FiberLogic

Broadband Access Innovations

OptiQwave-8310
STM-1 Digital Microwave System

Installation Manual

Table of Contents

1. Introduction

The OptiQwave-8310 is a license-exempt (5.725~5.850GHz) digital microwave in ISM band that provides STM-1 point-to-point wireless connections at the range of 1~50 km with high availability.   It complies with FCC Part 15, Subpart C 15.247 & 15.249.   Fiber Logic allows you to quickly add backhaul and backbone connections to your infrastructure. Because it is wireless, Fiber Logic's OptiQwave 8310 offers significant cost-savings compared to traditional leased lines. In addition, fast deployment opens up new revenue streams and enables faster customer acquisition. It also provides a time-to-market advantage when installing a leased-line is too costly or impossible.
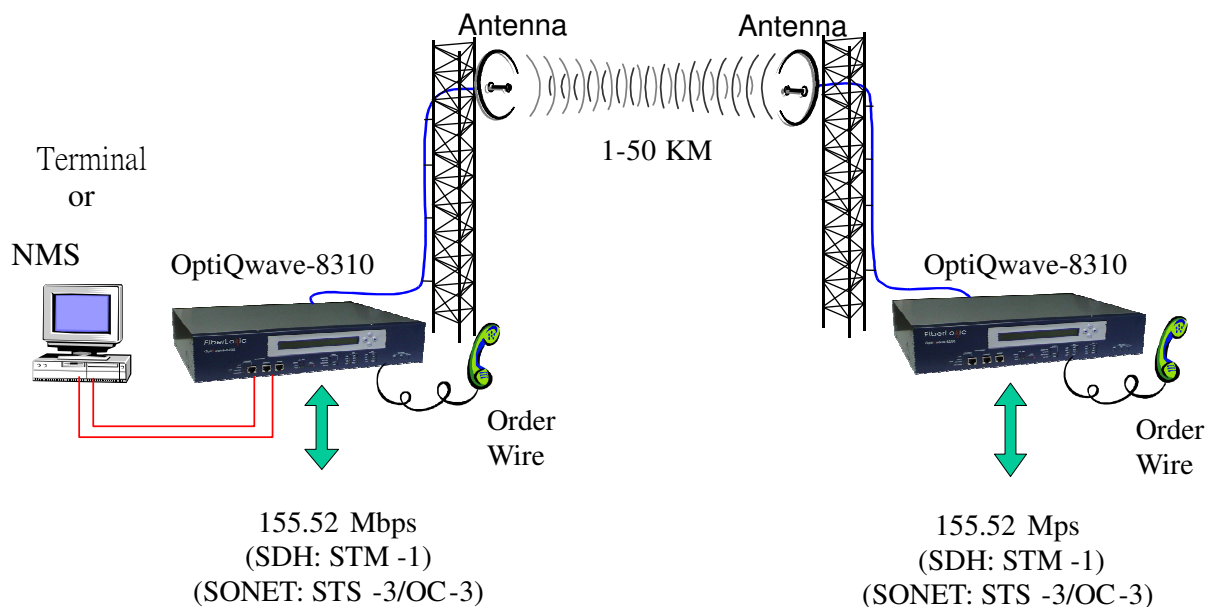
Application Diagram

