# Loop-AM3440 series
# TDMoE Card
# User's Manual

LOOP TELECOMMUNICATION INTERNATIONAL, INC.
8F, NO. 8, HSIN ANN RD.
SCIENCE-BASED INDUSTRIAL PARK
HSINCHU, TAIWAN
Tel: +886-3-578-7696
Fax: +886-3-578-7695

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**D** Bitte führen Sie das Gerät am Ende seinerLewbensdauer den zue Verfügung stehended Rückgabeund Sammelsystemen zu.

**GB** At the end of the product's useful life, please dispose of it at appropriate collection points provided in your country

**F** Une fois le produit en fin devie, veuillez le déposer dans un point de recyclage approprié.

**ES** Para preservar el medio ambiente, al final dela vida útil de su producto, depositelo en los laguares destinado aello de acuerdo con la legislación vigente.

**P** No final de vida útil do producto, por favor coloque no ponto de recolha apropriado.

**I** Onde tutelare l'ambiente, non buttate l'apparecchio trai i normali rifiuti al termine della sua vita utile, ma portatelo presso i punti do taccolta specifici per questi rifiuti previsti dalla normativa vigente.

**NL** Wij raden u aan het apparant aan het einde van zijn nuttige levensduur, niet bij hey gewone huisafval te deponeren, maar op de dearvoor bestemde adressen.

**DK** Når produktet er udtjent, bor det børtskaffes via de sæ rlige indsamlingssteder i landet.

**N** Ved slutten av produktets levetid bør det avhendes på en kommunal miljøstasjon eller leveres til en elektroforhandler.

**S** Lämna vänligen in produkten på lämplig återvinningsstation när den är förbrukad.

**FIN** Hävitä tuote käytöiän päättyessä viemällä se asianmukaiseen keräyspisteeseen.

**PL** Gdy produkt nie nadaje sie juz do dalszego uzytku, nalezy zostawic go w jednym ze specjalnych punktów zajmujacych sie zbiórka zuzytych producktów w wybranych miejscach na terenie kraju.

**CZ** Po skončení jeho životnosti odložte prosím výrobek na přislušném sběrném místé zřízeném dle předpisů ve vaší zemi.

**SK** Po skončení jeho životnosti odovzdajte prosím zariadenie na príslušnom zbernom mieste podía platných miestnych predpisov a noriem.

**SLO** Ko se izdelku izteče življenska doba, ga odnesite na ustrezno zbirno mesto oziroma ga odvrzite v skladu z veljavnimi predpisi.

**GR** Στο Τέλος της λειτουργικής Ζωής του προϊόντος παρακαλώ
Πετξτε το στα ειδικά σημεία που Παρέχονται οτη χωρα σας.

**PRC** 當產品使用壽命結束,請在你的國家所提供的適當地點做好回收處理

# 1. PRODUCTION DESCRIPTION

## 1.1. Description

Loop Telecom's TDMoE plug-in card is designed for the Loop-AM3440 series. TDMoE card is used to transport TDM traffic over IP network, in addition to Ethernet traffic. As the communications network migrates from TDM to IP, the TDMoE card provides a flexible and cost effective choice for the transport of legacy TDM signals.

It provides four Ethernet ports with no limitation for WAN or LAN port assignment: two aggregate ports with GbE combo interface and two tributary ports with 10/100/1000 BaseT Ethernet interfaces. The TDMoE card support point-to-point and point-to-multi-point voice and date application.

For transport of TDM signals E1, T1, Jitter and Wander adheres to G.823 Traffic and G.823 Synchronous.

## 1.2. TDMoEthernet ─ Theory of Operation

Over the past few years, packet-switched network (PSN) coverage has become ubiquitous, stimulating a desire for convergence of all communications services over a unified infrastructure. This has brought into prominence the concept of a pseudowire (PW). A pseudowire emulates a native service (e.g., ATM, frame-relay, Ethernet or TDM) but utilizes transport over a PSN.

TDM over Ethernet, or TDMoEthernet, is a TDM PW technology that makes it possible to provision E1, T1, and serial data services across IP, MPLS or layer 2 Ethernet networks. The services are provided in a manner transparent to all protocols and signaling. TDMoEthernet enables service providers to migrate to next generation networks while continuing to provide all their revenue-generating legacy voice and data services, and without fork-lift upgrades of end-user equipment. TDMoEthernet also benefits data carriers by enabling them to offer lucrative leased-line and voice services on their packet-switched infrastructures. It enables enterprises to run voice and video over the same IP/Ethernet-based network that is currently used to run only LAN traffic, thereby minimizing network maintenance and operating costs.

Unlike other traffic types that can be carried over pseudowires, TDM is a real-time bit stream, leading to TDMoEthernet having unique characteristics. In addition, conventional TDM networks have numerous special features, in particular those required in order to carry voice-grade telephony channels. These features imply signaling systems that support a wide range of telephony features, a rich standardization literature, and well-developed OAM mechanisms. All of these factors must be taken into account when emulating TDM over PSNs.

One critical issue in implementing TDM PWs is clock recovery. In native TDM networks the physical layer carries highly accurate timing information along with the TDM data, but when emulating TDM over PSNs this synchronization is absent. TDM timing standards can be exacting, and conformance with these requires innovative mechanisms to adaptively reproduce the TDM timing. TDMoEthernet ensures that recovered clock jitter and wander levels conform to ITU-T G.823/824, even for networks that introduce high packet delay variation and packet loss.

TDMoEthernet complements VoIP in those cases where VoIP is not applicable, and in those cases where VoIP price/performance is not optimal. Most importantly, TDMoEthernet can provide higher voice quality with much lower latency than VoIP. And unlike VoIP, TDMoEthernet can support all applications that run over E1/T1 circuits, not just voice. TDMoEthernet can provide traditional leased-line services over IP, and is transparent to protocols and signaling. Because TDMoEthernet provides an evolutionary (as opposed to revolutionary approach), investment protection is maximized.

### 1.2.1. Clock Recovery

Sophisticated TDM clock recovery mechanisms, one for each E1/T1 interface, allow end-to-end TDM clock synchronization, despite packet delay variation of IP/MPLS/Ethernet network.

TDMoEthernet supports the following clock recovery modes:
• Adaptive clock recovery
• External clock
• Loopback clock

The clock recovery mechanisms provide both fast frequency acquisition and highly accurate phase tracking:
• Jitter and wander of the recovered clock are maintained at levels that conform to G.823/G.824 traffic or synchronization interfaces. For adaptive clock recovery, the recovered clock performance depends on packet network characteristics.
• Short-term frequency accuracy (1 second) is better than 16 ppb (using PPB reference), or 100 ppb (using PPM reference)
• Capture range is ±90 ppm
• Internal synthesizer resolution of 0.5 ppb
• High resilience to the packet loss and mis-ordering, up to 5% of packet loss/misordering without degradation of clock recovery performance
• Robust to sudden significant constant delay changes
• Automatic transition to hold-over is performed upon link-break events

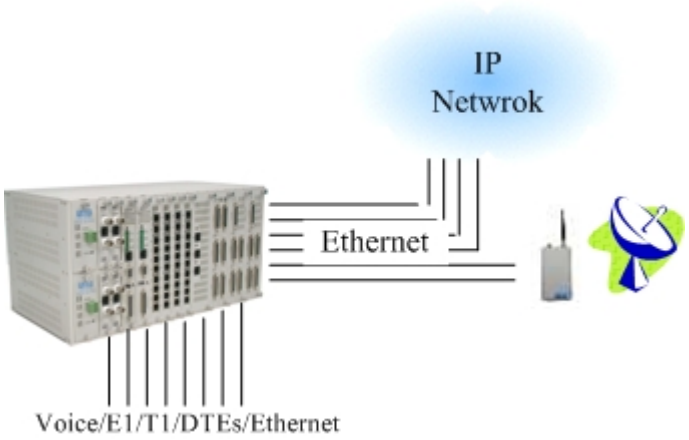
### 1.2.2. Bundles

A bundle is defined as a stream of bits that have originated from the same physical interface. They are transmitted from a TDMoEthernet source device to a TDMoEthernet destination device. For example, bundles may comprise any number of 64 Kbps timeslots originating from a single E1, T1 or an entire E3/DS3. Bundles are single direction streams, frequently coupled with bundles in the opposite direction to enable full duplex communications. More than one bundle can be transmitted between two TDMoEthernet devices. For E1/T1, the chip provides internal bundle cross-connect functionality, with DS0 resolution. You can establish a cross-connect between different E1/T1 interfaces of TDMoEthernet device, or within one interface of TDMoEthernet. Only one bundle can be defined for E3/DS3.

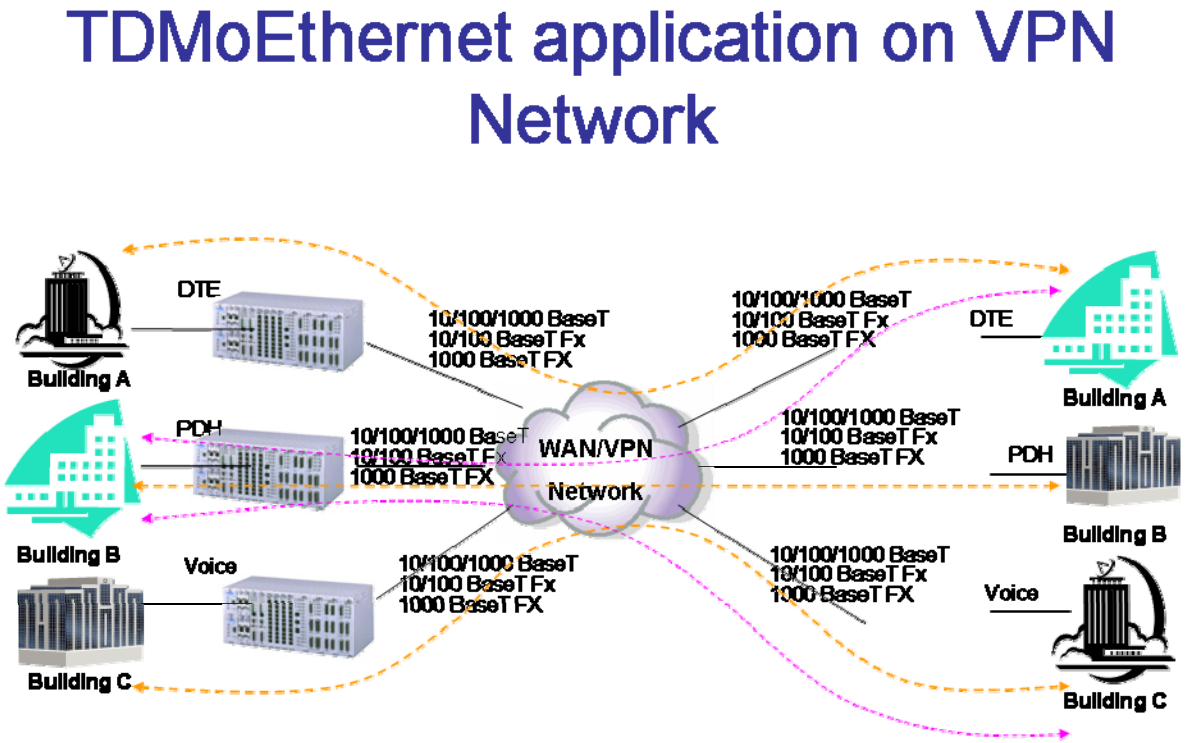
Up to 64 bundles are supported. Each bundle in the TDMoEthernet is transmitted using one of the following payload type methods: AAL1, CESoPSN or SAToP. Each TDM over Ethernet bundle/connection may be assigned to one of the payload types. For E1/T1, the chip provides internal bundle cross-connect functionality, wit DS0 resolution. You can establish a cross-connect between different E1/T1 interfaces of the TDMoEthernet device, or within one interface of the device.

## 1.3. Application

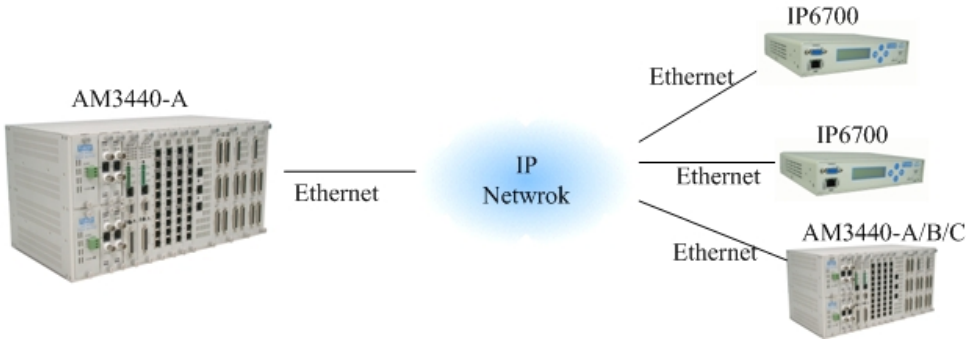
**TDMoE plug-in card in AM3440 series is to transport TDM traffic (voice signals/E1/ T1/ DTEs/ Ethernet) into IP Traffic.**



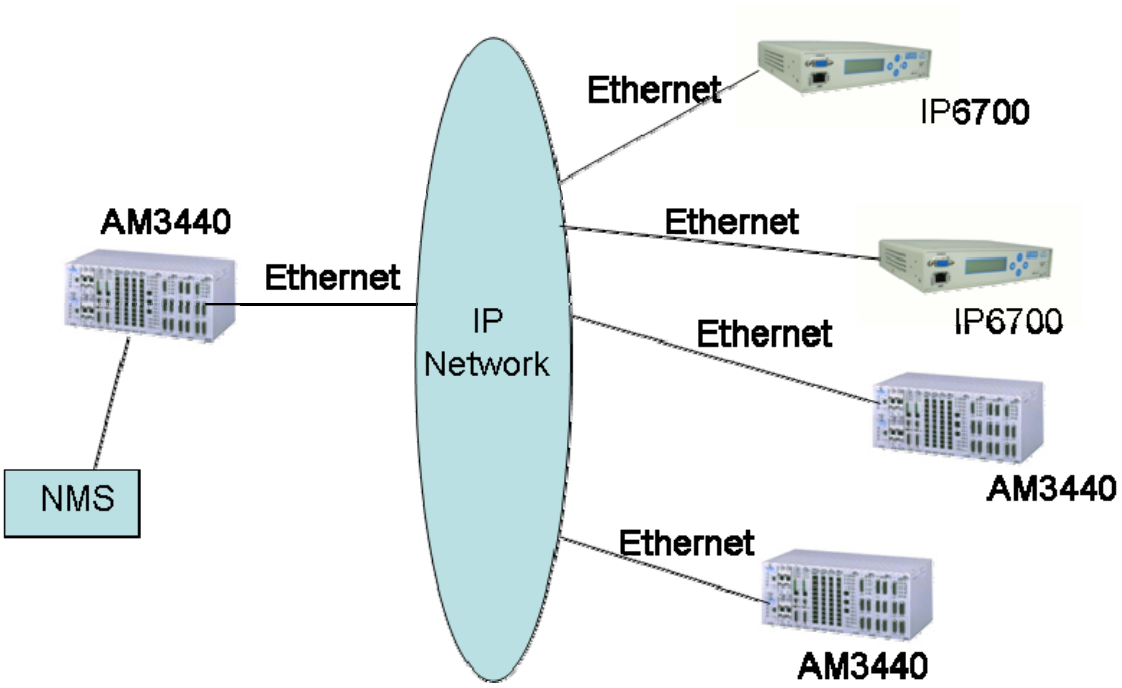

**Point to Point Application**



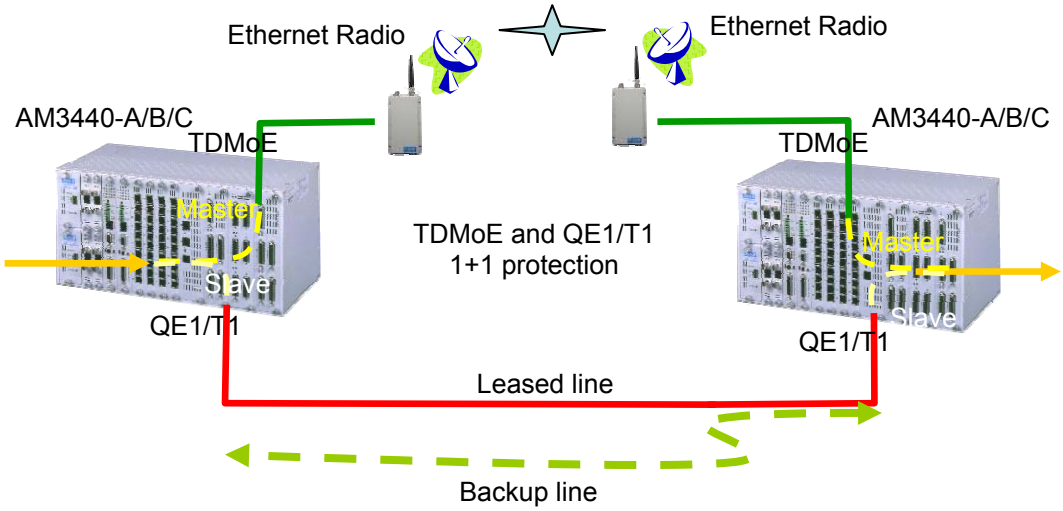
**Point to Multi-Point Application**




**Remote Management**



**Ethernet and QE1/T1 Protection**




## 1.4. Specifications

***Optical SFP Module Characteristic for Gigabit Ethernet(GbE)***

| SFP Optical Module | Direction | Data Rate | Wavelength(nm) | Connector | Distance |
|---|---|---|---|---|---|
| MTAFW | dual uni-directional fiber | 1.25G | 850 | LC without M | 550 m |
| MTAFD | dual uni-directional fiber | 1.25G | 850 | LC with DDM | 550 M |
| MTBTD | dual uni-directional fiber | 1.25G | 1310 | LC with DDM | 2 km |
| MTBTW | dual uni-directional fiber | 1.25G | 1310 | LC without DDM | 2 km |
| PTB2W | dual uni-directional fiber | 1.25G | 1310 | LC without DDM | 20 km |
| PTB4W | dual uni-directional fiber | 1.25G | 1310 | LC without DDM | 40 km |
| PTC5W | dual uni-directional fiber | 1.25G | 1550 | LC without DDM | 50 km |
| PTC6W | dual uni-directional fiber | 1.25G | 1550 | LC without DDM | 60 km |
| PTC8W | dual uni-directional fiber | 1.25G | 1550 | LC without DDM | 80 km |
| PTC9W | dual uni-directional fiber | 1.25G | 1550 | LC without DDM | 90 km |
| PTCVW | dual uni-directional fiber | 1.25G | 1550 | LC without DDM | 110 km |
| PTCXW | dual uni-directional fiber | 1.25G | 1550 | LC without DDM | 120 km |
| PTB1D | dual uni-directional fiber | 1.25G | 1310 | LC with DDM | 10 km |
| PTB3D | dual uni-directional fiber | 1.25G | 1310 | LC with DDM | 30 km |
| PTB4D | dual uni-directional fiber | 1.25G | 1310 | LC with DDM | 40 km |
| PTC5D | dual uni-directional fiber | 1.25G | 1550 | LC with DDM | 50 km |
| PTC6D | dual uni-directional fiber | 1.25G | 1550 | LC with DDM | 60 km |
| PTC8D | dual uni-directional fiber | 1.25G | 1550 | LC with DDM | 80 km |
| PTC9D | dual uni-directional fiber | 1.25G | 1550 | LC with DDM | 90 km |
| PTCVD | dual uni-directional fiber | 1.25G | 1550 | LC with DDM | 110 km |
| PTCXD | dual uni-directional fiber | 1.25G | 1550 | LC with DDM | 120 km |
| PKB1W | dual uni-directional fiber | 622Mbps~1.25G | 1310 | LC with DDM | 10 km |

| SFP Optical Module | Direction | Data Rate | Wavelength(nm) | Connector | Distance |
|---|---|---|---|---|---|
| PTD1W | Single bi-directional fiber | 1.25G | 1310nm | LC without DDM | 10 Km |
| PTE1W | Single bi-directional fiber | 1.25G | 1550nm | LC without DDM | 10 Km |
| PTD2W | Single bi-directional fiber | 1.25G | 1310nm | LC without DDM | 20 Km |
| PTE2W | Single bi-directional fiber | 1.25G | 1550nm | LC without DDM | 20 Km |
| PTD4W | Single bi-directional fiber | 1.25G | 1310nm | LC without DDM | 40 Km |
| PTE4W | Single bi-directional fiber | 1.25G | 1550nm | LC without DDM | 40 Km |
| PTD6W | Single bi-directional fiber | 1.25G | 1310nm | LC without DDM | 60 Km |
| PTE6W | Single bi-directional fiber | 1.25G | 1310nm | LC without DDM | 60 Km |
| PTD1D | Single bi-directional fiber | 1.25G | 1310nm | LC with DDM | 10 Km |
| PTE1D | Single bi-directional fiber | 1.25G | 1550nm | LC with DDM | 10 Km |
| PTD2D | Single bi-directional fiber | 1.25G | 1310nm | LC with DDM | 20 Km |

| | | | | | |
|---|---|---|---|---|---|
| PTE2D | Single bi-directional fiber | 1.25G | 1550nm | LC with DDM | 20 Km |
| PTD4D | Single bi-directional fiber | 1.25G | 1310nm | LC with DDM | 40 Km |
| PTE4D | Single bi-directional fiber | 1.25G | 1550nm | LC with DDM | 40 Km |
| PTD6D | Single bi-directional fiber | 1.25G | 1310nm | LC with DDM | 60 Km |
| PTE6D | Single bi-directional fiber | 1.25G | 1310nm | LC with DDM | 60 Km |
| PTD8D | Single bi-directional fiber | 1.25G | 1310nm | LC with DDM | 80 Km |
| PTE8D | Single bi-directional fiber | 1.25G | 1310nm | LC with DDM | 80 Km |

