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Configuring the GW6000 Service Managed Gateway

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1 Introduction

High-speed packet (IP, VPN, ATM…) based networks are the latest innovation in the world of communications. The capacity of these networks is increasing rapidly, fuelled by the popularity of the Internet and decreasing costs associated with the technology.

Worldwide data traffic volume has already surpassed that of the telephone network, and for many applications, the price of IP traffic has dropped below the traffics associated with traditional TDM services. Consequently, significant effort is being expended on VoIP technologies. Inherent revolutionary change in all forms of VoIP is where much of the existing telephony infrastructure will be replaced by new IP-based mechanisms. Despite the hype, this effort has been more protracted and less successful than initially expected.

Today's telephony technology is extremely complex, both those portions that VoIP aims to replace and those to which VoIP must interface. Revolutionary implementations of its hundreds of features and thousands of variations cannot be expected to be developed in a short time frame.

There is, however, an alternative method of exploiting IP networks for telephony service that is evolutionary rather than revolutionary. This method uses IP networks as a drop-in replacement for native TDM networks. It seamlessly interfaces to all existing equipment, such as legacy PBXs and switches, and inherently provides all the hundreds of telephony features and the PSTN quality to which customers have become accustomed. This alternative is circuit extension over IP using GL6510.

1.1 The CESoPSN concept

The increase in access and edge network transport is forcing service providers to consider other cost effective transport mechanisms. Circuit switched transport mechanisms, T1/E1 and SDH/SONET have been the core of the voice network. With the evolution of ubiquitous packet networks, efforts are being made to transport voice over the packet switched network.

Circuit Emulation Services over Packet Switched Networks (CESoPSN) transport digital trunks such as T1/E1 and SDH/SONET circuits over packet networks such as IP or ATM. There are challenges in realizing virtual circuits over packet networks, with interfaces satisfying the same performance characteristics as the circuit switched networks.

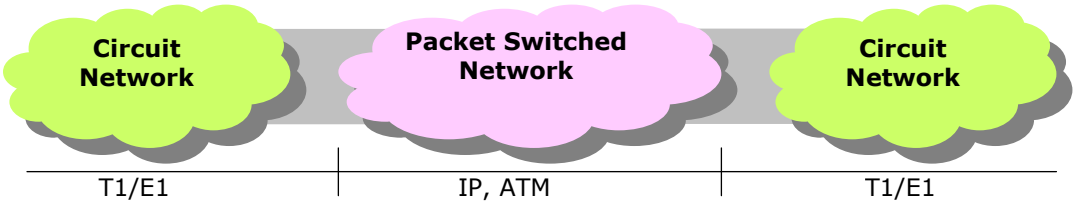


Figure 1: Concept of CESoPSN

1.2 System features

Physical		Description
Dimension		GL6510-P4 440(W) x 43.6(H) x 246(D) mm 19 inch rack mountable (1U) GL6510-P1 280(W) x 43.6(H) x 208(D) mm
Power		GL6510-P4 AC for 100 ~ 240VAC DC for –40 to –60VDC Hot-swappable and load sharing dual redundancy (optional) GL6510-P1 AC for 100 ~ 240VAC
Interfaces		Ethernet RJ-45 UTP Cat.5/5e, max length is up to 100m Multi mode 1310nm SFP, max length is up to 2Km Single mode 1310nm SFP, max length is up to 10Km SFP(Small Form Factor Pluggable) GL6510-P4 4xT1/E1, 2xEtherent, 1xManagement 2 x 100Base-Fx extention (optional) External clock input GL6510-P1 1xT1/E1, 6xEtherent 1 x 100Base-Fx extention (optional) External clock input
Operating environment		Ethernet RJ-45 UTP Cat.5/5e, max length is up to 100m Multi mode 1310nm SFP, max length is up to 2Km Single mode 1310nm SFP, max length is up to 10Km SFP(Small Form Factor Pluggable) GL6510-P4 4xT1/E1, 2xEtherent, 1xManagement 2 x 100Base-Fx extention(optional) External clock input GL6510-P1 1xT1/E1, 6xEtherent 1 x 100Base-Fx extention (optional) External clock input Temperature: 0~50ºC/32-122ºF Humidity: Non condensing 5~95%
Ethernet	**Auto negotiation**	10/100 link detect automatically 100Base-Fx: Only 100Mbps, full duplex mode

	Flow control	IEEE802.3x in full duplex mode Back pressure in half duplex mode
	Auto MDI-X	Supported on only Auto negotiation mode.
	Connector	Balanced (120 Ω): RJ-48c (8pin) Unbalanced (75Ω): Balun (RJ-48c to BNC, Optional)
	Line interface	ITU-T G.703
E1	**Line impedance**	Balanced 120Ω Unbalanced 75Ω
	Framing mode	Unframed (default) Frame
	Framing	CRC4 MF (both CAS and CCS)
	Line coding	HDB3 (default) AMI
	Line rate	2.048Mbps (± 50ppm)
	Jitter/wander performance	ITU-T G.823
T1	**Line interface**	ITU-T G.703 ANSI T1.102 T1.403 AT&T TR62411 ETSI 300-011
	Line impedance	Balanced 100 Ω
	Framing mode	Unframed (default) Frame
	Framing	ESF (default) SF SLC96 T1-DM Japanese TTC JT-G704
	Line coding	B8ZS(default) AMI
	Line rate	1.544Mbps (± 32ppm)
	Jitter/wander performance	AT&T TR-62411 ITU-T G.824
	Connector	DB-9 type
Alarm	**Signal**	Major alarm Minor alarm Remote alarm clear *Only supported in GL6510-P4

Common	Description
Multi-protocol encapsulation	IP/UDP/RTP-PW (IPv4 only) MPLS/MEF-PW Compliant with: Latest IETF PWE3 MPLS forum MEF circuit emulation standards PWE3- Pseudo Wired Emulation End to End(Based on IETF) MEF- Metro Ethernet Forum(Based on MEF2.0)
End-to-end delay	0.625ms + network delay
Packet size	Max. 1522 Bytes with VLAN tag
Clock mode	Loopback Internal External Adaptive Differential(in-band)

System	Description
Syslog(remote/local log)	256 log messages 1024 backup messages
NTP	RFC 1305
Access host	Max. 10 entries

System management	Description
Console	Local console port: RS-232
Telnet	Max. 4 sessions
SNMP agent	SNMP v1/v2c
HTTP Web GUI	Web-based management
Image upgrade	Image upgrade via FTP/TFTP interface

Standard conformation	Description
SNMP	IEEE 802.1Q VLAN tagging IEEE 802.1p priority IEEE 802.3x flow control IEEE 802.3/802.3u RFC 1157 (SNMP v1/v2c) RFC 1643 (Ethernet-like MIB) RFC 1213 (MIB-II) RFC 2819 (RMON Group 1,2,3,9) RFC 791 (IP) RFC 792(ICMP) RFC 826 (ARP)

E1	ITU-T Rec
	G.703
	G.704
	G.706
	G.711
	G.732
	G.755
	G.796
	G.823
	I.431
T1	AT&T
	TR62411
	ITU-T Rec.
	G.703
	G.704
	G.802
	G.824
	ANSI
	T1.403
	Telcordia
	GR-303-CORE
	TTC
	JT-G703
	JT-G704

Table 1: System features

1.3 System appearance

1.3.1 Front panel description

1.3.1.1 System LEDs

The GL6510' system LED shows the status of system power, fan operating and that the system is functioning properly. Section 1.4.1 LED indicators, describes the LED colors and their meanings.

1.3.1.2 : Console port

You can connect the system to a PC via console port, An RJ-45 to DB-9 female DTE adapter cable is provided to connect the system.

Console port pinout(GL6510)		**Serial port pinout(PC)**	
1	Reserved	1	NC (Not connected)
2	Reserved	2	TXD
3	TXD (from GL6510)	3	RXD
4	GND	4	Reserved
5	GND	5	GND

6	RXD (to GL6510)	6	Reserved
7	Reserved	7	Reserved
8	Reserved	8	Reserved
		9	NC

Table 2: Console port pinout

TDM port LEDs (for GL6510-P1)

The GL6510-P1 has 2 Sync and one Alarm LEDs indicating the TDM port status.

Uplink ports LEDs (for GL6510-P1)

The GL6510-P1 has 2 LINK and 2 ACT LEDs indicating the uplink port status.

LAN ports LEDs(for GL6510-P1)

The GL6510-P1 has 4 LINK and 4 ACT LEDs indicating the LAN port status.

Power slot (for GL6510-P4)

The system is powered by an internal power supply. The single AC power supply is provided as default. For redundancy purposes, an additional AC or DC power supply can be inserted as optional. In the event that dual power equipped, load sharing and hot swapping functions are supported between them.

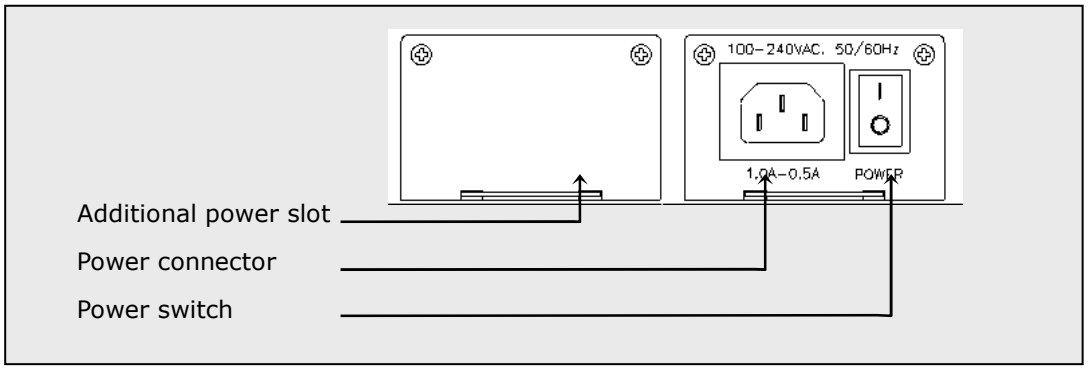


Figure 5: Power slot for GL6510-P4

TDM ports and LEDs (for GL6510-P4)

The GL6510-P4's TDM ports are numbered from 1 to 4 in front of the system body. The TDM interfaces are connected to a circuit-switching network. You can monitor the port status through the LEDs.

RJ-48c connector's pinout of T1/E1 is shown below:

RJ-48c Connector pinout

1	Tx Ring
2	Tx Tip
3	FGND
4	Rx Ring
5	Rx Tip
6	FGND
7	Not Used

8	Not Used

Table 3: TDM ports and LEDs (for GL6510-P4)

External clock (for GL6510-P4)

The external clock port can only receive a clock from an external source. When a TDM clock is external or in differential mode, an external clock must be connected to this port.

Uplink ports and LEDs (for GL6510-P4)

The GL6510-P4 has 2 uplink ports that connect to the PSN(Packet Switched Network) to exchange encapsulated TDM data. For a 100Base-Fx connection insert the relevent option module to uplink the interface. As factory default, 10/100Base-Tx ports are supplied as uplink interfaces. To use 100Base-Fx change the configuration. See section 6: Configuring the Ethernet Port.

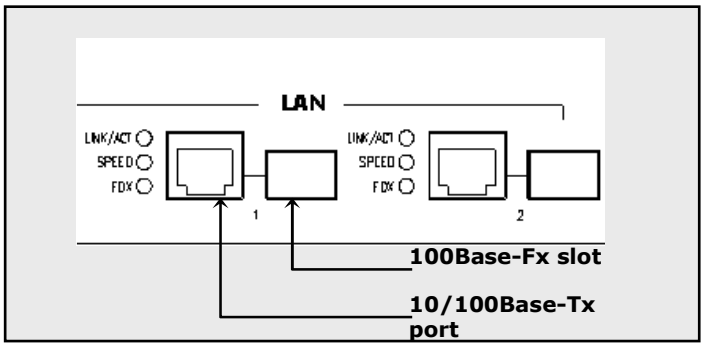


Figure 6: 10/100Base-Tx or 100Base-Fx are used exclusively

RJ-45 connector pinout

1	TX+
2	TX-
3	RX+
4	Not used
5	Not used
6	RX-
7	Not used
8	Not used

Table 4: RJ-45 connector pinout

Alternative option slot

SFP type	100Base-Fx- multi mode 1310nm, 2Km 100Base-Fx- 62.5/125µm single mode 1310nm, 10Km

Table 5: Alternative option slot

Only 10/100Base-Tx RJ-45 module(s) are supplied. 100Base-Fx module(s) are not supplied.

Management ports (for GL6510-P4)

GL6510-P4 is managed remotely using 'Management port'via telnet or WEB GUI.

1.3.2 Rear panel description

LAN ports (for GL6510-P1)

The GL6510-P1 has four LAN ports for using an Ethernet network.

Uplink ports (for GL6510-P1)

The GL6510-P1 has two uplink ports for PSN. LAN data (from LAN ports) and encapsulated TDM data (from TDM ports) are converged into PSN through the uplink port.

Optional uplink 100Base-Fx extension (for GL6510-P1)

The GL6510-P1 has two uplink ports for connecting to a PSN(Packet Switched Network) to exchange encapsulated TDM data. For a 100Base-Fx connection, insert the relevent option module into the Uplink2 Interface to only uplink two interfaces.

As factory default, 10/100Base-Tx ports are supplied as uplink interfaces. To use 100Base-Fx, change the configuration. See section 6: Configuring the Ethernet Port.

TDM ports (for GL6510-P1)

The GL6510-P1's TDM ports are numbered from 1 to 4 in front of the system body. The TDM interfaces are connected to a circuit-switching network. You can monitor the port status through the LEDs.

RJ-48c connector's pinout of T1/E1 is shown below:

RJ-48c Connector Pinout

1	Tx Ring
2	Tx Tip
3	FGND
4	Rx Ring
5	Rx Tip
6	FGND
7	Not Used
8	Not Used

Table 6: RJ-48 connector pinout

External clock port (for GL6510-P1)

The external clock port can only receive a clock from an external source. When a TDM clock is external or in differential mode, this external clock port is mandated over others. An external clock must be connected to this port.

Power connector & switch (for GL6510-P1)

The device is powered by an internal power supply. Only a single AC power supply can be used as there is no redundant power supply.

Alarm Port (Dry contact, for GL6510-P4 only)

The GL6510-P4 has alarm ports in the real panel of the system to connect to the Central Alarm Monitoring System (CAMS). In this case, a DB9 cable is required between the CAMS and the device.

Alarm DB-9 Connector pinout

1	Discrete	Line input
2	Discrete	Line input
3	Major alarm	Common contact
4	Major alarm	Normally open
5	Minor alarm	Common contact
6	Discrete	Line input
7	Discrete	Line input
8	GND	-
9	Minor alarm	Normally open

Table 7: Alarm DB-9 Connector pinout

When a major alarm occurs, the relay between pin 3 and 4 is closed. When a minor alarm occurs, the relay between pin 5 and 9 is closed.

The following alarm features are not implemented in software version 1.0

- Major alarm displays
- LoS/LoF
- AIS
- RAI
- Minor alarm displays
- LAN link down
- LAN link up

1.4 LED indicators

The unit's LEDs are used to monitor system activity and its status. The tables below explain the LED colours and their meanings.

1.4.1 System LEDs

LED	Colour	Description
Power	Off	System is not powered.
	Green	System is powered on.
RUN	Off	System is receiving power but is not functioning properly.
	Green	System is operating normally.
FAN	Off	System fans are operating normally.
	Red	Shows a fan failure

Table 8: System LEDs

1.4.2 Management port LEDs (Only GL6510-P4)

LED	Colour	Description
LINK/ACT	Off	No link.
	Solid Green	Link OK.
	Blinking Green	Activity. Packet being transferred on management port.
SPEED	Off	Link on 10Mbps speed.
	Orange	Link on 100Mbps speed.
FDX	Off	Link on half duplex mode.
	Orange	Link on full duplex mode.

Table 9: Management port LEDs (Only GL6510-P4)

1.4.3 LAN LEDs

LED	Colour	Description
LINK	Off	No link.
	Green	Link O.K.
ACT	Off	Link on 10Mbps speed.
	Blinking orange	Activity. Frame being transferred.

Table 10: LAN LEDs GL6510-P1

LED	Colour	Description
LINK/ACT	Off	No link.
	Solid Green	Link O.K.
	Blinking Green	Activity. Frame being transferred.
SPEED	Off	Link on 10Mbps speed.
	Orange	Link on 100Mbps speed.
FDX	Off	Link on half duplex mode.
	Orange	Link on full duplex mode.

Table 11: LAN LEDs GL6510-P4

1.4.4 T1/E1 LEDs

LED	Colour	Description
SYNC	Off	TDM port can't be synchronised cause of LoS/LoF detection.
	Green	Port synchronised.
ALARM	Off	No alarm is detected.
	Red	Alarm (eg. LoS/LoF) is detected.

Table 12: T1/E1 LEDs GL6510-P1

ALARM: The alarm LED is mounted in the front panel of GL6510-P1.

Loosing the synchronisation or frame turns the alarm LED red and it remains on red until the fault is cleared by the administrator.

The alarm LED represents the status of all TDM ports so the administrator can't detect where the alarm has originated.

SYNC: If at least one TDM port has clock synchronisation, the SYNC LED turns green

LED	Colour	Description
SYNC	Off	TDM port cannot be synchronised, cause of LoS (Loss of Signal)/LoF (Loss of Frame) detection.
	Green	Port synchronised.

Table 13: T1/E1 TDMGW4/8

The GL6510-P4 has no alarm LEDs, but an alarm port (dry contact) is mounted in the rear of the system.

2 Installing the GL6510

2.1 Checking the items before installing

The GL6510-P1 stands by itself on a flat table but the GL6510-P4 is stacked in a 19 inch rack. Ensure an optimal environment for installing the system, such as the correct power requirement, enough physical space, and easy access to other network devices.

Please read and follow the points below when installing the GL6510 for a safe and comfortable user environment.

Power connection

AC Input voltage AC100-240V, Input frequency is 50~60Hz

DC Input voltage DC –40 ~ –60V

Power consumption is 30Watts maximum.

The power supply is regulated automatically by the input voltage.

Do not overload the power line.

System Location

Check the parts and relevant tools before installing the system on to the rack.

Put the system in a cool and dry area.

Ensure there is at least 10cm of space of between the wall surface and the system, for good ventilation.

Avoid direct light, electrical interferences, and high temperatures.

Put the system in an area where the cables can be connected easily.

Take precautions against electric shock.

After connecting the power to the system, do not touch the system while wearing metallic accessories.

Do not touch the main board, the components of the option board and the pins of the connector.

Use the anti-electric shock package to keep the system and components in.

Keep the option board facing up after removing it from the system.

2.2 Installing the system to the rack

Use the bracket and screws provided with the system.

Attach the bracket to the each side of the GL6510-P4 using a screw driver.

Align the bracket hole and the rack hole and set the GL6510-P14 into the rack.

Fix the bracket to the rack with the screws provided.

3 System Management

3.1 Using the console port

The GL6510 provides a console port for system management. The console port controls the GL6510 through serial communication. An emulator such as 'hyper terminal' is necessary for serial communication with a console port.

Connect one end of the RS-232 cable to the serial port of the terminal and the other end of the cable to the CONSOLE port on the front side of the GL6510.

Set up the serial communication emulator in the same way.

Parameters	Value
Baud Rate	9600bps
Data Bit	8 bit
Stop Bit	1 bit
Parity Bit	None
Flow Control	Off

Table 14: Default console port parameter values

The console cable is a straight cable type, with an RJ-45 at one end and a DB-9 connector at the other.

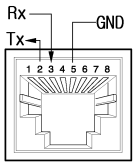


Figure 15: Console jack (to GL6510)

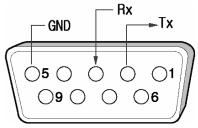


Figure 16: Serial jack (to PC)

Console side	Serial side	Description
1	8	Reserved
2	6	Reserved
3	2	TxD (From GW6000)
4	5	GND
5	5	GND
6	3	RxD (To GW6000)
7	4	Reserved
8	7	Reserved

Table 15: Console Cable Pinouts

3.2 Management via Telenet

The GL6510 provides a remote management system using the CLI via telnet. You can control the GL6510 remotely if you set up a telnet communication between a remote host and the GL6510's management port (Ethernet) via a network interface.

First enter an IP address of the same subnet group as the host via the console, and then connect the Ethernet port of the system to the remote host using a UTP cable. The Telnet interface configuration and functionality is the same as the console management interface. Up to four Telnet sessions can be established simultaneously.

3.3 Management via the web

The GL6510 provides web management. You can manage the GL6510 via a web browser (Internet Explorer or Netscape) after entering a system IP address in the same way using Telnet and then connecting to the Ethernet port of the remote host using a UTP cable.

3.4 Management via SNMP

You can manage the GL6510 via the SNMP manager (NMS) if you enter the IP address of the SNMP manager (NMS) as an IP Trap manager (the IP address of the SNMP Manager) via the CLI. SNMP allows you to manage the system such as monitoring statistics for counters on the remote network station and setting the configurable parameters.

4 Command line interface: CLI

4.1 Booting the GL6510

4.1.1 Initial screen

The example below shows the initial screen that appears when booting the GL6510 system for the first time. After the booting sequence is finished completely, the system issues a prompt to log in.

```
GW6000 Boot v1.0 (60 MHz)

DRAM  : 64 MB
FLASH : 32 MB
Hit 'ESC' key to stop autoboot:  0
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>e
th0: FEC ENET Ver0

Uncompressing image...
>>>>>>>>>>>>>>>>>>>>>>>>>>


        ####### ######  #     #          #####  #     #
           #    #     # ##   ##         #     # #  #  #
           #    #     # # # # #         #       #  #  #
           #    #     # #  #  #  #####  #  #### #  #  #
           #    #     # #     #         #     # #  #  #
           #    #     # #     #         #     # #  #  #
           #    ######  #     #          #####   ## ##

GW6000 login: root

   Welcome to TDM Gateway.

GW6000#
```

Figure 16: Initial screen

4.1.2 Boot mode

Boot mode provides an additional function, a simple hardware test and recovery function that the OS image and the file system image from the Flash memory when they crash.

Boot supports both a user mode and an administrator mode. User mode allows all basic commands. Administrator mode is for all basic commands and also the programmer's debugging command. To use all other functions, select user mode.

Figure 17 shows the initial screen that appears when booting the GL6510 system for the first time. Press ESC before booting automatically, to allow the system to enter boot mode.

```
GW6000 Boot v1.0

DRAM  : 64 MB
FLASH : 32 MB
Hit 'ESC' key to stop autoboot: 1   ► Enter 'ESC' Key on this
prompt

=> printenv
bootcmd=setenv bootargs root=/dev/ram; bootm f0080000 f0180000
bootdelay=3
baudrate=9600
loads_echo=1
gatewayip=10.20.254.101
netmask=255.255.0.0
clocks_in_mhz=1
kill=erase f0080000 f0ffffff;erase f1000000 f1ffffff
go=tftpboot 1000000 tdmgw.kernel;cp 1000000 f0080000
3ffff;tftpboot 1100000 tdmf
burn=run kill;run go
me=tftpboot 300000 tdmgw.kernel;tftpboot 1300000
tdmgw.ramdisk;bootm 300000 1300
ethaddr=00:e0:22:33:11:22
bootargs=root=/dev/ramdisk
filesize=a10ef
ipaddr=10.20.250.100
serverip=10.20.1.67
stdin=serial
stdout=serial
stderr=serial

Environment size: 587/262140 bytes
=>
```

Figure 17: Initial screen that appears when booting the GL6510 system for the first time

4.1.3 User mode

Command	Description
bdinfo	Displays the board information
bootm	Loads the boot images
help	Displays the command list
printenv	Displays the environmental parameters of boot
boot	Reboots the board

Table 18: User mode commands and descriptions

```
=> setenv ipaddr 10.20.77.88
=> setenv server 10.20.1.1
=> saveenv
Saving Environment to Flash...
Un-Protected 1 sectors
Erasing Flash...
.
Done
OK
Writing to Flash... done
Protected 1 sectors
```

Figure 18: Screen showing user mode

4.1.4 Structure of commands

CONFIG mode consists of system setting commands.

Use the # key for CONFIG mode.

Operation + Function + Destination or Index + Feature or Parameters + Value or mode (type).

Command	Description
Operation	Displays target information. For example, commands such as `show` and `set`.
Function	System functions such as ces-tdm, snmp
Destination or index	Port number or index. For example, `eth port 1` or `ces-context 1`.
Feature or parameters	Detailed features or parameters. For example, `eth port 1 port flow-control` or `ces-context 1 jitter buffer 1000`.
Value or type	Detailed features or parameters. For example, `eth port 1 port flow-control` on or `ces-context 1 jitter buffer 1000`.

Table 19: Description of commands

4.2 CLI key conventions

GL6510's CLI provides key conventions such as command completion, command abbreviation, and context sensitive online help using the "?" key.

4.2.1 Command completion

Use the <TAB> key for the command completion function.

Enter the first characters of the command and press < TAB>. The entered command is completed automatically without having to type the remaining part of the command.

If it is not possible to distinguish between several commands using just one or two characters, press <TAB> twice to display all related commands.

For example, if you type 'sh' and press <TAB>, 'show' is displayed. If you type 's' and press <TAB> twice, 'save', 'set' and 'show' are displayed.

```
GW6000#s<TAB><TAB>
save  set   show

GW6000#sh<TAB>
GW6000#show
```

Figure 18: Example of CLI key conventions

4.2.2 Command abbreviation

The command abbreviation function recognises the minimum characters to distinguish one command from another command.

For example, the command beginning with the character 's' are 'show', 'snmp', and 'system'. Therefore, the abbreviated command of 'show' is 'sh', 'set' is 'se' and 'save' is 'sa'.

4.2.3 Context sensitive online help

Use the '?' key to get help anywhere on the screen.

If you type '?' at the beginning of the command line ('?' does not display on the screen), the first word of the command and simple description are displayed.

If you type '?' after typing 's', all commands beginning with 's' such as 'save', 'show' and 'set' and their descriptions are displayed.

If you type '?' after the space of the completed command or abbreviated command, the descriptions of the next command are displayed. For example, if you type '?' after 'sh [space]', all the possible commands that can be combined with 'show' and their descriptions are displayed.

```
GW6000# se?
set  Configure running system information
GW6000# se[space] ?
access-host  Configure access-host list
alarm-led    Manage alarm LED messages
ces-context  Configure CES Context related parameters
ces-psn      Configure CES PSN related parameters
ces-tdm      Show CES TDM related running configuration
diag         Configure system diagnostics
eth          Configure Ethernet
log          Configure system log related parameters
ntp          Configure NTP related parameters
profile      Manage profiles
qos          Qos Setup
snmp         Configure SNMP related parameters
```

```
  swconf        manage switch configuration file
  system        Configure system related parameters
    user          Define user information
```

Figure 19: Example of command combinations

<cr> is displayed when all commands match the condition. Then press the 'Enter' key

When you type '?', use commands beginning with a lowercase letter as input commands.

When you type '?' use commands beginning with a capital letter as variables.

4.2.4 Editing commands using keystrokes

Key	Function
Ctrl+f	Shifts one character to the right
Ctrl+b	Shifts one character to the left
Ctrl+a	Shifts to the head of the command line
Ctrl+e	Shifts to the end of the command line
Ctrl+h	Deletes the character before the cursor
Ctrl+w	Deletes the word before the cursor
Ctrl+k	Deletes from the cursor to the end of the command line
Ctrl+u	Deletes at the cursor point before the command line
Ctrl+t	Switches the character before the cursor with the character at the cursor
Ctrl+n	Shifts to the next line of the history buffer (the same function as the arrow key '↓')
Ctrl+p	Shifts to the previous line of the history buffer (the same function as the arrow key '↑')
↓	Shifts to the next line of the history buffer (ctrl+n)
↑	Shifts to the previous line of the history buffer (ctrl+p)
<TAB>	Completes the command
?	Displays available Command at that point with a simple description.

Table 20: Editing commands using key strokes

Communication emulators such as "hyper terminal" are not able to search the command saved in the history buffer using the arrow keys ('↑', '↓'). This is because the arrow keys are mapped to other keys on the emulator itself. It is recommended you use the latest emulator version to allow key mapping.

