trouble report

Appendix D Trouble Shooting

Trouble Shooting Table		
1	Configured parameter values are lost after equipment restart	
	When user modifies or changes the parameters, the user should save the configurations in the flash memory by entering the “Save Configuration” menu, and then reboot the system by entering the “Reboot” menu.	
2	Console / Telnet / Web User Name and Password	
	When accessing the device through Telnet or the Web, the user will be prompted to enter the password. User can try the default user name “root” and password “root” to log in.	
3	Access denied	
	There are several conditions that will disable user’s access to the device via Console, Telnet or the Web.	
	Message	Solution
	Incorrect user	The password entered is incorrect. Check the user name and password again.

Table D-1 Trouble Shooting Table

Appendix E Glossary

KEYWORD	EXPLANATION
10 Base-T	Part of the original IEEE 802.3 standard, 10 Base-T is the Ethernet specification of 10 Mbps base-band that uses two pair of twisted-pair, Category 3,4 or 5 cabling- using one pair to send data and the other to receive. 10 Base-T has a distant limit of about 100 meters per segment.
100 Base-T	Based on the IEEE 802.3u standard, 100BaseT is the Fast Ethernet specification of 100 Mbps base-band that uses UTP wiring. 100BaseT sends link pulse over the network when no traffic is present.
Address Mask	The address mask for an IP address is used to identify the boundary between the network portion of the address and host portion.
ADSL	Asymmetric Digital Subscriber Line: An evolving high-speed transmission technology originally developed by Bell-core and mow standardized by ANSI as T1.413. Uses existing UTP copper wires from Telephone Company's central office to subscriber's premises. Involves electronic equipment in the form of ADSL modems at central office and subscriber's premises. Sends digital signal up and down these copper wires and sends more information one way than the other- hence the term "asymmetric".
ARP	Address Resolution Protocol is a method to find a host's physical address from its IP address. An ARP request is sent to the network, naming the IP address, then machine with that IP address returns its physical address so it can receive the transmission.
ATM	Asynchronous Transfer Mode. International standard for cell relay in which multiple service types (such as voice, video, or data) are conveyed in fixed-length (53-byte) cells. Fixed-length cells allow cell processing to occur in hardware, thereby reducing transit delays. ATM is designed to take advantage of high-speed transmission media such as E3, SONET, and T3.
Authentication	Proof that the information came from the user or location that repeatedly sent it. One example of authenticating software is through digital signature.
Bandwidth	This is the capacity on a link usually measured in bits-per-second (bps).
Bridging	Bridging provides LAN-to-LAN frame forwarding services between two or more LANs. Frames from one LAN are forwarded across a bridge to a connected LAN. Bridging works is similar to the way repeaters work except that bridges forward frame based on their MAC address.
CBR	Constant Bit Rate: An ATM Forum Q-o-S class created for use in ATM network. CBR is used for communications on precision clocking to guarantee trustworthy delivery.
CHAP	Challenge Handshake Authentication Protocol is an alternative protocol that avoids sending password over the wire by using a challenge/response technical.
Class A network	Part of Internet Protocol hierarchical addressing scheme. Class A networks have only 8 bits for defining networks and 24 bits for defining hosts on each network.
Class B network	Part of Internet Protocol hierarchical addressing scheme. Class B networks have only 16 bits for defining networks and 16 bits for defining hosts on each network.
Class C network	Part of Internet Protocol hierarchical addressing scheme. Class C networks have only 24 bits for defining networks and 8 bits for defining hosts on each network.
CLI	Command Line Interface: Allow you to configure TAINET'-s products with maximum flexibility.
CO	Central Office. A CO is a facility that serves local telephone subscribers. In the CO, subscriber's lines are joined to switching equipment that allows them to connect to each other for both local and long distance calls.
CPE	Customer Premise Equipment is privately owned telecommunication equipment at an organization's site that is attached to the telecommunication network. CPE