2. System Design

2.1 OptiQwave-8310 Front Panel
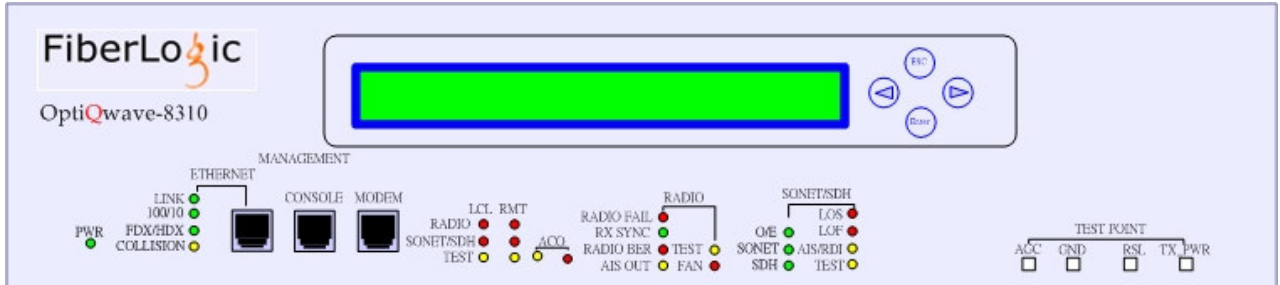
2.2 OptiQwave-8310 Rear Panel
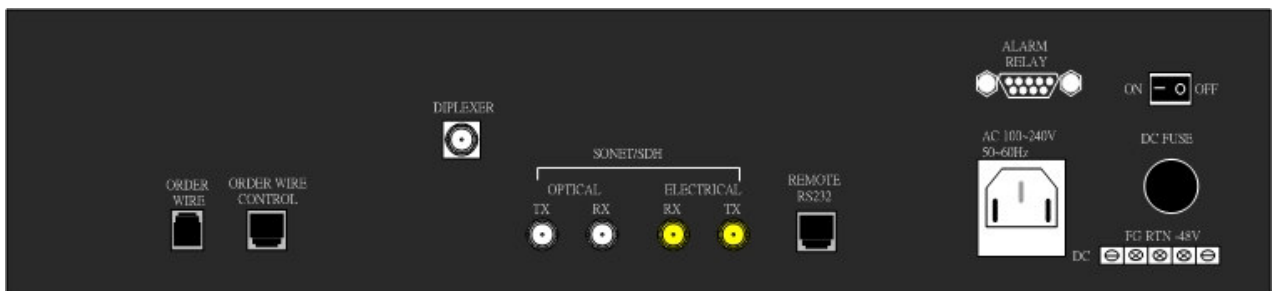
3. System Features

✧ The unit can be placed at desktop or rack-mounted on the standard 19" or 23" rack. LED signals are located at the front panel indicating system status.

✧ This system contains digital modem/demodem unit, transmission unit, antenna unit and operation management unit.

✧ The system is modular based, including power module, LCD module, baseband module, digital modem module, RF RX module, RF TX module, and transmission module. Every module protects from wrong insertion.

✧ The transmission unit, N-type connector, can be connected via coaxial cables or waveguide.

✧ Built-in SNMP Agent: Via the 10/100BaseT interface located at the rear panel or the FiberLogic GUI interface (operated in PC Windows 98^{TM} and above OS), system configuration, network performance monitoring, and loopback can be performed.

✧ The unit operates at 5.725~5.850 GHz unlicensed frequency. The RF channel uses Frequency Division Duplex FDD mode, which utilizes different frequencies upstream and downstream. The system has 1 set (A1 channel and A2 channel) of transmission channels. See section 5.1 for details.

✧ Hot Stand-by automatic protection can be proivded when two OptiQwave microwave units are connected to FiberLogic's OptiQwave 8155 Protection Switch.

✧ The output power of the transmitter is at least 17dBm, and with 10dB adjustable range. The stability of the transmitter is ±20ppm.

✧ The threshold value of the Receiver is -73dBm (at 10^{-6} BER) or lower. The maximum acceptable signal is up to -15dBm (no bit error) or higher. In addition, the system gain is up to 90dB.

✧ The unit supports AGC test point. Please refer to Section 12-3 for the diagram of the relationship between AGC and RF Receive Level.

✧ The TPL and RSL can be read from the LCD screen located at the front panel. They can also be measured from the Test Point at the front panel.

✧ The system conforms to FCC Part 15, Subpart C 15.247 & 15.249 standard.

✧ The system uses 32 QAM modulations. It provides SDH STM-1 capacity (155.52Mbps), one orderwire, and one Remote RS-232 interface.

✧ SDH interface can be configured as STM-1 optical or STM-1 electrical, at user's discretion.

✧ SDH STM-1 conforms to ITU-T G.707, G.703, G.957, and G.958.

✧ STM-1 background quality level can be up to BER $\leq 10^{-10}$.

✧ Statistics report of SDH STM-1 interface (ES, SES, B1ERR). The performance monitoring intervals include the current 15 minutes, the past 24 hours at 15-min increments, and 7 days at 24-hour increments. Should the readings exceed the threshold values, alarm will be generated.

✧ Local maintenance personnel can communicate with the remote personnel via handset or headset at any time without dialing the PSTN.

- ◇ Remote system maintenance can be performed via the Remote RS-232 interface.

- ◇ LCD Front Panel Functional Keys: System configuration, path performance and monitoring can be controlled via LCD control panel interface.

- ◇ Built-in menu-driven local console port: Use of CID interface connected with VT-100 terminal to do system configuration, view system status, system monitoring, and loopback tests.