***Combo Gigabit Ethernet(GbE) Interface***

| | |
|---|---|
| Number of Ports | 2 |
| Speed | 10/100/1000M Base T |
| Connector | RJ45 for twisted pair GbE, LC for optical GbE, auto detection |

***Gigabit Ethernet(GbE) Interface***

| | |
|---|---|
| Number of Port | 2 |
| Speed | 10/100/1000M Base T |
| Connector | RJ45 |

***Ethernet Function***

| | |
|---|---|
| Basic Features | MDI/MDIX for 10/100/1000M BaseT auto-sensing<br>Ping function contained ARP<br>Per port, programmable MAC hardware address learn limiting (max. MAC table 8192 (8k) entry)<br>Packet Delay Variation:<br>- Unframed T1: Up to 340 ms<br>- Framed T1: Up to 256 ms<br>- E1:up to 256 ms<br>- Framed T1 with CAS: Up to 192 ms |
| Packet Transparency | Packet transparency support for all types of packet types including IEEE 802.1q VLAN and 802.1ad (Q-in-Q) |
| QoS | User configurable 802.1p CoS, ToS in out going IP frame |
| Traffic Control | Ingress packet Rate limiting buckets per port for ethernet port<br>Supporting Rate-based and Priority-based rate limiting for LAN port<br>Granularity:<br>a. From 64 Kbps to 1 Mbps in increments of 64 Kbps<br>b. From 1 Mbps to 100 Mbps in increments of 1 Mbps<br>c. From 100 Mbps to 1000 Mbps in increments of 10Mbps<br><br>Pause frame issued when the traffic exceeding the limited rate before packet dropped following IEEE802.3X |

***Jitter & Wander***

PPM: per G.823 Traffic
PPB: per G.823 Synchronous

***Standard Compliance***

| | |
|---|---|
| IETF | TDMoIP (RFC5087), SAToP (RFC4553), CESoPSN (RFC5086) |
| IEEE | 802.1q, 802.1p, 802.1d, 802.3, 802.3u, 802.3x, 802.3z, 802.1s, 802.1w |

# 2. INSTALLATION

## 2.1. Mechanical Installation

The TDMoEthernet card can be plugged into any of the available full size slots in the AM3440 chassis.

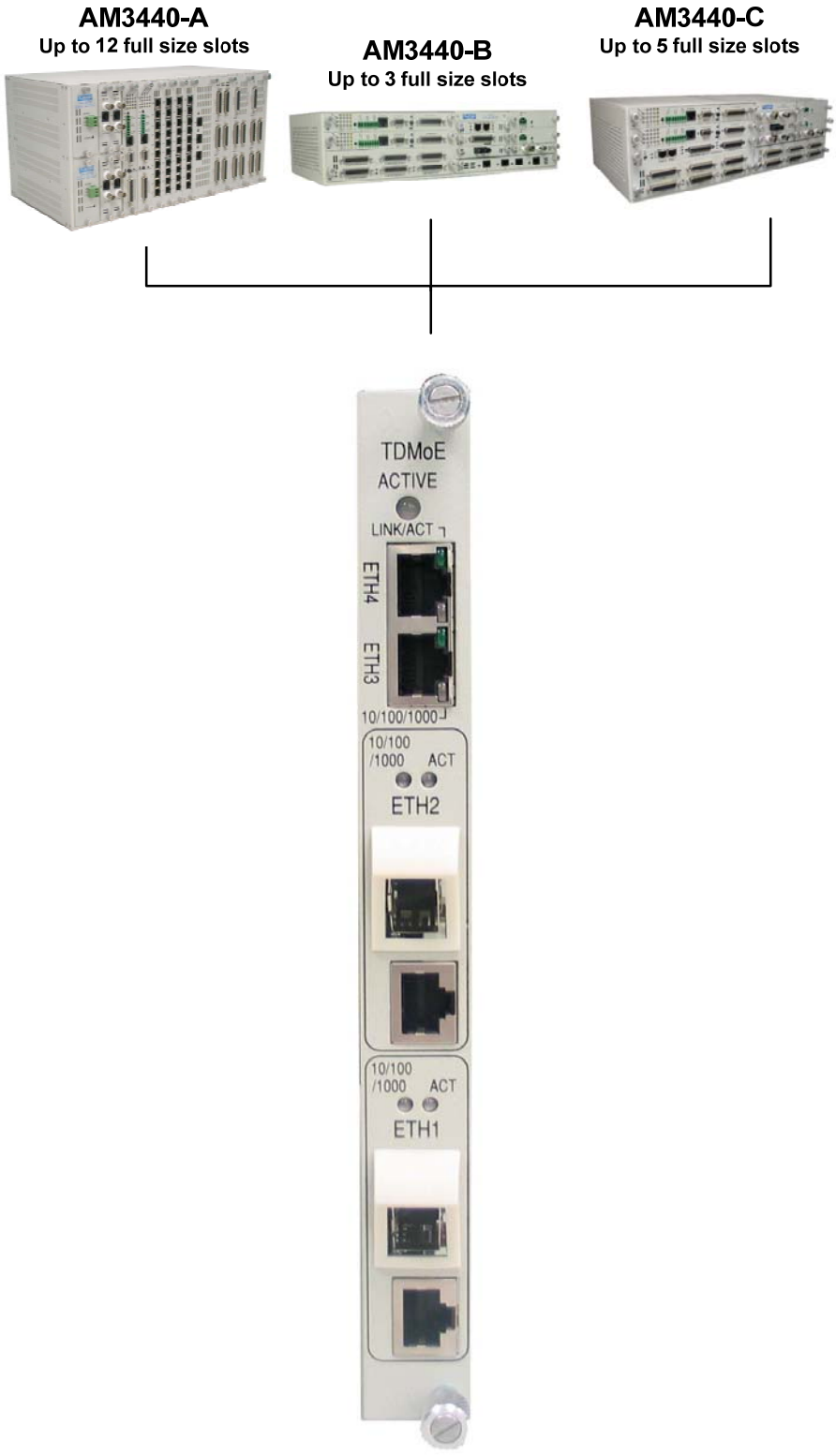



**Figure 2-1 Front Panel of TDMoE Card**

The front panel is shown in Figure 2-1. Pin definition and pin connection of the console port are listed in the following tables.

**NOTE:** If you see protruding screw heads on the slot 3 of CHB or slot 5 of CHC as shown in the figure below, do not plug the TDMoE card into these two locations because the card might be damaged.

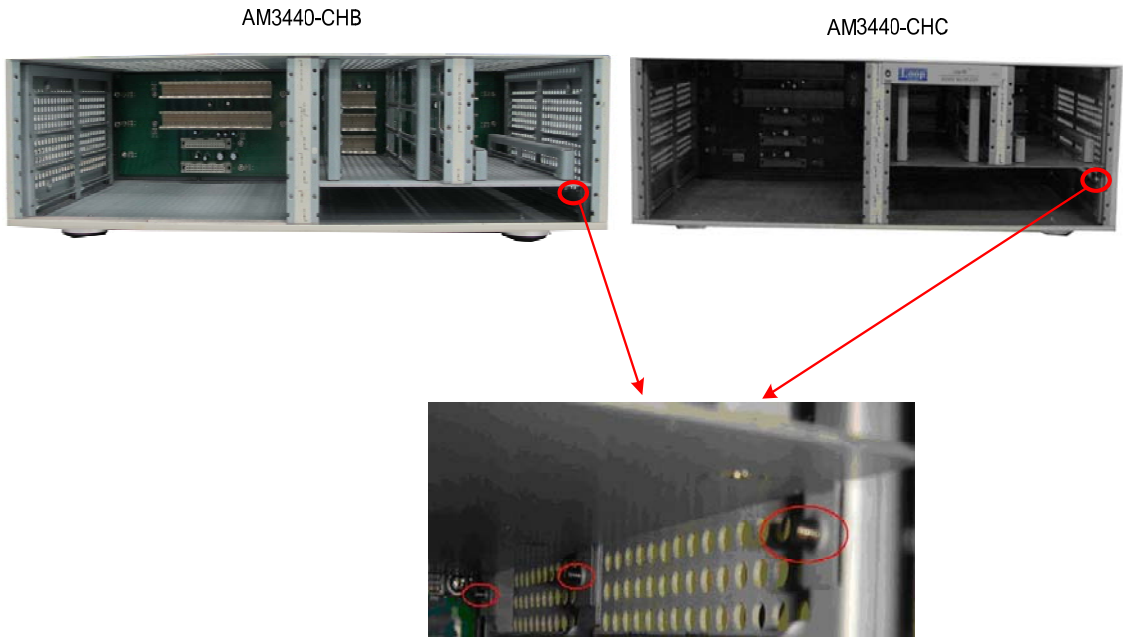



**Table 2-1 Ethernet Function Table**

| | |
|---|---|
| Ethernet Functions | Four 10/100/1000 Mbps, auto-negotiation |
| | Auto MDI/MDIX |
| | Auto-crossover function support |
| | Flow control |
| | Force mode: duplex (half/full), speed(10/100/1000M) |
| | Egress Rate Limiting |
| Connector | RJ45 |

**Table 2-2 RJ45 for Ethernet Port**

| Pin Number | Signal | Signal Direction |
|---|---|---|
| 1 | Transmit Data + | Output from TDMoE card |
| 2 | Transmit Data - | Output from TDMoE card |
| 3 | Receive Data + | Input to TDMoE card |
| 4 | No Connection | |
| 5 | No Connection | |
| 6 | Receive Data - | Input to TDMoE card |
| 7 | No Connection | |
| 8 | No Connection | |

# 3. OPERATION

## 3.1. Alarm

When the TDMoE card reports an alarm condition, such as loss of synchronization, the ALARM will cause the LED on the front panel to light. Each alarm can be individually enabled or disabled. The alarm types are listed in the table as below.

**Table 3-1 Alarm Default – for System and Line**

| Alarm | Option | Default |
|---|---|---|
| ARP/bundle | DISABLE,MAJOR,CRITICAL,MINOR | DISABLE |
| Rx-Lost/bundle | DISABLE,MAJOR,CRITICAL,MINOR | DISABLE |
| Cell-Lost/bundle | DISABLE,MAJOR,CRITICAL,MINOR | DISABLE |
| Underrun/bundle | DISABLE,MAJOR,CRITICAL,MINOR | DISABLE |
| Overrun/bundle | DISABLE,MAJOR,CRITICAL,MINOR | DISABLE |
| Ethernet Link Down | DISABLE,MAJOR,CRITICAL,MINOR | DISABLE |

## 3.2. LED

The front panel of the TDMoE has multi-color LEDs for operation and error indications. The indication is either off, steady on, or flickering. The following table lists each LED and its color and the meaning it represents. Note that when powering up and self test is in progress, the unit front panel LEDs are also used to indicate fault conditions.

**Table 3-2 LED Indication for Main Unit**

| LED | | | Color | Indication |
|---|---|---|---|---|
| ACT | | | Off | No power, card failure or LED failure |
| | | | Green | Active |
| | | | Flashing Green | Hard waving |
| | | | Red | Alarm |
| Eth3 and Eth4 | ACT | | Flashing Green | Data is being transmitted or received through Ethernet port |
| | SPEED | 1000M | Amber | Link with 1000M bps |
| | | 100M | Green | Link with 100M bps |
| | | 10M | Off | Link with 10M bps |
| | | ACT | | |
| Eth1 and Eth2 (Electrical) | SPEED | 10 | Off | Link with 10M bps |
| | | 1000 | Amber | Link with 1000M bps |
| | | 100 | Green | Link with 100M bps |
| | | ACT | Flashing Green | Data is being transmitted or received through Ethernet port |
| Eth1 and Eth2 (Optical) | SPEED | 1000<br>100 | Amber<br>Green | WAN port is link up |

# 4. MAINTENANCE

## 4.1. Near End Loopback

The near end loopbacks such as backplane loopback, payload loopback, local loopback, and line loopback, are activated by the TDMoE. The loopbacks are at the near end facility. The following paragraph describes each loopback in detail.

### 4.1.1. Backplane Loopback/Time Slot Interface Loopback (FPGA to Backplane Loopback)

Backplane loopback is illustrated in Figure 4-1. The incoming signal is immediately looped back to Backplane after entering FPGA without going through FPGA process. The outgoing signal then passes TDMoE Chipset and Ethernet Switch and arrives in the remote physical link.

### 4.1.2. Payload Loopback (FPGA to Ethernet Loopback)

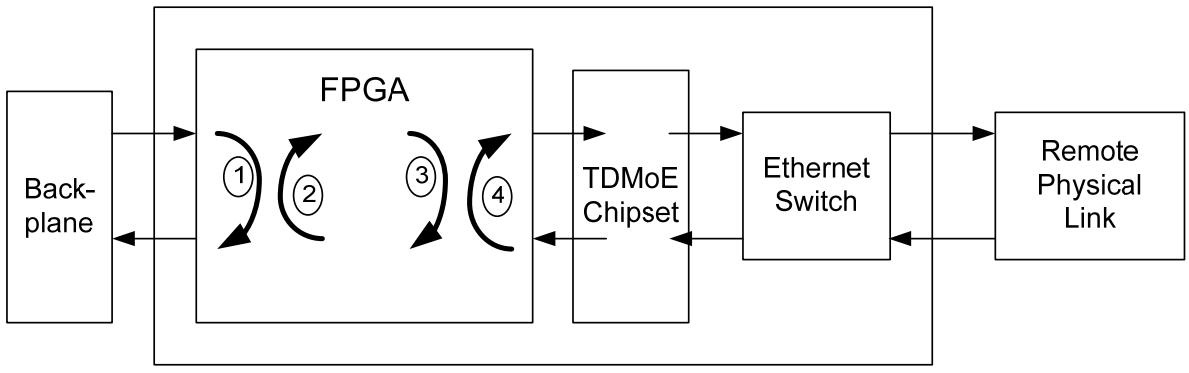
Payload loopback is illustrated in Figure 4-1. The signal is looped back to TDMoE Chipset from FPGA after it goes through Ethernet Switch and TDMoE Chipset. The signal then passes Ethernet Switch and arrives at the remote physical link.

### 4.1.3. Local Loopback (FPGA to Backplane Loopback)

Local loopback is illustrated in Figure 4-1. The incoming signal is looped back to Backplane from FPGA. The outgoing signal then passes TDMoE Chipset and Ethernet Switch and arrives at the remote physical link.

### 4.1.4. Line Loopback (TDMoE Chipset to Ethernet Loopback)

Line loopback is illustrated in Figure 4-1. The signal is immediately looped back to Ethernet Switch after entering FPGA without going through FPGA process. The signal then arrives at the remote physical link.




1 Backplane loopback
2 Payload loopback
3 Local loopback
4 Line loopback

**Figure 4-1 Loopback Diagram**

# 5. TERMINAL OPERATION

The TDMoE provides comprehensive report and configuration capability through the console port. By using single-character commands and arrow keys, the TDMoE can be configured and monitored through the use of a VT-100 terminal. The single-character commands are not case sensitive, except for when using a password.

## 5.1. Log on and Log off

The Controller Menu screen will appear after you login. To Log off, simply press the **F** button.
**Note:** The AM3440 chassis type will appear in the top left-hand corner of the screen.
(See highlighting in the sample screen below.)

```
LOOP AM3440-C           === Controller Menu ===       10:04:45 12/29/2009
(Slot A~D, 1~5)
Serial Number   : 123529             Redundant Controller: Disabled
Hardware Version: Ver.F              Start Time  : 10:03:27 12/29/2009
Software Version: V8.07.01 12/25/2009   Device Name: LOOP AM3440-C


[DISPLAY]                          [SETUP]
C -> System Configuration
B -> Clock source Configuration
Q -> Alarm Queue Summary
I -> Information Summary
R -> Redundant CTRL Information
P -> Performance Report

[LOG]                             [MISC]
U -> Choose a Slot
F -> Log Off [SETUP],[MISC] Menu
O -> Log On  [SETUP],[MISC] Menu


>>SPACE bar to refresh or enter a command ===>
```

After logging on, a full Controller Menu will appear as shown below. Press **U** from the full Controller Menu to choose the slot that your TDMoE card is in. Key in the slot number. Press the **Enter** key.

```
LOOP AM3440-A           === Controller Menu ===       18:15:36 05/25/2010

Serial Number   : 170530             Redundant Controller: Disabled
Hardware Version: Ver.H              Start Time  : 13:00:08 05/25/2010
Software Version: V8.10.01 05/19/2010   Device Name: LOOP AM3440-A


[DISPLAY]                          [SETUP]
C -> System Configuration             S -> System Setup
B -> Clock source Configuration       M -> System Alarm Setup
Q -> Alarm Queue Summary              W -> Firmware Transfer
I -> Information Summary              V -> Store/Retrieve Configuration
R -> Redundant CTRL Information       K -> Clock source Setup
P -> Performance Report               T -> Bit Error Rate Test

[LOG]                             [MISC]
U -> Choose a Slot                  A -> Alarm Cut Off
F -> Log Off [SETUP],[MISC] Menu    X -> Clear Alarm Queue
O -> Log On  [SETUP],[MISC] Menu    Y -> Controller Return to Default
                                    Z -> Controller Reset


==>> Input the unit number (A~D or 1~5): 2
```

After choosing the appropriate slot, the Port Menu will appear for the TDMoE card. You will see DISPLAY and LOG sections on the main menu.

```
SLOT 2  TDMoE              === Port Menu ===          11:30:59 05/24/2010

FPGA    Version: Ver.A                              OSC Type: TCXO
Software Version: V1.01.02 05/03/2010


[DISPLAY]                            [SETUP]
1 -> 15-Min/1-Hr/7 Days Perf.Report
2 -> 15-Min/1-Day Perf.Report
C -> System Configuration
J -> All Time Slot Assignment
H -> Time Slot IP Configuration
N -> Status & Statistics
A -> Alarm History


[LOG]                                [MISC]
U -> Choose Other Slot
F -> Log Off [SETUP],[MISC] Menu
O -> Log On  [SETUP],[MISC] Menu
E -> Return to Controller Main Menu


>>SPACE bar to refresh or enter a command ===>
```

Press **O** to log on, and you will see the SETUP and MISC sections.

```
SLOT 2  TDMoE              === Port Menu ===          11:30:59 05/24/2010

FPGA    Version: Ver.A                              OSC Type: TCXO
Software Version: V1.01.02 05/03/2010


[DISPLAY]                            [SETUP]
1 -> 15-Min/1-Hr/7 Days Perf.Report    L -> Loopback Setup
2 -> 15-Min/1-Day Perf.Report          S -> System Setup
C -> System Configuration              T -> Time Slot IP Assignment
J -> All Time Slot Assignment          M -> Alarm Setup
H -> Time Slot IP Configuration       R -> Clear Alarm History
N -> Status & Statistics               X -> Clear Performance Data
A -> Alarm History                     W -> Firmware Upgrade


[LOG]                                [MISC]
U -> Choose Other Slot                 Y -> Unit Load Default
F -> Log Off [SETUP],[MISC] Menu       Z -> Card Reset
O -> Log On  [SETUP],[MISC] Menu
E -> Return to Controller Main Menu


>>SPACE bar to refresh or enter a command ===>
```

**Note:**

1. OSC Ver: There are two kinds of hardware version - TCXO (TCXO =1 PPm) & OCXO (OCXO= 10 PPb).

When a VT-100 terminal is connected to the CONSOLE port of the TDMoE, a main menu is displayed on the VT-100 monitor. The main menu consists of four groups of commands, DISPLAY, LOG, SETUP, and MISC. All commands are detailed in the VT-100 Menu Tree illustrations below.