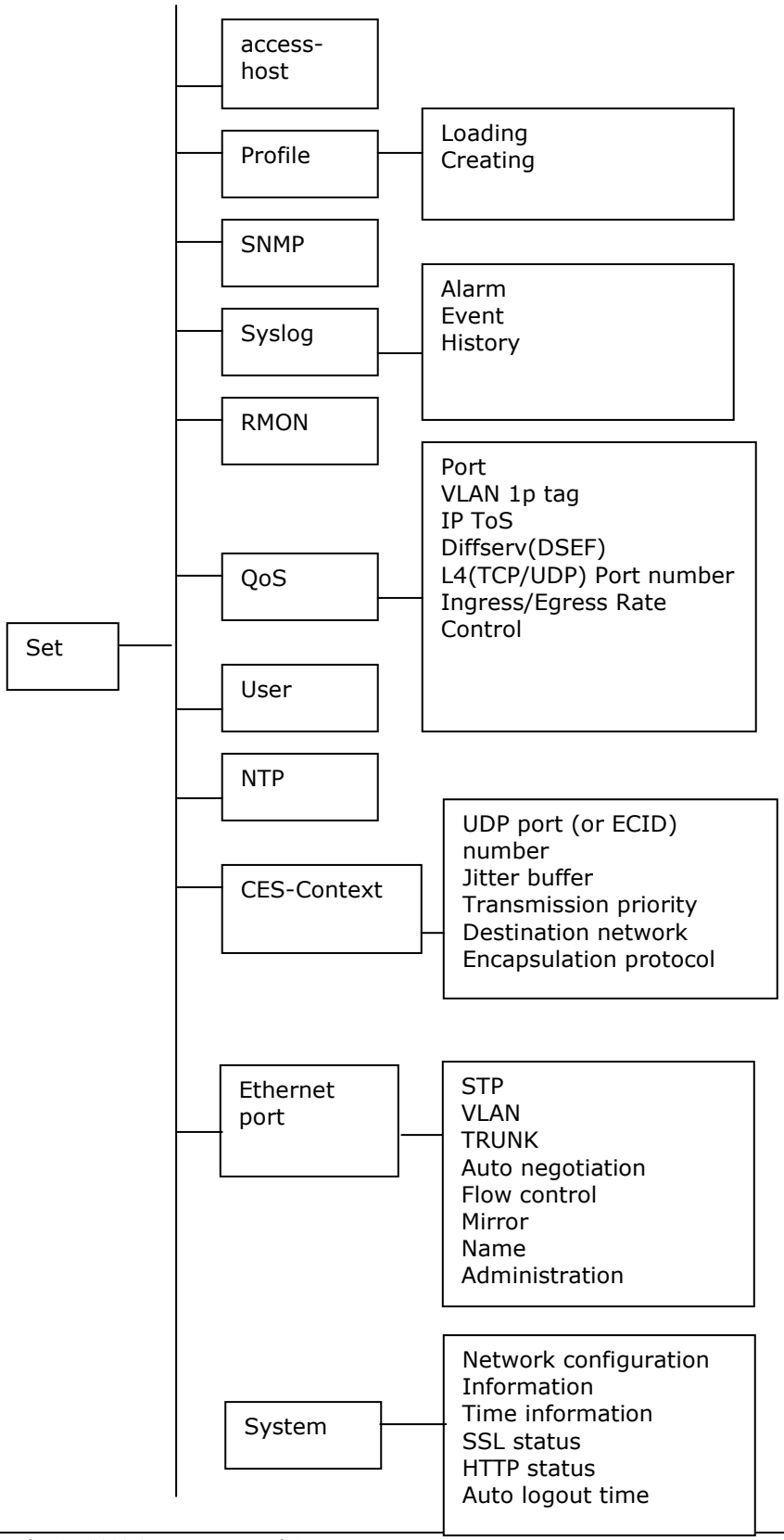
4.3 CLI Conventions

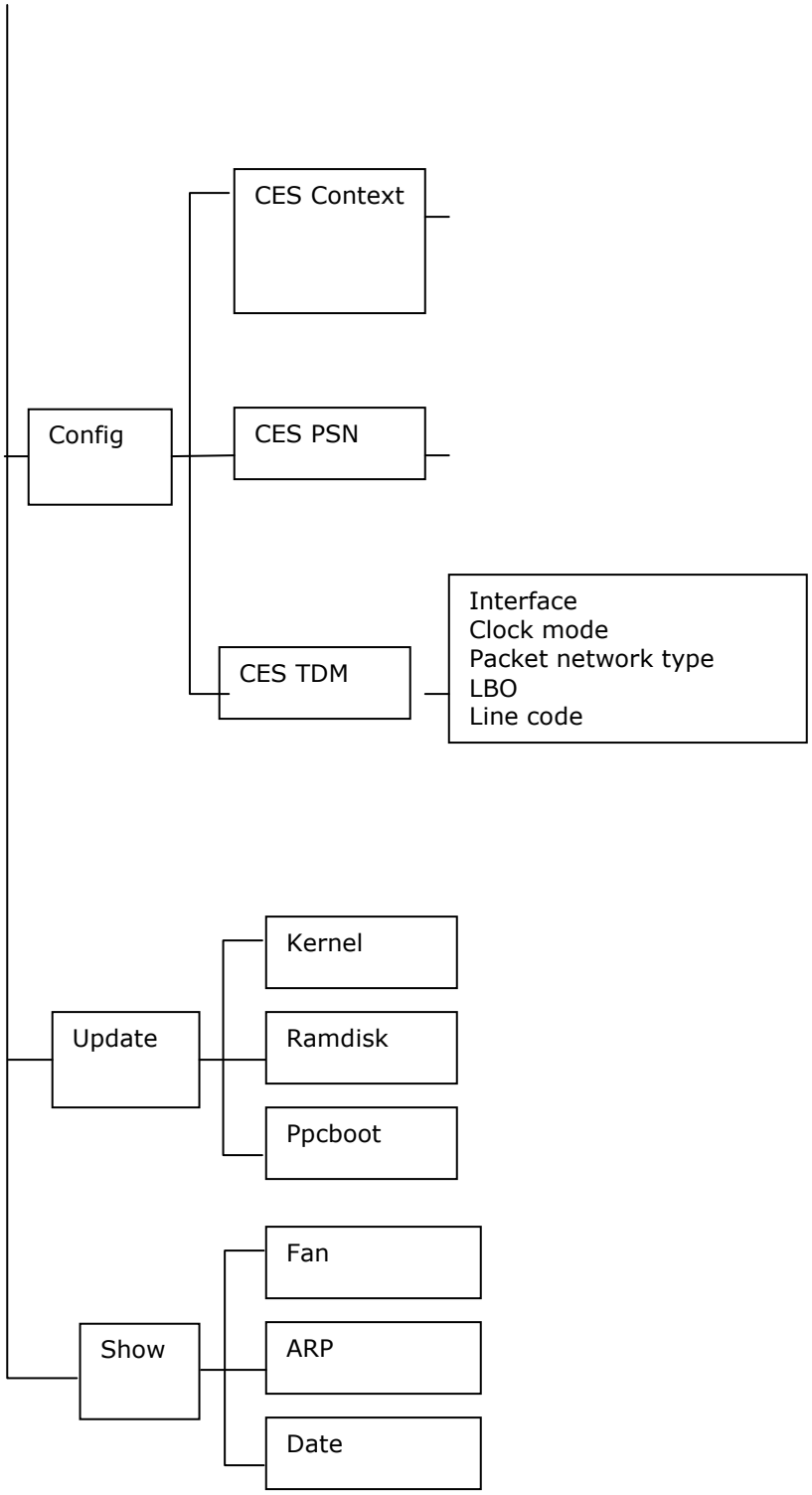
This publication uses these conventions to convey instructions and information. Command descriptions use these conventions.

Command	Description
Command beginning with a capital letter	Variable command ex) <PortList>
Command beginning with a lower case letter	Reserved command ex) port
A.B.C.D	IP address
A.B.C.D/M	IP address and subnet mask using the prefix ex) 192.168.20.19/26 (192.168.20.19/255.255.255.192)
XX-XX-XX-XX-XX-XX	MAC address
(a|b|c), (Port No.)	Enter a, b or c
<x-y>, <PortList>	Enter a value from a to b. Sets the range of the port using ‘,’ and ‘-’ ex) 1-5,10,12-15
[A]	Enter “A” as an option
{string, value}	Enter a string or value. ex) system name GL6510
(a|<x-y>)	Enter ‘a’ or a value between x and y.

Table 21: CLI Conventions commands and their descriptions

4.4 CLI Tree


Set
access-host
Profile
Loading
Creating
SNMP
Syslog
Alarm
Event
History
RMON
QoS
Port
VLAN 1p tag
IP ToS
Diffserv(DSEF)
L4(TCP/UDP) Port number
Ingress/Egress Rate Control
User
NTP
CES-Context
UDP port (or ECID) number
Jitter buffer
Transmission priority
Destination network
Encapsulation protocol
Ethernet port
STP
VLAN
TRUNK
Auto negotiation
Flow control
Mirror
Name
Administration
System
Network configuration
Information
Time information
SSL status
HTTP status
Auto logout time


CES Context
Config
CES PSN
Interface
Clock mode
Packet network type
LBO
Line code
CES TDM
Kernel
Update
Ramdisk
Ppcboot
Fan
Show
ARP
Date

5 Configuring system information

5.1 System log on

After booting the system, log on with 'root' as name and no password. After successful log on, the 'GW6000#' prompt appears:

```
          ####### ######  #      #           #####  #      #
             #    #      # ##    ##          #      # #  #   #
             #    #      # # # # #          #        #  #   #
             #    #      # #  #  #  #####   #  #### #  #   #
             #    #      # #     #           #      # #  #   #
             #    #      # #     #           #      # #  #   #
             #    ######  #      #            #####   ## ##


  GW6000 login: root

  GW6000#
```

Table 22: Example of GW6000 prompt

5.2 Top level commands

This section describes the commands for setting up the system network, administrator information, automatic logout, system initialization, and rebooting the system.

Command	Description
config	Configures system features and environments interactively.
exit	Exits the current terminal session.
ftp	Connects to remote FTP server.
logout	Disconnects the current user connection. The new prompt is displayed while using the console. *The telnet connection is disconnected.
ping	Sends ICMP request to check the connection.
reboot	Restart agent.
save	Saves the configuration.

set	Sets the feature and system environments individually.
show	Shows the system configuration.
update	Updates image file from dram to frash rom.

Table 23: Commands for setting up the network system

5.2.1 System network properties

To access the system remotely, assign the IP address, subnet mask and gateway.

5.2.1.1 Configurating comands for the network

Command	Description
set system gateway A.B.C.D	Sets the gateway.
set system gateway disable	Disables the system default gateway.
set system ip A.B.C.D/M	Enters the system IP address and subnet mask.
ping A.B.C.D [<1-10000>]	Executes the ping test with the corresponding IP. As an additional option, you can enter the number of times the ping test is performed. By default, the ping test is performed 5 times.

Table 24: Commands for configuring the network

```
GW6000# set system ip 10.20.140.100/16
▶▶ Sets system IP address as 10.20.140.100 and subnet mask as
255.255.0.0

GW6000# set system gateway 10.20.254.101
▶▶ Sets system default gateway as 10.20.254.101

GW6000# ping 10.20.254.101
▶▶ Sends ICMP request to 10.20.254.101 check connection.
PING 10.20.254.101 (10.20.254.101): 56 data bytes
64 bytes from 10.20.254.101: icmp_seq=0 ttl=255 time=2.1 ms
64 bytes from 10.20.254.101: icmp_seq=1 ttl=255 time=0.9 ms
64 bytes from 10.20.254.101: icmp_seq=2 ttl=255 time=2.0 ms
64 bytes from 10.20.254.101: icmp_seq=3 ttl=255 time=0.9 ms
64 bytes from 10.20.254.101: icmp_seq=4 ttl=255 time=1.9 ms

--- 10.20.254.101 ping statistics ---
```

```
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 0.9/1.5/2.1 ms
▶▶ Displays ping result.

GW6000# show system

  ------------------------------------------------------------
-------------
  System Information
============================================================
===========
Product Name              : TDMGW41
System Name               : GL6510
System Description        : CESoPSN equipment
Contact Point             : admin@domain
Telephone                 : 123-456-7890
  System Location           : research
  System Up Time            : 01 hr(s) 30 min(s) 46 sec(s)
  Kernel version            : 1.00
  HW version                : 1.00
  SW release date           : Jun 29 2005
  SW version                : 1.00
  SW release time           : 16:28:09
  IP Address                : 10.20.140.100     ▶▶ IP address
setting is done
  Netmask                   : 255.255.0.0       ▶▶ Subnet mask
setting is done
  Network Address           : 10.20.0.0         ▶▶ Network
address is assigned
  Default Gateway           : 10.20.254.101 ▶▶ Default gateway
setting is done
  MAC Address               : 00-e0-1a-00-11-11 ▶▶ System MAC
address
  Auto Logout Time (Min)    : 10
  Syslog server Status      : enable
  Web server Status         : enable
  NTP daemon Status         : disable
  SNMP agent Status         : enable
  SSL server Status         : enable
  ------------------------------------------------------------
-------------
```

Figure 2: Example of screen showing configuration

5.2.2 Configuring system time

Command	Description
set system time zone <-12 ~ +12>	Sets the time zone offset range from –12 to +12. This command sets the local system time according to the GMT time zone. To set the local system time using NTP, set the time according to your GMT(Greenwich Mean Time) zone. The GMT time zone offset is from -12 ~ +12.
set system date <1-12> <1-31> <0-23> <0-59> {Year}	Sets the system time. Enter the time in 24-hour format. GL6510 does not support a real-time clock function, so reset the time after rebooting the system.
show date	Displays the system time.

Table 25: Commands for system time

```
GW6000# set system timezone +9
▶▶ Sets system timezone offset to +9

GW6000# set system date 04 22 11 52 2005
Fri Apr 22 11:52:00 GMT+9 2005
▶▶ Sets system date manually

GW6000# show date
Fri Apr 22 11:52:21 GMT+9 2005
▶▶ Displays system date
```

Figure 3: Example of screen showing configuration

5.2.3 Configuring system information

You can assign characteristic information to distinguish or check system by system.

Command	Description
set system contact {string}	Sets the system contact point. Maximum character length is 64.
set system location {string}	Sets the system location. Maximum character length is 64.
set system name {string}	Sets the system name.

	Maximum character length is 15
set system phone {string}	Sets the phone number to contact system supervisor. Maximum character length is 64.

Table 26: Commands to check system by system

```
GW6000# set system contact www.***.com
▶▶ Sets system contact point as 'www.***.com'

GW6000# set system location BD3F
▶▶ Sets system location as 'BD3F'

GW6000# set system name Office305
▶▶ Sets system name as 'Office305'

GW6000# set system phone 123-123-123
▶▶ Sets system phone as '123-123-123'
```

Figure 4: Example of configuration

Logout of CLI C**Command**	**Description**
exit or logout	Exit from the command shell.
set system logout <0-60>	Sets the system auto logout time. 0(Disable): The system is not on auto logout. The system logs out after a period of time. If you set it to 0 then it will never logout.

Table 27: To exit (or logout) of the system or set auto logout time

```
GW6000# set system logout 3
▶▶ Sets auto logout timer as 3 minutes

------------------------------------------------------
-----------------
  System Information
======================================================
================
Product Name              : TDMGW41
System Name               : GL6510
System Description        : CESoPSN equipment
Contact Point             : admin@domain
Telephone                 : 123-456-7890
  System Location           : research
```

```
    System Up Time            : 01 hr(s) 30 min(s) 46
  sec(s)
    Kernel version            : 1.00
    HW version                : 1.00
    SW release date           : Jun 29 2005
    SW version                : 1.00
    SW release time           : 16:28:09
    IP Address                : 10.20.140.100
    Netmask                   : 255.255.0.0
    Network Address           : 10.20.0.0
    Default Gateway           : 10.20.254.101
    MAC Address               : 00-e0-1a-00-11-11
    Auto Logout Time (Min)    : 3            ▶▶ Auto logout
  time configured as 3 minutes
    Syslog server Status      : enable
    Web server Status         : enable
    NTP daemon Status         : disable
    SNMP agent Status         : enable
    SSL server Status         : enable
    ------------------------------------------------------
  -------------------
```

Figure 5: Example of system logout configuration

If you set the logout time you will have to login again, manually.

5.2.4 System daemon process

System processes can be enabled and disabled using the commands below.

To enable the processing system feature, you can control the system daemon status

Command	Description
set system http (disable|enable)	Disables or enables the HTTP daemon processing status.
set system ssl (disable|enable)	Disables or enables the SSL (Secure Sockets Layer) daemon processing status.
set log (disable|enable)	Disables or enables the syslog agent daemon processing status.
set snmp (disable|enable)	Disables or enables the SNMP agent daemon processing status.
set ntp (disable|enable)	Disables or enables the NTP client daemon processing status.

Table 28: Commands

```
GW6000# set system http enable
▶▶ Sets HTTP processing daemon to enable

GW6000# set system ssl enable
▶▶ Sets SSL processing daemon to enable

GW6000# set log enable
▶▶ Sets HTTP processing daemon to enable

GW6000# set snmp enable
▶▶ Sets SNMP processing daemon to enable

GW6000# set ntp enable
▶▶ Sets HTTP processing daemon to enable

GW6000# show system
  ------------------------------------------------------------
---------------
  System Information

============================================================
==============
  Product Name              : TDMGW41
  System Name               : GL6510
 …
  Auto Logout Time (Min)    : 3
  Syslog server Status      : enable   ▶▶ Syslog status is
enabled
  Web server Status         : enable   ▶▶ HTTP daemon status
is enabled
  NTP daemon Status         : enable   ▶▶ NTP daemon status
is enabled
  SNMP agent Status         : enable   ▶▶ SNMP daemon status
is enabled
  SSL server Status         : enable   ▶▶ SSL daemon status
is enabled
  ------------------------------------------------------------
```

Figure 6: Example of configuration

5.2.5 System maintenance

Command	Description
set system initialize	Initializes the current settings to the default settings. The system is restored to default settings once the system is rebooted.

	* After initializing the system, induce 'reboot'.
reboot	Reboots the system.
save	Saves the configuration.
ping	Sends an ICMP request to check the network connection.
update	Updates image from its internal RAM to novitiate ROM.

Table 29: Commands and their description

Although the system is initialized, ces-psn, system IP address, and gateway are kept at the previous value.

5.2.6 Displaying the system status

When you use the 'show' command, ARP table, system information, network configuration, fan status and system date are displayed.

Command	**Description**
show **arp**	Displays the ARP table.
show **system**	Displays the system information and is executable in both VIEW and CONFIG modes.
show **date**	Displays the system date and time information.
show **fan**	Displays the system fan status.

Table 30: Commands and their description

```
GW6000# show arp      ▶▶ Displays arp table
Address          HWtype     HWaddress           Flags Mask
Iface
10.20.254.101        ether      00:01:F4:0A:A6:BB    C
eth0

GW6000# show system  ▶▶ Displays configured system information

-------------------------------------------------------------
-----------
  System Information

=============================================================
===========
```

```
    Product Name                : TDMGW41
    System Name                 : TDMGW
    System Description          : CESoPSN equipment
    Contact Point               : admin@domain
    Telephone                   : 123-456-7890
    System Location             : research
    System Up Time              : 00 hr(s) 05 min(s) 57 sec(s)
    Kernel version              : 1.00
    HW version                  : 1.00
    SW release date             : Apr 20 2005
    SW version                  : 1.00
    SW release time             : 16:28:09
    IP Address                  : 10.20.140.100
    Netmask                     : 255.255.0.0
    Network Address             : 10.20.0.0
    Default Gateway             : 10.20.254.101
    MAC Address                 : 00-e0-1a-00-11-11
    Auto Logout Time (Min)      : 10
    Syslog server Status        : enable
    Web server Status           : enable
    NTP daemon Status           : enable
    SNMP agent Status           : enable
    SSL server Status           : enable
  ------------------------------------------------------------
  -----------

  GW6000# show date     ▶▶ Displays system date
  Mon Apr 25 19:19:03 GMT+9 2005


  GW6000# show fan      ▶▶ Displays fan status

  FAN Status
  -------------------------------------------------
    FAN A             Normal
    FAN B             Normal
  -------------------------------------------------
```

Figure 7: Example of a screen showing configuration

5.3 System image upgrade

5.3.1.1 Upgrade via FTP

GL6510 provides a software change function while operating after booting the system normally. After setting the system IP and connecting the system, (Figure 9) you can download the software from the FTP server and save it to the flash memory.

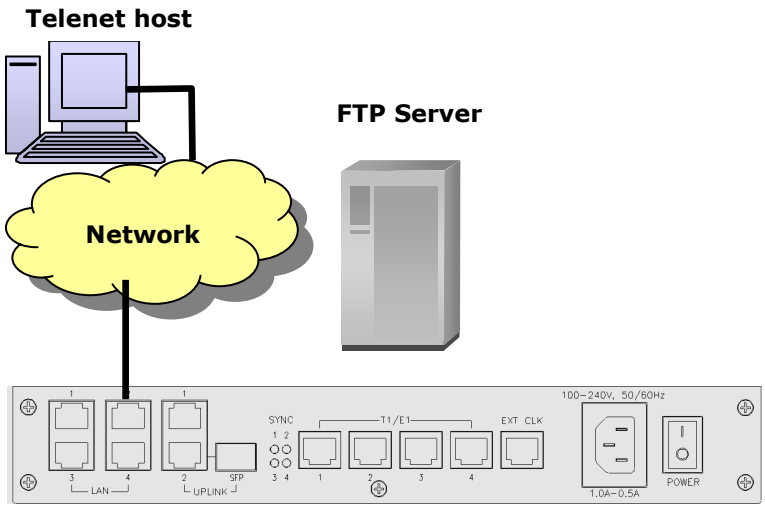


Figure 8: Software upgrade via CLI or Telnet

Command	Description
ftp A.B.C.D	Downloads the file from the FTP server to the system. Usually an FTP server connection is used for downloading new software image or profile. After completing the download, the software is automatically saved to the flash memory.
update (kernel| ramdisk|ppcboot)	Updates the system from dram to flash memory. Reboot the system after updating

Table 31: Commands

```
GW6000# set system ip 192.168.1.20/24
▶▶ Sets system IP address as 192.168.1.20

GW6000# ftp 192.168.1.1
▶▶ Connects to ftp server

Connected to 192.168.1.1.
220 3Com 3CDaemon FTP Server Version 2.0
Name (192.168.1.1:root): user1
▶▶ Enters user account

331 User name ok, need password
Password:******
▶▶ Enters designated password

230 User logged in
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> hash
```

```
Hash mark printing on (1024 bytes/hash mark).

ftp> get tdmgw.kernel
▶▶ Gets update image(kernel) file from FTP server
local: tdmgw.kernel remote: tdmgw.kernel
200 PORT command successful.
150 File status OK ; about to open data connection
##########################################################
############################
226 Closing data connection; File transfer successful.
653854 bytes received in 0.76 secs (844.1 kB/s)

ftp> bye
221 Service closing control connection

GW6000# update kernel
▶▶ Updates system with new kernel file

Erasing Flash...
Image CRC Value = 0xdeb5373f
checksum Result = 0xdeb5373f
Erased 1024 Kibyte @ 0 -- 100% complete.
Update Kernel to Flash...
Image CRC Value = 0xdeb5373f
checksum Result = 0xdeb5373f
OK...

GW6000# ftp 192.168.1.1
▶▶ Connects to ftp server

Connected to 192.168.1.1.
220 3Com 3CDaemon FTP Server Version 2.0
Name (192.168.1.1:root): Virtual Access
331 User name ok, need password
Password:******
230 User logged in
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> hash
Hash mark printing on (1024 bytes/hash mark).

ftp> get tdmgw.ramdisk
▶▶ Gets update image(ramdisk) file from FTP server

local: tdmgw.ramdisk remote: tdmgw.ramdisk
200 PORT command successful.
150 File status OK ; about to open data connection
##########################################################
```

```
##################################################################
##################################################################
##################################################################
##################################################################
##################################################################
##################################################################
##################################################################
##################################################################
##################################################################
##################################################################
##########
226 Closing data connection; File transfer successful.
5766729 bytes received in 6.40 secs (879.4 kB/s)

ftp> bye
▶▶ Disconnect to FTP server

221 Service closing control connection
GW6000# update ramdisk
▶▶ Updates system with new ramdisk file.
Erasing Flash...
Image CRC Value = 0x4300aee2
checksum Result = 0x4300aee2
Erased 7168 Kibyte @ 0 -- 100% complete.
Update Ramdisk to Flash...
Image CRC Value = 0x4300aee2
checksum Result = 0x4300aee2
OK...

GW6000# reboot
```

Figure 9: Example of configuration

6 Configuring the Ethernet port

GL6510's 10/100Base-Tx Ethernet ports provide an L1 physical feature like Auto Negotiation, Auto-MDIX management feature like IP, MAC address. This section describes the port related configuration settings.

The GL6510 has two uplink ports mounted for processing TDM packet encapsulated RTP-PW or MEF-PW and four LAN ports used for packet network users.

The GL6510-P4, has two LAN ports mounted for processing only TDM packet encapsulated RTP-PW or MEF-PW.

6.1 Commands for LAN configuration

Command	Description
set eth port auto-nego enable (<Portlist>| all)	Sets the auto negotiation mode as enable or disable. If the remote port is set to "Auto negotiation", the port speed and duplex are recognised automatically. Correct use of commands: 1. set eth port auto-nego enable 1-up2 (X) 2. set eth port auto-nego enable 1-4, up1-up2 (O)
set eth port admin-status (enable|disable) (<Portlist>|all)	Sets the administration status of a port. The default value is "enable". If this command is set to "disable", packet transmission is blocked via this port.
set eth port speed (10hd|10fd|100hd|100fd) (<Portlist>|all)	Sets the port to "force" speed and duplex mode. Force mode sets the port speed regardless of the status of the corresponding port. 10hd: Establishes its link to forced 10Mbps half duplex mode. 10fd: Establishes its link to forced 10Mbps full duplex mode. 100hd: Establishes its link to forced 100Mbps half duplex mode. 100fd: Establishes its link to forced 100Mbps full duplex mode. Correct use of commands: 1. set eth port speed 100fd 1-up2 (X) 2. set eth port speed 100fd 1-4, up1, up2 (O)
set eth port flow-control (on|off) (<Portlist >|all)	Sets the IP address of the LAN port 1
set eth port statistic clear(<Portlist>|all)	Clears the accumulated port counter to '0'.

show eth port (<Portlist>|all)	Displays port administrative state as well as port speed, duplex and flow control status. `---------------------------------------------------------------` ` no state/admin speed/type duplex A/N F/C pvid trunk` `===============================================================` ` 1 down/ enable 100M/TX FD(A) 100M(A) Off(-) 1 -` ` 2 down/ enable 100M/TX FD(A) 100M(A) Off(-) 1 -` ` 3 down/ enable 100M/TX FD(A) 100M(A) Off(-) 1 -` ` 4 down/ enable 100M/TX FD(A) 100M(A) Off(-) 1 -` `UP1 down/ enable 100M/TX FD(A) 100M(A) Off(-) 1 -` `UP2 down/ enable 100M/TX FD(A) 100M(A) Off(-) 1 -` `---------------------------------------------------------------`

Table 32: Commands for LAN configuration

6.2 Configuring the Ethernet (only uplink) trunk

To failover and extend Ethernet bandwidth, GL6510-P4 LAN1/2 and GL6510-P1's uplink 1/2 can be bonded together to form a single larger link.

Command	Description
set eth trunk (enable|disable)	Sets uplink port 1,2 as a trunk group.
show eth trunk	Displays uplink 1,2's port trunk status. `----------------------------------` `Trunk ID : Uplink1 Uplink2` `==================================` `Trunk0 : X X` `----------------------------------`

Table 33: Configuring the Ethernet (only uplift) trunk

To aggregate the trunk group successfully, first check that Ethernet ports are fixed as either auto negotiation or full duplex mode.

6.3 Displaying the LAN port statistic counter

GL6510 counts and displays transmitted and received packets per each port.

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>set eth port statistic clear (<Portlist>|mgmt|all)</td><td>Clear accumulated packet counter.</td></tr>
<tr><td>show eth port statistic (<Portlist>|mgmt|all)</td><td>Displays Ethernet LAN and uplink ports frame counters.