- ◇ When using dial-up modem, the connection can be seen as dial-in or dial-out. When it is dial-in, maintenance personnel can dial at anytime, connect the remote SDH STM-1 Digital Microwave via PSTN. Dial-out connection means that the system will dial-out and alert the maintenance personnel should certain values exceed the threshold settings. The default alarm trigger threshold is set as 5. Users can change the value.

- ◇ Built-in SNMP Agent: Via the 10/100BaseT interface located at the rear panel or the FiberLogic GUI interface (operated in PC Windows 95^{TM} and above OS), system configuration, network performance monitoring, and loopback can be performed.

- ◇ Additional EOC channel is available. It does not use the transmission capacity. EOC channel ensures that maintenance can be carried out in a non-intrusive manner.

- ◇ Remote system monitoring, maintenance & configuration can be performed by the local unit.

- ◇ Via the microwave chain, the Ethernet interface at both sides has bridge capability. Using back-to-back connection, local personnel can maintain the chained microwave systems.　The bridge function can be enabled or disabled.

- ◇ System configuration is stored in NVRAM (Nonvolatile Memory). Configurations are reloaded automatically when power failed and back again.

- ◇ Local loopback and remote loopback can be performed for SDH STM-1 interface. Local loopback can be performed for Radio interface. In addition, PRBS test pattern is available for testing purpose.

- ◇ Under some system alarm status, the SDH MS-AIS signals will replace the normal SDH STM-1 signal output (AIS-Out mechanism) in order to alert the next level SDH network. Please see Section 7.2.1 for details.

- ◇ The equipment provides alarm and status LEDs at the front panel for at-a-glance system status.

- ◇ Provide RADIO, and SONET/SDH major alarm and minor alarm visual and audio relay output.

- ◇ The unit can be powered by AC, DC or AC/DC power source. The acceptable range is 90V~240V for AC and –48V for DC.

- ◇ System date and time are merely for the report of alarm and statistics. It is free with the Y2K problem and won't cause any system malfunction.

- ◇ Operation temperature :0～50℃.　Humidity: 0%～90%, non-condensing.

- ◇ EMI - Conform to FCC Part15, Subpart B, Class B; CISPR22 Class B.

4. System Block Diagram
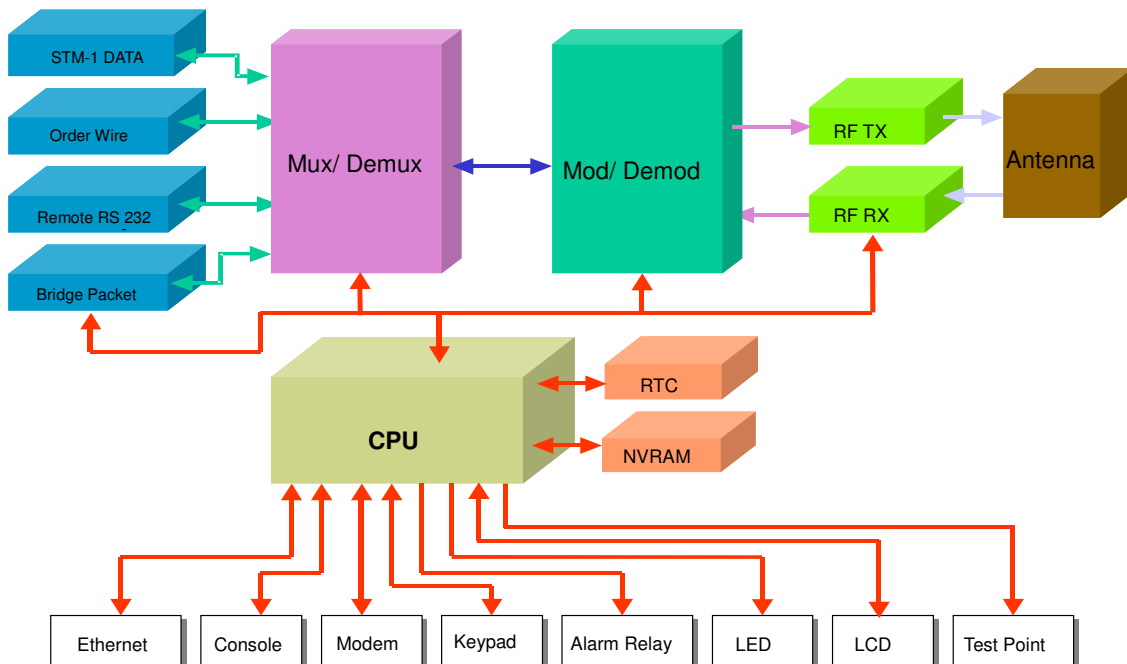
Mux/Demux	：	Multiplex the sigals from Remote RS-232, order wire, Bridge Packet, STM-1 data into high-speed electrical signals, and transmit to RF transmitter after it is 32 QAMed. RF receiver will then demultiplex it back to Remote RS-232, Order wire, Bridge Packet, and STM-1 data singals.
Modulator	：	Use 32 QAM modulation. It modulates the baseband signals from multiplexer to 32 QAM signals and fees to the RF transmitter.
Demodulator	：	Demodulate the 32 QAM signals into baseband signals and feeds to the demultiplexer.
RF Transmitter	：	Feeds the 32 QAM signals to antenna.
RF Receiver	：	Trasnmit the RF signals to demodulator for processing.
Test point	：	This is where it computes AGC, RSL and TPL values from the voltage measured.
CPU	：	system control center, it controls BUS components, performs executive functions, and etc.
NVRAM	：	Non Volatile RAM.
Keypad	：	CPU will decipher the status of Key/SW, and execute the according command.