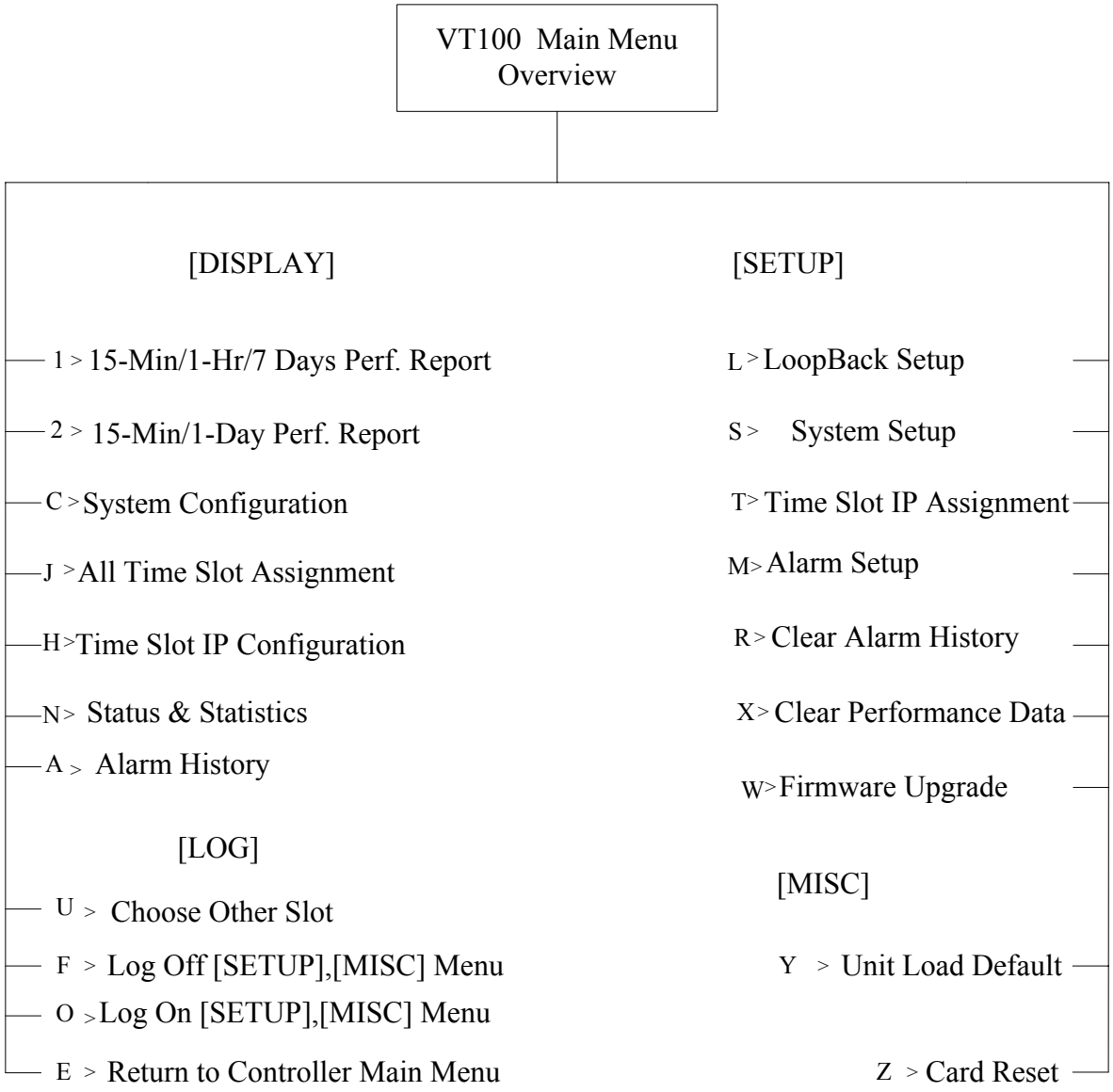



**Figure 5-1 VT-100 Menu Tree for TDMoE**

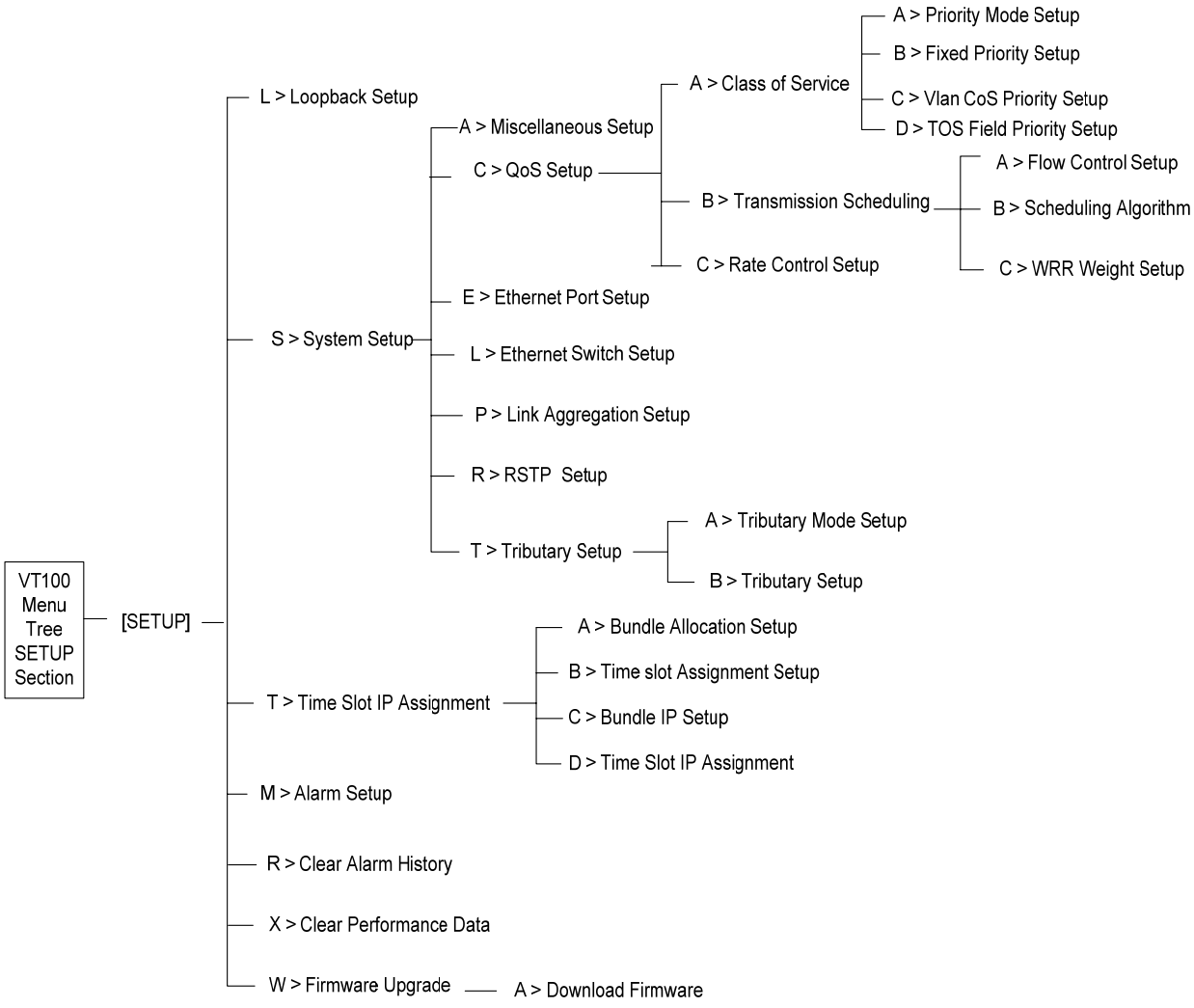



**Figure 5-2 VT100 Menu Tree – SETUP Section**

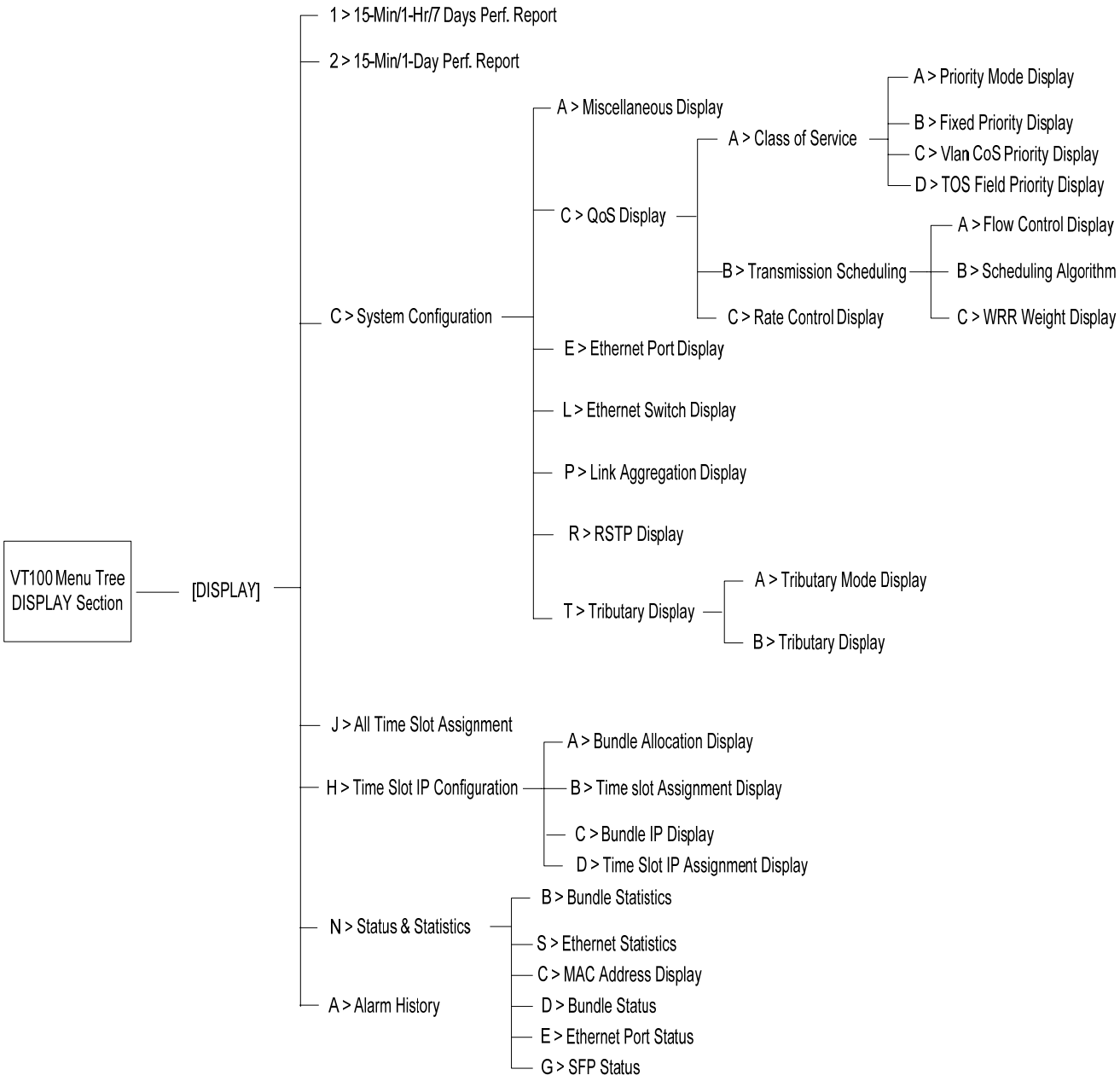



**Figure 5-3 VT100 Menu Tree – DISPLAY Section**

# 6. SYSTEM STATUS

This chapter shows the DISPLAY section on VT100 Main Menu. This is where you can get the information about current system status. You can also check your settings here after you do the setup configuration in the SETUP section.

**Note:** The screen for System Configuration Display should correspond to the System Setup page; Time Slot IP Configuration should correspond to Time Slot IP Assignment.

## 6.1. 15-Min/1-Hr/7 Days Perf. Report

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (1) 15-Min/1-Hr/7 Days Perf. Report |
| ➢ **Description** | Display the 15-Min/1-Hr/7 Days performance report |

**Table 6-1 15-Min/1-Hour/7 Days Perf Report**

| Field | | Setting Options | Default |
|---|---|---|---|
| Register Port | | Trib1~4 | Trib1 |
| Register Bundle | E1 | 00~31 | 00 |
| | T1 | 00~24 | 00 |

➢ **15-Min/1-Hr/7 Days Perf. Report Screens:**

Use arrow keys to select a port and a bundle and press **Enter** key:

```
SLOT 2  TDMoE     === 15-Min/1-Hr/7 Days Perf.Report ===  12:53:06 12/30/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Register Port    :Trib1
Register Bundle :00









<< Press ESC key to return to previous menu >>
```

Then you will see the 15-Min/1-Hour/7 Days Perf. Report for the port and bundle you select listed as below:

```
SLOT 1  TDMoE     === 15-Min/1-Hr/7 Days Perf.Report ===  13:42:29 12/29/2010
Trib 1 Bundle 0
-- Valid Seconds in Current 15-Min Interval: 0 seconds
                              Rx-Lost    J-UR       J-OR
   Current 15-Min Interval    : 0          0         0
   1st Nearest 15-Min Interval: -----      -----      -----
   2nd Nearest 15-Min Interval: -----      -----      -----
   3rd Nearest 15-Min Interval: -----      -----      -----
   4th Nearest 15-Min Interval: -----      -----      -----

-- Valid 15-Min Intervals in Current 24-Hour Interval: 0
                           Rx-Lost     J-UR       J-OR
   Current 24-Hour Interval: 3          -----      -----
   12/28/2010              : 3          -----      -----
   12/27/2010              : -----      -----      -----
   12/26/2010              : -----      -----      -----
   12/25/2010              : -----      -----      -----
   12/24/2010              : -----      -----      -----
   12/23/2010              : -----      -----      -----
   12/22/2010              : -----      -----      -----


<< TAB key to show Statistics Report >>
<< ESC key to return to previous menu, SPACE bar to refresh >>
```

## 6.2. 15-Min/1-Day Perf. Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (2) 15-Min/1-Day Perf. Report |
| ➢ **Function** | Display the 15-Min/1-Day performance report |

**Table 6-2 24-Hour Perf. Display**

| Field | | Setting Options | Default |
|---|---|---|---|
| Register Port | | Trib1~4 | Trib1 |
| Register Bundle | E1 | 00~31 | 00 |
| | T1 | 00~24 | 00 |
| Register Parameter | | Rx-Lost, J-UR, J-OR | Rx-Lost |

➢ **ETH 24-Hour Perf. Report Screens:**

Use arrow keys to select a port, a bundle and a parameter, and press **Enter**:

```
SLOT 2  TDMoE       === 15-Min/1-Day Perf.Report ===    13:02:08 12/30/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Register Port    :Trib1
Register Bundle  :00
Register Parameter:Rx-Lost









<< Press ESC key to return to previous menu >>
```

Then you will see the 15-Min/1-Day Perf. Report for the port, bundle, and parameter you select listed as below:

```
SLOT 1  TDMoE       === 15-Min/1-Day Perf.Report ===    13:44:28 12/29/2010
Trib 1 Bundle 0 Rx-Lost
-- Valid Seconds in Current 15-Min Interval: 0 seconds
-- Valid 15-Min Intervals in Current 24-Hour Interval: 0
                           Rx-Lost   J-UR       J-OR
  Current 15-Min Interval   : 0         0         0
  Current 24-Hour Interval  : 3         0         0

-- Trib 1 Bundle 0 Rx-Lost     Last 96 15-Min Interval :
  01-08 --:-- > 0    0    0    0    0    0    0    0
  09-16 --:-- > 0    0    0    0    0    0    0    0
  17-24 --:-- > 0    0    0    0    0    0    0    0
  25-32 --:-- > 0    0    0    0    0    0    0    0
  33-40 --:-- > 0    0    0    0    0    0    0    0
  41-48 --:-- > 0    0    0    0    0    0    0    0
  49-56 --:-- > 0    0    0    0    0    0    0    0
  57-64 --:-- > 3    ----- ----- ----- ----- ----- ----- -----
  65-72 --:-- > ----- ----- ----- ----- ----- ----- ----- -----
  73-80 --:-- > ----- ----- ----- ----- ----- ----- ----- -----
  81-88 --:-- > ----- ----- ----- ----- ----- ----- ----- -----
  89-96 --:-- > ----- ----- ----- ----- ----- ----- ----- -----

<< TAB key to show Statistics Report >>
<< ESC key to return to previous menu, SPACE bar to refresh >>
```

## 6.3. System Configuration

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration |
| ➢ **Description** | There are seven options you can select from the System Configuration menu: (A) Miscellaneous Display (C) QoS Display (E) Ethernet Port Display (L) Ethernet Switch Display (P) Link Aggregation Display (R) RSTP Display (T) Tributary Display. |

### 6.3.1. Miscellaneous Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (A) Miscellaneous Display |
| ➢ **Description** | Display the active bundle time, alarm filter, and delay switch time |

### 6.3.2. QoS Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) QoS Display |
| ➢ **Description** | There are three options you can select from the QoS Display: (A) Class of Service (B) Transmission Scheduling (C) Rate Control Display. |

#### 6.3.2.1. Class of Service

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) Qos Display > (A) Class of Service |
| ➢ **Description** | There are four options you can select from the Class of Service: (A) Priority Mode Display (B) Fixed Priority Display (C) Vlan CoS Priority Display (D) ToS Field Priority Display. |

##### 6.3.2.1.1. Priority Mode Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) Qos Display > (A) Class of Service > (A) Priority Mode Display |
| ➢ **Description** | Display the priority mode of Ethernet 1~4 |

##### 6.3.2.1.2. Fixed Priority Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) Qos Display > (A) Class of Service > (B) Fixed Priority Display |
| ➢ **Description** | Display the transmission priority of Ethernet 1~4 |

##### 6.3.2.1.3. Vlan CoS Priority Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) Qos Display > (A) Class of Service > (C) Vlan CoS Priority Display |
| ➢ **Description** | Display the CoS priority value and its transmission priority |