<table>
<tr><th colspan="2">Receive Total</th></tr>
<tr><td>Rx Byte</td><td>Displays the number of received bytes in good and bad packets.</td></tr>
<tr><td>Rx Packet</td><td>Displays the number of received good and bad frame.</td></tr>
<tr><td>Rx Good Byte</td><td>Displays the number of received bytes in good packets.</td></tr>
<tr><td>Rx Good Packet</td><td>Displays the number of received good frame.</td></tr>
<tr><td>Rx Fc Packet</td><td>Displays the number of received pause frame.</td></tr>
<tr><td>Rx Multicast Packet</td><td>Displays the number of received multicast frame.</td></tr>
<tr><td>Rx Broadcast Packet</td><td>Displays the number of received broadcast frame.</td></tr>
<tr><td>Rx Alignment Error</td><td>Displays the number of received alignment errors.</td></tr>
<tr><td>Rx CRC Error</td><td>Displays the number of received CRC errors.</td></tr>
<tr><td>Rx Oversize Error</td><td>Displays the number of received frames longer than max frame length bytes with valid CRC.</td></tr>
<tr><td>Rx Runt Error</td><td>Displays the number of received frames shorter than 64 bytes with valid CRC.</td></tr>
<tr><td>Rx Dropped Error</td><td>Displays the number of times a frame is dropped, because of lack of available resources.</td></tr>
<tr><td>Rx Jabber Error</td><td>Displays the number of received frames longer than max frame length bytes with invalid CRC.</td></tr>
<tr><td>Rx 64b Packet</td><td>Displays the number of received 64bytes frames in good and bad packets.</td></tr>
<tr><td>Rx 65-127b Packet</td><td>Displays the number of received 65~127bytes received frames in</td></tr>
</table>
</td></tr>
</table>

	good and bad packets.
Rx 128-255b Packet	Displays the number of received 128~255bytes received frames in good and bad packets.
Rx 256-511b Packet	Displays the number of received 256~511bytes received frames in good and bad packets.
Rx 512-1023b Packet	Displays the number of received 512~1023bytes received frames in good and bad packets.
Rx 1024-1518b Packet	Displays the number of received 1024~1518 bytes received frames in good and bad packets.
Rx Coll	Displays the number of received collision.
Rx Late Coll	Displays the number of received collision events that occurred late.
Rx Fragmentation	Displays the number of received frames shorter than 64 bytes with invalid CRC.
Rx Short Event	Counts and displays the number of received frames less than 10 bytes.

Transmit Total	
Tx Byte	Counts the number of transmitted bytes in good and bad packets.
Tx Unicast Packet	Counts the number of transmitted unicast packets.
Tx Packet Error	Counts the number of transmitted failure packets.
Tx Fc Packet	Counts the number of transmitted pause packets.

7 Configuring VLAN

If the broadcasting packet enters a LAN, all nodes on the LAN receive the broadcasting packet. In this case, the nodes that do not require this information receive the broadcasting packet, and then the traffic is increased. To make up for this problem, the GL6510 provides a Virtual LAN (VLAN) based on IEEE802.1Q for Ethernet ports. The advantages are that unnecessary traffic is decreased and security is improved because packets cannot be exchanged among different VLANs.

7.1 Commands for IEEE802.1Q Tagged VLAN

GL6510 supports the 802.1Q tagged based VLAN. Tagging is the process of adding 4 bytes tag containing the VID (VLAN ID) to an Ethernet frame. The tagged frame size may be up to 1522 bytes. By default all GL6510's Ethernet ports are untagged members of VLAN 1. The default VLAN members may be added or deleted but VLAN ID 1 can't be removed.

Command	**Description**
set eth vlan create {Name} <VLAN ID>	Creates a VLAN. This sets the VID, the VLAN name. When creating a VLAN. A VLAN name stands in for a VLAN. The VID is used for compatibility between LAN devices when using a VLAN over several LAN devices. It consists of less than 10 characters, and several special characters may be used (~`!@#$%^&*()-_+=|/'"[]{}), though spaces may not be used. A letter must be used for the first letter of a VLAN name. A VLAN name is recognised locally inside a device but the VID is recognised by a device directly connected via a trunk link A VID can be from 2~4094. The VID 1 is set as the 'default' and 0 and 4095 is reserved ID.
set eth vlan delete (<VLAN ID>|all)	Deletes all VLAN Groups except the default VLAN 1
set eth vlan add-port <VLAN ID> <Portlist>	Adds member ports to a VLAN. If a port is added, the PVID of the added port is set as a VID of the VLAN it belongs to.
set eth vlan del-port <VLAN ID> <Portlist>	Adds member ports to a VLAN. If a port is added, the PVID of the added port is set as a VID of the VLAN it belongs to.
set eth vlan pvid (<VLAN ID>|cpu) <Portlist>	Sets the PVID for each port. If an untagged packet enters the port, it adds a tag to the PVID and sends it. By default, the PVID of all ports is set to 1.

show eth vlan	Displays the VLAN information. 'U' on the IEEE 802.1Q VLAN mode indicates an untagged member port and 'T' indicates a tagged member port.

Table 34: Commands for IEEE802.1Q tagged VLAN

7.1.1 Tagged/untagged mode

If a port belongs to a specific VLAN as untagged, then the port sends the frame without tagging. But if the port belongs to a VLAN with tagged mode, it sends the frame with VLAN tagging (The tag value should be equal to VLAN ID).

7.1.2 The advantage of a IEEE 802.1Q tagged VLAN

By adding port(s) as tagged to all VLAN groups and assigning PVID as 1, then this tagged port is able to carry forward every VLAN ID to remote side's destination ports located in the same VLAN group. So if several devices with multiple VLANs are connected then add the same ports as "tagged" to each VLAN so that the VLAN IDs can be forwarded between the devices.

The tagged uplink that connects devices is usually called to the '1Q-tagged' or '1Q-trunk' port.

7.1.3 PVID (Port VLAN ID)

The PVID is the value that is set for each port and the default value is 1. A 'default' VLAN is automatically set when the device is booted, where all ports are in untagged mode. When a VLAN is created, the PVID of the VLAN member ports are automatically set to the created VLAN ID. In cases where a port is added to a VLAN, it is set as an added VLAN ID. If a VLAN is removed or the port is removed from a VLAN and the PVID is the same as the VLAN ID, it is set to 1.

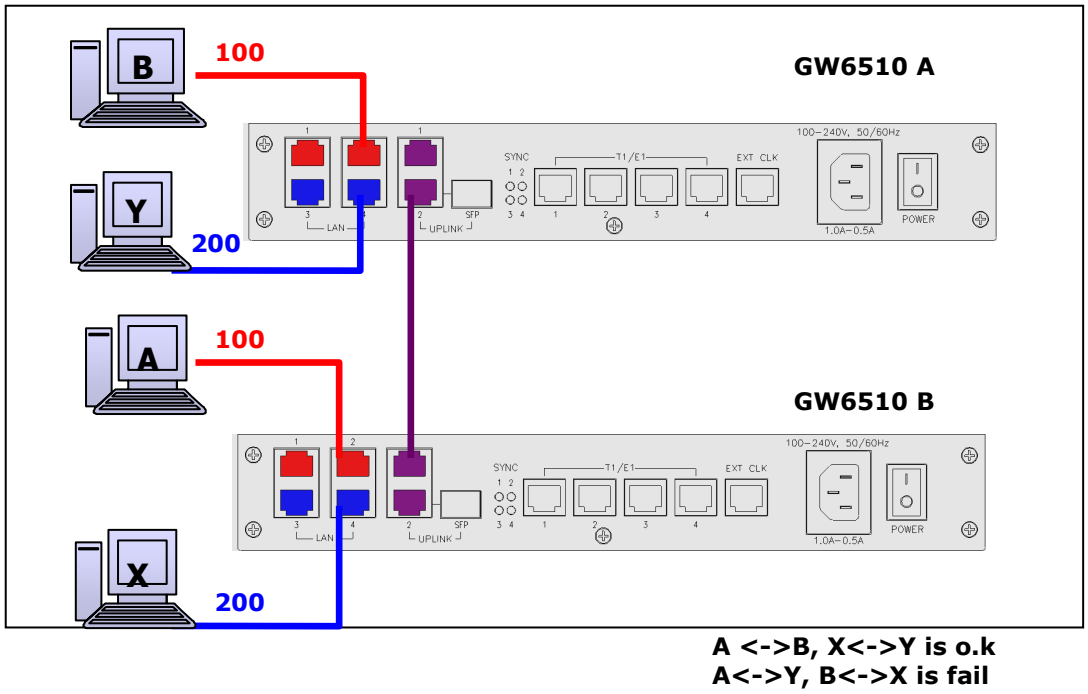


Figure 10: How to create a VLAN, adding/deleting a port, and removing a VLAN

```
Step 1: Creating VLAN
GW6000 # set eth vlan create 100 100
GW6000 # set eth vlan create 200 200

Step 2: Add untagged port to new VLAN
GW6000# set eth vlan add-port 100 1-2 untagged
GW6000# set eth vlan add-port 200 3-4 untagged

Step 3: Add tagged port to VLAN
GW6000# set eth vlan add-port 1 up1 tagged
GW6000# set eth vlan add-port 1 up2 tagged
GW6000# set eth vlan add-port 100 up1 tagged
GW6000# set eth vlan add-port 100 up2 tagged
GW6000# set eth vlan add-port 200 up1 tagged
GW6000# set eth vlan add-port 200 up2 tagged

Step 4: Setting PVID
GW6000# set eth vlan pvid 100 1,2
GW6000# set eth vlan pvid 200 3,4
GW6000# set eth vlan pvid 1 up1
GW6000# set eth vlan pvid 1 up2

Step 5: Displaying VLAN configuration
GW6000# show eth vlan
```

```
  ------------------------------------------------------------
-------------
  Vlan Mode : 802.1Q
  ------------------------------------------------------------
-------------
  Name / VLAN ID / Type  : 'Default' / 1 / Static VLAN

============================================================
===========
  Port List              : 1   2   3   4 up1 up2 | trunk0
  Active Port            : .   .   .   .   .   .        .
  Port Type              : .   .   .   .   T   T        .
  ------------------------------------------------------------
-------------
  Name / VLAN ID / Type  : '100' / 100 / Static VLAN

============================================================
===========
  Port List              : 1   2   3   4 up1 up2 | trunk0
  Active Port            : A   .   .   .   A   .        .
  Port Type              : U   U   .   .   T   T        .
  ------------------------------------------------------------
-------------
  Name / VLAN ID / Type  : '200' / 200 / Static VLAN

============================================================
===========
  Port List              : 1   2   3   4 up1 up2 | trunk0
  Active Port            : .   .   A   .   A   .        .
  Port Type              : .   .   U   U   T   T        .
------------------------------------------------------------
-----------
CPU-included VLAN      : 1
------------------------------------------------------------
-----------
```

Figure 11: Example of a screen showing commands for IEEE802.1Q Tagged VLAN

An IEEE 802.1Q VLAN provides multiple VLANs that allows multiple port usage. You can use tagged ports more than once as a trunk link on several devices that are configured with the same VLAN. The tagged ports of multiple VLANs can be set as follows:

Connect the Uplink1 to the tagged port, so the PVID of uplink1 is not required.

If the port is removed from the default VLAN, data transferred to the default VLAN for that port cannot be received.

7.2 CPU protection by VLAN

GL6510 protects its CPU performance and access by adding the CPU to a specific VLAN.

Command	Description
set eth vlan add-cpu <VLAN ID>	Adds the CPU port to specific VLAN group.
set eth vlan del-cpu <VLAN ID>	Deletes the CPU port to specific VLAN group.
set eth vlan pvid cpu <VLAN ID>	Sets the PVID for each port. If an untagged packet enters the port, it adds a tag to the PVID and sends it. By default, the PVID of all ports is set to 1.

Table 35: Commands for adding the CPU to a specific VLAN

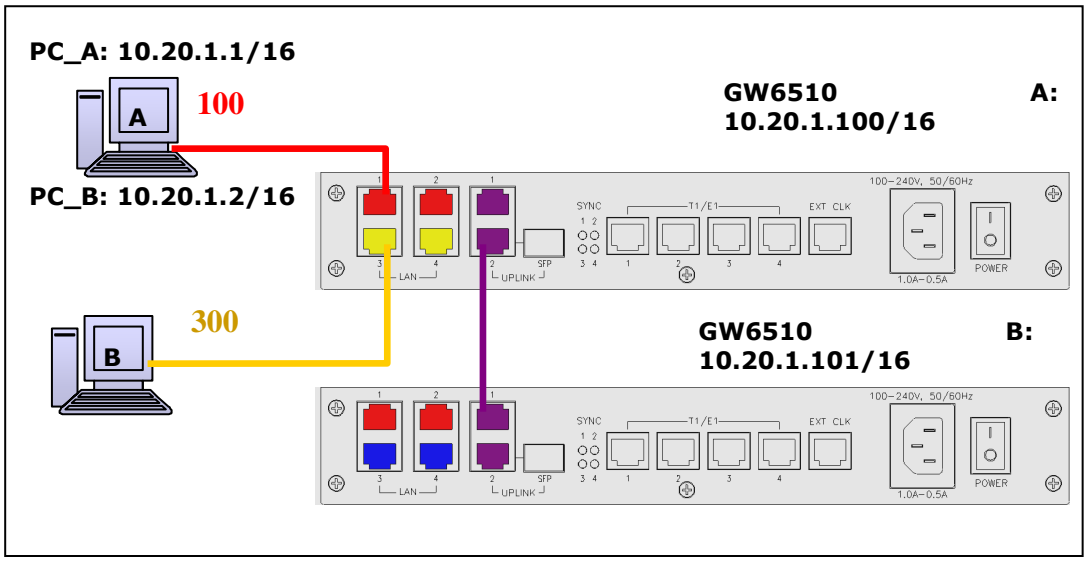


Figure 12: Configuration of CPU accessible VLAN

Configuration 1) PC_A can access GL6510 A and B's CPU. But PC_B can't access GL6510 A and B.

```
Step 1:
Finish the VLAN configurations like above referring to
Example 1.

Step 2: Delete VLAN 1 and add VLAN 100 to CPU
GL6510A side
GW6000 # set eth vlan del-cpu 1
GW6000 # set eth vlan add-cpu 100

GL6510B side
GW6000 # set eth vlan del-cpu 1
GW6000 # set eth vlan add-cpu 100
```

Step 3: Displays VLAN configuration
GL6510A side

```
GW6000# show eth vlan

-------------------------------------------------------
------------------
     Vlan Mode : 802.1Q
     -------------------------------------------------
----------------------
     Name / VLAN ID / Type  : 'Default' / 1 / Static
VLAN

=======================================================
==================
     Port List              : 1   2   3   4 up1 up2 |
trunk0
     Active Port            : .   .   .   .   .   .
.
     Port Type              : .   .   .   .   T   T
.
     -------------------------------------------------
----------------------
     Name / VLAN ID / Type  : '100' / 100 / Static
VLAN

=======================================================
==================
     Port List              : 1   2   3   4 up1 up2 |
trunk0
     Active Port            : A   .   .   .   A   .
.
     Port Type              : U   U   .   .   T   T
.
     -------------------------------------------------
----------------------
     Name / VLAN ID / Type  : '300' / 300 / Static
VLAN

=======================================================
==================
     Port List              : 1   2   3   4 up1 up2 |
trunk0
     Active Port            : .   .   A   .   A   .
.
     Port Type              : .   .   U   U   T   T
.
```

```
-------------------------------------------------------
------------------
CPU-included VLAN      : 100
-------------------------------------------------------
------------------
```

GL6510 B side

```
GW6000# show eth vlan

     -------------------------------------------------
-----------------------
     Vlan Mode : 802.1Q
     -------------------------------------------------
-----------------------
     Name / VLAN ID / Type  : 'Default' / 1 / Static
VLAN

=======================================================
==================
     Port List              : 1   2   3   4 up1 up2 |
trunk0
     Active Port            : .   .   .   .   .   .
.
     Port Type              : .   .   .   .   T   T
.
     -------------------------------------------------
-----------------------
     Name / VLAN ID / Type  : '100' / 100 / Static
VLAN

=======================================================
==================
     Port List              : 1   2   3   4 up1 up2 |
trunk0
     Active Port            : A   .   .   .   A   .
.
     Port Type              : U   U   .   .   T   T
.
     -------------------------------------------------
-----------------------
     Name / VLAN ID / Type  : '200' / 200 / Static
VLAN

=======================================================
==================
     Port List              : 1   2   3   4 up1 up2 |
trunk0
     Active Port            : .   .   A   .   A   .
```

```
.
     Port Type              : .   .   U   U   T   T
.
-------------------------------------------------------
------------------
CPU-included VLAN      : 100
-------------------------------------------------------
------------------
```

Figure 13: Screen showing Configuration of CPU accessible VLAN

8 Configuring spanning tree protocol

8.1 Spanning tree introduction

If a LAN is composed of multiple separated areas via devices, there may be more than one physical path for communication between the different areas. An undesired loop can be caused by the basic switch characteristic that gets the MAC addresses of hosts belonging to the LAN and creates a network path. In this case, communication between hosts that want to communicate is abnormal and has a negative effect on the whole network. The protocol used to prevent the loop occuring, maintain one normal path on the LAN, and preserve one tree type topology by changing the path, if there is any error on the path, is called the Spanning Tree Protocol (STP).

The GL6510 allows STP based on 802.1D so network topology is preserved.

8.2 Commands for spanning tree configuration

Command	**Description**
set eth stp (enable|disable)	Activates/deactivates STP. "enable" is the default setting. The 802.1D device is enabled.
show eth stp bridge	Displays the operating status of STP. It displays the statistics for each BPDU, the current status on the topology and various kinds of timers.
show eth stp port [<PortList>]	Displays the main parameters participating in the STP and the role of the port participating in the STP. This can be any of the following parameters: disable, blocking, listening, learning, forwarding.
set eth stp bridge forward-delay <4-30>	Sets the Forward Delay Time of the 802.1D device. The time unit is in seconds, the spanning tree state is transferred by the time unit, and the Forward Delay Time of the Root Bridge is used as the Aging Time of all switches participating in the topology when the topology changes.
set eth stp bridge hello-time <1-10>	Sets the Hello time of the 802.1D device. The time unit is in seconds, and transfers the BPDU of each switch by the time unit. With 802.1D, the Hello Timer is only activated on the root bridge. If the Config BPDU is sent with this standard, the lower bridge receives it, modifies the information, and resends the Config BPDU to a lower device.
set eth stp bridge max-age <6-40>	Sets the maximum age time of the 802.1D device. The time unit is in seconds. The maximum age is the

	time taken to determine the validity of a BPDU transmitted from the upper layer. If a BPDU with high priority arrives at a port, this event is recorded. The recorded information is restored to its original default value when a BPDU with the same priority fails to arrive after the maximum age has passed.
set eth stp bridge priority <1-65535>	Sets the Bridge Priority of the 802.1D device. The default value is 32768 on the BPDU. With 802.1D, a BPDU Field set to Bridge Priority is 2bytes space and can be between 1 and 65535.
set eth stp port pathcost <1- 65535> <PortList>	Sets the Port Path Cost of 802.1D based STP. This is set automatically according to the link speed of the port. 100Mbps → 19 10Mbps → 100 To change the cost, you can assign it using this command.
set eth stp port priority <1-255> <PortList>	Sets the priority of the 802.1D based STP port. By default, the priority of all ports is set as 128 on the BPDU. With 802.1D, the Port Priority space is set as 1 byte between 1 and 255.

Table 36: Commands for spanning tree configuration

8.3 Configuration examples using spanning tree protocol

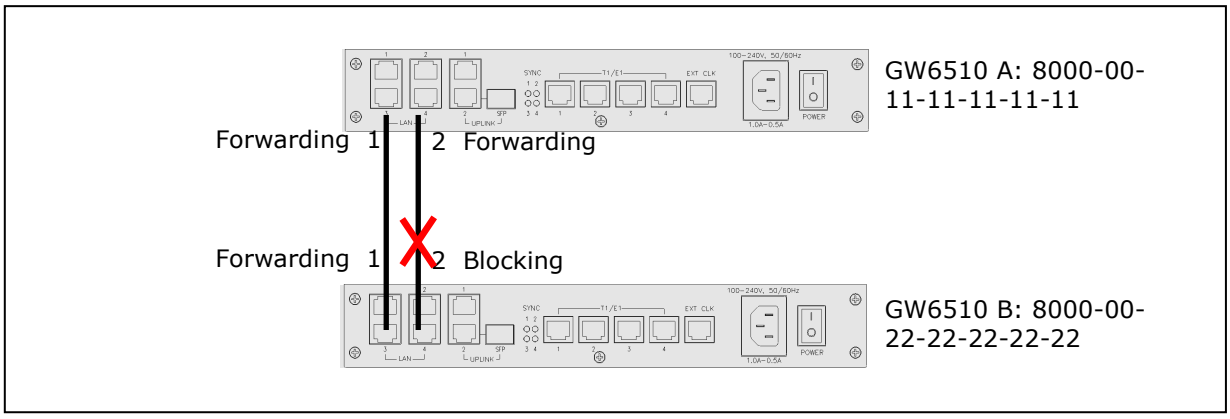


Figure 14: Spanning tree protocol

```
GL6510A side
GW6000# show stp bridge

Spanning Tree Protocol      :           enabled
   ------------------------------------------------
     Bridge ID                  : 8000:001111111111
Designated Root             : 8000:001111111111
     Root Port                  :                1
Root Path Cost              :               19
     Root Path Cost             :                0
     Max age                    :               20
     Hello time                 :                2
     Forward delay              :               15
     Transmit hold count        :                6
-----------------------------------------------
GL6510B side
GW6000# show stp bridge

Spanning Tree Protocol      :           enabled
  ------------------------------------------------
    Bridge ID                  : 8000:002222222222
    Designated Root            : 8000:001111111111
    Root Port                  :                1
    Root Path Cost             :               19
    Current Max Age (sec)      :               20
    Current Hello Time (sec)   :                2
    Current Forward Delay (sec) :               15
    Hold Time (sec)            :                1
    Bridge max age             :               20
    Bridge hello time          :                2
    Bridge forward delay       :               15
    Topology Change Count      :                0
-----------------------------------------------
```

Figure 15: Example of displaying the topology status by STP

You can assign 5 seconds as the Hello Time of the root bridge, 10 seconds as the Forward Delay Time, 30 seconds as the maximum Age Time and then reflect them all on the topology.

```
GL6510A side

GW6000# set eth stp bridge hello-time 5
GW6000# set eth stp bridge forward-delay 10
GW6000# set eth stp bridge max-age 30
GW6000# show stp bridge

Spanning Tree Protocol      :           enabled
  ------------------------------------------------
```

```
      Bridge ID                      : 8000:001111111111
      Designated Root                : 8000:001111111111
      Root Port                      :                  0
      Root Path Cost                 :                  0
      Current Max Age (sec)          :                 30
      Current Hello Time (sec)       :                  5
      Current Forward Delay (sec)    :                 10
      Hold Time (sec)                :                  1
      Bridge max age                 :                 30
      Bridge hello time              :                  5
      Bridge forward delay           :                 10
      Topology Change Count          :                  7
  ---------------------------------------------------
```

Figure 16: Example of screen showing Bridge Status

You can change the bridge priority for device 3 to the root bridge and the whole topology.

```
  GL6510B side
  GW6000# stp bridge priority 3
```

Figure 17: Changing topology by bridge priority

You can change the port role by changing the port priority:

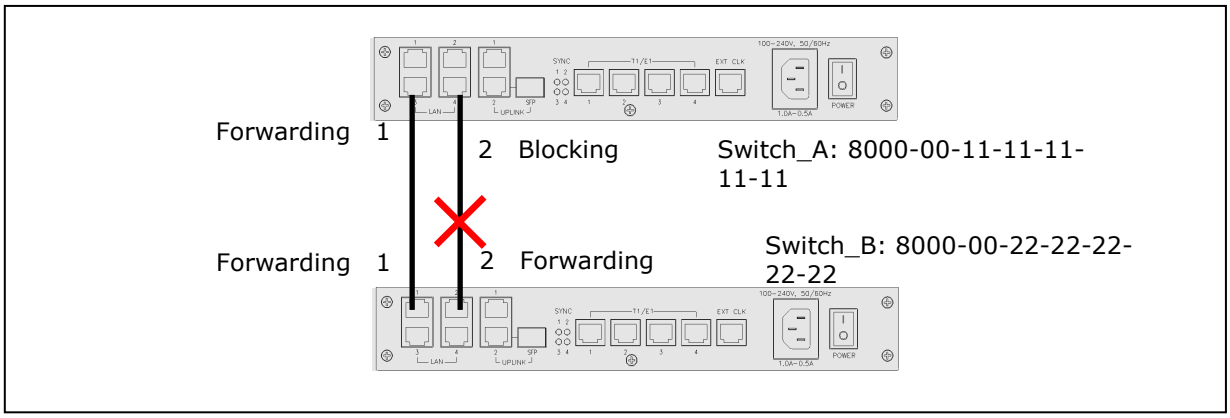


Figure 18: Changing the port priority

9 Configuring Quality of Service (QoS)

GL6510 supports two level transmission queues by classifying a specific packet field, port priority, IEEE802.1p Tag, IP ToS, Diffserv(only DSEF), and L4 port number marking. It controls ingress and egress rate by 1Mbps granuality.

GL6510's queue scheduling mode is set to strict priority. The high priority packet is processed first regardless of the time it arrives in the input queue. If there is no high priority packet, a low priority packet is processed. Packets in the high priority queue are transacted first and packets in the low priority queue are transacted when the high priority queue is completely empty. (See figure 19)

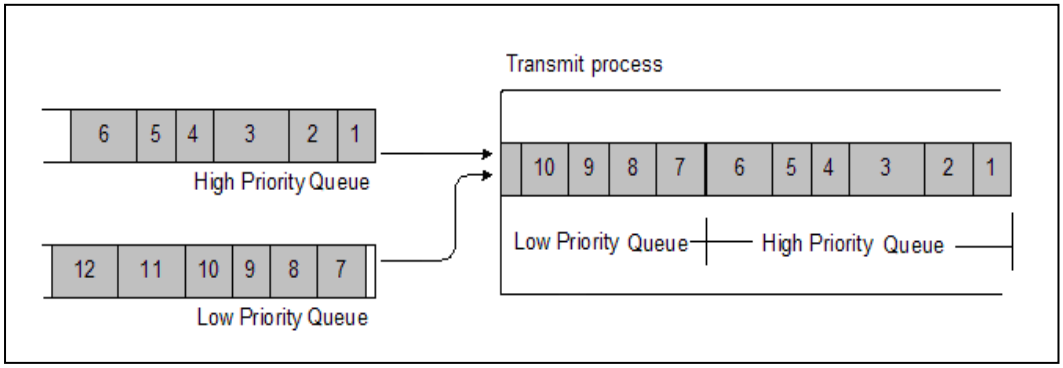


Figure 19: Packets in priority queues

9.1 Configuring QoS classification and status

To enable QoS status and classification method, use 'qos global' configuration.

Command	**Description**
set qos global status (enable|disable)	Enables/disables qos status.
set qos global diffserv (enable|disable)	Enables/disables diffserv status. Only the DSEF(0xb5 or 46) packet is able to classify in GL6510 diffserv.
set qos global tosvlan (tos|vlantag)	Selects the qos classification field vlantag or ToS. As they place the marker in the same field, either TOS or VLANTAG can be set but not both Set the classified field to VLAN 802.1p tag or IP ToS.
show qos global	Displays the qos global status. `Output)` `Qos Global Status : Enabled` `DiffServ Expedited Forwarding : Enabled`

	TosVlan mode : Use VLAN Tag in 802.1Q header

Table 20: Commands and descriptions of QoS classification and status

9.2 Configuring classifying and scheduling

To configure classification fields and their transmission priority, use the following commands.

Command	Description
set qos port-priority status <Portlist> (enable|disable)	Enables/disables port priority.
set qos port-priority <Portlist> tx-priority (high|low)	Sets port priority transmission queue level high or low. The port that has its priority set to high will transmit frames before the one that has its priority set to low.
show qos port-priority	Displays configuration of port priority.

Table 21: Commands to configure classifying and scheduling

Command	Description
set qos vlan <0-7> tx-priority (hith|low)	Sets the IEEE802.1p VLAN tag field queue level to high or low.
show qos vlan	Displays configuration of port priority.

Table 22: VLAN Quality of Service

Command	Description
set qos tos <0-7> tx-priority (hith|low)	Set\ the IP tos field queue level to high or low. GL6510 uses bits from 2 to 4 as tos field.
show qos tos	Displays configuration of tos transmission priority.