Output Alarm ： is connected to alarm devices.　CPU will act in accordance to the type of alarm and activate the proper alarm relay output, making it from normal open to normal close.

LED ： System status light indication

Modem ： Modem interface.

LCD ： LCD display with key control.

Console(CID) ： CID is connected v-100 terminal for network management and system configuration.

Ethernet ： Connected to LAN/Ethernet for network management purpose.

RTC ： Real time clock

Remote RS-232 ： RS-232 is connected to the remote system for network management and system configuration purpose.

Chapter 5

5. Technical Specification

5.1 Radio (RF and Digital Modem) Interface

Frequency Range	：	5.725~5.850 GHz
RF Channel Bandwidth	：	30~40 MHz
Modulation	：	32 QAM or 64 QAM（Optional）
System Capacity	：	1 x STM-1, 1 x O.W., 1 x Remote RS-232
Antenna Connector	：	50 Ω N-type Female
RF Output Power	：	≧ +17 dBm (no attenuation)
RF Attenuation Range	：	≧ 24 dB
TX Frequency	：	A1: 5750 MHz (5730-5770), A2: 5825 MHz (5805-5845)
RX Frequency	：	A1: 5825 MHz (5805-5845), A2: 5750 MHz (5730-5770)
TX Frequency Stability	：	≦ ± 15 ppm
Classic RX Level	：	-15 to –60 dBm
RX Sensitivity	：	≦ - 73 dBm (10^{-6} BER)
Maximum RX Level	：	≧ - 15 dBm (no bit error)
System Gain	：	> 90 dB
Residual BER	：	≦10^{-10} under RSL： -20 to –60 dBM
Transmission Distance	：	Up to 50 KM.
Test Point	：	TX_PWR, RSL and AGC Measurements
Loopback	：	Local loopback
Alarm Relay	：	Local and remote Radio alarm (Radio Fail, Radio BER)
Output Relay	：	Audible and Visual
Performance monitoring	：	24-hour availability
Test Pattern	：	Unframed 2^{9-1}, 2^{11-1}, 2^{15-1}, 2^{20-1} or 2^{23-1} PRBS (155.52 Mbps)
PRBS BER Test	：	Bit Error and Unsync Second Monitor and Statistics
Security Code	：	Encryption code. Radio transmission can be encrypted.

5.2 SDH Interface

5.2.1 STM-1 Optical Interface

Standard	：	ITU-T G.957 complied
Connector Type	：	FC/PC female
Data Rate	：	155.52 Mbps
Frame	：	Binary NRZ after scrambling
Application Code	：	S-1.1, optional for S-1.2, L-1.1 or L-1.2
Wavelength	：	1261-1360 nm, optional for 1550 nm
Light Source	：	Multi-Longitudinal Mode

Tx Power	：	-10 dBm nominal
RMS	：	7.7 nm (Max.)
Extinction Ratio	：	8.2 dB (Min.)
Rx Sensitivity	：	$\leqq$ - 28 dBm (10^{-10} BER)
Overload	：	-8 dBm (Min.)
Path Penalty	：	1 dB (Max.)
Jitter Generation	：	ITU-T G.958 Complied
		$\leqq$ 0.01 UIrms (12 kHz High Pass Filter)
Jitter Toleranc	：	ITU-T G.958 Figure 9.3 and Table 9.2 Complied
AIS Generation	：	It will be generated when LOS or MS-AIS of STM-1 is detected. Also, the RX Unsync or RADIO BER of RADIO is detected. AIS generation will be done when the system got different security code.
Loopback	：	Local and remote loopbacks
Alarm Output	：	Major Alarm (LOS, LOF) and Minor Alarm (Threshold Cross Alarm)
Alarm Output Relay	：	Audio and Visual
Performance Monitoring	：	15-min/24-hour/7-day performance statistics
BER	：	$\leqq 10^{-10}$