KEYWORD	EXPLANATION
	equipment includes routers, modem, PBX, telephones and video communication equipment.
Crossover Ethernet Cable	A cable that wires a pin to its opposite pin, for example RX+ is wired to TX+. This cable connects two similar device, for example, two data terminal equipment (DTE) or data communication equipment (DCE) devices.
DCE	Data Communication Equipment is typically a modem or other type of communication device. The DCE sits between the DET (data terminal equipment) and a transmission circuit such as a phone line.
DHCP	Dynamic Host Configuration Protocol automatically assigns IP address to clients when they log on. DHCP centralizes IP address management on the central computers that run the DHCP server program.
DNS	Domain Name System. A database of domain names and their IP address-e-s. DNS is the primary naming system for many distributed networks, including the internet.
Domain Name	The unique name that identifies an Internet site. Domain Names always have 2 or more parts that are separated by dots. Generally speaking, the part on the left is the most specific and the part on the right is the most general.
DSL	Digital Subscriber Line technologies enhance the data capacity of the existing twisted-pair wire that runs between the local telephone company switching offices and most homes and offices. There are actually seven types of DSL services, ranging in speeds form 16kbits/sec to 52 M bits/sec. The services are either symmetric (traffic flows at the same speed in both directions) or asymmetrical (the downstream capacities higher than the upstream capacities). DSL connections are point-to-point dedicated circuits, which means that they are always connected. There is no dial-up. There is also no switching, which means that the line is a direct connection into the carrier's frame relay, ATM or Internet-connect system.
DSLAM	A Digital Subscriber Line Access Multiple-x-e-r is a network device. Usually at a telephone company central office, that receives signals from multiple customer Digital Subscriber Line connections and puts the signals on the a high-speed backbone line using multiplexing techniques. Depending on the product, DSLAM Multiple-x-e-r connects DSL lines with some combination of asynchronous transfer mode ATM, frame relay or IP networks.
DTE	Originally, Data Terminal Equipment meant Dumb Terminal Equipment. But today it is a computer, bridge or router that interconnects local area network (LAN) in increasingly more intelligent ways.
Dynamic route	Also known as adaptive routing, this technique automatically adapts to traffic or physical network revisions.
Ethernet	A very common method of networking computers in a LAN. There are a number of adaptations to the IEEE 802.3 Ethernet standard, including adaptations with data rates of 10 Mbps and 100 Mbps over coaxial cable, twisted-pair cable and fiber-optical cable.
FTP	File transfer protocol: The TCP/IP protocol used for transmitting files between network nodes, it supports a broad range of file types and is defined in RFC 959.
Gateway	A gateway is a computer system or other device that acts as translator between two systems that do not use the same communication protocols, data formatting structures, languages and/or architecture.
HTTP	Hyper Text Transfer Protocol. The most common protocol used on the Internet HTTP is the primary protocol used for web sites and web browsers. It is also prone to certain kinds of attack.
IGMP	Internet Group Management Protocol: Employed by IP hosts, the protocol that reports their multicast group membership to an adjacent multicast router.
IP	Internet Protocol. The IP (currently IP version 4), is the underlying protocol for routing packets on the Internet and other TCP/IP-based networks.
IP Pool	Internet Protocol Pool refers to the collective group of IP address locates in any particular place.
ISP	Internet Service Provide connections into the Internet for home users and businesses. There are local, regional, national, and global ISPs. You can think of