Table 23: VLAN Type of Service

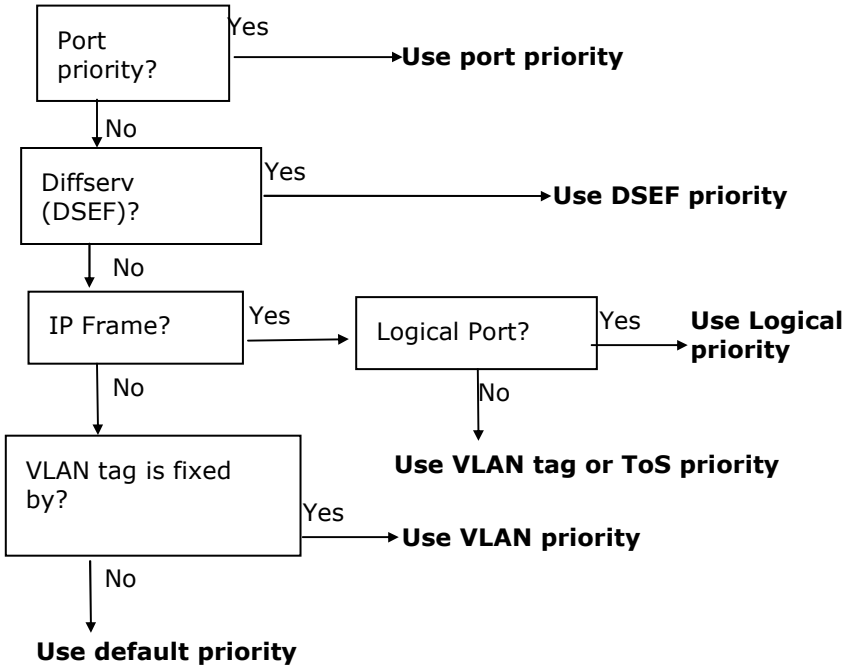
Command	Description

set qos logicalport user-def <0-7> port-number <1-65535>	Sets the user-defined logical port number up to 8 indexes.
set qos logicalport (user-def|well-known) <0-7> tx-priority (hith|low)	Sets the transmission priority to high or low.
set qos logicalport (user-def|well-known) <0-7> port-status (enable|disable)	Enables/disables each logical (L4) port number's qos status.
set qos logicalport rangeport lowport <1-65535>	Sets the low port number.
set qos logicalport rangeport highport <1-65535>	Sets the high port number.
set qos logicalport rangeport tx-priority (hith|low)	Enables/disables each logical (L4) port number's qos status.

Figure 24: Port priority filter commands

GL6510's QoS operation depends on internal mechanism. If L4 port, 21 should be classified and guaranteed its transmission, Port priority, Diffserv should be disabled at first.

QoS priority classification rule:



1. By user configuration, the classification field should be configured as ToS or VLAN, as they place the marker in the same field. Either TOS or

VLANTAG can be set but not both

2. VLAN Tag means IEEE802.1p field.

9.3 Configuring the rate limit

GL6510 controls both tx(egress) and rx(ingress)'s Ethernet bandwidth by 1Mbps granularity.

Command	**Description**
set qos ratecontrol ingress (enable|disable)	Enables/Disables ingress rate control function in globally.
set qos ratecontrol egress (enable|disable)	Enables/Disables egress rate control function in globally.
set qos ratecontrol (<Portlist>|all) (ingress-rate|egress-rate) <1-100>	Set ingress/egress rate by 1Mbps granularity.
show qos ratecontrol	Displays ingress and egress rate control status and configured rate. -------- Port No. Ingress_Status Egress_status IngressRate EgressRate ======== 1 Enable Enable 100.0(Mbps) 100.0(Mbps) 2 Enable Enable 100.0(Mbps) 100.0(Mbps) 3 Enable Enable 100.0(Mbps) 100.0(Mbps) 4 Enable Enable 100.0(Mbps) 100.0(Mbps) up1 Enable Enable 100.0(Mbps) 100.0(Mbps) up2 Enable Enable 100.0(Mbps) 100.0(Mbps) --------

Table 37: Commands for configuring rate limit

GL6510's rate control cannot be configured port by port.

To disable a specific port's rate control, set the rate to 100Mbps.

10 Configuring CES-TDM

The GL6510 has up to 8 TDM (T1/E1) ports. So the TDM bandwidth is extendable up to 8.192Mbps by trunking. To control the circuit network, adjust the TDM interface type, clock mode, line-coding and line build out factor.

10.1 CES-TDM Port configuration

You can configure TDM parameters interactively through the **config ces-tdm** command. GW6000 CLI is recommended for configuring by config mode.

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>TDM interface? [e1|e1-crc-mfrm|e1-unframe|t1-sf|…|t1-unframe]</td><td>Configure data format to E1/T1-frame or E1/T1-unframed.
<table>
<tr><th>Mode</th><th>Description</th></tr>
<tr><td>e1</td><td>E1 no CRC frame is the E1 frame format.</td></tr>
<tr><td>e1-crc-mfrm</td><td>E1 CRC multi-frame is the E1 frame format.</td></tr>
<tr><td>e1-unframe</td><td>E1 unframed format.</td></tr>
<tr><td>t1-sf</td><td>T1 super frame format.</td></tr>
<tr><td>t1-dm</td><td>T1 degraded minute frame format.</td></tr>
<tr><td>t1-slc96</td><td>T1 subscriber line carrier 96.</td></tr>
<tr><td>t1-dm-fdl</td><td>T1 degraded minute and facility data link (FDL) messaging frame format.</td></tr>
<tr><td>t1-esf</td><td>T1 extended super frame format.</td></tr>
<tr><td>t1-dm-fdl-jpn-alarm</td><td>T1 degraded minute, facility data link (FDL) messaging and Japan alarm frame format.</td></tr>
<tr><td>t1-dm-jpn-alarm</td><td>T1 degraded minute and Japan alarm frame format.</td></tr>
<tr><td>t1-slc96-jpn-alarm</td><td>T1 subscriber line carrier 96 and Japan alarm frame format.</td></tr>
<tr><td>t1-sf-jpn-alarm</td><td>T1 super frame and Japan alarm frame format.</td></tr>
<tr><td>t1-jt-g704</td><td>T1 TTC JT-G.704 frame format.</td></tr>
<tr><td>t1-unframe</td><td>T1 unframe format.</td></tr>
</table></td></tr>
<tr><td>In frame mode
TDM clock-mode? [internal-frame|external-frame|adaptive-rtp-frame|adaptive-avg-frame]</td><td>Configures the clock mode to synchronise with the remote device.

In frame mode
adaptive-rtp-frame: the system extracts the clock recovery information from the incoming packets' RTP timestamp and synchronises the TDM clock as recovered clock in E1/T1 frame mode.
adaptive-avg-frame: the system extracts the clock recovery information by averaging the packet arrival rate and synchronising the TDM clock as recovered clock in E1/T1 frame mode.
external-frame (Slave): the system TDM clock acts as slave. So the TDM clock is received from other master source and then synchronises itself with the TDM clock.</td></tr>
</table>

<table>
<tr>
<td>In unframe mode:
TDM clock-mode? [loopback-unframe|internal -unframe|adaptive-rtp-unframe|adaptive-avg-unframe|diff-unframe]</td>
<td>internal-frame (Master): the system TDM clock acts as master source. So connected devices are received TDM clock from master and synchronised with it.
In external frame mode, only TDM port 1 receives the clock signal and propagates the other ports.

In unframe mode
adaptive-rtp-unframe: the system extracts the clock recovery information from the incoming packets' RTP timestamp and synchronises the TDM clock as recovered clock in E1/T1 unframe mode.
adaptive-avg-unframe: the system extracts the clock recovery information by averaging the packet arrival rate and synchronises the TDM clock as recovered clock in E1/T1 unframe mode.
internal-unframe: the system TDM clock acts as master source. So connected devices receive TDM clock from master and synchronised with it.
loopback-unframe: the system TDM clock is synchronised by the TDM rx clock to the incoming TDM line.
diff-unframe: the system TDM clock is synchronised based on common reference clock (in-band packet timestamps).</td>
</tr>
<tr>
<td>TDM net-type? [dedicated|metropolitan|continental|loopback]</td>
<td>Configures the packet switching network type.
continental: Ethernet interfaces and remote ports are connected as another network via router.
dedicated: Ethernet interface and remote port are in the same subnet group.
loopback: Ethernet interfaces are connected as loopback connection.
metropolitan: Ethernet interfaces are connected.</td>
</tr>
<tr>
<td>In E1 mode
TDM line-build-out? [e1-75ohm|e1-120ohm]

In T1 mode
TDM line-build-out? [t1-lh-0db| t1-lh-7.5db|…|t1-sh-tr62411-440ft|t1-sh-tr62411-550ft|t1-sh-tr62411-660ft]</td>
<td>In E1 mode
In E1 mode, set the line impedance to 120ohm or 75ohm.
<table><tr><th>Line Impedance</th><th>Description</th></tr><tr><td>e1-120ohm</td><td>Sets the line impedance as balanced 120ohm.</td></tr><tr><td>e1-75ohm</td><td>Sets the line impedance as unbalanced 75ohm.</td></tr></table>
In T1 mode
In T1 mode, set the cable length to match the specified distance to the remote TDM interface.
Adjust the internal impedance value to match the cable impedance, according to the cable specification
For the E1 or T1, follow the cable specifications.</td>
</tr>
</table>

<table>
<tr><td></td><td>
<table>
<tr><th>Cable Length</th><th>Description</th></tr>
<tr><td>t1-lh-0/15/22.5/7.5db</td><td>Set the attenuation to 0/15/22.5/7.5dB.</td></tr>
<tr><td>t1-sh-110ft</td><td>Cable length of 0 to 110 feet.</td></tr>
<tr><td>t1-sh-220ft</td><td>Cable length of 111 to 220 feet.</td></tr>
<tr><td>t1-sh-330ft</td><td>Cable length of 221 to 330 feet.</td></tr>
<tr><td>t1-sh-440ft</td><td>Cable length of 331 to 440 feet.</td></tr>
<tr><td>t1-sh-550ft</td><td>Cable length of 441 to 550 feet.</td></tr>
<tr><td>t1-sh-660ft</td><td>Cable length of 551 to 660 feet.</td></tr>
<tr><td>t1-lh-tr62411-0db</td><td>Set the attenuation to 0dB.</td></tr>
<tr><td>t1-sh-tr62411-110ft</td><td>Cable length of 0 to 110 feet.</td></tr>
<tr><td>t1-sh-tr62411-220ft :</td><td>Cable length of 111 to 220 feet.</td></tr>
<tr><td>t1-sh-tr62411-330ft</td><td>Cable length of 221 to 330 feet.</td></tr>
<tr><td>t1-sh-tr62411-440ft</td><td>Cable length of 331 to 440 feet.</td></tr>
<tr><td>t1-sh-tr62411-550ft</td><td>Cable length of 441 to 550 feet.</td></tr>
<tr><td>t1-sh-tr62411-660ft</td><td>Cable length of 551 to 660 feet.</td></tr>
</table>
</td></tr>
<tr><td></td><td>Long haul: to configure transmit and receive level for a cable length
For cable longer than 660 feet, use the ‘t1-lh’ command for a T1.
Short haul: sets transmit attenuation for the cable length of 660 feet or shorter as a T1 trunk.</td></tr>
<tr><td>In E1 mode
TDM line-code? [ami| hdb3-e1]

In T1 mode
TDM line-code? [ami|b8zs-t1]</td><td>To recover the link clock and data, the TDM E1 or T1 line are encoded as below. The AMI mode is configured as default.
In E1 mode:
ami: Alternate Mark Inversion(AMI) line code type. Valid for T1 and E1 mode.
hdb3-e1: HDB3(High Density Bipolar 3 Zeros) line code type. Valid only for E1 mode.
In T1 mode:
ami: Alternate Mark Inversion(AMI) line code type. Valid for T1 and E1 mode.
b8zs-t1: B8ZS(Bipolar 8 Zeros Substitution) line code type. Valid only for T1 mode.</td></tr>
<tr><td>TDM underrun-byte? [0-255]</td><td>Configures the underrun data’s byte pattern.</td></tr>
</table>

TDM idle-data? [enable|disable]	Enables/Disables the sending of idle data. **Enable**: If there are no synchronised TDM ports, the idle data is transmitted. **Disable**: If there are no synchronised TDM ports, the idle data is not transmitted.
TDM alarm-fast-detect? [enable|disable]	Only available on T1 mode
TDM save the configuration?	Saves the configuration.

Info message

Reboot the system to apply the changes.

Press 'Y' or 'y' to reboot

Reboot to apply TDM changed configuration.

PSN type diagrams

Continental type

If the router is used to connect the other packet switching network, set the network type as 'Continental'.

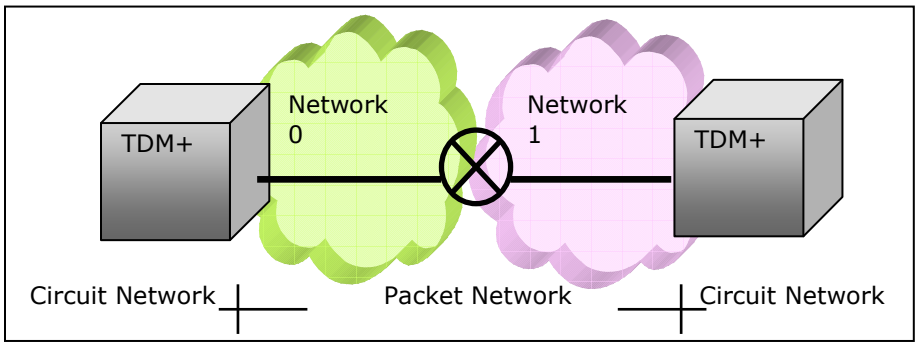


Figure 25: Continental type PSN diagram

Dedicated type

If the network is connected to a sing packet switching network, set the network type as 'Dedicated'.

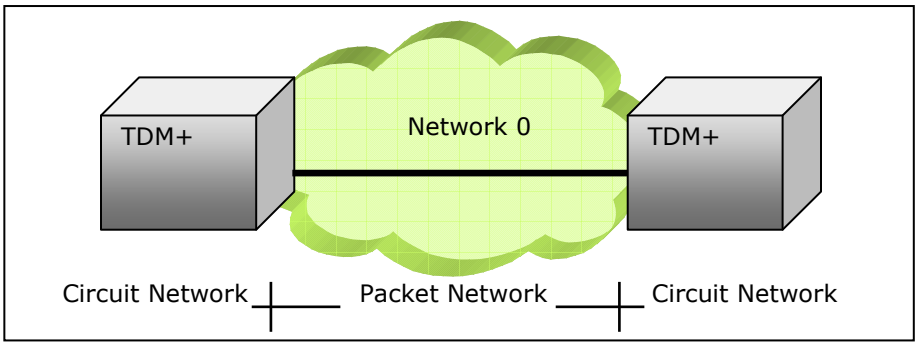


Figure 26: Dedicated type PSN diagram

Loopback type

Check both the PSN and TDM interface status, and then set the network type as 'Loopback'.

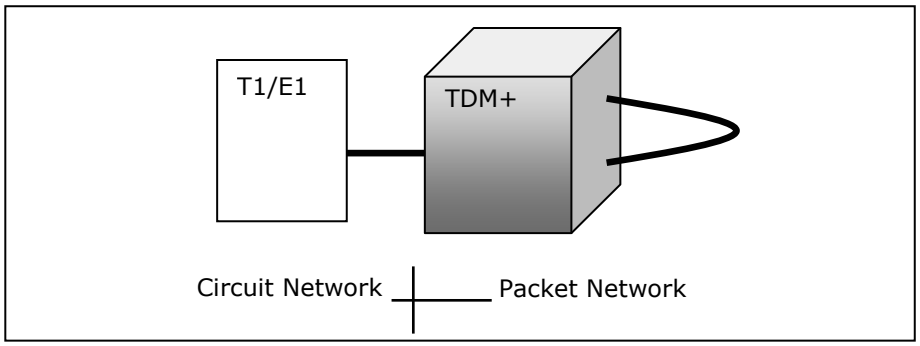


Figure 27: Loopback type PSN diagram

Metropolitan type

If the network is configured as metro Ethernet, set the network type as 'Metropolitan'.

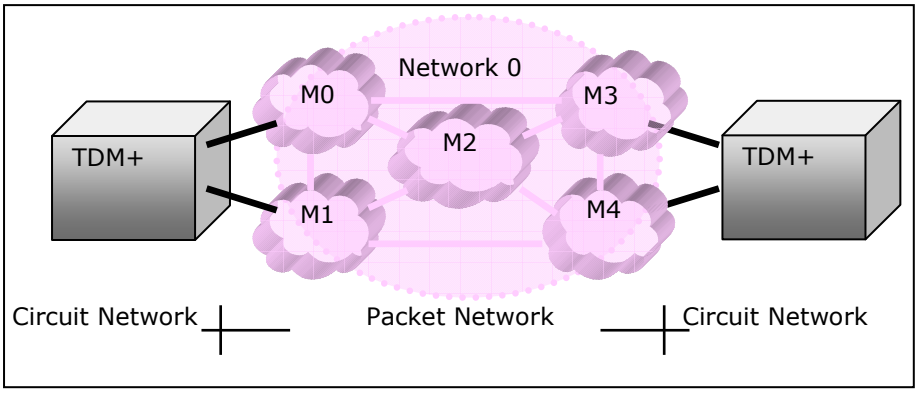


Figure 28: Metropolitan type PSN diagram

10.2 Displaying CES-TDM interface

Command	Description

show ces-tdm	Displays TDM configuration and status. CES-TDM is configured only by the `config ces-tdm` command In E1 frame mode `----------` `Interface : E1 UNFRAME` `Clock Mode : Loopback(Unframe)` `Network Type : Dedicated` `Tx Line Build Out : E1 120ohm` `Line Code : HDB3` `Underrun Byte : 255 [Hex:0xFF]` `Idle Timing : Disable` `----------` In T1 mode `----------` `Interface : T1 UNFRAME` `Clock Mode : Loopback(Unframe)` `Network Type : Dedicated` `Tx Line Build Out : T1 Short Haul 110FT` `Line Code : AMI` `Alarm Fast Detect : Disable` `Underrun Byte : 255 [Hex:0xFF]` `Idle Timing : Disable` `----------`

show ces-tdm dco (<TDMport>|all)

Displays DCO (Digital Clock Oscillator) status.

In adaptive mode, the GL6510 has extracted the TDM clock from the incoming packet network and uses this to synchronise the internal DCO.

To check the adaptive mode status, check the TDM DCO per each port.

DCO Freq. Offset: displays the difference of synchronised clock fluctuation.

CET mode

CET status

Example 1: adaptive clock mode

Range	-75,000 ~ +75,000
Unit	PPB(Parts Per Billion)

CET mode	Description
DISABLED	TDM clock mode is set as loopback, external or internal.
ADAPTIVE	TDM clock mode is set as adaptive.
ADAPTIVE_ENHANCED	TDM clock mode is set as loopback, external or internal.

CET status	Description
FREERUN	Context is not used.
HOLDOVER	Context is activated and DCO start to check the received packet to recover synchronised clock.
ACQUIRING	Synchronisation is done but tuning the conversion clock very detail.
ACQUIRED	Synchronisation is done and accurate clock is operated.

```
-------------------------------------------------------
-----
  DCO state
=======================================================
======
  TDM port #1   DCO Freq. Offset  : 6725
                CET Mode          :
GL6510_CET_ADAPTIVE_ENHANCED
                CET Status        :
GL6510_CET_STATUS_ACQUIRED
-------------------------------------------------------
-----
```

Example 2: internal, external or loopback clock mode

```
-------------------------------------------------------
------
DCO state
=======================================================
======
  TDM port #1   DCO Freq. Offset     : 0
                CET Mode             :
```

	GL6510_CET_DISABLED CET Status : GL6510_CET_STATUS_NONE ----------

11 Configuring CES-PSN

GL6510 uses an internal Ethernet port route to encapsulated TDM data to (and from) the uplink port(s).

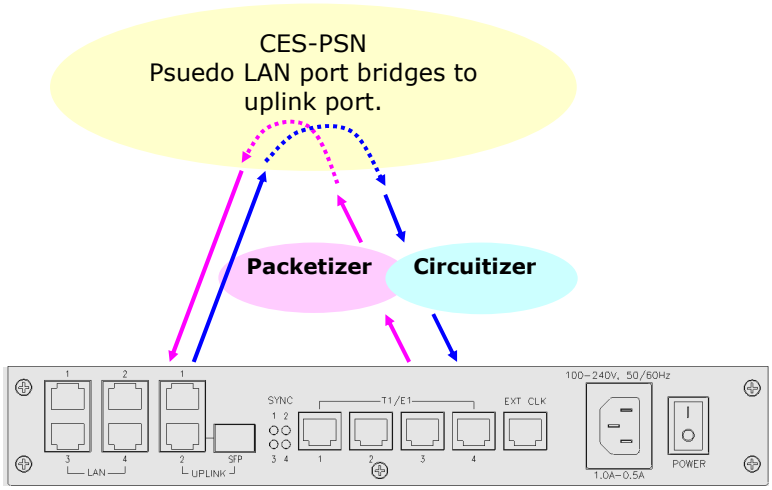


Figure 29: Configuring CES-PSN

GL6510's psn port is hard wired as 100Mbps and full duplex only. If the uplink port's link speed is set to 10Mbps, then TDM data transmission's delay and loss could occur.

So if possible, the uplink port should be up as 100Mbps and full duplex mode.

11.1 Configurating using the config ces-psn command

For translating TDM data to packet type, you can assign destination IP and gateway address via CES-PSN commands interactively.

Command	**Description**
PSN ip? [A.B.C.D/M]	Sets the ces-psn interface's IP address. To establish encapsulated (by RTP-PW or MEF-PW) packet forwarding session, the Destination IP address is assigned mandatorily.
PSN gateway [A.B.C.D]	Sets the ces-psn interface's default gateway.
PSN VLAN status? [enable|disable]	Enables/Disables the VLAN status. If PSN vlan status is enabled, the TDM data is encapsulated by adding 4bytes, VLAN tag field.

PSN VLAN id ? [1-4094]	Sets the VLAN ID.
PSN IEEE 802.1p priority? [0-7]	Sets the VLAN 802.1p tag.
PSN Save the configuration? [yes|no]	Saves the ces-psn configuration.

11.2 Configurating using the config ces-psn command

CES-PSN is virtual interface only for bridging context(s) between TDM and uplink ports

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>show ces-psn</td><td>Displays CES-PSN configuration.
<pre>

  CES PSN Configuration

==
  IP address   : 10.0.1.5
  MAC address   : 00-e0-1a-84-65-21
  Subnet mask   : 255.255.0.0
  Default gateway IP   : 10.20.254.101
  VLAN status   : enable
  VLAN ID   : 40
  VLAN 802.1p priority   : 0

</pre></td></tr>
<tr><td>show ces-psn pkc-stats</td><td>
<table>
<tr><th colspan="2">Received</th></tr>
<tr><td>Protocol cnt</td><td>Displays packets encapsulated RTP-pw, MEF-pw or MPLS-pw counter.</td></tr>
<tr><td>Protocol no match</td><td>Displays packets neither RTP-pw, MEF-pw or MPLS-pw encapsulated counter.</td></tr>
<tr><td>Classify no match</td><td>Displays encapsulated RTP-pw, MEF-pw or MPLS-pw packets are not classified to specific context counter.</td></tr>
<tr><td>Verify fail</td><td>Displays encapsulated RTP-pw, MEF-pw or MPLS-pw but invalid packets counter.</td></tr>
<tr><td>IPv4 checksum</td><td>Displays RTP-pw, MEF-pw or MPLS-pw encapsulation with invalid IP checksum counter.</td></tr>
</table>
Displays the internal packet classifier counters.</td></tr>
<tr><td>show ces-psn pki-stats</td><td>Displays the internal packet counters.
<table>
<tr><th colspan="2">Receive Total</th></tr>
<tr><td>BYTES RX</td><td>Displays the received bytes in good and bad packets.</td></tr>
<tr><td>BYTES RX GOOD</td><td>Displays the received bytes in good packets.</td></tr>
</table></td></tr>
</table>

FRAME RX	Displays the received good and bad frame.
FRAME RX GOOD	Displays the received good frame.
FLOW CTRL RX	Displays the received pause frame.
MULTICAST RX	Displays the received multicast frame.
BROADCAST RX	Displays the received broadcast frame.
64	Displays the received 64bytes frames in good and bad packets.
65 TO 127	Displays the received 65~127bytes frames in good and bad packets.
128 TO 255	Displays the received 128~255bytes frames in good and bad packets.
256 TO 511	Displays the received 256~511bytes frames in good and bad packets.
512 TO 1023	Displays the received 512~1023bytes frames in good and bad packets.
1023 TO 1518	Displays the received 1024~1518bytes frames in good and bad packets.
JABBER	Displays the received frames longer than max frame length with invalid CRC.
OVERSIZE	Displays the received frames longer than max frame length with valid CRC.
FRAGMENT	Displays the received frames shorter than 64 bytes with invalid CRC.
UNDERSIZE	Displays the received frames shorter than 64 bytes with valid CRC.
ALIGNMENT	Displays the received alignment errors.
CRC	Displays the received CRC errors.
COLLISION	Displays the received collision.
FILTER	Displays the received filter counts.

Transmit Total	
BYTES TX	Displays the transmitted bytes in good and bad packets.
FRAME TX FAIL	Displays the transmitted failure packets.
UNICAST TX	Displays the transmitted unicast packets.
FLOW CTRL TX	Displays the transmitted pause packets.
NON UCAST TX	Displays the transmitted not unicast packets.

11.3 Clearing the CES-PSN packet counter

To monitor CES-PSN counters efficiently, clear the CES-PSN packet classifier and counter.

Command	**Description**
set ces-psn pki-stats clear	Clear accumulated packet counter to 0.
set ces-psn pkc-stats clear	Clear accumulated packet classification counter to 0.

12 Configuring CES-Context

Each stream of packets created by the packet assembler is called a **Context** in GL6510.

Context contains the information on how to manipulate the packets to be received or sent to TDM stream interfaces. To enable the encapsulation between the TDM stream and PSN packets, the context information contains a logical identifier (ID) to configure the end-to-end connection to transport TDM data over Packet Switch Network. So the context consists of the parameters including the TDM port (E1/T1), IP address, UDP port / ECID, LAN port and so on.

12.1 Context configuration using set command

Using set command, the context is configured without checking interaction.

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>set ces-context (Context ID|<Context List>)
(enable|disable)</td><td>Enables/Disables the context status. If the each context ID is specified and not enabled, the context is not used.

Available context ID for each product.
TDMGW11: 1-32
TDMGW21: 1-64
TDMGW41/4: 1-128
TDMGW8: 1-256</td></tr>
<tr><td>set ces-context (Context ID|<Context List>)
dst-ip A.B.C.D</td><td>Sets the context destination IP address.
Each context’s destination IP address assignment is mandate.</td></tr>
<tr><td>set ces-context (Context ID|<Context List>) dst-mac xx-xx-xx-xx-xx-xx</td><td>Sets the context destination MAC address statically.</td></tr>
<tr><td>In TDM frame mode
set ces-context (Context ID|<Context List>)
protocol (mef-pw|rtp-pw) timestamp (bit|
byte) frames-per-packet (1-62)</td><td>Determines what kind of protocols, timestamp-increment and length of payload are employed for encapsulating on the pseudo wire in TDM frame mode.

Check the maximum frames-per-packet length as following:

<table>
<tr><th>Timestamp</th><th>Interface</th><th>RTP-PW</th><th>MEF-PW</th></tr>
<tr><td rowspan="2">Bit</td><td>T1</td><td>42</td><td>42</td></tr>
<tr><td>E1</td><td>31</td><td>31</td></tr>
<tr><td rowspan="2">Byte</td><td>T1</td><td>60</td><td>62</td></tr>
<tr><td>E1</td><td>45</td><td>46</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td></td></tr>
<tr><td>In TDM unframed mode
set ces-context (Context ID|<Context List>)
protocol (mef-pw|rtp-pw) timestamp (bit| byte) bytes-per-packet <1-1492></td><td>Determines what kind of protocols, type of timestamp-increment and length of payload are employed for encapsulating on the pseudo wire in TDM unframed mode.

Check the maximum bytes-per-packet length as following.