##### 6.3.2.1.4. ToS Field Priority Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) Qos Display > (A) Class of Service > (D) ToS field Priority Display |
| ➢ **Description** | Display the ToS priority value and its transmission priority |

#### 6.3.2.2. Transmission Scheduling

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) Qos Display > (B) Transmission Scheduling |
| ➢ **Description** | There are three options you can select from the Transmission Scheduling: (A) Flow Control Display (B) Scheduling Algorithm |

| | |
|---|---|
| | (C) WRR Weight Display. |

#### 6.3.2.2.1. Flow Control

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) Qos Display > (B) Transmission Scheduling > (A) Flow Control Display |
| ➢ **Description** | Display the state of flow control for Ethernet 1~4 |

#### 6.3.2.2.2. Scheduling Algorithm

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) Qos Display > (B) Transmission Scheduling > (B) Scheduling Algorithm |
| ➢ **Description** | Display the scheduling method for each port |

#### 6.3.2.2.3. WRR Weight Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) Qos Display > (B) Transmission Scheduling > (C) WRR Weight Display |
| ➢ **Description** | Display the weight for each queue |

### 6.3.2.3. Rate Control

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (C) Qos Display > (C) Rate Control |
| ➢ **Description** | Display the rate control of Ethernet 1~4 |

## 6.3.3. Ethernet Port Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (E) Ethernet Port Display |
| ➢ **Description** | Shows layer one configuration for all RSTP ports. This includes the state, auto negotiation, speed, and duplex status. |

## 6.3.4. Ethernet Switch Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (L) Ethernet Swtich Display |
| ➢ **Description** | Shows layer two configuration (age time) for RSTP |

## 6.3.5. Link Aggregation Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration Display> (P) Link Aggregation Display |
| ➢ **Description** | Displays the state of Trunk1 and Trunk 2 for the link aggregation |

**NOTE:** Please refer to section 7.2.5 for detailed information on Link Aggregation.

### 6.3.6. RSTP Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (R) RSTP Display |
| ➢ **Description** | You will see actions RSTP, ETH1, ETH2, ETH3 and ETH4 at the button of the screen. Use arrow keys to select the action you need, then, press **Enter** to show the detail information of the action you choose. If you select **RSTP**, you will see its state. If you select ETH1~4, you will see its STP state, port priority, port cost, link type, and edge port. |

➢ **RSTP Display Screens:**

Using arrow keys to select an action and press Enter:

```
SLOT 2  TDMoE              === RSTP Display ===        15:49:47 12/30/2009









Select Action >>  *RSTP  ETH1  ETH2  ETH3  ETH4
```

Then you will see the detail information for the action you select listed as below:

```
SLOT 2  TDMoE              === RSTP Display ===        15:49:06 12/30/2009


RSTP State   : STP









<< ESC key to return to previous menu, SPACE bar to refresh >>
```

**ETH1**

```
SLOT 2  TDMoE           === RSTP Port Display ===      08:35:34 01/06/2010



[ETH1]
STP State    : DISABLE
Port Priority: 128
Port Cost    : 19
Link Type    : auto
Edge Port    : Enable









<< ESC key to return to previous menu, SPACE bar to refresh >>
```

### 6.3.7. Tributary Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration > (T) Tributary Display |
| ➢ **Description** | There are two options you can select from the Tributary Display: (A) Tributary Mode Display and (B) Tributary Display. |

#### 6.3.7.1. Tributary Mode Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration Display> (T) Tributary Display > (A) Tributary Mode Display |
| ➢ **Description** | Display the tributary mode |

#### 6.3.7.2. Tributary Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (C) System Configuration Display> (T) Tributary Display > (B) Tributary Configuration Display |
| ➢ **Description** | You will see actions Trib1, Trib2, Trib3, and Trib4 at the button of the screen. Use arrow keys to select the action you need, then, press **Enter** to show the detail information of the action you choose. You will see its framing mode, CAS, and remote loss. |

➢ **Tributary Display Screens:**

Using arrow keys to select an action and press Enter:

```
SLOT 2  TDMoE           === Tributary Display ===       15:56:31 12/30/2009









Select Action >>  *Trib1  Trib2  Trib3  Trib4
```

Then you will see the detail information for the action you select listed as below:

```
SLOT 2  TDMoE           === Tributary Display ===       18:08:24 05/21/2010


Framing Mode     : E1-Unframe
CAS             : Off
Remote Loss     : Continue



NOTE: Send ARP Packet after remote unit is undetached



<< ESC key to return to previous menu, SPACE bar to refresh >>
```

## 6.4. All Time Slot Assignment

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (J) All Time Slot Assignment |
| ➢ **Description** | Display the ability that a port can tolerate the jitter |

➢ **All Time Slot Assignment Screen:**

```
SLOT 2  TDMoE         === All Time Slot Assignment ===    15:21:03 01/07/2010

 P BID  UDP   Format Cell Jit-Tol Jit-Buf Dest. IP Address
 = === ===== ====== ==== ======= ======= ================
 1   0    1    AAL1   5     20     256    001.001.001.002




<< ESC key to return to previous menu, SPACE bar to refresh >>
```

## 6.5. Time Slot IP Configuration

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (H) Time Slot IP Configuration |
| ➢ **Description** | There are four options you can select from the Time Slot IP Configuration: (A) Bundle Allocation Display (B) Time Slot Assignment Display (C) Bundle IP Display (D) Time Slot IP Assignment Display. |

### 6.5.1. Bundle Allocation Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (H) Time Slot IP Configuration > (A) Bundle Allocation Display |
| ➢ **Description** | Display the bundle allocation of Trib1~4 |

### 6.5.2. Time Slot Assignment Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (H) Time Slot IP Configuration > (B) Time Slot Assignment Display |
| ➢ **Description** | Display the bundle for each time slot |

**Table 6-3 Timeslot Assignment Display**

| Field | Setting Options | Default |
|---|---|---|
| Port | Trib1~4 | Trib1 |

➢ **Time Slot Assignment Display screens:**

Using arrow keys to select a port and press **Enter**, then you will see the timeslot assignments for the port you select listed as below:

```
SLOT 2  TDMoE       === Time Slot Assignment Display ===  16:03:07 12/30/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Port:Trib1

TS0 : Idle       TS16:  Idle
TS1 : Idle       TS17:  Idle
TS2 : Idle       TS18:  Idle
TS3 : Idle       TS19:  Idle
TS4 : Idle       TS20:  Idle
TS5 : Idle       TS21:  Idle
TS6 : Idle       TS22:  Idle
TS7 : Idle       TS23:  Idle
TS8 : Idle       TS24:  Idle
TS9 : Idle       TS25:  Idle
TS10: Idle       TS26:  Idle
TS11: Idle       TS27:  Idle
TS12: Idle       TS28:  Idle
TS13: Idle       TS29:  Idle
TS14: Idle       TS30:  Idle
TS15: Idle       TS31:  Idle
```

```
<< Press ESC key to return to previous menu >>
```

### 6.5.3. Bundle IP Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (H) Time Slot IP Configuration > (C) Bundle IP Display |
| ➢ **Description** | Display the Source IP address, subnet mask, and gateway IP |

### 6.5.4. Time Slot IP Assignment Display

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (H) Time Slot IP Configuration > (D) Time Slot IP Assignment Display |
| ➢ **Description** | Display the UDP setting of a port |

## 6.6. Status & Statistics

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (N) Status & Statistics |
| ➢ **Description** | There are six options you can select from the Network Status: (B) Bundle Statistics (S) Ethernet Port Statistics (M) MAC Address Display (D) Bundle Status (E) Ethernet Port Status (G) SFP Status. |

### 6.6.1. Bundle Statistics

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (N) Status & Statistics > (B) Bundle Statistics |
| ➢ **Description** | Display the amount of bundle a port has and the traffic statistics of each bundle |

➢ **Bundle Statistics Screen:**

```
SLOT 2  TDMoE           === Bundle Statistics ===       10:38:41 01/07/2010

 P BID  J-UR   J-OR   Jit-Buf     Rx-Lost RX-Good TX-Good
                     min/max
 = === ====== ====== ===== ===== ======  ======   ======
 1  4   0      0      0     512   0       0        0









<< ESC key to return to previous menu, SPACE bar to refresh >>
```

### 6.6.2. Ethernet Port Statistics

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (N) Status & Statistics > (S) Ethernet Port Statistics |
| ➢ **Description** | You will see actions ETH1, ETH2, ETH3, and ETH4 at the button of the screen. Use arrow keys to select the action you need, then, press **Enter** to show the detail information of the action you choose. |

- **Ethernet Port Statistics Screens:**

Use arrow keys to select an action and press **Enter**:

```
SLOT 2  TDMoE         === Ethernet Port Statistics ===    16:33:58 12/30/2009




Select Action >>  *ETH1  ETH2  ETH3  ETH4
```

Then you will see the traffic statistics for the port you select listed as below:

```
SLOT 2  TDMoE           === Traffic Statistics ===      18:19:13 01/05/2010

[ETH4]
Rx packets          : 702630
Rx bytes           : 203759888
Tx packets          : 661144
Tx bytes           : 191728270
Tx unicast Packets   : 661140
Tx multicast Packets : 0
Tx broadcast Packets : 4
Tx pause Packets     : 0
Rx unicast Packets   : 702627
Rx multicast Packets : 0
Rx broadcast Packets : 3
Rx pause Packets     : 0
Rx bulky packets     : 0
Rx shorty packets    : 0
Rx fragment packets  : 0
CRC Error           : 0


<< ESC key to return to previous menu, SPACE bar to refresh >>
```

### 6.6.3. MAC Address Display

| | |
|---|---|
| **Command Path** | Main Menu > (N) Status & Statistics > (M) MAC Address Display |
| **Description** | You will see selections All, ETH1, ETH2, ETH3, and ETH4 at the button of the screen. Use arrow keys to select the action you need, then, press **Enter** to show the detail information of the action you choose. |

- **MAC Address Display Screens:**

Use arrow keys to select a port and press **Enter**:

```
SLOT 2  TDMoE           === MAC Table Display ===       16:39:48 12/30/2009









Display By >>     *ALL  ETH1  ETH2  ETH3  ETH4
```

You will see the MAC address information about the port connected shown on the screen:

```
SLOT 2  TDMoE          === MAC Address Display ===      18:19:57 01/05/2010

No.   MAC Address       Port
0000 00-50-c6-aa-00-01  MGT
```

```
<< ESC key to return to previous menu, SPACE bar to refresh >>
```

### 6.6.4. Bundle Status

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (N) Status & Statistics > (D) Bundle Status |
| ➢ **Description** | Display whether the bundle is active or inactive |

➢ **Bundle Status Screen:**

```
SLOT 2  TDMoE            === Bundle Status ===        18:20:10 01/05/2010

 P BID  status
 = ===  ========
 1  0   active









<< ESC key to return to previous menu, SPACE bar to refresh >>
```

### 6.6.5. Ethernet Port Status

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (N) Status & Statistics > (E) Ethernet Port Status |
| ➢ **Description** | Shows layer one configuration for all RSTP ports. This includes the state, auto negotiation, speed, and duplex status. |

➢ **Ethernet Port Status Screen:**

```
SLOT 2  TDMoE          === Ethernet Port Status ===     08:48:11 12/31/2009

[ETH1]
State           :Enable   Speed  :10Mbps   Duplex  :Half
Auto Negotiation:Enable   Link   :Down


[ETH2]
State           :Enable   Speed  :10Mbps   Duplex  :Half
Auto Negotiation:Enable   Link   :Down


[ETH3]
State           :Enable   Speed  :10Mbps   Duplex  :Half
Auto Negotiation:Enable   Link   :Down


[ETH4]
State           :Enable   Speed  :10Mbps   Duplex  :Half
Auto Negotiation:Enable   Link   :Down

<< ESC key to return to previous menu, SPACE bar to refresh >>
```

### 6.6.6. SFP Status

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (N) Status & Statistics > (G) SFP Status |
| ➢ **Description** | You will see selections ETH1 and ETH2 at the button of the screen. Use arrow keys to select the action you need, then, press **Enter** to show the detail information of the action you choose. |

➢ **SFP Status Screens:**

Use arrow keys to select an action and press **Enter**:

```
SLOT 2  TDMoE              === SFP Status ===         08:52:00 12/31/2009









Select Action >>  *ETH1  ETH2
```

You will see the SFP status for the port you selected as shown below.

```
SLOT 1  TDMoE              === SFP Status ===         18:22:47 01/05/2010

                   Connector  : Not available
                   Transceiver: OC 3, multi-mode short
                   Link Length: long distance(L)
                   Technology : Shortwave laser w/ OFC(SL)
                   Encoding   : Not available
                   Length(9/125 mm fiber)   : 12700 m
                   Length(50/125 mm fiber)  : 1270 m
                   Length(62.5/125 mm fiber): 1270 m
                   Temperature: 127.490 degrees C
                   Vcc     :   3.263 mV
                   Tx Bias :  65.278 mA
                   Tx Power:   3.263 mW
                   Rx Power:   3.263 mW

<< ESC key to return to previous menu, SPACE bar to refresh >>
```

## 6.7. Alarm History

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (A) Alarm History |
| ➢ **Description** | Display the alarm message been transmitted of the card |

➢ **Alarm History Screen:**

```
SLOT 1  TDMoE            === Alarm History ===        18:21:28 01/05/2010


[TYPE]         [PORT]  [BUNDLE]  [CURR-STATE]  [COUNT]  [THRESHOLD]   [ALARM]
ETH4-LINK       DOWN                 ALARM         1                    MAJOR
```

```
<< ESC key to return to previous menu, SPACE bar to refresh >>
```

# 7. SYSTEM SETUP

This chapter introduces setup procedures of TDMoE. This includes loopback setup, system setup, time slot IP assignment, alarm setup, clear alarm history, clear performance data, and firmware upgrade. Please go to the SETUP section in the main menu to find the part you want to operate.

## 7.1. Loopback Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (L) Loopback Setup |
| ➢ **Function** | Enable users to setup the near-end loopback, LB port, and LB map |
| ➢ **Description** | Loopback Setup:<br>• **Near-End Loopback:**<br>1. Backplane Loopback: The incoming signal is immediately looped back to Backplane after entering FPGA without going through FPGA process.<br>2. Payload Loopback: The signal is looped back to TDMoE Chipset from FPGA after it goes through Ethernet Switch and TDMoE Chipset. The signal then passes Ethernet Switch and arrives at the remote physical link.<br>3. Line Loopback: The signal is immediately looped back to Ethernet Switch after entering FPGA without going through FPGA process. The signal then arrives at the remote physical link.<br>4. Local Loopback: The incoming signal is looped back to Backplane from FPGA.<br>• **Loopback Port:** the port that runs the loopback test<br>• **Loopback MAP:** the amount of time slots for a port that runs the loopback test |

➢ **Loopback Test Screen:**

```
SLOT 2  TDMoE            === Loopback Setup ===       09:43:11 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

NEAR-END LOOPBACK :OFF
LB PORT          :Trib1
LB MAP           :iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii   CH:01









<< Press ESC key to return to previous menu >>
```

**NOTE:** If the Near-End Loopback is OFF, all four ports (Trib1~4) do not perform loopback.

When the framing mode for each port is T1-None or E1-Unframe, the screen is shown as:

```
SLOT 2  TDMoE            === Loopback Setup ===       11:58:07 05/24/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

NEAR-END LOOPBACK :OFF
LB PORT          :Trib1
LB MAP           :111111111111111111111111









<< Press ESC key to return to previous menu >>
```

**Table 7-1 Loopback Setup**

| Field | | Setting Options | Default |
|---|---|---|---|
| Near-End Loopback | | OFF, Backplane, PLB, LLB, Local | OFF |
| LB Port | | Trib1~4 | Trib1 |
| LB MAP | E1 | CH01~CH32 | i |
| | T1 | CH01~CH24 | i |

## 7.2. System Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup |
| ➢ **Function** | In System Setup section, you can change the original system configuration. |
| ➢ **Description** | There are seven options you can select from the System Setup: (A) Miscellaneous Setup (C) Qos Setup (E) Ethernet Port Setup (L) Ethernet Switch Setup (P) Link Aggregation Setup (R) RSTP Setup (T) Tributary Setup. |

### 7.2.1. Miscellaneous Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (A) Miscellaneous Setup |
| ➢ **Function** | Enables users to change the active bundle time, time durations of alarm filter and delay switch. |

**Table 7-2 Advanced Setup**

| Field | Setting Options | Default |
|---|---|---|
| Active Bundle Time(s) | 1~99999999 | 00000090 |
| Alarm Filter | 0~180 | 000 |
| Delay Switch | 0~180 | 000 |
| Recover Delay | 0~180 | 000 |

➢ **Advanced Setup Screen:**

Use **BACKSPACE** to edit the active bundle time:

```
SLOT 2  TDMoE          === Miscellaneous Setup ===      10:09:15 12/31/2009
Please input decimal number (1~99999999), BACKSPACE to edit

Active Bundle Time(s): 00000090

[Protection]
Alarm Filter: 003
Delay Switch: 000
Recover Delay:000




<< Press ESC key to return to previous menu >>
```

| | |
|---|---|
| Active Bundle Time | Active bundle time is the period of time that the system tries to activate an established but inactive bundle. A bundle is necessary between local and remote devices to transmit TDMoE traffic. If the local device receives the MAC address of the remote device through ARP Response (Address Resolution Protocol), then the traffic can be steadily forwarded, and Active Bundle Time will not be triggered. However, if the local device cannot receive TDMoE traffic from the remote device, this situation is the so-called “Remote Loss”. Hence, the local device will send ARP request frames and request the MAC address of the remote device. Once a bundle is inactive, this status would trigger its own Active Bundle Time in operation. |
| Alarm Filter | When an alarm occurs, the system will monitor the alarm status. If the alarm still exists after the configured time, the alarm queue will be issued. |

| | |
|---|---|
| Delay Switch | When alarm is issued in the primary line, the configured time is the waiting time to activate the switching protection (switch from the primary line to the backup line). |
| Recover Delay | It's the delay switch for the backup line to switch back to the Master one when the Master line recovers from link failure. |

After you key in the active bundle time, press **ESC**. A prompt will ask if you wish to change the configuration. Press **Y** to confirm.

```
>> Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the configuration is successfully changed, the screen will return to the previous menu.

### 7.2.2. Qos Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) Qos Setup |
| ➢ **Description** | There are three options you can select from the Qos Setup: (A) Class of Service (B) Transmission Scheduling (C) Rate Control. |

**NOTE:** Please refer to the **Chapter 8 Appendix A: Quality of Service Setup** for the entire explanation and setup procedure on QoS Setup.

#### 7.2.2.1. Class of Service

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) Qos Setup > (A) Class of Service |
| ➢ **Description** | There are four options you can select from the Class of Service: (A) Priority Mode Setup (B) Fixed Priority Setup (C) Vlan CoS Priority Setup (D) ToS Field Priority Setup. |

##### 7.2.2.1.1. Priority Mode Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) Qos Setup > (A) Class of Service > (A) Priority Mode Setup |
| ➢ **Function** | Enables users to change the priority mode for each port |

**Table 7-3 Priority Mode Setup**

| Field | Setting Options | Default |
|---|---|---|
| ETH1~4 | Fixed, CoS, ToS | Fixed |

➢ **Priority Mode Setup Screen:**

Using **Tab** to select one of the options for each port:

```
SLOT 2  TDMoE          === Priority Mode Setup ===      10:40:53 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

ETH1: Fixed
ETH2: Fixed
ETH3: Fixed
ETH4: Fixed









<< Press ESC key to return to previous menu >>
```

After you change the priority mode for ETH1, ETH2, ETH3, and ETH4, press **Esc**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the configuration is successfully changed, the screen will return to the previous menu.

#### 7.2.2.1.2. Fixed Priority Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) QoS Setup > (A) Class of Service > (B) Fixed Priority Setup |
| ➢ **Function** | Enables users to change the transmission priority of each port |
| ➢ **Description** | By changing the transmission priority for each port, the user can specify that the transmission priority for any port is high, medium, or low. |

**Table 7-4 Fixed Priority Setup**

| Field | Transmission priority | Default |
|---|---|---|
| ETH1~4 | P0, P1, P2, P3 | P0 |

➢ **Fixed Priority Setup Screens:**

Using **Tab** to select one of the priorities for each port:

```
SLOT 2  TDMoE          === Fixed Priority Setup ===     13:17:01 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

     Transmission priority
ETH1: P0
ETH2: P0
ETH3: P0
ETH4: P0


NOTE: Priority:P3 > P2 > P1 > P0




<< Press ESC key to return to previous menu >>
```

After you choose the transmission priority, press **Esc**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the configuration is successfully changed, the screen will return to the previous menu.

#### 7.2.2.1.3. Vlan CoS Priority Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) Qos Setup > (A) Class of Service > (C) Vlan CoS Priority Setup |
| ➢ **Function** | Enables users to change the transmission priority for each CoS priority |
| ➢ **Description** | By changing the transmission priority for each class of service, the user can specify that the transmission priority for any class of service is high, medium, or low. |

**Table 7-5 Vlan CoS Priority Setup**

| CoS priority | Transmission priority | Default |
|---|---|---|
| 0~7 | P0, P1, P2, P3 | P0 |

➢ **Vlan CoS Priority Setup Screens:**

Using **Tab** to select one of the priorities for each CoS priority:

```
SLOT 2  TDMoE        === Vlan Cos Priority Setup ===    13:18:47 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Cos priority   Transmission priority
   0           P0
   1           P0
   2           P0
   3           P0
   4           P0
   5           P0
   6           P0
   7           P0


NOTE: Priority:P3 > P2 > P1 > P0



<< Press ESC key to return to previous menu >>
```

After you choose the transmission priority for each tag priority, press **Esc**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the configuration is successfully changed, the screen will return to the previous menu.

#### 7.2.2.1.4. ToS Field Priority Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) Qos Setup > (A) Class of Service > (D) ToS Field Priority Setup |
| ➢ **Function** | Enables users to change the transmission priority for each ToS priority |
| ➢ **Description** | By changing the transmission priority for each type of service, the user can specify that the transmission priority for any type of service is high, medium, or low. |

**Table 7-6 ToS Field Priority Setup**

| ToS priority | Transmission priority | Default |
|---|---|---|
| 0~7 | P0, P1, P2, P3 | P0 |

➢ **ToS Field Priority Setup Screens:**

Using **Tab** to select one of the priorities for each ToS priority:

```
SLOT 2  TDMoE        === TOS field Priority Setup ===   13:28:23 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Tos priority   Transmission priority
   0           P0
   1           P0
   2           P0
   3           P0
   4           P0
   5           P0
   6           P0
   7           P0


NOTE: Priority:P3 > P2 > P1 > P0







<< Press ESC key to return to previous menu >>
```

After you choose the transmission priority for each tag priority, press **Esc**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the configuration is successfully changed, the screen will return to the previous menu.

#### 7.2.2.2. Transmission Scheduling

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) Qos Setup > (B) Transmission Scheduling |
| ➢ **Description** | There are four options you can select from the Class of Service: (A) Flow Control Setup (B) Scheduling Algorithm (C) WRR Weight Setup. |

##### 7.2.2.2.1. Flow Control Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) Qos Setup > (B) Transmission Scheduling > (A) Flow Control Setup |
| ➢ **Function** | Enables users to change the state of flow control for each port |
| ➢ **Description** | **Flow Control:** Flow Control is a method that manages the rate of data transmission between two devices. If the sending device forwards data at a faster rate than the buffer of the receiving device can handle, then the latter device will send the former one pause frames to request for quenching the transmission rate.<br>**Flow Control Setup:**<br>• **Enable:** the port is able to control the transmission speed<br>• **Disable:** the flow control mechanism is disabled |

**Table 7-7 Flow Control**

| Field | Setting Options | Default |
|---|---|---|
| ETH1~4 | Enable, Disable | Disable |

➢ **Flow Control Setup Screens:**

Using **Tab** to change the state for each port:

```
SLOT 2  TDMoE          === Flow Control Setup ===      13:34:22 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

ETH1: Disable
ETH2: Disable
ETH3: Disable
ETH4: Disable









<< Press ESC key to return to previous menu >>
```

**NOTE:** The transmitting port(s) of both local and remote devices should be **Enable** for Flow Control to function successfully.

After you choose Enable or Disable for each field, press **Esc**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the configuration is successfully changed, the screen will return to the previous menu.

##### 7.2.2.2.2. Scheduling Algorithm

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) Qos Setup > (B) Transmission Scheduling > (B) Scheduling Algorithm |
| ➢ **Function** | Enables users to change the scheduling method for each port |
| ➢ **Description** | Scheduling Algorithm:<br>• **SP:** depends on the hierarchy of the transmission priority. P3 is the highest, and P0 is the lowest<br>• **WRR:** depends on the weight of each priority |

**Table 7-8 Scheduling Algorithm**

| Port | Algorithm Options | Default |
|---|---|---|
| ETH1~4 | SP, WRR | SP |

➢ **Scheduling Algorithm Screens:**

Using **Tab** to change the scheduling method for each port:

```
SLOT 2  TDMoE          === Scheduling Algorithm ===     13:37:16 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS


ETH1: SP
ETH2: SP
ETH3: SP
ETH4: SP


NOTE:
SP: Strict Priority.
WRR: Weighted Round Robin.


<< Press ESC key to return to previous menu >>
```

After you choose SP or WRR for each port, press **Esc**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the configuration is successfully changed, the screen will return to the previous menu.

#### 7.2.2.2.3. WRR Weight Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) Qos Setup > (B) Transmission Scheduling > (C) WRR Weight Setup |
| ➢ **Function** | Enables users to change the weight for each queue |
| ➢ **Description** | The weight of each queue decides the transmission order of those queues |

**Table 7-9 WRR Weight Setup**

| Queue | Setting Options | Default |
|---|---|---|
| P0 | 0~100% | 007% |
| P1 | | 013% |
| P2 | | 027% |
| P3 | | 053% |

➢ **WRR Weight Setup Screens:**

Use **BACKSPACE** to edit the WRR weight for each queue:

```
SLOT 2  TDMoE            === WRR Weight Setup ===       14:24:08 12/31/2009
```

```
ARROW KEYS: CURSOR MOVE, Please Input: 0~100, BACKSPACE to edit

        P0 queue  P1 queue  P2 queue   P3 queue
Weight:   007%      013%      027%        053%


NOTE: The sum of weights must equal 100



<< Press ESC key to return to previous menu >>
```

After you enter new WRR Weight for each queue, press **Esc**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the configuration is successfully changed, the screen will return to the previous menu.

#### 7.2.2.3. Rate Control Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (C) Qos Setup > (C) Rate Control Setup |
| ➢ **Function** | **Rate Control/Limit**: Rate Control/Limit is applied to manage the transmission bandwidth of data flow from an interface to its buffer. When the transmission bandwidth of the ingress traffic exceeds the preconfigured data rate, the exceeded portion of ingress traffic will be dropped. For example, if the speed of a Fast Ethernet port is 100 Mbps and the rate limit is configured as 80 Mbps, then only 80 Mbps of data can be forwarded to the buffer. If there is a bursty traffic of 90Mbps, 10 Mbps of data will be dropped. |

**Table 7-10 Rate Control Setup**

| Port | Setting Options | Default |
|---|---|---|
| **When the Ethernet speed is 10M** | | |
| ETH1~4 | 1-15 x 64kbps<br>1-10 x 1Mbps | 00 x 64kbps |
| **When the Ethernet speed is 100M** | | |
| ETH1~4 | 1-15 x 64kbps<br>1-100 x 1Mbps | 00 x 64kbps |
| **When the Ethernet speed is 1000M** | | |
| ETH1~4 | 1-15 x 64kbps<br>1-100 x 1Mbps<br>10-100 x 10Mbps | 00 x 64kbps |

➢ **Rate Control Setup Screens:**

Using **BACKSPACE** to edit and enter decimal numbers and speed for each port:

```
SLOT 2  TDMoE          === Rate Control Setup ===      14:34:06 12/31/2009
Please input decimal number(1~15), BACKSPACE to edit

ETH1:  00   x 64kbps
ETH2:  00   x 64kbps
ETH3:  00   x 64kbps
ETH4:  00   x 64kbps




<< Press ESC key to return to previous menu >>
```

After you enter decimal number and speed for each port, press **Esc**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the configuration is successfully changed, the screen will return to the previous menu.

### 7.2.3. Ethernet Port Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (E) Ethernet Port Setup |
| ➢ **Function** | Enables users to change state, auto negotiation, speed, and duplex for each port |
| ➢ **Description** | You will see selections ETH1, ETH2, ETH3, and ETH4 at the button of the screen. Use arrow keys to select the port you need, then press **Enter** to show the Ethernet Port Setup of the port you choose. |

**Table 7-11 Ethernet Port Setup**

| | Field | Setting Options | Default |
|---|---|---|---|
| **ETH1, ETH2, ETH3, ETH4** | Port Status | Enable, Disable | Enable |
| | Auto Negotiation | Enable, Disable | Enable |
| | Speed | 10/100/1000 Mbps | 10 Mbps |
| | Duplex | Half, Full | Half |

**Note1:** 1000 Mbps-Half Duplex is not supported yet.
**Note2:** If you want to upgrade/downgrade the SFP speed to 1000/100 Mbps, you need to order an extra SFP module.

**Table 7-12 Auto Negotiation and Duplex**

| Parameter | Description |
|---|---|
| Auto Negotiation | Auto negotiation is a function by which the two connected Ethernet ports share common transmission parameters, such as speed and duplex. The two connected Ethernet ports will first share their possible values of parameters and then apply the best transmission mode they both support. For example, if two FE ports are with Auto Negotiation enabled, then they will be linked up at 1000Mbps and Full duplex. |
| Duplex | Duplex is a transmission mode that describes how two connected Ethernet ports transmit the traffic. There are two types of Duplex, Full-Duplex and Half-Duplex. Full-Duplex means that data can be transmitted in both directions on a single Ethernet Cable simultaneously, i.e. transmitting and receiving. Half-Duplex means that data can only be delivered in one direction at a time on a single Ethernet Cable rather than two directions. |

➢ **Ethernet Port Setup Screens:**
When you enter the Ethernet PHY Configuration Setup section, you will see a selection page as follows. Select one action from the button of the screen to view its configuration:

```
SLOT 2  TDMoE          === Ethernet Port Setup ===      15:00:28 12/31/2009




Select Action >>  *ETH1 ETH2  ETH3  ETH4
```

Press **Enter**. You will see the screen below.

```
SLOT 2  TDMoE          === Ethernet Port Setup ===      15:03:43 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
```

```
Electrical
[ETH1]
Port Status     : Enable
Auto Negotiation: Enable
Speed           : 10Mbps
Duplex          : Half



<< Press ESC key to return to previous menu >>
```

**NOTE:** If Auto Negotiation is **Enable**, then there is no need to setup Speed and Duplex. If both local and remote devices configure Auto Negotiation as **Disable**, then configurations of Speed and Duplex for both devices should be the same. Otherwise, the link will fail. If Auto Negotiation is **Disable** for the local device and is **Enable** for the remote device, then the remote device needs not configure Speed and Duplex. It will automatically apply same configurations of the two modes as those of the local device.

After you change the setting options for each field, press **ESC**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the configuration is successfully changed, the screen will return to the previous menu.

### 7.2.4. Ethernet Switch Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (L) Ethernet Switch Setup |
| ➢ **Function** | Here, you can setup the age time for Ethernet layer two ports, and add or delete any Ethernet port and its MAC address. |
| ➢ **Description** | For setup procedures, please see the screen demonstrations shown below.<br>**Age Time:** the period of time that MAC addresses are flushed from the MAC Address Table if they have not been accessed during that interval<br>**MGT:** Management |

**Table 7-13 Ethernet Switch Setup**

| Field | Setting Options | Default |
|---|---|---|
| Age Time | 1~3825 | 0000300 |

**Table 7-14 Add Ethernet MAC Address**

| Field | Setting Options | Default |
|---|---|---|
| Add port | MGT, ETH1, ETH2, ETH3, ETH4 | MGT |
| Add MAC | Setup by user | 00 00 00 00 00 00 |

**Table 7-15 Delete Ethernet MAC Table**

| Field | Setting Options | Default |
|---|---|---|
| Delete port | MGT, ETH1, ETH2, ETH3, ETH4 | MGT |
| Delete MAC | Yes, No | No |

➢ **Ethernet Switch Setup Screens:**

When you enter this section, you will first see the Ethernet Switch Setup menu. Use arrow keys to select the action you need.

```
SLOT 2  TDMoE         === Ethernet Switch Setup ===     15:28:32 12/31/2009




Select Action >>  *Age   MAC Address
```

If you select **Age**, you will see a screen as below:

```
SLOT 2  TDMoE         === Ethernet Switch Setup ===     15:35:17 12/31/2009
ARROW KEYS: CURSOR MOVE, Please input: 0~1048575, BACKSPACE to edit
```

```
Age Time: 0000300

NOTE: Setting the age time to zero disables the aging process.
     Aging time must be a multiple of 15



<< Press ESC key to return to previous menu >>
```

If you select **MAC address**, you'll first have to choose from two actions: **Add** (add a new static address) or **Del** (delete a port or a static address). Use arrow keys to make your selection and press **Enter**.

```
SLOT 2  TDMoE          === Ethernet Switch Setup ===      15:38:36 12/31/2009









Select Action >>   Age   *MAC Address
                  *Add   Del
```

To add a new port, select **Add**. Using **Tab** to select a port, and using **BACKSPACE** to edit and enter new MAC address:

```
SLOT 1  TDMoE         === Add ethernet MAC Address ===    18:17:54 11/05/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Add Port    :MGT
Add MAC     :00 00 00 00 00 00







<< Press ESC key to return to previous menu >>
```

After you choose a port and enter the MAC address, press **ESC**. A prompt will ask if you wish to add the address. Press **Y** to confirm.

```
Start to add (Y/N)?
```

When the MAC address is added successfully, a message will appear as shown below:

```
RESULT: OK
```

To delete a port, select **Del**. Using **Tab** to select a port and a static:

```
SLOT 2  TDMoE        === Delete Ethernet MAC Table ===    09:03:58 01/12/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Delete Port  : MGT









<< Press ESC key to return to previous menu >>
```

After you choose a port and a static, press **ESC**. A prompt will ask if you wish to add the address. Press **Y** to confirm.

```
Start to delete (Y/N)?
```

When the MAC address is deleted successfully, a message will appear as shown below:

```
RESULT: OK
```

### 7.2.5. Link Aggregation Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (P) Link Aggregation Setup |
| ➢ **Function** | Enables users to change the state of Trunk1 and Trunk 2 for the link aggregation |
| ➢ **Description** | Link Aggregation Setup:<br>• **Disable:** disable the link aggregation function<br>• **Leader_ETH1~4:** the trunk group's configuration depends on the leader port's setting |

**Table 7-16 Link Aggregation Setup**

| Field | Setting Options | Default |
|---|---|---|
| Trunk Group1 | Disable, Leader_ETH1, Leader_ETH2 | Disable |
| Trunk Group2 | Disable, Leader_ETH3, Leader_ETH4 | Disable |

➢ **Link Aggregation Setup Screen:**

```
SLOT 2  TDMoE          === Link Aggregation Setup ===    15:49:31 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Trunk Group1: Disable
Trunk Group2: Disable




NOTE:
Trunk Group1:ETH1,ETH2
Trunk Group2:ETH3,ETH4









<< Press ESC key to return to previous menu >>
```

*What is Link Aggregation?*

Link Aggregation is a method of binding two or more ports/links into a single logical link/trunk in order to increase the bandwidth, and implicitly provides redundancy as well. Load Balancing Algorithm is applied automatically so that no single port of a trunk group will be overwhelmed. The Load Balancing Algorithm of the TDMoE card is based on the result of XOR Boolean operation on both Source MAC address and Destination MAC address. For a TDMoE card, 4 interfaces form two trunk groups; ETH1 and ETH2 compose one trunk group, while ETH3 and ETH4 establish another one. The following figure illustrates the trunk groups of a TDMoE card. Each Fast Ethernet interface possesses 100 Mbps bandwidth. By combining two ports and forming a trunk group, the bandwidth of that logical interface reaches up to 200 Mbps.

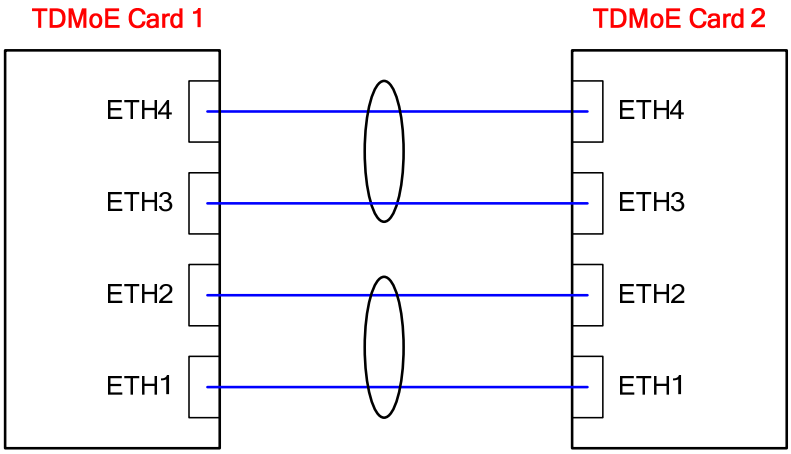



**Figure 7-1 Link Aggregation of TDMoE Card**

*Redundancy*

Link Aggregation implicitly provides redundancy, yet it is not a truly port backup function of a TDMoE card. For example, If 160 Mbps of data are transmitting over the trunk group, which implies each of the two ports forwards 80 Mbps respectively. However, if one port fails, then its 80 Mbps traffic will be transferred to another port. Yet, 60 Mbps of data will be dropped since the maximum bandwidth for a single FE port is 100 Mbps. Hence, it is suggested that Flow Control should be enabled. After enabling the Flow Control function, the system will send the connected device a pause frame to quench the data rate. Otherwise, data will be dropped all along.

*Precautions of Setup*

- For the Link Aggregation to function properly, the “Link Aggregation” function of the connected devices on both ends of an Ethernet cable must first be enabled.
- Within each trunk group, one port is selected as the leading port, and all the member ports must follow the configurations of that leading port. For example, ETH1 is selected as the leading port, then the port configurations of ETH2 such as flow control, speed and duplex mode must be identical with ETH1. Furthermore, the ports of the connected device (e.g. ETH1 and ETH2 of TDMoE card 2) ought to have the configurations identical to those of ETH1 of TDMoE card 1.
- Flow Control should be enabled so that the system will send the connected device a pause frame to quench the data rate. Otherwise, data will be dropped all along.

### 7.2.6. RSTP Configuration Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (R) RSTP Configuration Setup |
| ➢ **Function** | Setup your RSTP parameters or close RSTP operation |
| ➢ **Description** | In this section you can do both RSTP and RSTP port configuration setup. Use arrow key to select the action you would like to activate. It can be RSTP, ETH1, ETH2, ETH3 or ETH4.<br>RSTP state:<br>• **OFF**: Disable RSTP operation<br>• **STP**: Eisable STP operation<br>• **RSTP:** Enable RSTP operation |

➢ **RSTP Configuration Screens:**

When you enter this section, you will first see the RSTP Configuration menu. Use arrow keys to select the action you need.

```
SLOT 2  TDMoE              === RSTP Setup ===         15:58:41 12/31/2009









Select Action >>  *RSTP  ETH1  ETH2  ETH3  ETH4
```

Press **Enter** key**.** You will see the screen below.