KEYWORD	EXPLANATION
	local ISPs as the gatekeepers into Internet.
Jack Type	Different type of jacks (RJ-11, RJ-45 or RJ-48) can be used for an ISDN line. The RJ-11 is the most common in the world and is most often used for analog phones, modems and fax machines. RJ-48 and RJ-45 are essentially the same, as they both have the same 8-pin configuration. An RJ-11 jack can fit into an RJ-45 / RJ-48 connector, however, an RJ-45/RJ-48 cannot fit into an RJ-11 connector.
LAN	Local Area Network is a shared communication system to which many computers are attached. A LAN, as its mane implies, is limited to a local area. This has to do more with the electrical characteristics of the medium than the fact that many early LANs.
LED	Light Emitting Diode. LED are visual indicators that relay information about the status of specific Scorpio 1401 / 02 functions to user by lighting up, turning off or blinking. LED-slugs are usually found on the front panel of the physical device. Examples include Status, Power and System LEDS.
LLC-Multiplexing	LLC encapsulation allows multiplexing of multiple protocols over a single ATM virtual circuit. By prefixing the PDU (Payload Data Unit) with an IEEE 802.2 Logical Link Control (LLC) header, each protocol can be identified.
Loop-reach	Loop reach defines speed that can be attained at various distances. This is very important for DSL technology as distance from the CO influences attainable speeds.
MAC	On a local area network (LAN) or other network, the Media Access Control (MAC) address is your computer's unique hardware number. (On an Ethernet LAN, it is the mane as your Ethernet address). The MAC layer frames data for transmitted as a stream of bits.
Modem	Modulator-demodulator: A device that converts digital signal to analog and vice-versa so that digital information can be transmitted over analog communication facilities, such as voice-grade telephone lines.
Name Resolution	The allocation of an IP address to a host name. See DNS.
NAT	Network Address Translation is the translation of an Internet Protocol address used within one network to a different IP address known within another network. NAPT extends the notion of translation one step further by also translating transport identifier (e.g., TCP and UDP port numbers, ICMP query identifiers). This allows the transport identifiers of a number of private hosts to be multiplexed into the transport identifiers of a single external address. NAPT allows a set of hosts to share a single external address.
Network	Any time you connect 2 or more computers together so that they can share resources, you have a computer network. Connect 2 or more networks together and you have an internet.
Node	Any single computer connected to a network.
PAP	Password Authentication Protocol (PAP) is a security protocol that requires users to enter password before accessing a security system. The user's name and password are sent over the wire to a server there they are compared with a database of user account names and password. This technical is vulnerable to wiretapping (eavesdropping) because the password can be captured and used by someone to log onto the system.
Port	An Internet port refers to a number that is part of a URL, appearing after a colon (:) right after the domain name, Every service on an Internet server listens on a particular port number on that server. Most services have standard port numbers, e.g., Web servers normally listen on port 80.
Port (H/W)	An interface on a computer for connecting peripherals or device to the computer. A printer port, for example, is an interface that is designed to have a printer connected to it. Ports can be defined by specific hardware.
POTS	Plain Old Telephone Service is the analog telephone service that runs over copper twisted-pair wires and is based on the original Bell telephone system. Twisted-pair wires connect homes and businesses to a neighborhood central office. This is called the local loop. The central loop. The central office is connected to other central offices and long-distance facilities.

KEYWORD	EXPLANATION
PPP	Point to point. PPP encapsulates and transmits IP (Internet protocol) data-gram over serial point-to-point links. PPP works with other protocol such as IPX (Internet work Packet Exchange).
RIP	Routing Information Protocol is an interior or intra-domain routing protocol that uses the distance-vector routing algorithms. RIP is used on the Internet and is common in the NetWare environment as a method for exchange routing information between routers.
Router	A device that connects two networks together. Routers monitor, direct and filter information that passes between these networks. Because of their location, routers are a good place to install traffic or mail filter. Routers are also prone to attacks because they contain a great deal of information about a network.
Server	A computer, or a software package, that provides a specific kind of service to client software running on the computers.
SNMP	System Network Management Protocol is a popular management protocol defined by the Internet community for TCP/IP networks. It is a communication protocol for collecting information from device on the network.
Static Routing	Static routers tell the Scorpio routing information that it cannot learn automatically through other means. The need for Static Routing can arise in cases their RIP is disabled on the LAN or a remote network is beyond the one that is directly connected to a remote node.
VC-base multiplexing	Each ATM VC carries PDU-s of exactly one protocol type. When multiple protocols need to be transported, there is a separate VC for each protocol.
WAN	Wide Area Networks link geographically dispersed offices in other cities or around the globe. Just about any long-distance communication medium can serve as a WAN link, including switched and permanent telephone circuits, terrestrial radio systems and satellite system.

Table E-1 Glossary