<table><tr><th>Timestamp</th><th>RTP-PW</th><th>MEF-PW</th></tr><tr><td>Bit</td><td>1023 bytes</td><td>1023 bytes</td></tr><tr><td>Byte</td><td>1456 bytes</td><td>1492 bytes</td></tr></table></td></tr>
<tr><td>set ces-context (Context ID|<Context List>)
udp-dst-port <0-65535></td><td>Specifies the transmission destination-point of pseudo wire connection. This value is valid when using the RTP protocol mode.

The RTP pseudo-wire connection between two end-points is established with the {udpDestPort, udpSrcPort} pair in reverse.</td></tr>
<tr><td>set ces-context (Context ID|<Context List>)
udp-src-port <0-65535></td><td>Specifies the transmission source-point of pseudo wire connection. This value is valid when using the RTP protocol mode.

The RTP pseudo-wire connection between two end-points is established with the {udpDestPort, udpSrcPort} pair.</td></tr>
<tr><td>set ces-context (Context ID|<Context List>)
mef-ecid <0-1048575></td><td>Specifies the transmission ECID of pseudo wire connection.
Virtual circuit or pseudo wire receiving identifier to distinguish it from other pseudo wire connection.
This value is valid when using the MEF-PW protocol mode.</td></tr>
<tr><td>set ces-context (Context ID|<Context List>)
jitter-buffer <125-120,000></td><td>Specifies the jitter buffer size to compensate for packet delay variation (PDV) that is present in the packet network. The value is configured with integer multiple of 125us.</td></tr>
<tr><td>set ces-context (Context ID|<Context List>)
priority (high|highest|low|lowest)</td><td>Specifies the packet priority. The more the value is increased, the more often the packets in the queue are processed first.</td></tr>
<tr><td>set ces-context (Context ID|<Context List>) tdm-port <1-4></td><td>Specifies the TDM port to access. A grouped channel in the context is sent out using this port.</td></tr>
<tr><td>set ces-context {Context ID} tdm-channel-list <ChannelList></td><td>Specifies the available channels according to the interface type (E1 or T1). Each Channel can be marked with either a ‘1’or ‘0’. If this parameter is marked with</td></tr>
</table>

	'0', no TDM data is accessed via this port.
set ces-context {Context ID} tdm-first-channel <1-32>	Specifies which channel should appear at the start of each TDM frame. Note that the first channel range is from 1 to 24 in T1 mode.
set ces-context copy {Context ID} (Context ID|<Context List>)	Copy a specified context to destined context(s). All of context parameters are copied to target.

12.2 Context configuration with config ces-context command

It is possible to configure TDM parameters interactively using the `config` command. GL6510 CLI is recommended for configuring using **config ces-context** mode.

`[value]` means configurable value.

`(value)` means configured former value.

12.2.1 Frame mode/ RTP-PW type

On TDM frame and RTP-PW protocol mode, the frame per packet, ip-tos, UDP port number, and timestamp- increment, use the **config ces-context** command.

Notably in RTP-pw mode, the udp port number and the destination IP address combination should be used to create a unique packet network session.

To configure each context, enter `config ces-context`.

Command	**Description**
Context ID? [Context ID]	Assigns the context ID to be configured. Each product has different available contexts in frame mode: TDMGW11: 1-32 TDMGW21: 1-64 TDMGW41: 1-128 TDMGW4: 1-128 TDMGW8: 1-256
Context #ID status? [enable|disable]	Sets the context status.
Context #ID protocol-type? [mef-pw|rtp-pw]	Sets the protocol type.
Context #ID dst-ip? [A.B.C.D]	Sets the destination IP address and bit mask.
Context #ID ip-tos? [0-255]	Sets the ToS field.

Context #ID udp-src-port? [0-65535]	Configures the UDP source port number.
Context #ID udp-dst-port? [0-65535]	Configures the UDP destination port number.
Context #ID jitter-buffer? [125-120000]	Sets the Jitter buffer size.
Context #ID timestamp-increment? [bit|byte]	Sets the timestamp increment type to bit or byte.
In bit type timestamp increment **Context #ID frames-per-pkt? [1-31]** **Or** **In byte type timestamp increment** **Context #ID frames-per-pkt? [1-45]**	Sets the number of frames per packet counts.
Context #ID tdm-port? [TDMport]	Specifies the TDM port to access. A grouped channel in the context is sent out using this port.
Context #ID tdm-channel-list? [ex: 1 or 1,2 or 1-32]	Specifies the available channels according to the interface type (E1 or T1).
Context #ID tdm-first-channel? [1-24(T1), 1-32(E1)]	Specifies which channel should appear at the start of each frame.
Context #ID priority? [highest| high|low|lowest]	Specifies the packet priority.
Context #ID save the configuration? [Yes|No]	Saves the configuration.

12.2.2 Unframe mode/ RTP-PW type

On TDM unframed/ RTP-PW protocol mode, bytes per packet, ip-tos, UDP port number, and timestamp-increment use the `config ces-context` command.

Command	**Description**
Context ID? [Context ID]	Assign the context ID to be configured. Each product has different available contexts in unframe mode: TDMGW11: 1 TDMGW21: 1-2 TDMGW41: 1-4 TDMGW4: 1-4 TDMGW8: 1-8

Context #ID status? [enable|disable]	Sets the context status.
Context #ID protocol-type? [mef-pw|rtp-pw]	Sets the protocol type.
Context #ID dst-ip? [A.B.C.D]	Sets the destination IP address and bit mask.
Context #ID ip-tos? [0-255]	Sets the ToS field.
Context #ID udp-src-port? [0-65535]	Configures the UDP source port number.
Context #ID udp-dst-port? [0-65535]	Configures the UDP destination port number.
Context #ID jitter-buffer? [125-120000]	Sets the Jitter buffer size.
Context #ID timestamp-increment? [byte|bit]	Sets the timestamp increment type to bit or byte.
In 'bit' type timestamp-increment **Context #ID bytes-per-pkt? [1-1023]** **or** **In 'byte' type timestamp-increment** **Context #ID bytes-per-pkt? [1-1456]**	Sets the bytes counts.
Context #ID tdm-port? [TDMport]	Sets the TDM port number.
Context #ID priority? [highest|high|low| lowest]	Sets the queue priority level
Context #ID save the configuration? [Yes|No]	Saves the configuration.

12.3 Displaying context status

Command	**Description**
show ces-context <Conext ID>	Displays context configuration. Example 1: display of context in frame mode in RTP-pw mode ----------

Context ID **TDMGW11: 1-32** **TDMGW21: 1-64** **TDMGW41/4:1-128** **TDMGW8: 1-256**	Context ID : 1 ========== Status : enable Protocol Type : RTP-PW Destination IP : 10.0.1.5 Destination MAC : 00-01-f4-0a-a6-bb IP TOS : 0 [Hex:0x00] UDP Source Port(Tx) : 1000 UDP Destination Port(Tx) : 1000 UDP Source Port(Rx) : 1000 UDP Destination Port(Rx) : 1000 Timestamp Increment Mode : Bit Jitter Buffer Size : 2000 us Frames Per Packet : 10 packet(s) TDM Port : 1 TDM Channel(s) : [Number of assigned Channels : 32] --- |1 |2 |3 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 --- O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O --- TDM First Channel : 1 Tx Priority : Highest --- In MEF-pw mode --- Context ID : 1 ========== Status : enable Protocol Type : MEF-PW MEF ECID : 1 Destination MAC : 00-01-f4-0a-a6-bb Timestamp Increment Mode : Bit Jitter Buffer Size : 2000 us Frames Per Packet : 10 packet(s) TDM Port : 1 TDM Channel(s) : [Number of assigned Channels : 32] --- |1 |2 |3

```
  1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6
7 8 9|0 1 2
-------------------------------------------------------
  O O O O O O O O O O O O O O O O O O O O O O O O O O
O O O O O O
-------------------------------------------------------
TDM First Channel       : 1
    Tx Priority             : Highest
-------------------------------------------------------
```

Example 2: display of context in unframed mode

In RTP-pw mode

```
-------------------------------------------------------
------------
  Context ID               : 1
=======================================================
============
  Status                   : enable
  Protocol Type            : RTP-PW
  Destination IP           : 10.0.1.5
  Destination MAC          : 00-01-f4-0a-a6-bb
  IP TOS                   : 0 [Hex:0x00]
  UDP Source Port(Tx)      : 1000
  UDP Destination Port(Tx) : 1000
  UDP Source Port(Rx)      : 1000
  UDP Destination Port(Rx) : 1000
  Timestamp Increment Mode : Bit
  Jitter Buffer Size       : 2000 us
  Frames Per Packet        : 10 packet(s)
  TDM Port                 : 1
  Tx Priority              : Highest
-------------------------------------------------------------
```

In MEF-pw mode

```
-------------------------------------------------------
------------
  Context ID               : 1
=======================================================
============
  Status                   : enable
  Protocol Type            : MEF-PW
  MEF ECID                 : 1
  Destination MAC          : 00-01-f4-0a-a6-bb
  Timestamp Increment Mode : Bit
  Jitter Buffer Size       : 2000 us
  Frames Per Packet        : 10 packet(s)
  TDM Port                 : 1
  Tx Priority              : Highest
```

	----------
show ces-context list	Displays enabled or disabled context list. Example 1: display of context list in frame mode In Frame mode All contexts are disabled in framed mode. ---------- Enabled Context List : - - - - - - - - - - - - - - - … - - - - - - - - Disabled Context List : 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 … 121 122 123 124 125 126 127 128 ---------- Example 2: display of context list in unframed mode In unframed mode You are only able to use 4 contexts in unframed mode ---------- Context Status Information ========== Enabled Context List : 1 2 3 4 Disabled Context List : - - - - ---------- Displays enabled or disabled context list.
show ces-context protocol	Displays protocol usage per each context RTP-PW or MEF-PW. Example 1: display in frame mode ---------- Context Protocol Information ==========

```
  RTP-PW context:
         1   2   3   4   5   6   7   8   9  10  11  12
13  14  15
        …
       121 122 123 124 125 126 127 128
  MEF-PW context:
        -   -   -   -   -   -   -   -   -   -   -   -
-   -   -
        …
        -   -   -   -   -   -   -   -
  ------------------------------------------------------
  -----------
```

Example 2: display in unframed mode

```
  ------------------------------------------------------
  ----------
  Context Protocol Information
  ======================================================
  ===========
  RTP-PW context:
         1   2   3   4
  MEF-PW context:
        -   -   -   -
  ------------------------------------------------------
  ------------
```

show ces-context jitter-info

Displays total and each context jitter buffer status.

```
  ------------------------------------------------------
  ------------
  Jitter Buffer Information
  ======================================================
  ============
  Total Jitter | Used Jitter | Free Jitter
  ------------------------------------------------------
  -----------
     480000 us |     8000 us |   472000 us
  ------------------------------------------------------
  ------------
  ------------------------------------------------------
  -----------
  Jitter Buffer Usage Information
  ======================================================
  ============
ID     Jitter | ID     Jitter | ID     Jitter | ID
Jitter
  ------------------------------------------------------
```

	`` ------------ 1 : 2000us 2 : 2000us 3 : 2000us 4 : 2000us --- ```
show ces-context channels (Portnumber|all) **Portnumber** **TDMGW11: 1** **TDMGW21: 1-2** **TDMGW41/4: 1-4** **TDMGW8: 8**	Displays TDM channels per each TDM port. ``` --- TDM Port : 1 === |1 |2 |3 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 --- O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O --- ```
show ces-context rx-status <1-128|all > **Context ID** **TDMGW11: 1-32** **TDMGW21: 1-64** **TDMGW41/4:1-128** **TDMGW8: 1-256**	Displays received side's context status. ``` --- Rx State of enabled context(s) === Context #1 : state = active --- ``` Rx-context queue is processed without buffering, so the state is indicated as `active` or `not in use`
show ces-context tx-status < 1-128|all> **Context ID** **TDMGW11: 1-32** **TDMGW21: 1-64** **TDMGW41:1-128** **TDMGW4: 1-128** **TDMGW8: 1-256**	Displays transmitted side's context status. ``` --- Tx State of enabled context(s) === Context #1 State = active Avg Length = 0.500 ```

```
  Full Count =          0        Underruns  =        0
  Late Count =          0        Early Pkts =        0
-------------------------------------------------------
---------
```

Status	Description
State	Not in use: context is disabled Initialising: all context parameters are configured to establish the Packet network connection. (Context creation is O.K.) Updating: packet network session is established up but TDM port can't detect any received data. Tearing down: Context is torn down by setting the context to disabled Active: packet network session is established up and TDM port can detect transmitted and received data.
Avg Length	Transmitted TDM data's average queue level.
Full count	The total queue size and overflown for TDM data is full. In this case any received TDM data will be dropped.
Late Count	Transmitted TDM data counts stacked under minimum queue level.
Underruns	No TDM data to transmit in queue.
Early Pkts	Transmitted TDM data counts stacked over maximum queue level.

show ces-context txq-status <Context ID>

Context ID

TDMGW11: 1-32

TDMGW21: 1-64

TDMGW41/4:1-128

TDMGW8: 1-256

Displays TDM data's transmission queue status.

```
-------------------------------------------------------
---------
  Tx Queue State of enabled context(s)
=======================================================
=========
  Context 1.            Tx Queue Status
  Max = 7,              Min = 5
  Avg = 6.500,          PDV = (+|-)   1 frames(0.000125
ms)
-------------------------------------------------------
---------
```

Status	Description
Max	Displays dynamic adjusted maximum queue level.
Min	Displays dynamic adjusted minimum queue level.
Avg	Displays dynamic adjusted average queue level.
PDV	Displays (Max-Min)/2 value.

You can estimate a real network delay by checking the transmission queue status.

Example: Jitter buffer size is tuned by checking and comparing context txq-status.

	If byte per pkt is set to 256 and show context txq-status displays as below: `---------- Tx Queue State of enabled context(s) ========== Context 1. Tx Queue Status Max = 15, Min = 11 Avg = 14.500, PDV = (+|-) 2 frames(0.000250 ms) ----------` then you can estimate packet delay in real network. Estimated jitter buffer delay = (Avg – min) x Frame per pkt (or Bytes per pkt/32 (or 24)) x 125 = 3.5 x 8 x 125 = 3500us It is recommended to configure context Jitter buffer delay as 3500us.

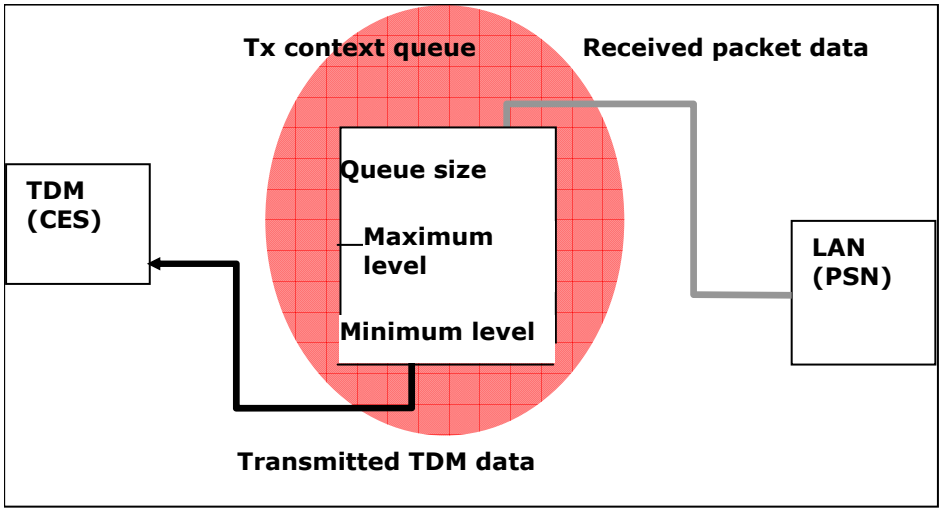


Figure 29: Example of context tx queue

13 Configuring SNMP

13.1 SNMP Introduction

SNMP (Simple Network Management Protocol) is the protocol that observes the operation of network devices defined as RFC of IETF and collects statistics, performance, and security information. It is the network management protocol used on most TCP/IP networks, although it is limited to the TCP/IP network. It exchanges MIB type data with the network device when the SNMP protocol is operating. When exchanging MIB, it uses four kinds of basic messages defined by the SNMP. By default, the SNMP is activated and read only, community is set to 'public', and the read/write community is set to 'private'. The host receiving the SNMP trap signal is not defined. Therefore, the host IP needs to be registered to receive the trap signal.

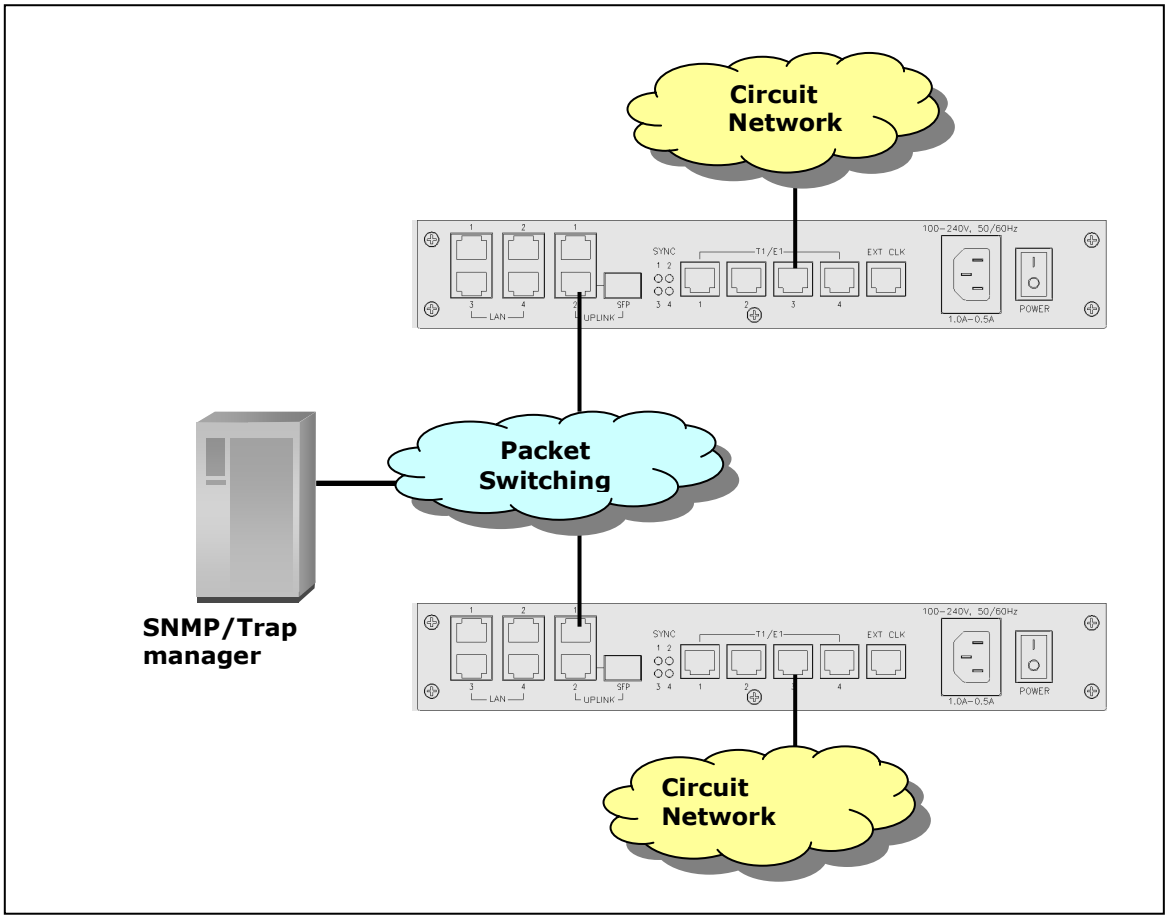


Figure 30: Example of SNMP configurations

13.2 SNMP Commands

Command	Description

set snmp (enable|disable)	Enables/disables snmp server daemon status.
set snmp get-community <1-4> {Name}	Sets the get(Read only) community. The default community is 'public'.
set snmp set-community <1-4> {Name}	Sets the set(Read only) community. The default community is 'private'.
set snmp (get-community|set-community) clear	Deletes get or set community.
show snmp	Displays the snmp configuration and status.

Table 9.1: Configuration of SNMP communities

Command	**Description**
set snmp trap-ver (1|2)	Sets the SNMP trap version to SNMPv1 or SNMPv2c. **1**: Trap (SNMP v1) **2**: Notification (SNMP v2c)
set snmp trap (cold-start| auth-fail|…| tdm-ais|all) (enable|disable)	Enables or disables traps transmission. **cold-start**: trap that agent is reinitialized by rebooting. **auth-fail**: trap that a user specifies incorrect community. **linkup**: trap that TDM port has connected. **linkdown**: trap that TDM port has disconnected. **fan-fail**: trap that fan is down or abnormal. **fan-restore**: trap that abnormal fan status turns to normal. **lan-linkup**: trap that LAN port has connection. **lan-linkdown**: trap that LAN port disconnection. **failover**: trap that LAN redundancy detection **tdm-sync**: trap that TDM port sync detection. **tdm-loslof**: trap that TDM port LoS/LoF detection. **tdm-rai**: trap that TDM port RAI detection. **tdm-ais**: trap that TDM port AIS detection.
set snmp trap-community <1-4> {Community} A.B.C.D	Sets the trap community and assigns IP address of trap receiver. The default community is public.
set snmp trap-community clear	Deletes configured trap-community.

show snmp	Display snmp configuration.

Table 38: Configuration of trap properties

```
GW6000# set snmp get-community 1 admin
▶▶ Sets SNMP get-community as admin

GW6000# set snmp set-community 1 admin
▶▶ Sets SNMP set-community as admin

GW6000# set snmp trap-ver 2
▶▶ Sets SNMP trap version as SNMPv2C

GW6000# set snmp trap all disable
▶▶ Sets SNMP traps to disable

GW6000# set snmp trap failover enable
▶▶ Sets failover traps to enable

GW6000# set snmp trap-community 1 admin 10.20.1.67
▶▶ Sets SNMP set-community as admin

GW6000# show snmp
▶▶ Check the synchronised date and time from server

  ------------------------------------------------------------
-------------
  SNMP (Simple Network Management System) Configuration

============================================================
===========
  SNMP server status                        enabled
  SNMP trap PDU version                     SNMPv2c
  ------------------------------------------------------------
-------------
  Get Community Name   1                     admin ▶▶ Get
community
  Get Community Name   2
  Get Community Name   3
  Get Community Name   4
  ------------------------------------------------------------
-------------
  Set Community Name   1                     admin ▶▶ Set
community
  Set Community Name   2
  Set Community Name   3
  Set Community Name   4
```

```
  ------------------------------------------------------------
-------------
  Trap Community Name  1                    admin ▶▶ Trap
community
  Trap Community Name  2
  Trap Community Name  3
  Trap Community Name  4
  ------------------------------------------------------------
-------------
  Trap Host IP Address 1               10.20.1.67 ▶▶ Manager's
IP address
  Trap Host IP Address 2
  Trap Host IP Address 3
  Trap Host IP Address 4
  ------------------------------------------------------------
-------------
  Cold Start Trap                          disabled
  Authentication Failure Trap              disabled
  Link Up Trap                             disabled
  Link Down Trap                           disabled
  FAN Fail Trap                            disabled
  FAN Restore Trap                         disabled
  LAN Link Up Trap                         disabled
  LAN Link Down Trap                       disabled
  LAN Link Failover Trap                    enabled ▶▶ Failover
trap is enabled
  TDM Sync Trap                            disabled
  TDM LOS/LOF Trap                         disabled
  TDM RAI Trap                             disabled
  TDM AIS Trap                             disabled
  ------------------------------------------------------------
-------------
```

Figure 31: Example of SMNP configuration

14 Configuring NTP

14.1 NTP configuration

NTP (Network Time Protocol) is a protocol that allows the client or server time to be synchronised with a time source such as another server, a radio, or a satellite set top box, and to exchange the time with each other.

NTP is a higher layer protocol than TCP/IP and provides a 1/10,000,000 second unit time referring to several time sources. With the NTP server, time synchronisation can be set once or periodically. With GL6510, you synchronise the time periodically with a defined remote NTP server. When NTP is activated, the time synchronisation interval is set from 1 to 100 hours.

14.2 NTP Commands

Command	Description
set ntp (enable|disable)	Enables or disables NTP daemon that synchronises the time periodically with the NTP server. NTP is not activated if the NTP server IP is not defined.
set ntp add-server A.B.C.D	Sets the NTP server IP address. Up to 3 server IP addresses may be added.
set ntp delete-server A.B.C.D	Deletes the NTP server IP address.
set ntp polling-interval <1-100>	Sets the polling time period (hour) to get time from NTP server.
Set ntp delay-time <disable|1-30>	Sets the delay time (second) Disable: delay time is set as '0'

Table 39: NTP commands

```
GW6000# set ntp delay-time 30
▶▶ Sets ntp delay time to 30 seconds

GW6000# set ntp add-server 10.20.252.7
▶▶ Adds ntp server

GW6000# set ntp enable
▶▶ Sets ntp client to enable
```

```
  NTP is enabled ▶▶ System notifies NTP is enabled

  GW6000# 28 Apr 10:24:57 ntpdate[218]: set time from server
  10.20.252.7
▶▶ System notifies date and time is synchronised from server

  GW6000# show ntp
  ▶▶ Displays NTP configuration

    ------------------------------------------------------------
  -------------
    Network Time Protocol Configuration

  ============================================================
  ===========
    NTP status            :      Enabled
    NTP polling-interval  :      1 hour
    NTP Delay time        :      5 second
    server 1              :      10.20.252.7
  ------------------------------------------------------------
  -----------

  GW6000# show date ▶▶ Check the synchronised date and time from
  server
  Thu Apr 28 10:25:22 GMT+9 2005
```

Figure 32: Example of NTP configuration

15 Configuring Access host

15.1 Access host introduction

GL6510 supports 'Access host' to a secure system from remote access. You can add an accessible host list using this function. When giving permission to a designated IP address, only that host is able to access to system remotely. By default, all hosts have the telnet authority to access the system.

15.1.1 Access host configuration commands

Command	Description
set access-host (enable|disable)	Allows or denies (Enables/Disables) remote (telnet, http and snmp) access to a device on a designated network.
set access-host (add|delete) A.B.C.D	Adds or deletes access host.
show access-host	Displays the Access host configuration.

Table 40: Access host commands and descriptions

To get a date and time from an NTP server, add the NTP's server's IP address to the access host list.

16 Monitoring via PMON counter

16.1 PMON counter

By using PMON counters, the GL6510 has PMON statistics and status. Through PMON statistics and status, you can check the number of errors, events and alarms on each access line. The parameters displayed depend on the TDM mode, T1 or E1.

16.1.1 PMON commands

The PMON commands count the number of errors or events for each E1 interface.

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>show ces-tdm pmon statistics</td><td>Displays errors-detected counts.

<table>
<tr><th>Counter</th><th>Description</th></tr>
<tr><td>ES (Error Second)</td><td>Displays one bit errors (CRC or LoF) during a second interval.
ES are not incremented during UAS.</td></tr>
<tr><td>SES (Severely ES)</td><td>SES is defined as a subset of ES.
If more 320 CRC or one or more LoF.
SES are not incremented during UAS.</td></tr>
<tr><td>UAS (Unavailable Sec.)</td><td>Number of seconds during which the port is unable to transmit or receive traffic because of detection of 10 consecutive SES or ES.</td></tr>
</table>

Example of display:
<pre>

  PMON Statistics
==
============
TDM Port | ES(Error Second) SES(Severely ES)
UAS(Unavailable Second)

----
    1 | 0   1
0
    2 | 1   1
0
    3 | 1   1
0
    4 | 0   1
0

</pre>
</td></tr>
</table>

```
--------------
Time Since :  268 sec
-------------------------------------------------------------
--------------
```

show ces-tdm pmon status

Displays errors and alarm detection.

Counter	Description
Loss Of Signal	Displays detection of LoS alarm
Loss Of Frame	Displays detection of LoF alarm only frame mode
RAI(Yellow Alarm)	Displays detection of RAI alarms
AIS(Blue Alarm)	Displays detection of RAI alarms

```
-------------------------------------------------------------
--------------
  PMON Status
=============================================================
==============
 TDM Port  |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)
AIS(BlueAlarm)
-------------------------------------------------------------
--------------
     1     |   detect        none         none
none
     2     |   detect        none         none
none
     3     |   detect        none         none
none
     4     |   detect        none         none
none
-------------------------------------------------------------
--------------
```

set ces-tdm pmon clear

Clears E1 error and event accumulated counts.