```
SLOT 2  TDMoE              === RSTP Setup ===         16:02:40 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS, ENTER: CHANGE RSTP STATE


RSTP State   : OFF









<< Press ESC key to return to previous menu >>
```

If you change the RSTP State from OFF to STP, you will see the screen as below.

```
SLOT 2  TDMoE              === RSTP Setup ===         09:52:14 01/05/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS, ENTER: CHANGE RSTP STATE


RSTP State   : STP









<< Press ESC key to return to previous menu >>
```

If you change the RSTP State from OFF to RSTP, you will see the screen as below. Note that the acceptable value for the maximum age should be bigger or equal to twice the value of hello time+ 1, and smaller or equal to twice the value of forward delay -1.

```
SLOT 2  TDMoE              === RSTP Setup ===         16:02:40 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS, ENTER: CHANGE RSTP STATE


RSTP State   : RSTP
Priority    : 32768
Hello Time   : 02  (s)
Maximum Age  : 20 (s)
Forward Delay: 15 (s)

NOTE: Acceptable value:
     max-age >= 2 * (hello-time + 1)
     max-age <= 2 * (forward-delay - 1)









<< Press ESC key to return to previous menu >>
```

**Table 7-17 RSTP Configuration**

| Field | Setting Options | Default |
|---|---|---|
| RSTP state | OFF, STP, RSTP | OFF |
| **When RSTP state is RSTP** | | |
| Priority | 0~65534 | 32768 |
| Hello time (sec.) | 1~10 | 2 |
| Maximum age (sec.) | 6~40 | 20 |
| Forward delay (sec.) | 4~30 | 15 |

After you change the RSTP state, priority, hello time, maximum age, and forward delay, press **ESC**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the RSTP configuration is changed successfully, the screen will return to the previous page.

After you change the RSTP State to STP or RSTP, you can change the configuration for ETH1~4.

```
SLOT 2  TDMoE            === RSTP Port Setup ===        08:52:04 01/06/2010
ARROW KEYS: CURSOR MOVE, Please input: 0~240, BACKSPACE to edit


[ETH1]
STP State    : DISABLE
Port Priority: 128
Port Cost    : 00019
Link Type    : auto
Edge Port    : Enable









<< Press ESC key to return to previous menu >>
```

**Note:** Link Type and Edge Port can be configured only when the RSTP State is **RSTP**.

**Table 7-18 ETH1~4 Configuration**

| Field | Setting Options | Default |
|---|---|---|
| Port Priority | 0~240 | 128 |
| Port Cost | 0~65534 | 00019 |
| Link Type | Auto, p-to-p, Shared | Auto |
| Edge Port | Disable, Enable | Enable |

**Table 7-19 RSTP and RSTP Port Setup Parameters**

| Parameter | Description |
|---|---|
| RSTP state | Specifies the type of spanning tree on this device |
| Priority | Priority is used in selecting the root device, root port, and designated port. The device with the highest priority (lower value) becomes the root device. |
| Hello time (sec.) | Interval (in seconds) at which this device transmits a configuration message (BPDU) |
| Maximum age (sec.) | The maximum time (in seconds) a device can wait without receiving a configuration message before attempting to reconfigure. |
| Forward delay (sec.) | The maximum time (in seconds) this device will wait before changing states (i.e. discarding to learning to forwarding). |
| Port priority | Defines the priority used for this port in the STP. If the path cost for all ports on a device is the same, the port with the highest priority (i.e. lowest value) will be configured as an root port for the device. |
| Port cost | This parameter is used by the STP/RSTP to determine the best path between devices. Therefore, lower values should be assigned to ports attached to faster media, and higher values |

| | |
|---|---|
| | assigned to ports with slower media. |
| Link type | Defines the link type attached to this interface:<br>• Auto: device automatically determines if the interface is attached to a point-to-point link or to shared media. This feature is applicable only for RSTP.<br>• P-to-p: connection to exactly one other bridge<br>• Shared: connection to two or more bridges |
| Edge port | Enable only when an interface is attached to a LAN segment that is at the end of a bridged LAN or to an end node. Since end nodes cannot cause forwarding loops, they can pass directly through to the spanning tree forwarding state, i.e. “fast forwarding”. This feature is applicable only for RSTP. |

### 7.2.7. Tributary Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (T) Tributary Setup |
| ➢ **Description** | There are two options you can select from the Tributary Setup: (A) Tributary Mode Setup and (B) Tributary Setup. |

#### 7.2.7.1. Tributary Mode Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (T) Tributary Setup > (A) Tributary Mode Setup |
| ➢ **Function** | Enables users to change the tributary mode |

**Table 7-20 Tributary Mode Setup**

| Field | Setting Options | Default |
|---|---|---|
| Mode | E1, T1 | E1 |

➢ **Tributary Mode Setup Screens:**

Using **Tab** to select a mode:

```
SLOT 2  TDMoE          === Tributary Mode Setup ===     16:18:33 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Mode: E1




<< Press ESC key to return to previous menu >>
```

After you select a mode, press **ESC**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

#### 7.2.7.2. Tributary Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (S) System Setup > (T) Tributary Setup > (B) Tributary Setup |
| ➢ **Function** | Enables users to change the framing mode, CAS, ARP on remote loss of each tributary port |
| ➢ **Description** | You will see selections Trib1, Trib2, Trib3, and Trib4 at the button of the screen. Use arrow keys to select the port you need, then press **Enter** to show the configuration of the port you choose. |

➢ **Tributary Setup Screens:**

When you enter this section, you will first see the Tributary Setup menu. Use arrow keys to select the action you need.

```
SLOT 2  TDMoE            === Tributary Setup ===        16:21:41 12/31/2009









Select Action >>  *Trib1  Trib2  Trib3  Trib4
```

Press **Enter** key. You will see the screen below.

**T1**

```
SLOT 2  TDMoE            === Tributary Setup ===        16:29:58 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Framing Mode      : T1-None
CAS               : Off
ARP on Remote Loss: Continue



NOTE: Send ARP Packet after remote unit is undetached



<< Press ESC key to return to previous menu >>
```

**E1**

```
SLOT 2  TDMoE            === Tributary Setup ===        08:43:26 01/12/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Framing Mode     : E1-Unframe
CAS            : Off
ARP on Remote Loss: Continue



NOTE: Send ARP Packet after remote unit is undetached



<< Press ESC key to return to previous menu >>
```

**Note:** If the Framing Mode of a port is framed, and “TSI Map Setup” in AM3440 Controller Menu ((S) System Setup > (C) TSI Map) is configured, you need to clear TSI Map (AM3440 Main Menu > (S) System Setup > (F) Clear a TSI Map) and delete bundle(s) of that port before changing settings of Framing Mode and CAS.

**Table 7-21 Tributary Configuration Setup (Trib1, Trib2, Trib 3, Trib4)**

| Field | Setting Options | | Default |
|---|---|---|---|
| Framing Mode | T1 | T1-None, T1-T1403, T1-ESF, T1-D4 | T1-None |
| | E1 | E1-Unframe, E1-FAS | E1-Unframe |
| CAS | On, Off | | On |
| ARP on Remote Lose | Continue, Stop | | Continue |

After you change the options, press **ESC**. A prompt will ask if you wish to change configuration. Press **Y** to confirm.

```
Change configuration (Y/N)? (Note:to save,please use V-command)
```

When the RSTP configuration is changed successfully, the screen will return to the previous page.

## 7.3. Time Slot IP Assignment

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (T) Time Slot IP Assignment |
| ➢ **Description** | There are four options you can select from the Time Slot IP Assignment: (A) Bundle Allocation Setup (B) Time Slot Assignment Setup (C) Bundle IP Setup (D) Time Slot IP Assignment. |

### 7.3.1. Bundle Allocation Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (T) Time Slot IP Assignment > (A) Bundle Allocation Setup |
| ➢ **Function** | Enables users to change the bundle allocation of each tributary port |

**Table 7-22 Bundle Allocation Setup**

| **Field** | | **Settings Options** | | | | **Default** | | | |
|---|---|---|---|---|---|---|---|---|---|
| Bundle Allocation | | Trib1 | Trib2 | Trib3 | Trib4 | Trib1 | Trib2 | Trib3 | Trib4 |
| | Option 1 | 16 | 16 | 16 | 16 | 16 | | | |
| | Option 2 | 32 | Disable | 32 | Disable | | | | |

➢ **Bundle Allocation Setup Screen:**

```
SLOT 2  TDMoE        === Bundle Allocation Setup ===    16:53:17 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

                 Trib1  Trib2   Trib3   Trib4
Bundle Allocation: 16     16      16      16









<< Press ESC key to return to previous menu >>
```

### 7.3.2. Time Slot Assignment Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (T) Time Slot IP Assignment > (B) Time Slot Assignment Setup |
| ➢ **Function** | Enables users to select a bundle for each time slot of a port |

**Table 7-23 Time Slot Assignment Setup**

| **Field** | | **Setting Options** | **Default** |
|---|---|---|---|
| Port | | Trib1~4 | Trib1 |
| E1 | TS0~31 | Idle, Bundle 0~32 | Idle |
| T1 | TS0~24 | Idle, Bundle 0~24 | Idle |

- **Time Slot Assignment Setup Screen:**

```
SLOT 2  TDMoE          === Time Slot Assignment Setup    18:31:33 01/05/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Port:Trib1

TS0 : Idle          TS16: Idle
TS1 : Idle          TS17: Idle
TS2 : Idle          TS18: Idle
TS3 : Idle          TS19: Idle
TS4 : Idle          TS20: Idle
TS5 : Idle          TS21: Idle
TS6 : Idle          TS22: Idle
TS7 : Idle          TS23: Idle
TS8 : Idle          TS24: Idle
TS9 : Idle          TS25: Idle
TS10: Idle          TS26: Idle
TS11: Idle          TS27: Idle
TS12: Idle          TS28: Idle
TS13: Idle          TS29: Idle
TS14: Idle          TS30: Idle
TS15: Idle          TS31: Idle


<< Press ESC key to return to previous menu >>
```

**Note:** If you want to perform the Time Slot Assignment Setup, you should do the TSI Map Setup in the AM3440 controller menu ((S) System Setup > (C) TSI Map Setup) first.

### 7.3.3. Bundle IP Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (T) Time Slot IP Assignment > (C) Bundle IP Setup |
| ➢ **Function** | Enables users to key in the source IP address, subnet Mask, and Gateway IP for the bundle |

- **Bundle IP Setup Screen:**

```
SLOT 2  TDMoE           === Bundle IP Setup ===       17:01:39 12/31/2009
ARROW KEYS: CURSOR MOVE, Please Input: nnn.nnn.nnn.nnn, BACKSPACE to edit


Src. IP Address : 000.000.000.000
Subnet Mask     : 000.000.000.000
Gateway IP      : 000.000.000.000









<< Press ESC key to return to previous menu >>
```

**Table 7-24 Bundle IP Setup**

| Field | Setting Options | Default |
|---|---|---|
| Source IP Address | Setup by User | 000.000.000.000 |
| Subnet Mask | | |
| Gateway IP | | |

### 7.3.4. Time Slot IP Assignment

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (T) Time Slot IP Assignment > (D) Time Slot IP Assignment |
| ➢ **Function** | Enables users to change UDP settings for a port |

➢ **Time Slot IP Assignment Screens:**

There are two unframed modes for user to choose: AAL1 and SAToP.

**AAL1:**

```
SLOT 2  TDMoE        === Time Slot IP Assignment ===    14:08:55 01/04/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Port          : Trib1
Bundle ID     : 00          PO/TS TS PO/TS TS BNDL ID/UDP NUM Dest IP Address
Format        : AAL1         ===== == ===== == =============== ===============
ToS           : 000             0  0    17 17
UDP Number    : 00000           1  1    18 18
Dest IP Addr: 000.000.000.000   2  2    19 19    Cell Num Jitter Delay Jitter Size
Stratum       : 3               3  3    20 20    ======== =========== ============
Cell in Bundle : 0005           4  4    21 21
Jitter Delay  : 020             5  5    22 22
Jitter Size   : 256             6  6    23 23
VLAN          : OFF             7  7    24 24
CVLAN ID      :                 8  8    25 25
CVLAN Priority :                9  9    26 26
SVLAN ID      :                10 10    27 27
SVLAN Priority :               11 11    28 28
Action        : Add bundle     12 12    29 29
Confirm       ? Yes             13 13   30 30
                                14 14   31 31
                                15 15
                                16 16
<< Press ESC key to return to main menu or save system setup >>
```

**SAToP:**

```
SLOT 2  TDMoE        === Time Slot IP Assignment ===    14:16:42 01/04/2010
Please input decimal number (1-65535), BACKSPACE to edit

Port          : Trib1
Bundle ID     : 00          PO/TS TS PO/TS TS BNDL ID/UDP NUM Dest IP Address
Format        : SAToP        ===== == ===== == =============== ===============
ToS           : 000             0  0     17 17
UDP Number    : 00000           1  1     18 18
Dest IP Addr: 000.000.000.000   2  2     19 19 Cell Num Jitter Delay Jitter Size
Stratum       : 3               3  3     20 20 ======== =========== ============
Size in Bytes  : 0300           4  4     21 21
Jitter Delay  : 020             5  5     22 22
Jitter Size   : 256             6  6     23 23
VLAN          : OFF             7  7     24 24
CVLAN ID      :                 8  8     25 25
CVLAN Priority :                9  9     26 26
SVLAN ID      :                10 10     27 27
SVLAN Priority :               11 11     28 28
Action        : Add bundle     12 12     29 29
Confirm       ? Yes            13 13     30 30
                               14 14     31 31
                               15 15

<< Press ESC key to return to previous menu >>
```

**CESoPSN:**

```
SLOT 2  TDMoE        === Time Slot IP Assignment ===    13:35:36 05/27/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Port          : Trib1
Bundle ID     : 00          PO/TS TS PO/TS TS BNDL ID/UDP NUM Dest IP Address
Format        : CESoPSN      ===== == ===== == =============== ===============
ToS           : 000             0      17
UDP Number    : 00000           1      18
Dest IP Addr: 000.000.000.000   2      19   Cell Num Jitter Delay Jitter Size
Stratum       : 3               3      20   ======== =========== ============
Number of Frame: 05             4      21
Jitter Delay  : 020             5      22
Jitter Size   : 256             6      23
VLAN          : OFF             7      24
CVLAN ID      :                 8      25
CVLAN Priority :                9      26
SVLAN ID      :                10      27
SVLAN Priority :               11      28
Action        : Add bundle     12      29
Confirm       ? No             13      30
```

```
                                14      31
                                15
                                16
<< Press ESC key to return to main menu or save system setup >>
```

After configured it, press "**Y**" or "**N**" to confirm it.

```
are you sure [Y/N] ?
```

After confirming to save the configuration, the screen will be shown as below:

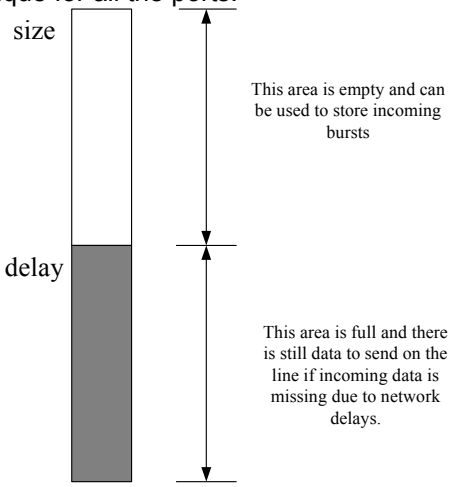
```
SLOT 2  TDMoE        === Time Slot IP Assignment ===    09:00:43 01/06/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Port         : Trib1
Bundle ID     : 00           PO/TS TS PO/TS TS BNDL ID/UDP NUM Dest IP Address
Format       : AAL1         ===== == ===== == =============== ===============
ToS          : 000           1  0  0   1 17 17    0          1 001.001.001.002
UDP Number    : 00001        1  1  1   1 18 18
Dest IP Addr: 001.001.001.002 1  2  2   1 19 19  Cell Num Jitter Delay Jitter Size
Stratum       :  3            1  3  3   1 20 20  ======== =========== ============
Cell in Bundle : 05           1  4  4   1 21 21    5         20         256
Jitter Delay   : 020           1  5  5   1 22 22
Jitter Size    : 256           1  6  6   1 23 23
VLAN         : OFF            1  7  7   1 24 24
CVLAN ID      :               1  8  8   1 25 25
CVLAN Priority :              1  9  9   1 26 26
SVLAN ID      :               1 10 10  1 27 27
SVLAN Priority :              1 11 11  1 28 28
Action       : Add bundle      1 12 12  1 29 29
Confirm      ? Yes             1 13 13  1 30 30
                               1 14 14   1 31 31
                               1 15 15
                               1 16 16
<< Press ESC key to return to main menu or save system setup >>
```

**Table 7-25 Time Slot IP Assignment**

| Field | | Setting Options | Default |
|---|---|---|---|
| Port | | Trib1~4 | Trib1 |
| Bundle ID | E1 | 0~31 | 00 |
| | T1 | 0~24 | 00 |
| Format | Unframe | AAL1, SAToP | AAL1 |
| | Frame | AAL1, CESoPSN | |
| ToS | | 0~255 | 000 |
| UDP Number | | 1~65535 | 00000 |
| Dest IP Addr. | | Setup by User | 000.000.000.000 |
| Stratum | | 1, 2, 3, 3E, 4 | 3 |
| **When Format is AAL1** | | | |
| Cell in Bundle | | 1~30 | 0005 |
| **When Format is CESoPSN** | | | |
| Number of Frame | | 1,2,3,4,6,8,12,24 | 0005 |
| **When Format is SAToP** | | | |
| Size in Bytes | | 24~1600 | 0300 |
| Jitter Delay | | 1~512 | 020 |
| Jitter size | | 1~512 | 256 |
| Vlan | | OFF, 1-Vlan, 2-Vlan | OFF |
| **When Vlan is 1-Vlan** | | | |
| CVLAN ID | | 1~4094 | 0000 |
| CVLAN Priority | | 0~7 | 0 |
| **When Vlan is 2-Vlan** | | | |
| CVLAN ID | | 1~4094 | 0000 |
| SVLAN ID | | | |
| CVLAN Priority | | 0~7 | 0 |
| SVLAN Priority | | | |
| Action | | Add Bundle, Delete All, Change | Add Bundle |

| | | |
|---|---|---|
| | Bundle, Activate All, Stop Tx Bundle | |
| Confirm | Yes, No | No |

**Note:**
1. There are 4 ports to have UDP number from 1 to 65535. If one port gets UDP number such as 100, another port cannot use the same UDP number.
2. If the user chooses “Add Bundle” option for Action, the bundle ID must be unique for the particular port. If the user chooses “Delete Bundle” option, the particular bundle must already be created. The UDP number needs to be unique for all the ports.




∗ Delay should be smaller than size. Also, the difference between size and delay should be larger than the time that it takes to reconstruct a packet (otherwise an overrun may occur when the packet arrives). Configuring the Jitter Buffer parameters correctly avoids under-run and overrun situation. Under-run occurs when the Jitter Buffer is empty (the entering rate is lower than the exiting one). In case of an under-run event, the chip transmits conditioning data instead of actual data towards the TDM interface. Overrun occurs when the jitter buffer is full and there is no room for new data to enter (the entering rate exceeds the exiting one). Under-run and overrun require special treatment from the chip HW, depending on the bundle type.

**Figure 7-2 Jitter Buffer Diagram**

## 7.4. Alarm Setup

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (M) Alarm Setup |
| ➢ **Function** | Enables users to change the Alarm for each type, and the threshold for ARP/bundle, RX-Lost/bundle, and Cell-Lost/bundle<br>• **xx/bundle:** each alarm is based on a bundle, i.e., every bundle has its own alarm<br>• **Rx-Lost/bundle:** Rx-lost means the received packet sequence number is not the same as expected sequence number.<br>• **Cell-Lost/bundle:** For AAL1, cell-lost means AAL1 cell received with wrong cell sequence number. For SAToP and CESoPSN, cell-lost means received packets that are discarded by SAToP and CESoP hardware machine.<br>• **Underrun/bundle:** Jitter buffer underrun means jitter buffer is empty.<br>• **Overrun/bundle:** Jitter buffer overrun means that jitter buffer is full and there is no room for new data to enter.<br>• **ARP/bundle:** destination doesn’t response ARP packet. So the transmitter doesn’t know the MAC address of destination.<br>• **Ethernet Link Down:** Ethernet ports on the TDMoE link down |

➢ **Alarm Setup Screen:**

```
SLOT 2  TDMoE              === Alarm Setup ===          09:24:53 01/04/2010
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

[Type]             [Alarm]    [Threshold]
ARP/bundle          DISABLE    00001
Rx-Lost/bundle      DISABLE    00001
Cell-Lost/bundle    DISABLE    00001
Underrun/bundle     DISABLE    1
Overrun/bundle      DISABLE    1
Ethernet Link Down  DISABLE




<< Press ESC key to return to previous menu >>
```

**Table 7-26 Alarm Setup**

| **Type** | **Alarm** | | **Threshold** | |
|---|---|---|---|---|
| | Setting Options | Default | Setting Options | Default |
| ARP/Bundle | Disable, Major, Critical, Minor | Disable | 1~65535 | 00001 |
| Rx-Lost/Bundle | | | | |
| Cell-Lost/Bundle | | | | |
| Underrun/Bundle | | | | |
| Overrun/Bundle | | | | |
| Ethernet Link Down | | | | |

## 7.5. Clear Alarm History

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (R) Clear Alarm History |
| ➢ **Function** | Enables users to clear alarm history |

➢ **Clear Alarm History Screen:**

To clear alarm history, press **R** from the port menu. A prompt will ask if you are sure you want to clear the alarm queue. Press **Y** for yes. The alarm queue will be cleared, and you will be returned to the port menu. This procedure is complete.