5.2.2 STM-1 Electrical Interface

Standard	：	ITU-T G.703 Complied
Connector Type	：	BNC or IEC 169-13 1.6/5.6 mm female
Data Rate	：	155.52 Mbps ± 20 ppm
Line Code	：	CMI (Code Mark Inversion)
Frame	：	ITU-T G.707 Complied
Impedance	：	75 Ω ±5% Unbalanced, Resistive
Pulse Shape	：	ITU-T G.703 Figure 24 and 25 Complied
Line Loss	：	12.7 dB (78MHz signal)
AIS Generation	：	When the system detects remote STM-1 LOS or MS-AIS signals or it detects RADIO RX Unsync. It happens when the Radio BER exceeds the threshold or receives different security code.
Loopback	：	Local and remote loopbacks
Alarm	：	Major alarm (LOS, LOF) and threshold alarm
Alarm Output	：	Audible and Visible
Performance Monitoring	：	15-min/24-hr/7-day performance statistics
BER	：	$\leqq 10^{-10}$

5.3 System Mangement

OptiQwave-8310 SDH STM-1 Digital Microwave porivdes the following interface: Ethernet Port, Console Port, Modem Port, Remote RS232 Port and LCD panel.   Via the interfaces above, system management for local and remote can be done.

LCD Interface

Use ←, →, Enter and ESC control keys located at the front panel to configure the system.   Both LOCAL and REMOTE units can be configured via LCD interface.   System functions such as configuration, monitoring, view, and loopbacks can be performed for both LOCAL and REMOTE units.

CID (Craft Interface Device, Console) Interface

The CID interface is RJ45, the standard EIA RS232C controlling signal.   By connecting VT-100 via the CID interface, system Menu Tree can be accessed.   You can configure, monitor, view, perform loopback, and other system functions for both Local and Remote units via the CID interface

Modem Interface

The MODEM interface is RJ45, the standard EIA RS232C controlling signal.   User can connect to the remote VT-100 terminal via modem dialup.   Remote unit can be accessed locally through the independent EOC channel.   You can configure, monitor, view, perform loopback, and other system functions for both Local and Remote units via the MODEM interface.
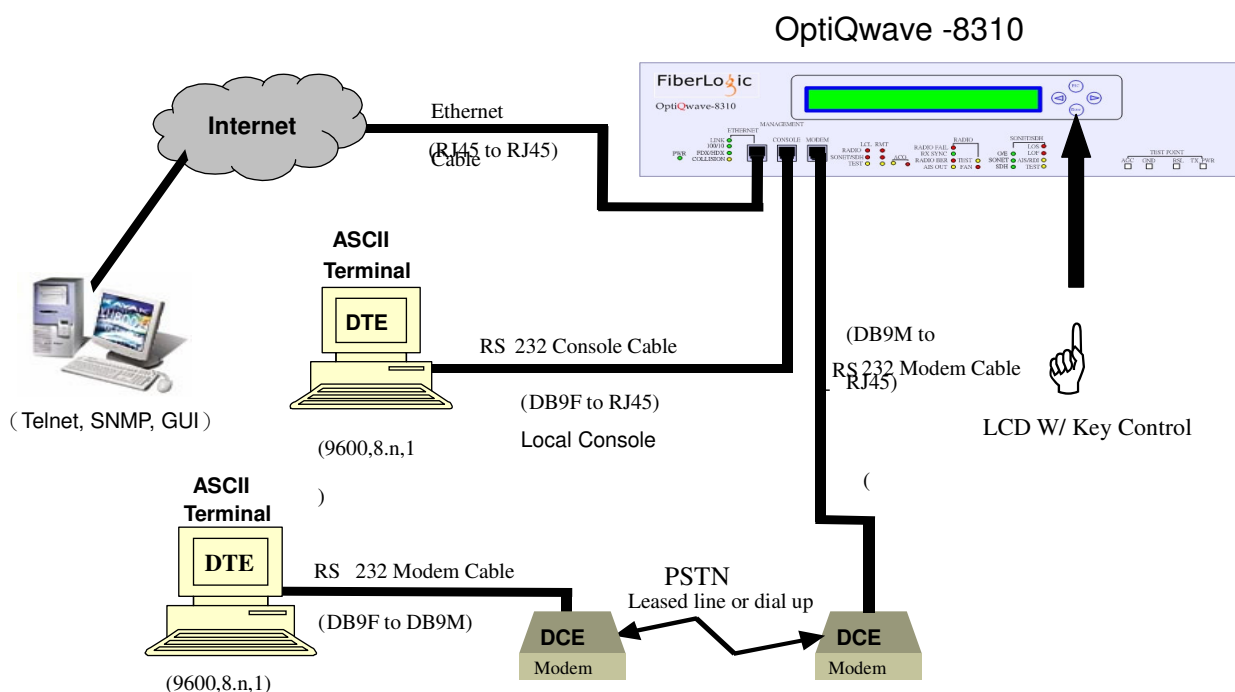
Figure 5.1