Command	Description
show ces-tdm pmon statistics	Displays errors-detected counts.

Counter	Description
ES (Error Second)	Displays one bit errors (CRC or LoF) during a second interval. ES are not incremented during UAS.
SES (Severely ES)	SES is defined as a subset of ES. If more 320 CRC or one or more LoF. SES are not incremented during UAS.
UAS (Unavilable Sec.)	Number of seconds during which the port is unable to transmit or receive traffic because of detection of 10 consecutive SES or ES.

Example of display

```
-------------------------------------------------------
------------------
  PMON Statistics
=======================================================
==================
TDM Port    |  ES(Error Second)  SES(Severely ES)
UAS(Unavailable Second)
-------------------------------------------------------
------------------
    1       |                 0                  1
0
    2       |                 1                  1
0
    3       |                 1                  1
0
    4       |                 0                  1
0
-------------------------------------------------------
--------------------
Time Since :  268 sec
-------------------------------------------------------
--------------------
```

show ces-tdm pmon status

Displays errors and alarm detection.

Counter	Description
Loss Of Signal	Displays detection of LoS alarm
Loss Of Frame	Displays detection of LoF alarm only frame mode
RAI(Yellow Alarm)	Displays detection of RAI alarms
AIS(Blue Alarm)	Displays detection of RAI alarms

```
-----------------------------------------------------------------
    PMON Status
=======================================================
====================
 TDM Port   |   LossOfSignal  LossOfFrame
```

	RAI(YellowAlarm) AIS(BlueAlarm) ---------- ---------- ---------- 1 | detect none none none 2 | detect none none none 3 | detect none none none 4 | detect none none none ---------- ---------- ----------
set ces-tdm pmon clear	Clears E1 error and event accumulated counts.

17 Configuring SSL

The Secure Sockets Layer (SSL) is a common protocol for managing the security of a message transmission on the Internet. SSL has recently been succeeded by Transport Layer Security, which is based on SSL. SSL uses a program layer located between the Internet's Hypertext Transfer Protocol (HTTP) and Transport Control Protocol (TCP) layers.

17.1 Commands for SSL

Command	Description
set system ssl (enable|disable)	Enables/disables SSL.
show system	Displays SSL status.

18 Loading profiles

The GL6510 provides system default and user specific profiles of up to 10 entries for each case. Profiles are classified and manipulated depending on the TDM clock mode and uploaded to the remote GL6510 via FTP.

18.1 Profile commands

Command	Description
show profile list	Displays the system user-defined profiles.
set profile create {Profile name}	Creates user-defined profiles from the current system configuration. By assigned profile name, a new profile is created and saved to the system memory.
set profile load (e1-adaptive-frame|…|t1-loopback-unframe)	Uploads profile to destination system. Remote systems are also uploaded via FTP.
set profile load user-defined {Profile name}	Uploads user-defined profile to destination system. Remote systems are also uploaded via FTP.
set profile rollback	Reverts to the previous configuration profile.

Table 41: Profile commands

1. If profile is loaded, reboot the system
2. Not included parameters:
    1. System,CES-PSN IP address
    2. System gateway.
    3. SNMP, Web, syslog agent parameters
    4. NTP parameters

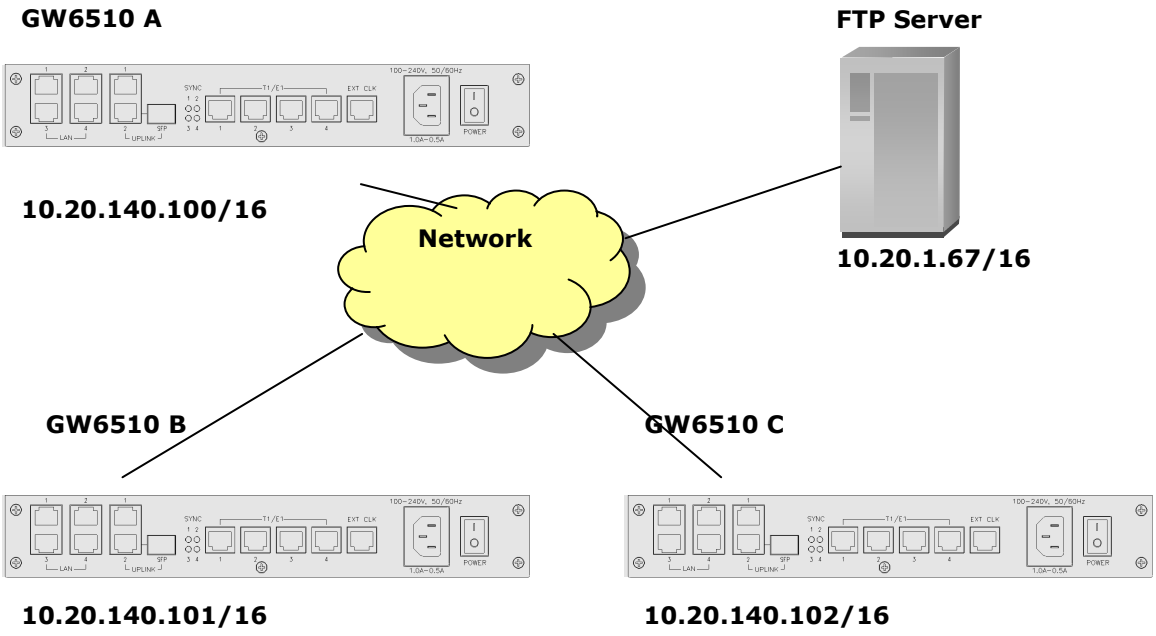


Figure 33: Network diagram

Step 1 (GL6510-A CLI side): GL6510-A creates user-defined profile on GL6510-A.

```
GL6510_A# set profile create apple.conf
GL6510_A# show profile list
apple.conf
```

Step 2 (FTP server side): FTP server copies apple.conf from GL6510-A.

```
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\up>
C:\up>ftp 10.20.140.100                    ▶▶Connect GL6510A
Connected to 10.20.140.100.
220 GW6000 FTP server (Version wu-2.6.2(3) Wed Jan 19 16:20:03
KST 2005) ready.
User (10.20.140.100:(none)): anonymous ▶▶Login Name for
profile downloading
331 Guest login ok, send your complete e-mail address as
password.
Password:                                   ▶▶Enter any E-mail type
as password
```

```
                                                    for example)
abc@admin.co.kr
230 Guest login ok, access restrictions apply.
ftp> ls
200 PORT command successful.
150 Opening ASCII mode data connection for file list.
apple.conf                              ▶▶GL6510A's user
defined profile is saved
226 Transfer complete.
ftp: 12 bytes received in 0.00Seconds 12000.00Kbytes/sec.
ftp> get apple.conf                     ▶▶Get profile from
GL6510-A
200 PORT command successful.
150 Opening ASCII mode data connection for apple.conf (1035
bytes).
226 Transfer complete.
ftp: 1062 bytes received in 0.00Seconds 1062000.00Kbytes/sec.
ftp> bye                                ▶▶ Disconnect
GL6510A's FTP connection
221-You have transferred 1062 bytes in 1 files.
221-Total traffic for this session was 1633 bytes in 2
transfers.
221-Thank you for using the FTP service on GW6000.
221 Goodbye.
```

Step 3 (GL6510-B,C side): GL6510-B,C loads 'apple.conf' from FTP server

```
GW6000# ftp 10.20.1.67
Connected to 10.20.1.67.
220 3Com 3CDaemon FTP Server Version 2.0
Name (10.20.1.67:root): profile      ▶▶ Login user defined
name.
331 User name ok, need password
Password:******                      ▶▶ Enters password.
230 User logged in
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> get apple.conf                  ▶▶ Copies GL6510's
profile from FTP server.
local: apple.conf remote: apple.conf
200 PORT command successful.
150 File status OK ; about to open data connection
226 Closing data connection; File transfer successful.
1062 bytes received in 0.00 secs (627.4 kB/s)
ftp> bye                             ▶▶ Exit FTP shell
221 Service closing control connection
```

```
GW6000#

GW6000# show profile list                                    ▶▶ Check the
profile is copied correctly
apple.conf

GW6000# set profile load user-defined apple.conf             ▶▶ Loads the
profile
Press 'Y' or 'y' to load profile.

Please reboot now.
GW6000# reboot                                               ▶▶ Reboot
system to apply the profile loading
```

19 Configuring RMON

19.1 RMON introduction

SNMP uses a method of periodically polling system information to analyze the network status. RMON (Remote network MONitoring) is a communication protocol that manages the network as an MIB type using a way of defining the network analyzing method (Control MIB), analyzing, and restoring the results on the system itself (Data MIB), and reporting it to the NMS. The SNMP has only Data MIB. RMON has two kinds of attributes: Control MIB and Data MIB, and analyzes the network according to the Control MIB definition and restores the results to the Data MIB Instance.

The GL6510 supports 1 (Statistics), 2 (History), 3 (Alarm), and 9 (Event) among the nine groups of RMON-I (RMON Lite). RMON uses the same basic messages as the SET/GET message of the SNMP and several kinds of reports defined by RMON transfers as trap types. Therefore the manager that wants to receive a report from RMON should be set as a SNMP Trap Host first. The GL6510 allows you to configure the Control MIB for each group via the CLI or the Web in addition to the external RMON Manager. A Statistics Group creates a Table (etherStatsTable) according to the number of physical ports. Other group controls analyze the network according to each control after being set and activated by the user. The analyzed network results are displayed via the RMON exclusive manager and the SNMP MIB browser.

19.2 RMON configuration

19.2.1 RMON History group control configuration

Command	Description
show rmon-control history	Displays the RMON history control information.
set rmon history (create|delete) index <1-65535>	All controls are managed via an Index. This creates controls as mapping an Index with a history control using a command in advance. This command creates or removes a control using an index between 1~65535. A maximum of 10 controls can be created. If a control is created, it is activated, the data source is IfIndex.1 (port 1), the bucket (a data column) has 50 entries, the sampling time is 30 minutes, and the owner name is 'monitor' by default. If you then activate the control, a history data table is automatically created as an Instance type of MIB (Data MIB) according to the defined parameters.
set rmon history (activate|deactivate) <1-65535>	Activates/deactivates the defined RMON history control.

set rmon history data-source <1-24> INDEX	Sets the data source port for the defined RMON history control. Enter the real source port number as the source port.
set rmon history request-bucket <1-100> <1-65535>	Changes the bucket size for the defined RMON history control.
set rmon history sample-interval <1-3600> <1-65535>	Sets the sampling time from between 1~3600 seconds for the defined RMON history control.
set rmon history owner {OWNER_NAME} <1-65535>	Sets the owner name for the defined RMON history control. The name can be up to 32 characters and spaces are not allowed.

Table 42: RMON history group control configuration

19.2.2 RMON alarm group/event control configuration

Command	Description
show rmon-control alarm	Displays the RMON alarm control information.
show rmon-control event	Displays the RMON event control information.
set rmon alarm create index <1-65535> f-event <1-65535> r-event <1-65535>	One alarm control is connected to 2 event controls (falling event, rising event) and therefore the falling and rising event indexes need to be entered together when creating an alarm control. A maximum of 10 alarm controls can be created. When an alarm control is created, the falling event control and the rising event control are coordinated. According to the content of the alarm Control, you can use both of them or none of them but the relationship is always maintained for the next usage. The initial value when creating an Alarm control is as follows: **Alarm control** **Active** / **Activate** Owner Name: monitor Falling threshold: 3 Rising threshold: 200 Sample type: Absolute Alarm variable: etherStatsPkts. 1 Alarm OID: 1.3.6.1.2.1.16.1.1.1.5.1 Startup alarm: Both Sampling interval: 1 second Alarm value: 0 **Falling event control**

Active	Activate
Owner Name	monitor
Community Name	public
Description	admin-FallingEvent
Event type	Event Log and Trap

Rising event control

Active	Activate
Owner Name	monitor
Community Name	public
Description	admin-RisingEvent
Event type	Event Log and Trap

Command	Description
set rmon alarm remove index <1-65535>	Removes the registered RMON alarm control. The event controls cooperating with the alarm control are also removed.
set rmon alarm owner {OWNER_NAME} <1-65535>	Sets the owner name for the defined RMON alarm control. This can be up to 32 characters and spaces are not allowed.
set rmon alarm (activate|deactivate) <1-65535>	Activates/deactivates the defined RMON alarm control.
set rmon alarm (falling-threshold|rising-threshold) <1-65535>	Sets the falling threshold or rising threshold from 1~65535 for the defined RMON alarm control.
set rmon alarm sample-interval <1-3600><1-65535>	Sets the sampling interval from between 1~3600 seconds for the defined RMON alarm control.
set rmon alarm sample-type (absolute|delta) <1-65535>	Sets the sample type as 'absolute' or as 'delta' type for the defined RMON alarm control.
set rmon alarm startup_alarm (none|rising|falling|both) <1-65535>	Sets the startup alarm for the defined RMON alarm control.
set rmon alarm sample-variable OID <1-65535>	Sets the OID for the defined RMON alarm control.

set rmon event (activate|deactivate) <1-65535>	Activates/deactivates the defined RMON event control.
set rmon event owner {OWNER_NAME} <1-65535>	Sets the owner name for the defined RMON event control. The name can be up to 32 characters and spaces are not available.
set rmon event community {COMMUNITY} <1-65535>	Sets the community name for the defined RMON event control. The name can be up to 32 characters and spaces are not available.
set rmon event description {Description} <1-65535>	Sets the description for the defined RMON event control. The description can be up to 128 characters and spaces are not allowed.
set rmon event event-type (none|log|trap|both) <1-65535>	Sets the event type for the defined RMON event control.

19.3 RMON configuration example

19.3.1 RMON History group control configuration example

```
GW6000 # rmon history create index 100
GW6000 # show rmon-control history
===== RMON History Group[2] Control Information =====
 Total Number of Control      : 1

 Control Index                : 100
 Control Active Status        : Activated
 Control Owner                : monitor
 Control Data Source          : IfIndex.1
 Control Request Bucket       : 50
 Control Sampling Interval    : 1800 (sec)
 ======================================================
```

Figure 34: RMON history group control configuration

```
GW6000 # rmon history data_source 3 100
▶▶ Changes the default setting value IfIndex.1 to 3 (IfIndex.3
= Port.3 )
▶▶ 100 is Index

GW6000 # rmon history owner admin 100
▶▶ Changes the default setting of Control Owner
```

```
from“monitor”to “i-Rex”.

GW6000 # rmon history request_bucket 70 100
▶▶ Increases the default setting of Bucket from 50  to 70

GW6000 # rmon history sample-interval 3 100
▶▶ Changes the default setting of Sampling Time from 1800
second to 3 second.

GW6000 # show rmon history
===== RMON History Group[2] Control Information =====
 Total Number of History Control   : 1

 Control Index                 : 100
 Control Active Status         : Activated
 Control Owner                 : ADMIN
 Control Data Source           : IfIndex.3
 Control Request Bucket        : 70
 Control Sampling Interval     : 3 (sec)
 ======================================================

GW6000 # rmon history deactivate 100
▶▶ Deactivates the control of History Control Index 100
```

19.3.2 RMON alarm group/event control configuration example

```
GW6000 # rmon alarm create index 200 f_event 300 r_event 400
GW6000 # show rmon-control alarm
======= RMON Alarm Group[3] Control Information =======

Total Number of Alarm Control    : 1

 Control Index                 : 200
 Control Active Status         : Activated
 Control Owner                 : monitor
 Control Falling Event         : 300
 Control Rising Event          : 400
 Control Falling Threshold     : 1
 Control Rising Threshold      : 65535
 Control Sampling Interval     : 1 (sec)
 Control Alarm Variable        : 1.3.6.1.2.1.16.1.1.1.5.1
 Control Sample Type           : Absolute
 Control Startup Alarm         : STARTUP RISING
 ========================================================
```

Figure 35: RMON alarm group/event control configuration

```
GW6000# rmon alarm falling-threshold 3 200
▶▶ Changes the default setting of falling threshold from 0 to
3. (200 is Index)

GW6000# rmon alarm rising-threshold 100 200
▶▶ Changes the default setting of rising threshold from 65535
to 100.

GW6000# rmon alarm owner admin 200
▶▶ Changes the default setting of Control Owner from
“monitor” to “i-Rex”

GW6000# rmon alarm sample-interval 3 200
▶▶ Changes the default setting of sampling time from 1second
to 3 second.

GW6000# rmon alarm sample-type delta 200
▶▶ Changes the default setting of Absolute to Delta  ( by the
range of change)

GW6000# rmon alarm sample-variable 1.3.6.1.2.1.16.1.1.1.5.2
200
▶▶ Changes the default setting of etherStatsPks.1 to
etherStatsPks.2
It is changeable to other MIB (ex, No. of TCP Connection)

GW6000# rmon alarm startup-alarm both 200
▶▶ The Default setting is activating the Both (falling/rising)
events but if necessary, it is possible to change to Rising
only, Falling only, or None

GW6000# show rmon-control alarm
===== RMON Alarm Group[3] Control Information =====
 Total Number of Alarm Control    : 1

 Control Index                 : 200
 Control Active Status         : Activated
 Control Owner                 : admin
 Control Falling Event         : 300
 Control Rising Event          : 400
 Control Falling Threshold     : 3
 Control Rising Threshold      : 100
 Control Sampling Interval     : 3 (sec)
 Control Alarm Variable        : 1.3.6.1.2.1.16.1.1.1.5.2
 Control Sample Type           : Delta
 Control Startup Alarm         : BOTH
 ================================================
```

```
GW6000# rmon alarm deactivate 200
▶▶ Deactivates the Control of Alarm Control Index 200
```

Figure 36:

```
GW6000# show rmon-control event
===== RMON Event Group[9] Control Information =====
 Total Number of Event Control    : 2

 Control Index                    : 300
 Control Active Status            : Activated
 Control Event Type               : EVENT LOG AND TRAP
 Control Owner                    : monitor
 Control Community                : public
 Control Description              : admin-FallingEvent
 ================================================

 Control Index                    : 400
 Control Active Status            : Activated
 Control Event Type               : EVENT LOG AND TRAP
 Control Owner                    : monitor
 Control Community                : public
 Control Description              : admin-RisingEvent
 ================================================
```

Figure 37:

```
GW6000# rmon event community admin 300
▶▶ Changes the default setting of trap community from “public”
to “admin”

GW6000# rmon event description CUSTOMER_Falling_1 300
▶▶ Changes the default setting of description from
“GL6510_FallingEvent” to “CUSTOMER_Falling_1”

GW6000# rmon event event-type trap 300
▶▶ Changes the default setting of Trap & Log to Trap Only

GW6000# rmon event owner admin 300
▶▶ Changes the default setting of Control Owner from “monitor”
to “admin”

GW6000# show rmon-control event
===== RMON Event Group[9] Control Information =====
 Total Number of Event Control    : 2

 Control Index                    : 300
 Control Active Status            : Activated
 Control Event Type               : EVENT TRAP
```

```
    Control Owner                  : admin
    Control Community              : admin
    Control Description            : CUSTOMER_Falling_1
    ====================================================

    Control Index                  : 400
    Control Active Status          : Activated
    Control Event Type             : EVENT LOG AND TRAP
    Control Owner                  : monitor
    Control Community              : public
    Control Description            : admin-RisingEvent
    ====================================================

  GW6000# rmon event deactivate 300
    ▶▶ Deactivates the Control of Event Control Index 300
```

Appendix A: Configuring Clock mode

1 GL6510 products introduction

GL6510-P4

4 TDM ports
1 External clock port
2 uplink ports
No user port
1 Management port

GL6510-P1

1 TDM ports
1 External clock port
2 uplink ports.
4 user ports
No management port

Available contexts

TDM mode	Unframed mode		Framed mode	
	E1	T1	E1	T1
GW6510-P1	1	1	32	24
GW6510-P4	4	4	128	96

Configuring the GW6510

Step 1: assign IP to the system

To transmit encapsulated TDM packets through the uplink port, ensure the destination MAC address of each context is known. The system plays a role of ARP function on behalf of each uplink port as the uplink ports are unable to respond to an incoming ARP request.

Step 2: assign IP to CES-PSN port

To determine the connection pair, each CES-PSN (virtual) port needs an IP address. It is used as the source address of TDM packets.

Step 3: configure CES-TDM

CES-TDM determines the TDM properties dedicated to T1/E1 standard such as LBO, Line Coding, Clock Mode, Underrun Byte and Idle Timing.

Step 4: configure CES-Context

Context configures the connection end-points by specifying encapsulation protocol type, protocol parameters, jitter buffer, packet length and channel information if framed mode is used.

20 Examples based on TDM clock mode

Framing type	Example	Circuit-A	GL6510 A	GL6510 B	Circuit-B
Frame	Case I	From Rx	External	Adaptive-avg or rpt	From Rx
	Case II	From Rx	Internal	Adaptive-avg or rtp	From Rx
	Case III	Internal	Adaptive-avg or rtp	Adaptive-avg or rtp	From Rx
Unframed	Case IV	Internal	Loopback	Adaptive-avg or rtp	From-Rx
	Case V	From Rx	Internal	Adaptive-avg or rtp	From-Rx
	Case VI	From Rx	Differential	Differential	From-Rx
	Case VII	Internal	Adaptive-avg or rtp	Adaptive-avg or rtp	From Rx

Table 43: Examples of TDM clock mode

*From Rx means the clock is extracted from the received clock signal.

20.1 External-Adaptive clock in frame mode: Case I

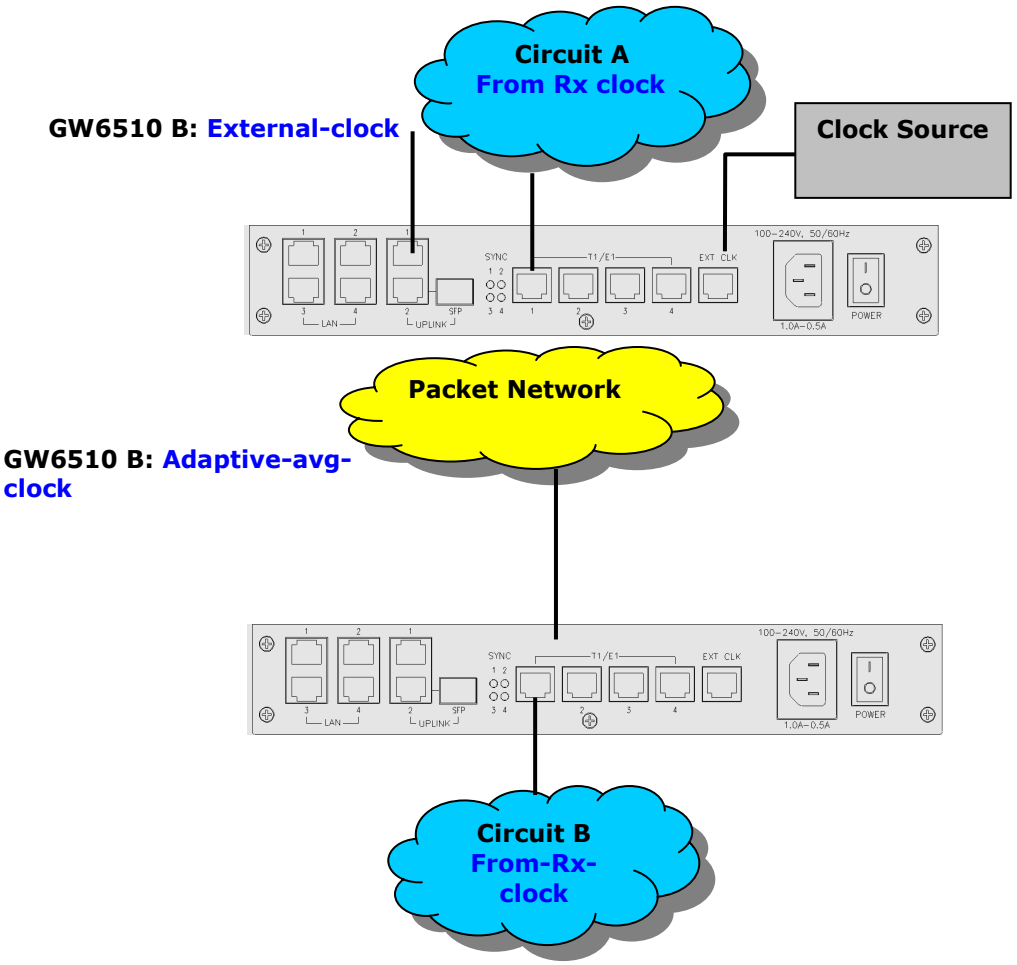


Figure 38 Network diagram

20.1.1 Configuration steps using CLI

20.1.1.1 Configuring the system network

```
GW6510 A's system IP address setup
GW6000# set system ip 210.100.100.254/16
GW6000# set system gateway 210.100.1.1
GW6510 B's system IP address setup
GW6000# set system ip 210.100.200.254/16
GW6000# set system gateway 210.100.1.1
```

Figure 39: System network configuration

```
GW6510 A's CES-PSN setup
TDM-GW# config ces-psn
 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.100.253/16
Network prefix of management and LAN port SHOULD be exactly equal(mandated)
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
The network prefix of management and LAN port SHOULD be matched exactly to avoid
malfunctioning of ARP
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
```

Figure 37: GW6510-A's CES-PSN configuration

```
GW6510 B's CES-PSN setup

TDM-GW# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.200.253/16
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

Figure 40: GW6510-B's CES-PSN configuration

20.1.1.2 CES-TDM configuration

GW6510 A's TDM setup

```
GW6000# config ces-tdm  ☞ TDM can be configured by 'config ces-tdm' command.
 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value
TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdl|t1-esf|t1-sf-
jpn-
alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm||t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-unframe]
(e1-crc-mfrm)
> e1-crc-mfrm          ☞ Set TDM interface type as (E1 CRC Multiframe)framed mode

TDM clock-mode ? [internal-frame|external-frame|adaptive-rtp-frame|adaptive-avg-frame]
(internal-frame)
> external-frame       ☞ Set TDM clock mode as external clock

TDM net-type ? [dedicated|metropolitan|continental|loopback] (metropolitan)
> dedicated            ☞ Set network type as dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
> e1-120ohm            ☞ Set TDM line impedance as 120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
> hdb3-e1              ☞ Set TDM line coding as hdb3-e1

TDM underrun-byte ? [0-255] (255)
> 255                  ☞ Set underrun byte pattern as 0xFF

TDM idle-timing ? [enable|disable] (enable)
> disable              ☞ Set idle timing to disable

TDM save the configuration ? [Yes|No] (Yes)
> yes
The system should be restarted to apply the changes.

Press 'Y' or 'y' to reboot system ...
--------------------------------------------------------------------------------
  Interface                : E1 CRC MFRM
  Clock Mode               : External(Frame)
  Network Type             : Dedicated
  Tx Line Build Out        : E1 120ohm
Line Code                : HDB3
Underrun Byte            : 255 [Hex:0xff]
Idle Timing              : Disable
--------------------------------------------------------------------------------
  TDM Port  |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ================================================================================
     1     |   none          none         none              none
     2     |   detect        detect       none              none
     3     |   detect        detect       none              none
     4     |   detect        detect       none              none
  --------------------------------------------------------------------------------
..TDM interface has been changed, so CONTEXT has been initialized.
The system should be rebooted to apply the changes.
Press 'Y' or 'y' to reboot ...


If TDM interface is changed, contexts are initialised as factory default.
```

"

GW6510 B's TDM setup

```
TDM-GW# config ces-tdm


 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-unframe]
(e1-crc-mfrm)
> e1-crc-mfrm             Set TDM interface type as (E1 CRC Multiframe)framed mode

TDM clock-mode ? [internal-frame|external-frame|adaptive-rtp-frame|adaptive-avg-frame]
(internal-frame)
> adaptive-avg-frame     Set TDM clock mode as adaptive-avg-framed clock

TDM net-type ? [dedicated|metropolitan|continental|loopback] (metropolitan)
> dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
> e1-120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
> hdb3-e1

TDM underrun-byte ? [0-255] (255)
> 255

TDM idle-timing ? [enable|disable] (enable)
> Disable

TDM save the configuration ? [Yes|No] (Yes)
> y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

  ------------------------------------------------------------------------
Interface                : E1 CRC MFRM
Clock Mode               : Adaptive-avg(Frame)
Network Type             : Dedicated
Tx Line Build Out        : E1 120ohm
Line Code                : HDB3
Underrun Byte            : 255 [Hex:0xff]
  Idle Timing              : Disable
------------------------------------------------------------------------

------------------------------------------------------------------------
  TDM Port  |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1     |   none          none         none              none
      2     |   detect        detect       none              none
      3     |   detect        detect       none              none
      4     |   detect        detect       none              none
------------------------------------------------------------------------
..
TDM interface has been changed, so CONTEXT has been initialized.
The system should be rebooted to apply the changes.
Press 'Y' or 'y' to reboot ...
```

If the TDM interface is changed, contexts are initialised as factory default.

20.1.1.3 CES-Context configuration

```
GW6510 A side CES-Context setup
GW6000# config ces-context   Context can be configured by 'config ces-context' command.