```
SLOT 2  TDMoE              === Port Menu ===          09:40:30 01/04/2010

FPGA    Version: Ver.A                          OSC Type: TCXO
Software Version: V1.01.02 05/03/2010


[DISPLAY]                              [SETUP]
1 -> 15-Min/1-Hr/7 Days Perf.Report     L -> Loopback Setup
2 -> 15-Min/1-Day Perf.Report           S -> System Setup
C -> System Configuration               T -> Time Slot IP Assignment
J -> All Time Slot Assignment           M -> Alarm Setup
H -> Time Slot IP Configuration         R -> Clear Alarm History
N -> Status & Statistics                X -> Clear Performance Data
A -> Alarm History                      W -> Firmware Upgrade


[LOG]                                 [MISC]
U -> Choose Other Slot                 Y -> Unit Load Default
F -> Log Off [SETUP],[MISC] Menu       Z -> Card Reset
O -> Log On  [SETUP],[MISC] Menu
E -> Return to Controller Main Menu

>> Clear alarm queue of SLOT 2  - are you sure ? [Y/N]
```

## 7.6. Clear Performance Data

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (X) Clear Performance Data |
| ➢ **Function** | Enables users to clear performance data |

➢ **Clear Performance Data Screen:**

To clear alarm history, press **X** from the port menu. A prompt will ask if you are sure you want to clear the performance data. Press **Y** for yes. The data will be cleared, and you will be returned to the port menu. This procedure is complete.

```
SLOT 2  TDMoE              === Port Menu ===          09:40:30 01/04/2010

FPGA    Version: Ver.A                              OSC Type: TCXO
Software Version: V1.01.02 05/03/2010


[DISPLAY]                              [SETUP]
1 -> 15-Min/1-Hr/7 Days Perf.Report     L -> Loopback Setup
2 -> 15-Min/1-Day Perf.Report           S -> System Setup
C -> System Configuration               T -> Time Slot IP Assignment
J -> All Time Slot Assignment           M -> Alarm Setup
H -> Time Slot IP Configuration         R -> Clear Alarm History
N -> Status & Statistics                X -> Clear Performance Data
A -> Alarm History                      W -> Firmware Upgrade


[LOG]                                  [MISC]
U -> Choose Other Slot                   Y -> Unit Load Default
F -> Log Off [SETUP],[MISC] Menu         Z -> Card Reset
O -> Log On  [SETUP],[MISC] Menu
E -> Return to Controller Main Menu

==> Clear performance data - are you sure [Y/N] ?
```

## 7.7. Firmware Upgrade

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (W) Firmware Upgrade |
| ➢ **Description** | There is only one selection: (A) Download Firmware. Press **A** to enter Download Firmware configuration. |

### 7.7.1. Download Firmware

| | |
|---|---|
| ➢ **Command Path** | Main Menu > (W) Firmware Upgrade > (A) Download Firmware |
| ➢ **Function** | Download Firmware allows you to select a particular firmware to do the download. |
| ➢ **Description** | There are two firmware versions (1and 2) for you to select. To confirm you TFTP server IP, type in the IP address and firmware file name, and then press **Enter**. |

➢ **Download Firmware Screen:**

```
LOOP AM3440-C          === Download Firmware ===       10:22:03 01/04/2010
ARROW KEYS: CURSOR MOVE, Please Input: nnn.nnn.nnn.nnn, BACKSPACE to edit


Bank 1 Firmware Ver. : V1.01.02 05/03/2010  (Good)
Bank 2 Firmware Ver. : V1.01.02 05/03/2010  (Good)
Working Firmware Bank: 2
TFTP Server IP       : 000.000.000.000
Firmware File Name   : ____________________




<< Press ESC key to return to previous menu >>
```

**Table 7-27 Download Firmware**

| Field | Setting Options | Default |
|---|---|---|
| TFTP Server IP | Setup by User | 000.000.000.000 |
| Firmware File Name | | Blank |

# 8. APPENDIX A: QUALITY OF SERVICE (QOS) SETUP

## 8.1. Overview

This chapter provides a more detailed explanation on Quality of Service (QoS) and Scheduling Algorithm. QoS is a control mechanism with the ability to provide different priorities to different data flows and to ensure a corresponding level of performance to each data flow.

For TDMoE card, QoS can be sorted into three types: Class of Service (CoS), Type of Service (ToS), and Fixed, these three methods are responsible for writing TDMoIP traffic from Ethernet interface to its own queues, and all will be discussed later. Scheduling Algorithm is a method that determines the transmission order of packets in the queues to the TDM interface or Tributary Port. Two types of Scheduling Algorithms are applied in TDMoE card: Strict Priority (SP) and Weighted Round Robin (WRR), both of which will be introduced later.

Generally, each interface of TDMoE card contains 4 queues, i.e. P0, P1, P2, and P3, and the order of queues is P3 > P2 > P1 > P0. So, there are 16 queues in total. The total size of the 16 queues is 1M bits.

## 8.2. Step by Step Setup Instructions

The following figure depicts the entire setup process. Noted that the whole settings are designated for ingress traffic only, the QoS (Fixed method) and Scheduling Algorithm (SP, Strict Priority) of egress traffic is fixed and cannot be changed.

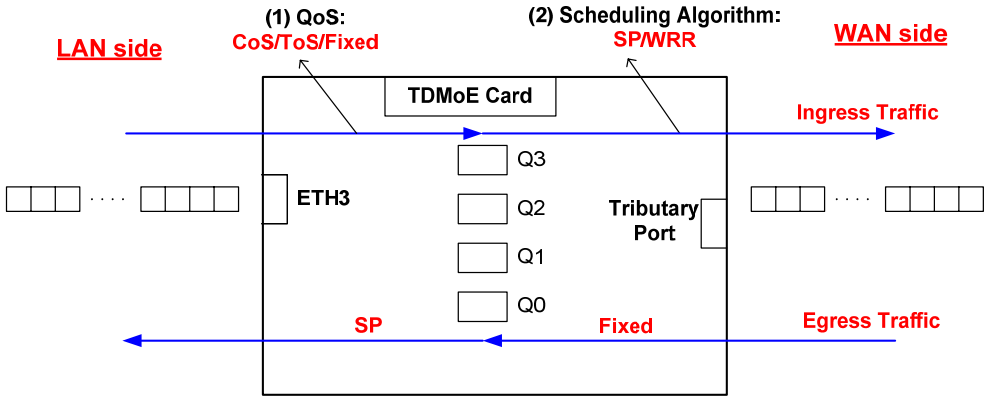



**Figure 8-1 QoS Diagram for TDMoE Card**

To fulfill the complete QoS setup of ingress traffic, two steps are required: select (1) one of the three QoS types and (2) one of the two Scheduling Algorithms. QoS is responsible for writing data from Ethernet interface to the queues of ingress traffic, whereas Scheduling Algorithm is in charge of reading data from the queues to the Tributary Port (TDM interfaces) of ingress traffic.

Noted that for the whole egress traffic data path, the QoS method of writing data from TDM interface to the queues is “Fixed” method, and the “Scheduling Algorithm” of reading data from the queues to Ethernet interfaces is “SP” – Strict Priority, and both cannot be changed.

Step by step setup instructions are interpreted below. The setup procedure explicated in this section can be referred back to the QoS Setup shown in the VT-100 terminal (Path: Main Menu > (S) System Setup > (C) QoS Setup).

### 8.2.1. QoS for Ingress Traffic – Writing Data From Ethernet Interface To Its Queues

In IP Networks, Quality of Service (QoS) serves as an essential role to guarantee the transmission quality of service of the packets in a Best-Effort environment. Real-time video and voice data, for example, require larger bandwidth and smaller transmission delay variation than e-mail service. It is assumed that the network manager can recognize applications, such as voice, video, or email traffic, and can evaluate their relative time-sensitivity or importance before the site installation. The network manager can then group the applications into classes, which determine those frames with higher priority for transmission and those which possess lower priority. QoS happens to be the technique that groups data into different priorities. In other words, applying QoS is to maintain the quality of service within IP Networks. Based on various techniques of QoS, setting procedures will become distinct. For TDMoE card, three types of QoS concerning ingress traffic are available: Fixed, CoS, and ToS, which define the way data are written from Ethernet interface to its own queues. The setup screen is shown as below.

```
SLOT 2  TDMoE          === Priority Mode Setup ===      10:40:53 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

ETH1: Fixed
ETH2: Fixed
ETH3: Fixed
ETH4: Fixed




<< Press ESC key to return to previous menu >>
```

(**VT-100 Terminal Path:** Main Menu > (S) System Setup > (C) QoS Setup > (A) Class of Service > (A) Priority Mode Setup)

For further information of Fixed, CoS, and ToS priority modes, please refer to the relevant section beneath.

#### 8.2.1.1. Fixed Priority Setup

If the “Priority Mode” of interfaces is set as “Fixed” mode, the next step is to configure the “Fixed Priority Setup”. The screen is shown as below.

```
SLOT 2  TDMoE          === Fixed Priority Setup ===     13:17:01 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

     Transmission priority
ETH1: P0
ETH2: P0
ETH3: P0
ETH4: P0



NOTE: Priority:P3 > P2 > P1 > P0







<< Press ESC key to return to previous menu >>
```

(**VT-100 Terminal Path:** Main Menu > (S) System Setup > (C) QoS Setup > (A) Class of Service > (B) Fixed Priority Setup)

**NOTE:** Transmission priority = Queue, thus P0 = Queue0, P1 = Queue1 and so on.

Configuring the priority mode of an interface as Fixed implies the relationship between LAN side interfaces and transmission priorities (its queues) are fixed. For example, if the priority mode for both ETH1 and ETH2 is Fixed and their transmission priorities are set as P1 and P0, respectively, this suggests frames entering ETH1 will be assigned to its own P1(Queue1), and ingress traffic of ETH2 will be sent to its own P0(Queue0).

One thing should be noticed. If the priority mode of ETH4 is set as CoS or ToS, for instance, and then you go on to configure its Fixed priority, the system will ignore the setting of Fixed Priority. This is because that if you set the priority mode of an interface as CoS or ToS, the next step is to perform the VLAN CoS priority setup or ToS field priority setup rather than Fixed Priority, and both CoS and ToS are introduced in succeeding sections.

#### 8.2.1.2. CoS Priority Setup

If “CoS” is selected as the “Priority Mode”, the next step is to configure the “VLAN CoS Priority Setup”. The screen is shown as below.

```
SLOT 2  TDMoE        === Vlan Cos Priority Setup ===    13:18:47 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Cos priority   Transmission priority
   0           P0
   1           P0
   2           P0
   3           P0
   4           P0
   5           P0
   6           P0
   7           P0

NOTE: Priority:P3 > P2 > P1 > P0



<< Press ESC key to return to previous menu >>
```

(**VT-100 Terminal Path:** Main Menu > (S) System Setup > (C) Qos Setup > (A) Class of Service > (C) Vlan CoS Priority Setup)

**Class of Service** (CoS) is a 3-bit field added in the MAC header when applying VLAN tagging. CoS is adopted to discriminate higher-priority traffic from lower-priority one. CoS determines the relationship between priorities of ingress Ethernet frame traffic and queues. There are 8 levels of priority values, ranging from 0 to 7, where 0 is the lowest priority and 7 the highest. By attaching priority value to frames, users are enabled to classify and place them into different queues. The screen above allows users to configure the transmission priority (= queue) for packets with different priorities.

Assumed that the priority mode for ETH3 and ETH4 are “CoS”, then both ports should apply the “VLAN CoS Priority Setup”. Moreover, ETH3 and ETH4 share common settings, rather than have their own.

#### 8.2.1.3. ToS Priority Setup

If “ToS” is selected as the “Priority Mode”, the next step is to configure the “ToS Field Priority Setup”. The screen is shown as below.

```
SLOT 2  TDMoE        === TOS field Priority Setup ===   13:28:23 12/31/2009
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Tos priority   Transmission priority
   0           P0
   1           P0
   2           P0
   3           P0
   4           P0
   5           P0
   6           P0
   7           P0

NOTE: Priority:P3 > P2 > P1 > P0



<< Press ESC key to return to previous menu >>
```

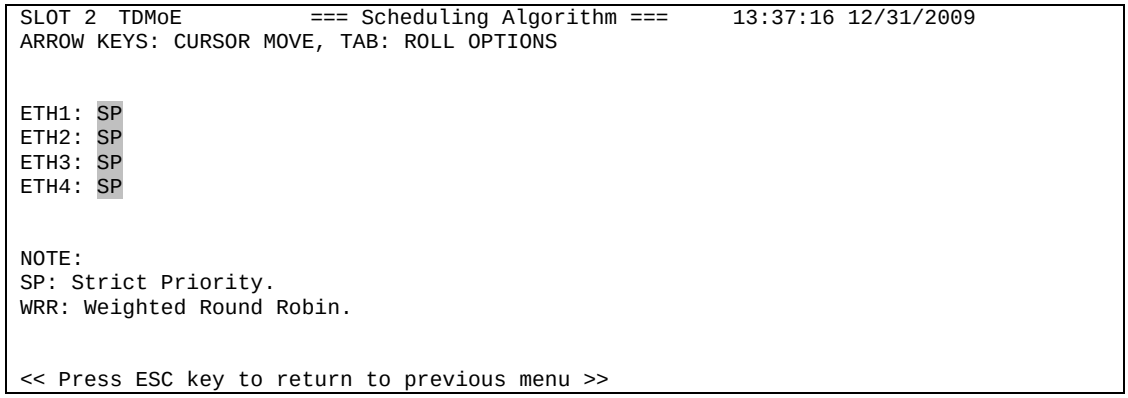
(**VT-100 Terminal Path:** Main Menu > (S) System Setup > (C) Qos Setup > (A) Class of Service > (D) ToS Field Priority Setup)

**Type of Service** (ToS) is an 8-bit field placed in the IP header to indicate how packets are treated. ToS determines the relationship between priorities of ingress IP packet traffic and queues. The 3 leftmost bits possess a priority value ranging from 0 to 7, which implies the importance of a packet. The higher the value, the more important the packet (default value = 0). By attaching priority value to packets, users are enabled to classify and place them into different queues. The screen above allows users to configure the transmission priority (= queue) for packets with different priorities.

Assumed that the priority mode for ETH1 and ETH4 are “ToS”, then both ports should apply the “ToS Field Priority Setup”. Moreover, ETH1 and ETH4 share common settings, rather than have their own.

### 8.2.2. Scheduling Algorithm for Ingress Traffic – Reading Data From Queues to TDM Interface

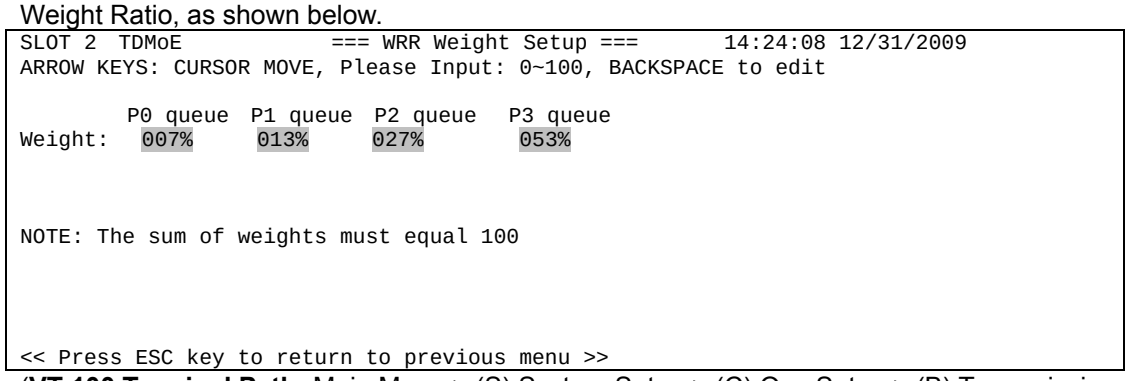
After QoS setup for ingress traffic is complete, the following process is to configure the Scheduling Algorithm for ingress traffic, which determines how packets are polled out of the queues and transmitted to TDM interfaces. If more than one of the queues for a port contains packets, then a transmission scheduling algorithm determines which queue should be transmitted first. Here, TDMoE card supports two scheduling algorithm taking charge of reading data from queues to TDM interface: Strict Priority (SP) and Weight Round Robin (WRR). The mechanisms and setup screens are shown below.




(**VT-100 Terminal Path:** Main Menu > (S) System Setup > (C) Qos Setup > (B) Transmission Scheduling > (B) Scheduling Algorithm)

**Strict Priority (SP):** When a port applies SP Algorithm, it suggests packets/frames will be delivered from queues to that port in a strict order. Whenever packets are to be forwarded, the system will transmit packets starting from the highest priority queue. For TDMoE card, each port includes 4 queues. The hierarchy of all the queues is: queue 3 is considered with highest priority, queue 2 is prior to queue 1, and Queue 0 has the lowest priority, i.e. queue3>queue 2>queue 1>queue 0. For example, queue 3, queue 2 and queue 1 all contain 4 packets. All 4 packets of queue 3 should be transmitted before any of those in queue2 or queue 1 are. Before queue 1 sends packets, all the packets in queue 2 should be delivered.

Yet, if you configure the scheduling algorithm as WRR, there is one last step to go, i.e. setup the WRR Weight Ratio, as shown below.




(**VT-100 Terminal Path:** Main Menu > (S) System Setup > (C) Qos Setup > (B) Transmission

Scheduling > (C) WRR Weight Setup)

**Weighted Round Robin (WRR)**: When a port uses the WRR algorithm, the transmission scheduling depends on the weight ratio of each queue. The port will read out data of the 4 queues in a round robin way relying on the configured Weight Ratio. Accordingly, to have WRR function successfully, users should configure the weight ratio for each queue, as the above screen shown. The queue with the higher weight will be transmitted first, and the one gets the lowest weight will be forwarded last. For example, the weight ratios of P0, P1, P2, and P3 are 7%, 13%, 27%, and 53% respectively. Hence, since P3 has the highest weight, packets in P3 will be sent first. After P3 completes the transmission, it's the turn of P2, and then P1, and finally P0. Moreover, within all the packets been forwarded in a round, 53% data come from P3, 27% from P2, 13% from P1, and 7% from P0. After one round, the port goes back to P3 and repeats the round again and again. One thing should be noticed: ports adopting WRR share common settings of Weight Ratio, rather than have their own.

# 9. Appendix B: 1 + 1 Protection between TDMoE and QE1/T1 Card

## 9.1. Overview

TDMoE card supports 1 + 1 protection function with QE1/T1 card, which is illustrated in the figure below. This chapter predominantly provides users with step by step guide for configuring 1 + 1 protection.

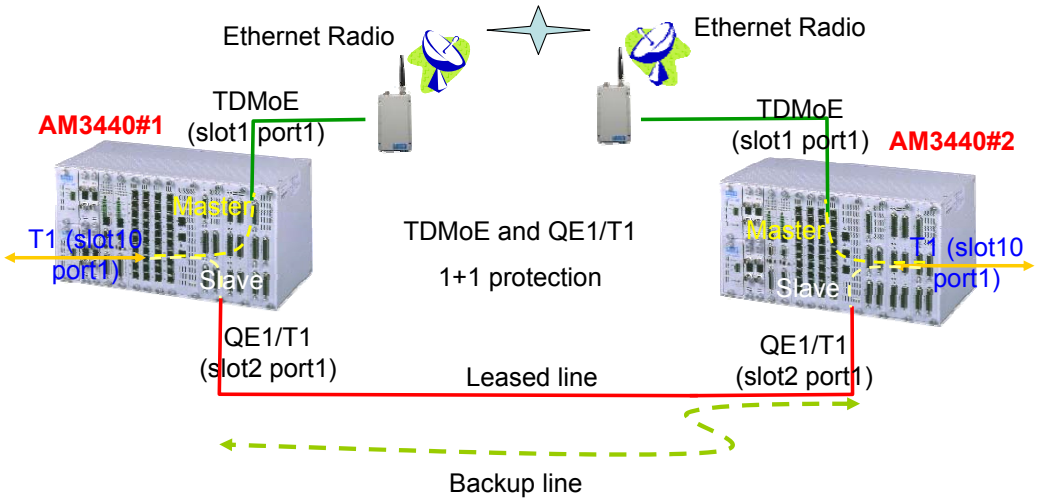



**Figure 9-1 TDMoE and QE1/T1 1 + 1 Protection**

To successfully setup 1 + 1 protection, follow the steps below in sequence:

1. Configuring TDMoE card:
   - Configure the interface mode
   - Configure the interface framing mode
   - Configure bundle IP
   - Assign timeslots to an interface
   - Configure parameters for each bundle

2. Configuring AM3440 Controller:
   - Configure QDS1 1:1 protection
   - Configure TSI map
   - Activate the TSI map
   - Configure Clock Source

For both AM3440#1 and AM3440#2, the configuration procedure is identical. In this section, the setup instructions of the **AM3440#1** are applied as an example.

**NOTE:**
When using 1+1 Protection with Quad E1/T1 card, two plug-in cards must be inserted next to each other as a pair so that one plug-in card can be used to protect the other.

For example: A pair of TDMoE and Quad E1/T1 cards should be installed in one of the following slot groupings: [1&2], [3&4], [5&6], [7&8], [9&10] or [11&12].

Each TDMoE and Quad E1/T1 card has four ports. The ports of one card protect the corresponding ports of the other card. For example, Port 1 of the protection card protects Port 1 of the other card. Similarly, Port 2 of the protection card protects Port 2 of the other card, etc.

## 9.2. Configuring TDMoE Card

To setup 1 + 1 protection, start with the TDMoE card. Five steps listed in the previous section are to be fulfilled. This section will detail each setup steps.

### 9.2.1. Step 1: Configure the Interface Mode

First of all, configure the TDMoE card mode, either E1 or T1.

- Command Path: TDMoE Main Menu > (S) System Setup > (T) Tributary Setup > (A) Tributary Mode Setup
- Mode options: E1, T1

Here, we use **T1** mode as an example.