Context ID ? [1-128] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.200.253           Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (0)
 > 2000                      Jitter buffer can be adjusted network environment.
                                      Refer to application notes by Virtual Access.
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 frames-per-pkt ? [1-31] (8)
 > 8                        In frame mode, Payload length is set by frame-per-pkt.
                                Refer to application notes by Virtual Access.
Context #1 tdm-port ? [1-4] (1)
 > 1
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------------
                      |1                  |2                  |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------------
Context #1 tdm-channel-list ? [ex: 1 or 1,2 or 1-32]
 (Just ENTER to keep)
 > 1-32
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------------
                      |1                  |2                  |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------------
Context #1 tdm-first-channel ? [1-24(T1),1-32(E1)] (1)
 > 1
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes
....
Saved TDM context #1

TDM-GW#
```

GW6510 B side CES-Context setup

```
GW6000# config ces-context

Context ID ? [1-128] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.100.253          ☛ Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (2000)
 > 2000
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 frames-per-pkt ? [1-31] (8)
 > 8
Context #1 tdm-port ? [1-4] (1)
 > 1
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------
                      |1                  |2                  |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------
Context #1 tdm-channel-list ? [ex: 1 or 1,2 or 1-32]
 (Just ENTER to keep)
 > 1-32
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------
                      |1                  |2                  |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------
Context #1 tdm-first-channel ? [1-24(T1),1-32(E1)] (1)
 > 1
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes
....
Saved TDM context #1

TDM-GW#
```

20.2 Internal -Adaptive clock in frame mode: Case II

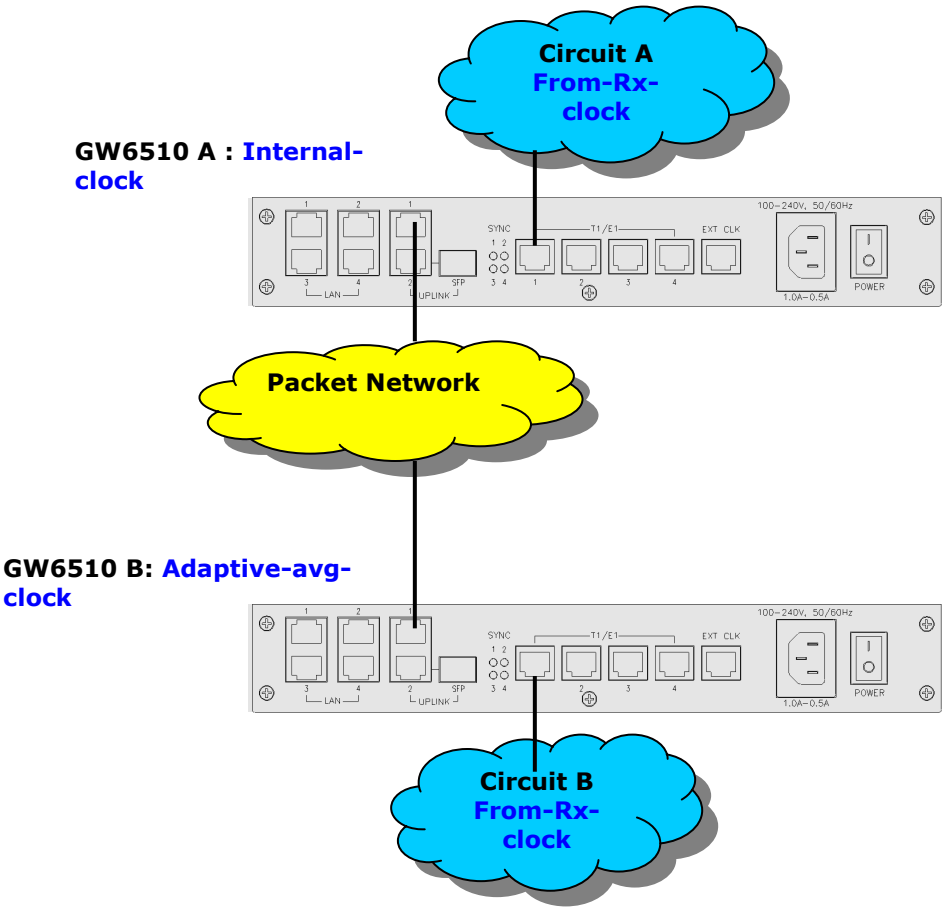


Figure 41: Network diagram

20.2.1 CLI configuration

GW6510 A's system IP address setup

```
TDM-GW# set system ip 210.100.100.254/16
TDM-GW# set system gateway 210.100.1.1

GW6510 B's system IP address setup

TDM-GW# set system ip 210.100.200.254/16
TDM-GW# set system gateway 210.100.1.1
```

Figure 42: GW6510 System's network configuration

```
GW6510 A's CES-PSN setup
TDM-GW# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.100.253/16
   Network prefix of management and LAN port SHOULD be exactly equal(mandated)
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
    The network prefix of management and LAN port SHOULD be matched exactly to avoid
       malfunctioning of ARP
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
yes
```

Figure 43: CES-PSN configuration

20.2.1.1 CES-TDM configuration

GW6510 A's TDM setup

```
TDM-GW# config ces-tdm


 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
                alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-
                unframe] (e1-crc-mfrm)
> e1-crc-mfrm        ▶▶ Set TDM interface type as framed mode

TDM clock-mode ? [internal-frame|external-frame|adaptive-rtp-frameadaptive-avg-frame]
                (internal-frame)
> internal-frame     ▶▶ Set TDM clock mode as internal clock

TDM net-type ? [dedicated|metropolitan|continental|loopback](metropolitan)
 > dedicated         ▶▶ Set network type as dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
 > e1-120ohm         ▶▶ Set TDM line impedance as 120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1           ▶▶ Set TDM line coding as hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255               ▶▶ Set underrun byte pattern as 0xFF

TDM idle-timing ? [enable|disable] (enable)
 > Disable            ▶▶ Set idle timing to disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

  ------------------------------------------------------------------------
  Interface                : E1 CRC MFRM
  Clock Mode               : Internal(Frame)
  Network Type             : Dedicated
  Tx Line Build Out        : E1 120ohm
   Line Code                : HDB3
   Underrun Byte            : 255 [Hex:0xff]
   Idle Timing              : Disable
   ------------------------------------------------------------------------


  ------------------------------------------------------------------------
  TDM Port  |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1     |   none          none         none              none
      2     |   detect        detect       none              none
      3     |   detect        detect       none              none
      4     |   detect        detect       none              none
  ------------------------------------------------------------------------
..
The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

Figure 44: CES-TDM configuration

GW6510 B's TDM setup

```
TDM-GW# config ces-tdm


 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
                alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-
                unframe] (e1-crc-mfrm)
> e1-crc-mfrm          ▶▶ Set TDM interface type as framed mode

TDM clock-mode ? [internal-frame|external-frame|adaptive-rtp-frame|adaptive-avg-frame]
                (internal-frame)
> adaptive-avg-frame  ▶▶ Set TDM clock mode as adaptive avg clock

TDM net-type ? [dedicated|metropolitan|continental|loopback](metropolitan)
 > dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
 > e1-120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255

TDM idle-timing ? [enable|disable] (enable)
 > Disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

  ------------------------------------------------------------------------
  Interface                : E1 CRC MFRM
  Clock Mode               : Adaptive-avg(Frame)
  Network Type             : Dedicated
  Tx Line Build Out        : E1 120ohm
  Line Code                : HDB3
  Underrun Byte            : 255 [Hex:0xff]
  Idle Timing              : Disable
   ------------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port  |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1     |   none          none         none              none
      2     |   detect        detect       none              none
      3     |   detect        detect       none              none
      4     |   detect        detect       none              none
  ------------------------------------------------------------------------
..
The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

Figure 45:

20.2.1.2 CES-Context configuration

GW6510 A side CES-Context setup

```
TDM-GW# config ces-context  Context can be configured by 'config ces-context' command.

Context ID ? [1-128] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.200.253          Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (0)
 > 2000                     Jitter buffer can be adjusted network environment.
                                    Refer to application note by Virtual Access.
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 frames-per-pkt ? [1-31] (8)
 > 8                        In frame mode, Payload length is set by frame-per-pkt.
                               Refer to application note by Virtual Access.
Context #1 tdm-port ? [1-4] (1)
 > 1
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------------
                      |1                    |2                    |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------------
Context #1 tdm-channel-list ? [ex: 1 or 1,2 or 1-32]
 (Just ENTER to keep)
 > 1-32
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------------
                      |1                    |2                    |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------------
Context #1 tdm-first-channel ? [1-24(T1),1-32(E1)] (1)
 > 1
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes
....
Saved TDM context #1

TDM-GW#
```

GW6510 B side CES-Context setup

```
TDM-GW# config ces-context

Context ID ? [1-128] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.100.253          ☛ Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (2000)
 > 2000
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 frames-per-pkt ? [1-31] (8)
 > 8
Context #1 tdm-port ? [1-4] (1)
 > 1
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------
                      |1                  |2                  |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------
Context #1 tdm-channel-list ? [ex: 1 or 1,2 or 1-32]
 (Just ENTER to keep)
 > 1-32
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------
                      |1                  |2                  |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------
Context #1 tdm-first-channel ? [1-24(T1),1-32(E1)] (1)
 > 1
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes
....
Saved TDM context #1

TDM-GW#
```

20.3 Adaptive -Adaptive clock in frame mode: Case III

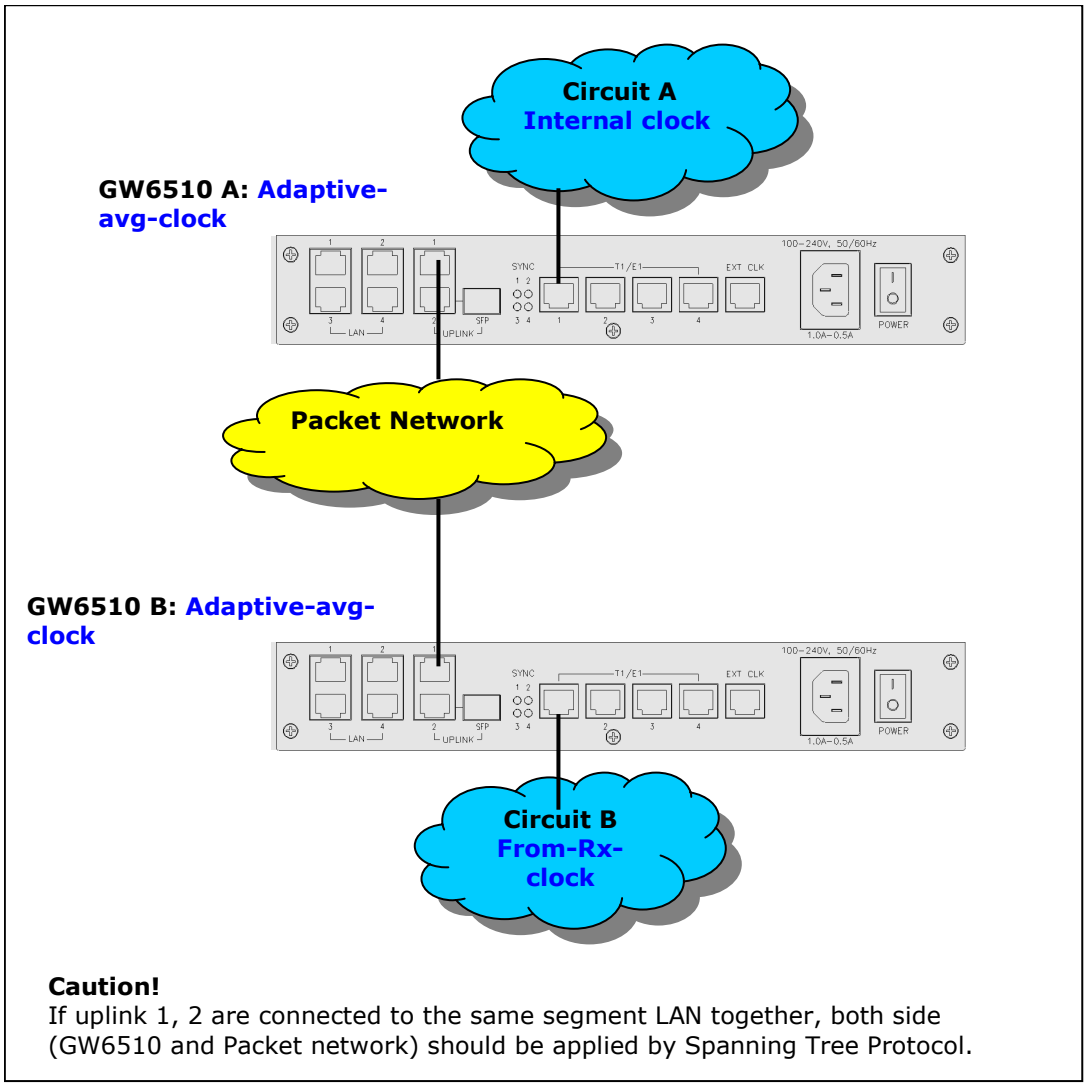


Figure 46: Network diagram

20.3.1 CLI Configuration

```
W 6510 A's system IP address setup

DM-GW# set system ip 210.100.100.254/16
DM-GW# set system gateway 210.100.1.1

W 6510 B's system IP address setup

DM-GW# set system ip 210.100.200.254/16
DM-GW# set system gateway 210.100.1.1
```

Figure 47: System's network configuration

GW 6510 A's CES-PSN setup

```
TDM-GW# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.100.253/16
   ☛ Network prefix of management and LAN port SHOULD be exactly equal(mandated)
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
    ☛ The network prefix of management and LAN port SHOULD be matched exactly to avoid
       malfunctioning of ARP
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

GW 6510 B's CES-PSN setup

```
TDM-GW# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.200.253/16
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

Figure 48: CES-PSN configuration

GW6510 A's TDM setup

```
TDM-GW# config ces-tdm      ☞ TDM can be configured by 'config ces-tdm' command.

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
             alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-unframe]
             (e1-crc-mfrm)
> e1-crc-mfrm               ☞ Set TDM interface type as (E1-CRC-Multiframed) framed mode

TDM clock-mode ? [internal-frame|external-frame|adaptive-rtp-frame|adaptive-avg-frame]
                (internal-frame)
> adaptive-avg-frame        ☞ Set TDM clock mode as adaptive avg clock

TDM net-type ? [dedicated|metropolitan|continental|loopback]
        (metropolitan)
 > dedicated                ☞ Set network type as dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)

 > e1-120ohm                ☞ Set TDM line impedance as 120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1                  ☞ Set TDM line coding as hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255                      ☞ Set underrun byte pattern as 0xFF

TDM idle-timing ? [enable|disable] (enable)
 > Disable                  ☞ Set idle timing to Disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

  ------------------------------------------------------------------------
  Interface                : E1 CRC MFRM
  Clock Mode               : Adaptive-avg(Frame)
  Network Type             : Dedicated
  Tx Line Build Out        : E1 120ohm
  Line Code                : HDB3
  Underrun Byte            : 255 [Hex:0xff]
  Idle Timing              : Disable
   ------------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port  |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1     |   none          none         none              none
      2     |   detect        detect       none              none
      3     |   detect        detect       none              none
      4     |   detect        detect       none              none
  ------------------------------------------------------------------------
..
The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

Figure 49: CES-TDM configuration

GW6510 B's TDM setup

```
TDM-GW# config ces-tdm

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
                alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-
                unframe] (e1-crc-mfrm)
> e1-crc-mfrm           ☞ Set TDM interface type as (E1-CRC-Multiframed)framed mode

TDM clock-mode ? [internal-frame|external-frame|adaptive-rtp-frame|adaptive-avg-frame]
                (internal-frame)
> adaptive-avg-frame    ☞ Set TDM clock mode as adaptive avg frame clock

TDM net-type ? [dedicated|metropolitan|continental|loopback] (metropolitan)
 > dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
 > e1-120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255

TDM idle-timing ? [enable|disable] (enable)
 > disable

TDM save the configuration ? [Yes|No] (Yes)
 > y

The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

  ------------------------------------------------------------------------
  Interface               : E1 CRC MFRM
  Clock Mode              : Adaptive-avg(Frame)
  Network Type            : Dedicated
  Tx Line Build Out       : E1 120ohm
  Line Code               : HDB3
  Underrun Byte           : 255 [Hex:0xff]
  Idle Timing             : Disable
   ----------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port  |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1     |   none          none         none              none
      2     |   detect        detect       none              none
      3     |   detect        detect       none              none
      4     |   detect        detect       none              none
  ------------------------------------------------------------------------

The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

GW6510 A side CES-Context setup

```
TDM-GW# config ces-context  ☛ Context can be configured by 'config ces-context' command.

Context ID ? [1-128] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.200.253          ☛ Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (0)
 > 2000                     ☛ Jitter buffer can be adjusted network environment.
                                Refer to application note by Virtual Access.
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 frames-per-pkt ? [1-31] (8)
 > 8                        ☛ In frame mode, Payload length is set by frame-per-pkt.
                              Refer to application note by Virtual Access.
Context #1 tdm-port ? [1-4] (1)
 > 1
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------------
                      |1                  |2                  |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------------
Context #1 tdm-channel-list ? [ex: 1 or 1,2 or 1-32]
 (Just ENTER to keep)
 > 1-32
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------------
                      |1                  |2                  |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------------
Context #1 tdm-first-channel ? [1-24(T1),1-32(E1)] (1)
 > 1
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes
....
Saved TDM context #1

TDM-GW#
```

Figure 50: CES-Context configuration

GW6510 B side CES-Context setup

```
TDM-GW# config ces-context

Context ID ? [1-128] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.100.253          ☛ Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (2000)
 > 2000
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 frames-per-pkt ? [1-31] (8)
 > 8
Context #1 tdm-port ? [1-4] (1)
 > 1
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------
                      |1                  |2                  |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------
Context #1 tdm-channel-list ? [ex: 1 or 1,2 or 1-32]
 (Just ENTER to keep)
 > 1-32
  TDM Port : 1
  TDM Channel(s) Assignment
      ------------------------------------------------------------
                      |1                  |2                  |3
      1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2 3 4 5 6 7 8 9|0 1 2
      ------------------------------------------------------------
      O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
      ------------------------------------------------------------
Context #1 tdm-first-channel ? [1-24(T1),1-32(E1)] (1)
 > 1
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes
....
Saved TDM context #1

TDM-GW#
```

Figure 51:

20.4 Loopback-Adaptive clock in unframe mode: Case IV

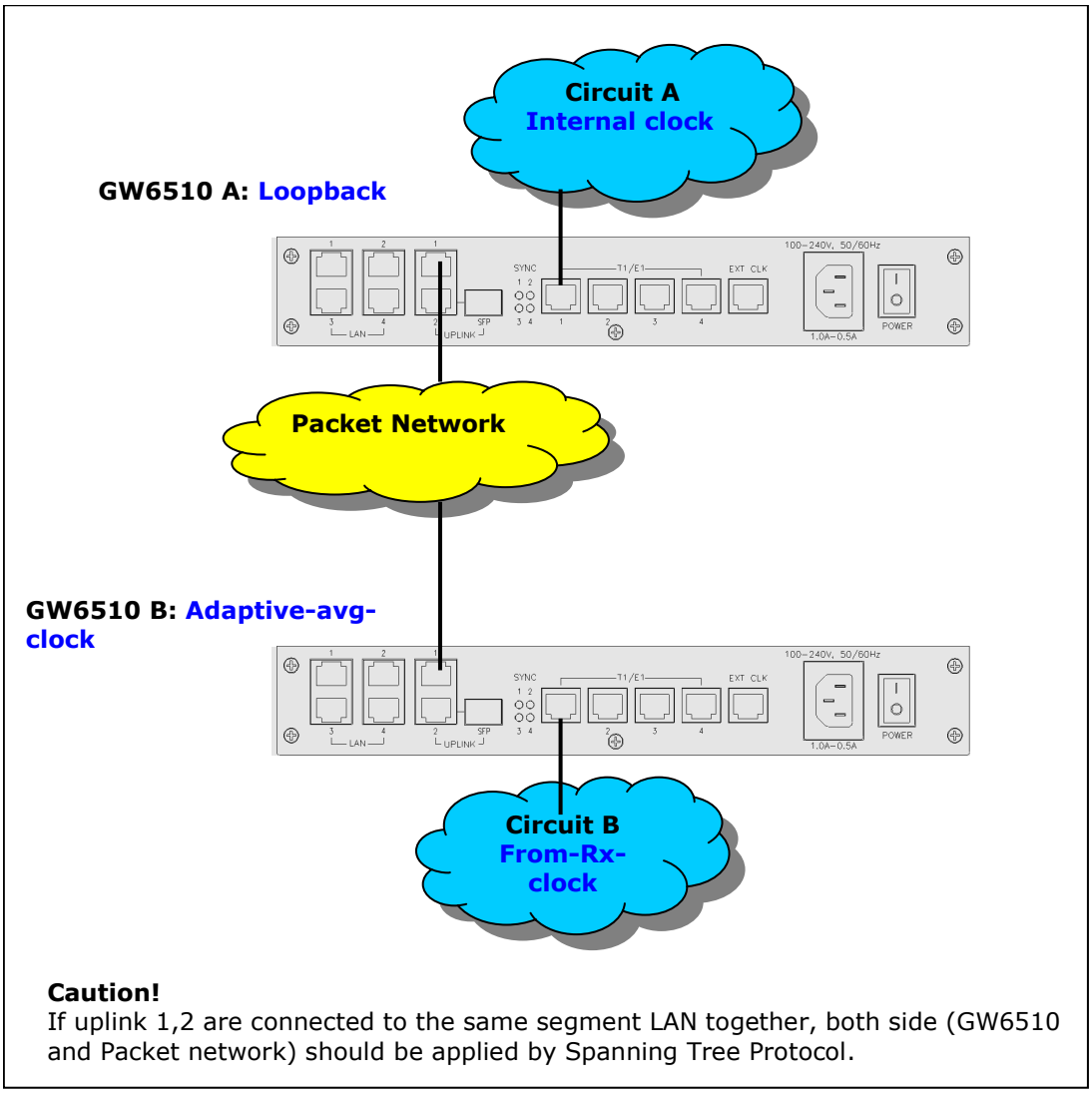


Figure 52: Network diagram

20.4.1 CLI Configuration

20.4.1.1 System network configuration

```
GW6510 A's system IP address setup

TDM-GW# set system ip 210.100.100.254/16
TDM-GW# set system gateway 210.100.1.1

GW6510 B's system IP address setup

TDM-GW# set system ip 210.100.200.254/16
TDM-GW# set system gateway 210.100.1.1
```

Figure 53: System network configuration

GW6510 A's CES-PSN setup

```
TDM-GW# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.100.253/16
   ☛ Network prefix of management and LAN port SHOULD be exactly equal(mandated)
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
    ☛ The network prefix of management and LAN port SHOULD be matched exactly to avoid
       malfunctioning of ARP
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

GW6510 B's CES-PSN setup

```
TDM-GW# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.200.253/16
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

Figure 54:

20.4.1.2 CES-TDM configuration

GW6510 A's TDM setup

```
TDM-GW# config ces-tdm      ☞ TDM can be configured by 'config ces-tdm' command.


 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
                alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-
                unframe] (e1-crc-mfrm)
> e1-unframe              ☞ Set TDM interface type as E1 unframed mode

TDM clock-mode ? [loopback-unframe|internal-unframe|adaptive-rtp-unframe|adaptive-avg-unframe|
                diff-unframe](loopback-unframe)
> loopback-unframe        ☞ Set TDM clock mode as loopback unframe clock

TDM net-type ? [dedicated|metropolitan|continental|loopback](metropolitan)
 > dedicated              ☞ Set network type as dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)

 > e1-120ohm              ☞ Set TDM line impedance as 120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1                ☞ Set TDM line coding as hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255                    ☞ Set underrun byte pattern as 0xff

TDM idle-timing ? [enable|disable] (enable)

 > Disable                ☞ Set idle timing to disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

   ------------------------------------------------------------------------
     CES TDM Configuration
     ====================================================================
     Interface                : E1 UNFRAMED
     Clock Mode               : Loopback(Unframed)
     Network Type             : Dedicated
     Tx Line Build Out        : E1 120ohm
     Line Code                : HDB3
     Underrun Byte            : 255 [Hex:0xff]
     Idle Timing              : Disable
   ------------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port   |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1      |   none          none         none              none
      2      |   detect        detect       none              none
      3      |   detect        detect       none              none
      4      |   detect        detect       none              none
  ------------------------------------------------------------------------

The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

GW6510 A's TDM setup

```
TDM-GW# config ces-tdm      ☞ TDM can be configured by 'config ces-tdm' command.


 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
                alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-
                unframe] (e1-crc-mfrm)
> e1-unframe              ☞ Set TDM interface type as E1 unframed mode

TDM clock-mode ? [loopback-unframe|internal-unframe|adaptive-rtp-unframe|adaptive-avg-unframe|
                diff-unframe](loopback-unframe)
> loopback-unframe        ☞ Set TDM clock mode as loopback unframe clock

TDM net-type ? [dedicated|metropolitan|continental|loopback](metropolitan)
 > dedicated              ☞ Set network type as dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
 > e1-120ohm              ☞ Set TDM line impedance as 120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1                ☞ Set TDM line coding as hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255                    ☞ Set underrun byte pattern as 0xff

TDM idle-timing ? [enable|disable] (enable)
 > Disable                ☞ Set idle timing to disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

   ------------------------------------------------------------------------
     CES TDM Configuration
     ====================================================================================
     Interface                : E1 UNFRAMED
     Clock Mode               : Loopback(Unframed)
     Network Type             : Dedicated
     Tx Line Build Out        : E1 120ohm
     Line Code                : HDB3
     Underrun Byte            : 255 [Hex:0xff]
     Idle Timing              : Disable
   ------------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port   |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1      |   none          none         none              none
      2      |   detect        detect       none              none
      3      |   detect        detect       none              none
      4      |   detect        detect       none              none
  ------------------------------------------------------------------------

The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

Figure 55:

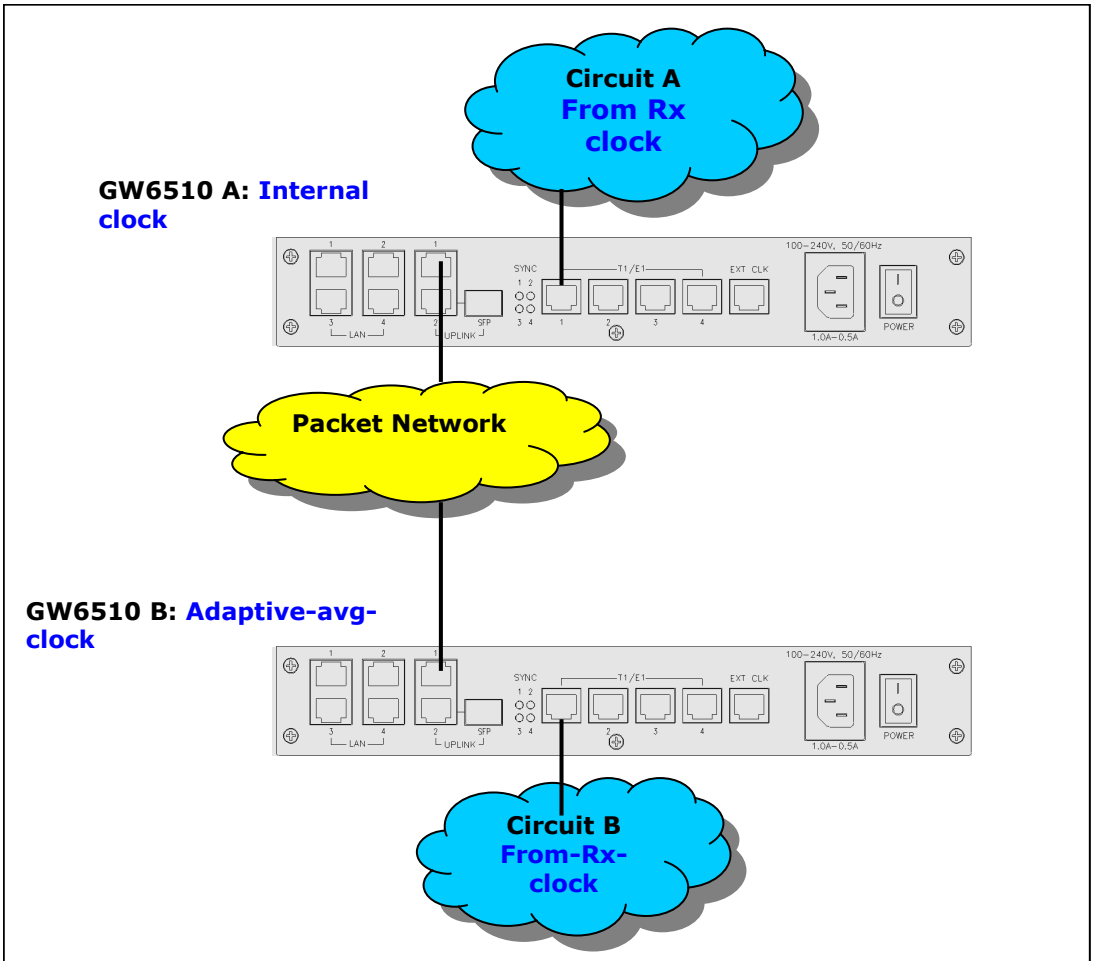
20.4.1.3 CES context set up

GW6510 A side CES-Context setup

```
TDM-GW# config ces-context  ☞ Context can be configured by 'config ces-context' command.

Context ID ? [1-4] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.200.253          ☞ Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (0)
 > 2000                     ☞ Jitter buffer can be adjusted network environment.
                                    Refer to application note by comtec.
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 bytes-per-pkt ? [1-1023] (8)
 > 8                        ☞ In unframed mode, Payload length is set by bytes-per-pkt.
                               Refer to application note by comtec.
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes

....
Saved TDM context #1

TDM-GW#
```

Figure 56:

20.5 Internal-Adaptive avg clock in unframe mode: Case V



Caution!
If uplink 1,2 are connected to the same segment LAN together, both side (GW6510 and Packet network) should be applied by Spanning Tree Protocol.

Figure 57: Network diagram

GW6510 B side CES-Context setup

```
GW6000# config ces-context  ☛ Context can be configured by 'config ces-context' command.

Context ID ? [1-4] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.100.253          ☛ Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (0)
 > 2000                     ☛ Jitter buffer can be adjusted network environment.
                                Refer to application notes by Virtual Access.
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 bytes-per-pkt ? [1-1023] (8)
 > 8                        ☛ In unframed mode, Payload length is set by bytes-per-pkt.
                               Refer to application notes by Virtual Access..
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes

....
Saved TDM context #1

TDM-GW#
```

Figure 58: CES-context setup

20.5.1.1 CES-PSN configuration

GW6510 A's CES-PSN setup

```
TDM-GW# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.100.253/16
   ☞ Network prefix of management and LAN port SHOULD be exactly equal(mandated)
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
    ☞ The network prefix of management and LAN port SHOULD be matched exactly to avoid
       malfunctioning of ARP
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

GW6510 B's CES-PSN setup

```
TDM-GW# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.200.253/16
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

Figure 59: CES-PSN configuration

20.5.1.2 CES-TDM configuration

```
GW6510 A's TDM setup

TDM-GW# config ces-tdm    ☞ TDM can be configured by 'config ces-tdm' command.


 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
               alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-
               unframe] (e1-crc-mfrm)
> e1-unframe              ☞ Set TDM interface type as E1 unframed mode

TDM clock-mode ? [loopback-unframe|internal-unframe|adaptive-rtp-unframe|adaptive-avg-unframe|
               diff-unframe](loopback-unframe)
> internal-unframe        ☞ Set TDM clock mode as internal unframe clock

TDM net-type ? [dedicated|metropolitan|continental|loopback] (metropolitan)
 > dedicated               ☞ Set network type as dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)

 > e1-120ohm               ☞ Set TDM line impedance as 120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1                 ☞ Set TDM line coding as hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255                     ☞ Set underrun byte pattern as 0xff

TDM idle-timing ? [enable|disable] (enable)
 > Disable                 ☞ Set idle timing to disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

   ------------------------------------------------------------------------
     CES TDM Configuration
     ====================================================================
     Interface                : E1 UNFRAMED
     Clock Mode               : Internal (Unframe)
     Network Type             : Dedicated
     Tx Line Build Out        : E1 120ohm
     Line Code                : HDB3
     Underrun Byte            : 255 [Hex:0xff]
     Idle Timing              : Disable
   ------------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port   |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1      |   none          none         none              none
      2      |   detect        detect       none              none
      3      |   detect        detect       none              none
      4      |   detect        detect       none              none
  ------------------------------------------------------------------------

The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

Figure 60: CES-TDM configuration

GW6510 B's CES-TDM setup

```
TDM-GW# config ces-tdm


 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
               alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-
               unframe] (e1-crc-mfrm)
> e1-unframe              ☛ Set TDM interface type as unframed mode

TDM clock-mode ? [loopback-unframe|internal-unframe|adaptive-rtp-unframe|adaptive-avg-unframe|
                diff-unframe](loopback-unframe)
> adaptive-avg-unframe    ☛ Set TDM clock mode as adaptive avg unframe clock

TDM net-type ? [dedicated|metropolitan|continental|loopback] (metropolitan)
> dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
 > e1-120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255

TDM idle-timing ? [enable|disable] (enable)
 > Disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

   ------------------------------------------------------------------------
     CES TDM Configuration
     ======================================================================
     Interface                : E1 UNFRAMED
     Clock Mode               : Adaptive-avg(Unframe)
     Network Type             : Dedicated
     Tx Line Build Out        : E1 120ohm
     Line Code                : HDB3
     Underrun Byte            : 255 [Hex:0xff]
     Idle Timing              : Disable
   ------------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port  |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1     |   none          none         none              none
      2     |   detect        detect       none              none
      3     |   detect        detect       none              none
      4     |   detect        detect       none              none
  ------------------------------------------------------------------------

The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

20.6 Differential-Differential clock in unframe mode: Case VI

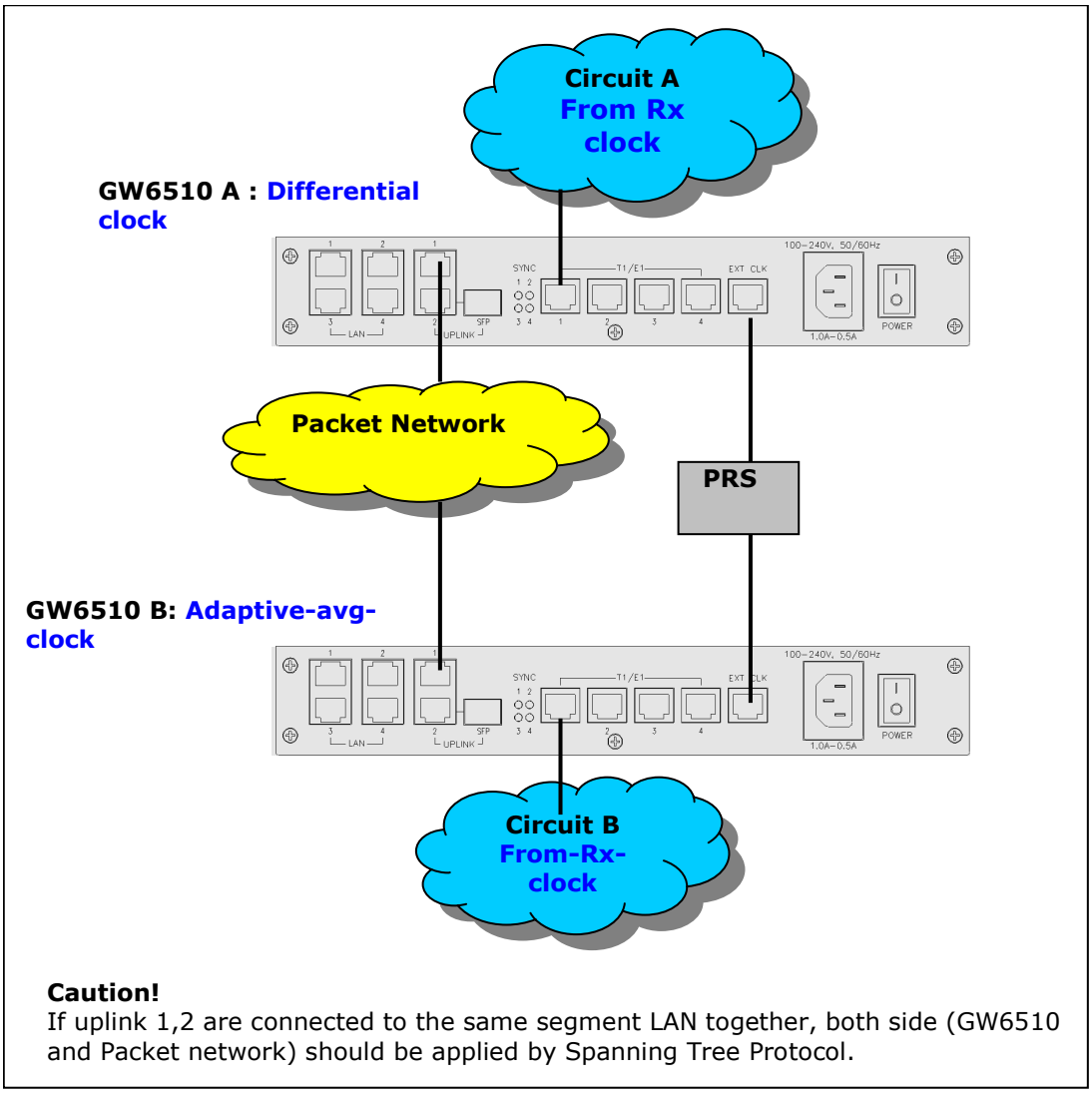


Figure 61: Network diagram

20.6.1 CLI configuration

GW6510 A's system IP address setup

```
GW6000# set system ip 210.100.100.254/16
GW6000# set system gateway 210.100.1.1
```

GW6510 B's system IP address setup

```
TDM-GW# set system ip 210.100.200.254/16
TDM-GW# set system gateway 210.100.1.1
```

Figure 62: System network configuration

GW6510 A's CES-PSN setup

```
GW6000# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.100.253/16
   ☛ Network prefix of management and LAN port SHOULD be exactly equal(mandated)
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
    ☛ The network prefix of management and LAN port SHOULD be matched exactly to avoid
       malfunctioning of ARP
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

GW6510 B's CES-PSN setup

```
TDM-GW# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.200.253/16
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

Figure 63: CES-PSN configuration

20.6.1.1 CES-TDM configuration

GW6510 A's CES-TDM setup

```
GW6000# config ces-tdm     ☞ TDM can be configured be 'config ces-tdm' command.

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
               alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-
               unframe] (e1-crc-mfrm)
> e1-unframe              ☞ Set TDM interface type as E1 unframed mode

TDM clock-mode ? [loopback-unframe|internal-unframe|adaptive-rtp-unframe|adaptive-avg-unframe|
               diff-unframe](loopback-unframe)
> diff-unframe            ☞ Set TDM clock mode as differential clock

TDM net-type ? [dedicated|metropolitan|continental|loopback](metropolitan)
 > dedicated               ☞ Set network type as dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
 > e1-120ohm               ☞ Set TDM line impedance as 120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1                 ☞ Set TDM line coding as hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255                     ☞ Set underrun byte pattern as 0xff

TDM idle-timing ? [enable|disable] (enable)
 > disable                 ☞ Set idle timing to disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...


  ------------------------------------------------------------------------
     CES TDM Configuration
  ========================================================================
     Interface                : E1 UNFRAMED
     Clock Mode               : Differential(Unframe)
     Network Type             : Dedicated
     Tx Line Build Out        : E1 120ohm
     Line Code                : HDB3
     Underrun Byte            : 255 [Hex:0xff]
     Idle Timing              : Disable
   ------------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port   |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1      |   none          none         none              none
      2      |   detect        detect       none              none
      3      |   detect        detect       none              none
      4      |   detect        detect       none              none
  ------------------------------------------------------------------------

The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

Figure 64:CES-TDM setup

```
GW6510 B's TDM setup

GW6000# config tdm

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
               alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-
               unframe] (e1-crc-mfrm)
> e1-unframe            ☛ Set TDM interface type as E1 unframed mode

TDM clock-mode ? [loopback-unframe|internal-unframe|adaptive-rtp-unframe|adaptive-avg-unframe|
                diff-unframe](loopback-unframe)
> diff-unframe          ☛ Set TDM clock mode as differential clock

TDM net-type ? [dedicated|metropolitan|continental|loopback](metropolitan)
 > dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
 > e1-120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255

TDM idle-timing ? [enable|disable] (enable)
 > disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

  ------------------------------------------------------------------------
    CES TDM Configuration
  ========================================================================
    Interface                : E1 UNFRAMED
    Clock Mode               : Differential(Unframe)
    Network Type             : Dedicated
    Tx Line Build Out        : E1 120ohm
    Line Code                : HDB3
    Underrun Byte            : 255 [Hex:0xff]
    Idle Timing              : disable
   ------------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port  |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1     |   none          none         none              none
      2     |   detect        detect       none              none
      3     |   detect        detect       none              none
      4     |   detect        detect       none              none
  ------------------------------------------------------------------------

The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

Figure 65:

20.6.1.2 CES context setup

GW6510 A side CES-Context setup

```
GW6000# config ces-context  ☞ Context can be configured by 'config ces-context' command.

Context ID ? [1-4] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.200.253          ☞ Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (0)
 > 2000                     ☞ Jitter buffer can be adjusted network environment.
                                    Refer to application note by Virtual Access.
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 bytes-per-pkt ? [1-1023] (8)
 > 8                        ☞ In unframed mode, Payload length is set by bytes-per-pkt.
                               Refer to application note by Virtual Access.
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes

....
Saved TDM context #1

TDM-GW#
```

Figure 66: CES context setup

GW6510 B side CES-Context setup

```
GW6000# config ces-context  ☛ Context can be configured by 'config ces-context' command.

Context ID ? [1-4] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.100.253          ☛ Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (0)
 > 2000                     ☛ Jitter buffer can be adjusted network environment.
                                Refer to application note by Virtual Access.
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 bytes-per-pkt ? [1-1023] (8)
 > 8                        ☛ In unframed mode, Payload length is set by bytes-per-pkt.
                               Refer to application note by Virtual Access.
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes

....
Saved TDM context #1

TDM-GW#
```

Figure 67:CES-context setup

20.7 Adaptive-Adaptive clock in unframe mode: Case VII

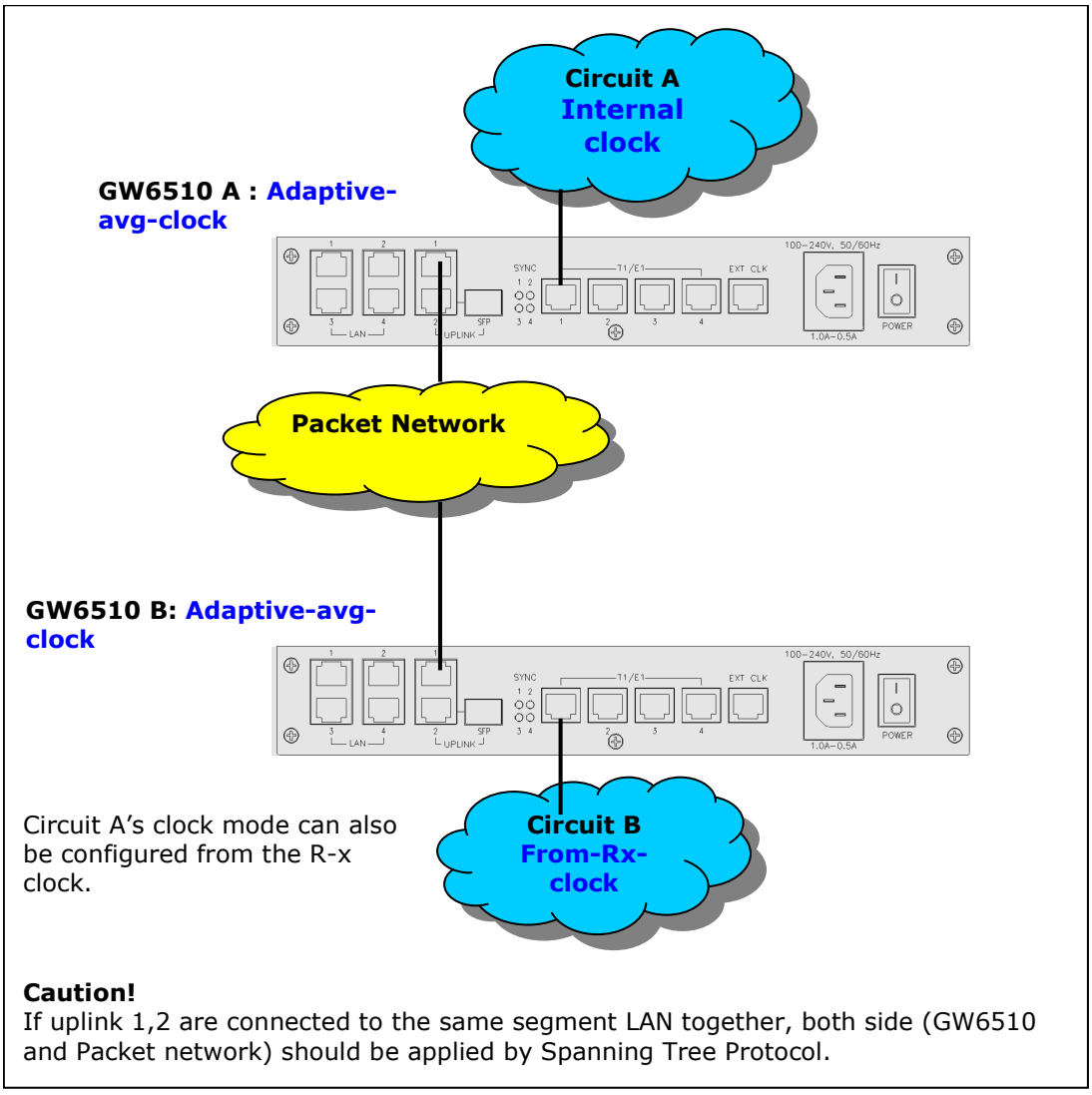


Figure 68: Network diagram

20.7.1 CLI configuration

```
GW6510 A's system IP address setup

GW6000# set system ip 210.100.100.254/16
GW6000# set system gateway 210.100.1.1

GW6510 B's system IP address setup

TDM-GW# set system ip 210.100.200.254/16
TDM-GW# set system gateway 210.100.1.1
```

Figure 69: System network configuration

GW6510 A's CES-PSN setup

```
GW6000# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.100.253/16
   ☛ Network prefix of management and LAN port SHOULD be exactly equal(mandated)
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
    ☛ The network prefix of management and LAN port SHOULD be matched exactly to avoid
       malfunctioning of ARP
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

GW6510 B's CES-PSN setup

```
TDM-GW# config ces-psn

 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

PSN ip? [A.B.C.D/M] (10.20.250.101/16)
 > 210.100.200.253/16
PSN gateway? [A.B.C.D] (10.20.254.101)
 > 210.100.100.1
PSN VLAN status? [enable|disable] (disable)
 > disable
PSN Save the configuration? [yes|no] (yes)
 > yes
```

Figure 70:CES-PSN configuration

GW6510 A's TDM setup

```
GW6000# config ces-tdm        ☞ TDM can be configured by 'config ces-tdm' command.
 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value
TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
               alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-
               unframe] (e1-crc-mfrm)
> e1-unframe                  ☞ Set TDM interface type as E1-unframed mode

TDM clock-mode ? [loopback-unframe|internal-unframe|adaptive-rtp-unframe|adaptive-avg-unframe|
                  diff-unframe](loopback-unframe)
> adaptive-avg-unframe        ☞ Set TDM clock mode as adaptive avg unframed clock

TDM net-type ? [dedicated|metropolitan|continental|loopback]
        (metropolitan)
 > dedicated                  ☞ Set network type as dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
 > e1-120ohm                  ☞ Set TDM line impedance as 120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1                    ☞ Set TDM line coding as hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255                        ☞ Set underrun byte pattern as 0xff

TDM idle-timing ? [enable|disable] (enable)
 > disable                    ☞ Set idle timing to disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...

   ------------------------------------------------------------------------
     CES TDM Configuration
     ======================================================================
     Interface                : E1 UNFRAMED
     Clock Mode               : Adaptive-AVG(Unframe)
     Network Type             : Dedicated
     Tx Line Build Out        : E1 120ohm
     Line Code                : HDB3
     Underrun Byte            : 255 [Hex:0xff]
     Idle Timing              : Disable
   ------------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port   |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1      |   none          none         none              none
      2      |   detect        detect       none              none
      3      |   detect        detect       none              none
      4      |   detect        detect       none              none
  ------------------------------------------------------------------------

The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
..
```

Figure 71: CES-TDM configuration

GW6510 B's CES-TDM setup

```
GW6000# config ces-tdm


 % Press 'Ctrl-X' to exit config process
 % Press 'Enter' to keep the previous value

TDM interface ? [e1|e1-crc-mfrm|e1-unframe|t1-sf|t1-dm|t1-slc96|t1-dm-fdlt1-esf|t1-sf-jpn-
             alarm|t1-dm-jpn-alarm|t1-slc96-jpn-alarm|t1-dm-fdl-jpn-alarm|t1-jt-g704|t1-unframe]
             (e1-crc-mfrm)
> e1-unframe                ☞  Set TDM interface type as E1-unframed mode

TDM clock-mode ? [loopback-unframe|internal-unframe|adaptive-rtp-unframe|adaptive-avg-unframe|
                 diff-unframe](loopback-unframe)
> adaptive-avg-unframe      ☞  Set TDM clock mode as adaptive avg unframed clock

TDM net-type ? [dedicated|metropolitan|continental|loopback] (metropolitan)
> dedicated

TDM line-build-out ? [e1-75ohm|e1-120ohm] (e1-120ohm)
 > e1-120ohm

TDM line-code ? [ami|hdb3-e1] (hdb3-e1)
 > hdb3-e1

TDM underrun-byte ? [0-255] (255)
 > 255

TDM idle-timing ? [enable|disable] (enable)
 > disable

TDM save the configuration ? [Yes|No] (Yes)
 > y
The system should be restarted to apply the changes.
Press 'Y' or 'y' to reboot system ...


   ------------------------------------------------------------------------
     CES TDM Configuration
     ====================================================================================
     Interface                 : E1 UNFRAMED
     Clock Mode                : Adaptive-AVG(Unframe)
     Network Type              : Dedicated
     Tx Line Build Out         : E1 120ohm
     Line Code                 : HDB3
     Underrun Byte             : 255 [Hex:0xff]
     Idle Timing               : Disable
   ------------------------------------------------------------------------

  ------------------------------------------------------------------------
  TDM Port   |   LossOfSignal  LossOfFrame  RAI(YellowAlarm)  AIS(BlueAlarm)
  ========================================================================
      1      |   none          none         none              none
      2      |   detect        detect       none              none
      3      |   detect        detect       none              none
      4      |   detect        detect       none              none
  ------------------------------------------------------------------------

The system should be rebooted to apply the changes.
Press 'Y' or 'y' to continue rebooting ...
```

Figure 72:

20.7.1.1 CES context setup

GW6510 A side CES-Context setup

```
GW6000# config ces-context  ☞ Context can be configured by 'config ces-context' command.

Context ID ? [1-4] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.200.253          ☞ Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (0)
 > 2000                     ☞ Jitter buffer can be adjusted network environment.
                                  Refer to application note by Virtual Access.
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 bytes-per-pkt ? [1-1023] (8)
 > 8                        ☞ In unframed mode, Payload length is set by bytes-per-pkt.
                               Refer to application note by Virtual Access.
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration ? [yes|no] (yes)
 >yes

....
Saved TDM context #1

TDM-GW#
```

Figure 73:

GW6510 B side CES-Context setup

```
GW6000# config ces-context  ☛ Context can be configured by 'config ces-context' command.

Context ID ? [1-4] (1)
 > 1
Context #1 status ? [enable|disable] (enable)
 > enable
Context #1 dst-ip ? [A.B.C.D] (10.0.1.5)
 > 210.100.100.253          ☛ Set the destination IP encapsulated TDM data is forwarded to.
Context #1 protocol-type ? [mef-pw|rtp-pw] (rtp-pw)
 > rtp-pw
Context #1 ip-tos ? [0-255] (0)
 > 0
Context #1 udp-src-port ? [0-65535] (1000)
 > 1000
Context #1 udp-dst-port ? [0-65535] (1000)
 > 1000
Context #1 jitter-buffer ? [125-120000] (0)
 > 2000                     ☛ Jitter buffer can be adjusted network environment.
                                Refer to application note by Virtual Access.
Context #1 timestamp-increment ? [byte|bit] (bit)
 > bit
Context #1 bytes-per-pkt ? [1-1023] (8)
 > 8                        ☛ In unframed mode, Payload length is set by bytes-per-pkt.
                               Refer to application note by Virtual Access.
Context #1 priority ? [highest|high|low|lowest] (highest)
 >highest
Context #1 save the configuration? [yes|no] (yes)
 >yes

....
Saved TDM context #1

TDM-GW#
```

Figure 74:

21 Troubleshooting

21.1 Configuring system information warning and error messages

Error message | **Solution**

% Gateway is unreachable | Check the gateway and IP address exist in the same subnetwork domain

Invalid IP Address | Check the address is a valid range and value

Normally, network, broadcast, out of range addresses are an invalid value

IP	Subnet mask		Invalid address		Valid address
	bit	decimal	Broadcast	Network	Range
200.1.1.1	8	255.0.0.0	200.255.255.255	200.0.0.0	200.0.0.1~200.255.255.254
	16	255.255.0.0	200.1.255.255	200.1.0.0	200.1.0.1~200.1.255.254
	…	…	…	…	…
	29	255.255.255.248	200.1.1.7	200.1.1.0	200.1.1.1~200.1.1.6
	30	255.255.255.252	200.1.1.3	200.1.1.0	200.1.1.1, 200.1.1.2

httpd is running!!, do not enable

%ssl server already enabled | The command is rejected because SSL daemon status is already enabled.

% syslog is already enabled | The command is rejected because syslog agent daemon status is already enabled.

snmpd is running!!, so do not enable!!!	The command is rejected because SNMP agent daemon status is already enabled.
NTP is enabled	The command is rejected because NTP client daemon status is already enabled

21.2 Configuring Context using set command error messages

Error message	**Solution**
% Context x should be disabled prior to change.	To configure context parameter, the context status should be disabled.
% Out of range: bytes-per-pkt. (Valid range: 1~xx)	Check the number of bytes length that is in the range.
% Out of range: frames-per-pkt. (Valid range: 1~xxxx)	Check the number of frames length that is in the range.
Packet length (Header + payload) examples	
Unframed/ RTP-pw mode	Ethernet (14 Bytes) + IP (20 Bytes) + UDP (8 Bytes) + RTP and SAToP (16 Bytes) = 58 Bytes
Frame/ RTP-pw mode.	Ethernet (14 Bytes) + IP (20 Bytes) + UDP (8 Bytes) + RTP and CESoPSN (16 Bytes) = 58 Bytes
Unframed/ MEF-pw	Ethernet (14 Bytes) + ECID (4 Bytes) + RTP and SAToP (4 Bytes) = 22 Bytes
Frame /MEF-pw	Ethernet (14 Bytes) + ECID (4 Bytes) +CESoETH (4 Bytes) = 22 Bytes

21.3 SNMP Configuration warning and error messages

Error message	Solution
% previously used community-name	Check the community name is not duplicated.
snmpd is running!!, so do not enable	SNMP agent daemon is already enabled.

21.4 NTP configuration warning and info messages

Error message	Solution
NTP is enabled, disable first	Disable NTP daemon to configure NTP parameters.
25 Apr 10:20:11 ntpdate[170]: no server suitable for synchronisation found	System date cannot be set up because there is no response from NTP server Check the connection with NTP server and NTP server status.
25 Apr 10:18:14 ntpdate[144]: set time from server 10.20.252.7	NTP server synchronises system date and time.