```
SLOT 1  TDMoE          === Tributary Mode Setup ===     15:28:03 08/03/2011
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Mode: T1


<< Press ESC key to return to previous menu >>
```

### 9.2.2. Step 2: Configure the Interface Framing Mode

After setting the card mode, then go on to set up the framing mode and CAS for each of the 4 tributary ports.

- Command Path: TDMoE Main Menu > (S) System Setup > (T) Tributary Setup > (B) Tributary Setup
- Framing options for T1: T1-None, T1-T1403, T1-ESF, T1-D4
- Framing options for E1 ; E1-Unframe, E1-FAS

Users have to select the port for framing mode to be configured. Here, we choose **Trib1** as an example.

```
SLOT 1  TDMoE            === Tributary Setup ===        15:33:10 08/03/2011



Select Action >>  *Trib1  Trib2  Trib3  Trib4
```

After choosing a port, then set up its framing mode. For T1 mode, we select **T1-ESF** as an example.

```
SLOT 1  TDMoE            === Tributary Setup ===        15:34:45 08/03/2011
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Framing Mode     : T1-ESF
CAS              : Off
Remote Loss      : Continue


NOTE: Send Packet after remote unit is undetected


<< Press ESC key to return to previous menu >>
```

**NOTE:**
1. For voice application, CAS must be **ON**.
2. The framing mode and CAS need to be configured for all the 4 ports, and each port has its own settings.
3. If the Framing Mode of a port is framed, and “TSI Map Setup” in AM3440 Controller Menu ((S) System Setup > (C) TSI Map) is configured, you need to clear TSI Map (AM3440 Main Menu > (S) System Setup > (F) Clear a TSI Map) and delete bundle(s) of that port before changing settings of Framing Mode and CAS. A warning message will appear at the bottom

of the screen:

```
SLOT 1  TDMoE           === Tributary Setup ===        15:35:35 08/03/2011
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Framing Mode     : T1-ESF
CAS              : Off
Remote Loss      : Continue


NOTE: Send Packet after remote unit is undetected


Warning!! If you need to change FRAME and CAS,
          Please clear TSI MAP (MAP 1~4) of this port and delete bundle first.

<< Press ESC key to return to previous menu >>
```

### 9.2.3. Step 3: Configure Bundle IP

Once the framing mode setup is accomplished, the next step is to configure the bundle IP, including Source IP Address, Subnet Mask, and Gateway IP.

- Command Path: TDMoE Main Menu > (T) Time Slot IP Assignment > (C) Bundle IP Setup

```
SLOT 1  TDMoE           === Bundle IP Setup ===        15:36:23 08/03/2011
ARROW KEYS: CURSOR MOVE, Please Input: nnn.nnn.nnn.nnn, BACKSPACE to edit


Src. IP Address : 192.168.014.100
Subnet Mask     : 255.255.255.000
Gateway IP      : 192.168.014.254


<< Press ESC key to return to previous menu >>
```

**NOTE:** For AM3440#2, the source IP Address is configured as 192.168.014.200 as an example.

To check the Bundle IP setting, users can go to Bundle IP Display (TDMoE Main Menu > (H) Time Slot IP Configuration > (C) Bundle IP Display)).

### 9.2.4. Step 4: Assign Timeslots to an Interface

After Configuring the Bundle IP, the following step is to assign bundles to the timeslots. Each tributary interface can be assigned more than one bundles.

- Command Path: TDMoE Main Menu > (T) Time Slot IP Assignment > (B) Time Slot Assignment Setup

```
SLOT 1  TDMoE       === Time Slot Assignment Setup ===   15:40:52 08/03/2011
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Port:Trib1

TS0 : Idle           TS16: Bundle0
TS1 : Bundle0         TS17: Bundle0
TS2 : Bundle0         TS18: Bundle0
TS3 : Bundle0         TS19: Bundle0
TS4 : Bundle0         TS20: Bundle0
TS5 : Bundle0         TS21: Bundle0
TS6 : Bundle0         TS22: Bundle0
TS7 : Bundle0         TS23: Bundle0
TS8 : Bundle0         TS24: Bundle0
TS9 : Bundle0
TS10: Bundle0
```

```
TS11: Bundle0
TS12: Bundle0
TS13: Bundle0
TS14: Bundle0
TS15: Bundle0

<< Press ESC key to return to previous menu >>
```

To check the time slot assignment setting, users can go to Time Slot Assignment Display (TDMoE Main Menu > (H) Time Slot IP Configuration > (B) Time Slot Assignment Display)).

### 9.2.5. Configure Parameters for Each Bundle

After the Time Slot Assignment Setup is fulfilled, users have to configure the parameters for each bundle.

- Command Path: TDMoE Main Menu > (T) Time Slot IP Assignment > (D) Time Slot IP Assignment

Here, the destination IP Address is the IP Address of **AM3440#2**.

```
SLOT 1  TDMoE          === Time Slot IP Assignment ===     15:43:08 08/03/2011
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS

Port           : Trib1
Bundle ID      : 00          PO/TS TS PO/TS TS BNDL ID/UDP NUM Dest IP Address
Format         : AAL1        ===== == ===== == =============== ===============
ToS            : 000            0       17 17    0            1 192.168.014.200
UDP Number     : 00001        1  1  1    18 18
Dest IP Addr: 192.168.014.200 1  2  2    19 19 Cell Num Jitter Delay Jitter Size
Stratum        :  3           1  3  3    20 20 ======== =========== ============
Cell in Bundle : 05           1  4  4    21 21    5        20        256
Jitter Delay   : 64           1  5  5    22 22
Jitter Size    : 256          1  6  6    23 23
VLAN           : OFF          1  7  7    24 24
CVLAN ID       :              1  8  8
CVLAN Priority :              1  9  9
SVLAN ID       :              1 10 10
SVLAN Priority :              1 11 11
Action         : Add bundle   1 12 12
Confirm        ? Yes          1 13 13
                              1 14 14
                              1 15 15
                                16 16
<< Press ESC key to return to main menu or save system setup >>
```

**NOTE:**
1. The UDP number must be **unique** for all the bundles.
2. The Destination IP is the IP address for the remote TDMoE card to be mapped to.
3. For TDMoE card with PPM version, Stratum should always be **3**.
4. For AM3440#2, the destination IP Address is the IP Address of **AM3440#1**, i.e. 192.168.014.100.
5. The Jitter Delay setting depends on the network environment. For detailed information, please refer to Section 7.3.4 Time Slot IP Assignment.

To check the bundle settings, users can go to Time Slot IP Assignment Display (TDMoE Main Menu > (H) Time Slot IP Configuration > (D) Time Slot IP Assignment Display)).

The entire process of setting up bundle(s) is complete. Users can ascertain whether the settings are successfully configured through All Time Slot Assignment.

***All Time Slot Assignment***

- Command Path: TDMoE Main Menu > (J) All Time Slot Assignment

```
SLOT 1  TDMoE          === All Time Slot Assignment ===    15:44:20 08/03/2011
```

```
 P BID  UDP  Format  Cell Jit-Tol Jit-Buf Dest. IP Address
 = === ===== ======= ==== ======= ======= ================
 1   0     1 AAL1     5    20     256     192.168.014.200



<< ESC key to return to previous menu, SPACE bar to refresh >>
```

## 9.3. Configuring AM3440 Controller

After configuring the TDMoE card, users have to go back to the AM3440 Controller Menu to perform the following four configurations.

1. Configure QDS1 1:1 Protection
2. Configure TSI Map
3. Activate TSI Map
4. Configure Clock Source

### 9.3.1. Configure QDS1 1:1 Protection

First of all, 1+1 protection function should be enabled.

- Command Path: AM3440 Controller Menu > (S) System Setup > (Q) QDS1 1:1 Protection

The QDS1 Protection screen will appear. Choose Setup. The Setup menu is to setup the protection modes for each protection pair and ports.

```
LOOP AM3440-A          === QDS1 1:1 Protection ===      15:46:05 08/03/2011



>> Select ? *Setup     Status
```

On the Setup Screen, there are four selections for the user to setup such as disable, line-nonrevertive, line-revertive, 1+1 nonrevertive, and 1+1 revertive. To perform the 1+1 protection, select 1+1 nonrevertive or 1+1 revertive. The sample below is to setup the port 1 of slot 1: 2 as 1+1 revertive protection.

```
LOOP AM3440-A          === QDS1 1:1 Protection ===      15:46:07 08/03/2011
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
Protect Pair(Master:Backup)    Port 1      Port 2      Port 3      Port 4
=========================== ===========  ===========  ===========  ===========
Slot A :B  (     :     )    -----------  -----------  -----------  -----------
Slot C :D  ( RTR : RTR )    -----------  -----------  -----------  -----------
Slot 1 :2  ( TDMOE:QuadT1)   1+1REV      DISABLE      DISABLE      DISABLE
Slot 3 :4  (     : DTE-A)   -----------  -----------  -----------  -----------
Slot 5 :6  (     :     )    -----------  -----------  -----------  -----------
Slot 7 :8  (X.50 :     )    -----------  -----------  -----------  -----------
Slot 9 :10 (     :QuadT1)    -----------  -----------  -----------  -----------
Slot 11:12 (     :     )    -----------  -----------  -----------  -----------

Protection Working Port       Port 1      Port 2      Port 3      Port 4
Slot A :B  (     :     )
Slot C :D  ( RTR : RTR )
Slot 1 :2  ( TDMOE:QuadT1)    1 -1
Slot 3 :4  (     : DTE-A)
Slot 5 :6  (     :     )
Slot 7 :8  (X.50 :     )
Slot 9 :10 (     :QuadT1)
Slot 11:12 (     :     )
<< Press ESC key to return to previous menu >>
```

**NOTE:**
1. **1+1 revertive:** When the master line recovers, the working line will automatically switch from the backup line back to the master one. The switching time is user configurable

(Command Path: TDMoE Main Menu > (S) System Setup > (A) Miscellaneous Setup).

2. **1+1 nonrevertive:** After the working line switches from master to backup, it will not shift back to the master even though the master line has recovered.

### 9.3.2. Configure TSI Map

After activating the 1+1 protection, users need to set the cross-connect map.

- Command Path: AM3440 Controller Menu > (S) System Setup > (C) TSI Map Setup.

```
LOOP AM3440-A             === System Setup (MAP) ===       15:48:10 08/03/2011
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
MAP NO: MAP_1
            Target     Quad-T1 NON-CAS          Source     TDMoE   NON-CAS
Target      PO/TS D SL/PO TS PO/TS D SL/PO TS  PO/TS D SL/PO TS PO/TS D SL/PO TS
Slot  : 10  ===== ========== ===== ==========  ===== ========== ===== ==========
Port  : P1   1  1 d  2  1  1  1 17 d  2  1 17   1  1 d  1  1  1  1 17 d  1  1 17
T.S.  : 01   1  2 d  2  1  2  1 18 d  2  1 18   1  2 d  1  1  2  1 18 d  1  1 18
             1  3 d  2  1  3  1 19 d  2  1 19   1  3 d  1  1  3  1 19 d  1  1 19
             1  4 d  2  1  4  1 20 d  2  1 20   1  4 d  1  1  4  1 20 d  1  1 20
T.S.# : 24   1  5 d  2  1  5  1 21 d  2  1 21   1  5 d  1  1  5  1 21 d  1  1 21
Clear : No   1  6 d  2  1  6  1 22 d  2  1 22   1  6 d  1  1  6  1 22 d  1  1 22
d/v   : d    1  7 d  2  1  7  1 23 d  2  1 23   1  7 d  1  1  7  1 23 d  1  1 23
             1  8 d  2  1  8  1 24 d  2  1 24   1  8 d  1  1  8  1 24 d  1  1 24
             1  9 d  2  1  9                    1  9 d  1  1  9
Source       1 10 d  2  1 10                    1 10 d  1  1 10
Slot  :  1   1 11 d  2  1 11                    1 11 d  1  1 11
Port  : P1   1 12 d  2  1 12                    1 12 d  1  1 12
T.S.  : 01   1 13 d  2  1 13                    1 13 d  1  1 13
             1 14 d  2  1 14                    1 14 d  1  1 14
Confirm?Yes  1 15 d  2  1 15                    1 15 d  1  1 15
             1 16 d  2  1 16                    1 16 d  1  1 16

 << Press ESC to return to Controller Setup menu, then Press D to active >>
```

### 9.3.3. Activate TSI Map

After configuring the TSI MAP, the next step is to activate the TSI MAP.

- Command Path: AM3440 Controller Menu > (S) System Setup > (D) Select a New TSI MAP

Select the MAP that is configured, and Press **ESC**. A prompt will ask if you are sure.

```
 LOOP AM3440-A         === System Setup (New map) ===    15:50:03 08/03/2011
 ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS


                       Last activated TSI Map: MAP_1

                       Change to TSI Map    : MAP_1

        (This item will be ignored if anyone of the following is enabled.)


                     [TSI Map]   switch   start hr/min
                       Map1    DISABLE   00:00
                       Map2    DISABLE   00:00
                       Map3    DISABLE   00:00
                       Map4    DISABLE   00:00



 << Press ESC to return to previous menu >>
```

**NOTE:** To make sure whether the MAP is activated, users can check the Current TSI MAP from the System Main Menu.

- Command Path: AM3440 Controller Menu > (C) System Configuration > (D) Current TSI MAP

```
LOOP AM3440-A     === System Configuration (Current Map) ==15:51:10 08/03/2011
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS
Current Map

Slot Number: 1   TDMoE       PO/TS D SL/PO TS   PO/TS D SL/PO TS
Port Number:P1   NON-CAS     ===== ==========   ===== ==========
                             1  1 d  2  1  1    1 17 d  2  1 17
                             1  2 d  2  1  2    1 18 d  2  1 18
                             1  3 d  2  1  3    1 19 d  2  1 19
                             1  4 d  2  1  4    1 20 d  2  1 20
                             1  5 d  2  1  5    1 21 d  2  1 21
                             1  6 d  2  1  6    1 22 d  2  1 22
                             1  7 d  2  1  7    1 23 d  2  1 23
                             1  8 d  2  1  8    1 24 d  2  1 24
                             1  9 d  2  1  9
                             1 10 d  2  1 10
                             1 11 d  2  1 11
                             1 12 d  2  1 12
                             1 13 d  2  1 13
                             1 14 d  2  1 14
                             1 15 d  2  1 15
                            1 16 d  2  1 16

<< Press ESC to return to previous menu >>
```

### 9.3.4. Configure Clock Source

After activating the TSI Map, the last step is to setup the clock source.

- Command Path: AM3440 Controller Menu > (S) System Setup > (K) Clock Source Setup

For AM3440#1, the Master/Second clock source is **INTERNAL**.

```
LOOP AM3440-A      === System Setup (CLOCK-Normal Mode) ===14:14:07 09/09/2008
ARROW KEYS: CURSOR MOVE, TAB: ROLL OPTIONS


Master_Clk Source : INTERNAL            Clock Hold-Over: ON
Second_Clk Source : INTERNAL
Current Clock     : MASTER_CLK
Clk_Recover_Mode  : AUTOMATIC
Clock Status      : NORMAL
Ext. Clock Type   : E1(75ohm)
Dual External Clock Protection : Disable




<< Press ESC key to return to previous menu >>
```

**NOTE:** For AM3440#2, the clock source is bundle clock. Hence, the Master clock source will be **SLOT_1 P1**, and Second clock source is **SLOT_2 P1**.

After the entire process of setting up 1+1 protection for both AM3440#1 and AM3440#2 are complete, users can ascertain whether the settings are successfully configured by checking the bundle status. If the bundle status is active, then the configuration is accomplished.

***Bundle Status***

- Command Path: TDMoE Main Menu > (N) Status & Statistics > (D) Bundle Status

```
SLOT 1  TDMoE             === Bundle Status ===                  15:44:46 08/03/2011

 P BID  status
 = ===  ========
 1  0   active




<< ESC key to return to previous menu, SPACE bar to refresh >>
```