Ethernet Interface

The 100/10Base T interface is RJ45 female.   It conforms to IEEE802.3.   LED indications including LINK, 100/10, FDX/HDX, and COLLISION are located at the front panel.   System configurations, monitoring, system status, loopbacks and other system functions can be performed via the Ethernet interface, telnet, SNMP and FiberLogic GUI interface.   See below:
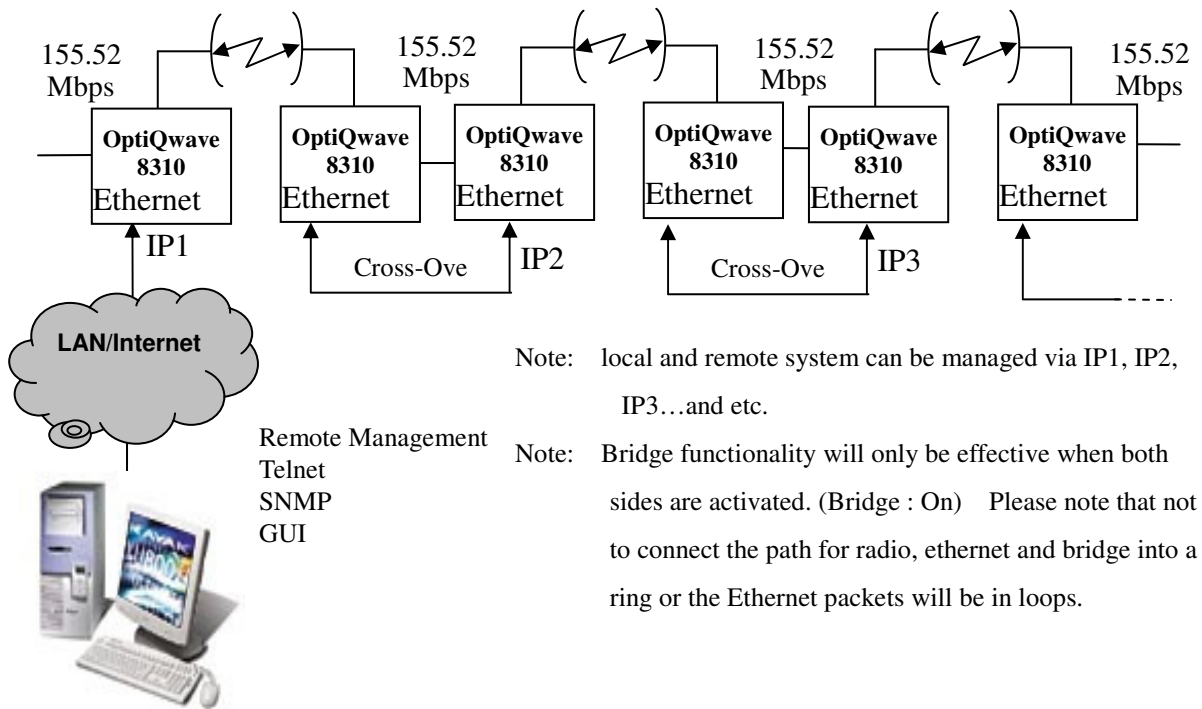
Figure 5.2 Ethernet Back-to-Back Connection

R-RS232 (Remote RS-232) Interface

The connector is RJ45 female.   It is the standard EIA RS232C controlling signal.   It can be connected to the local VT-100 terminal.   Menu Driven tree can be accessed and therefore system configurations can be performed.   The configuring data are transmitted via the independent EOC channel, and therefore does not take up other system resources.
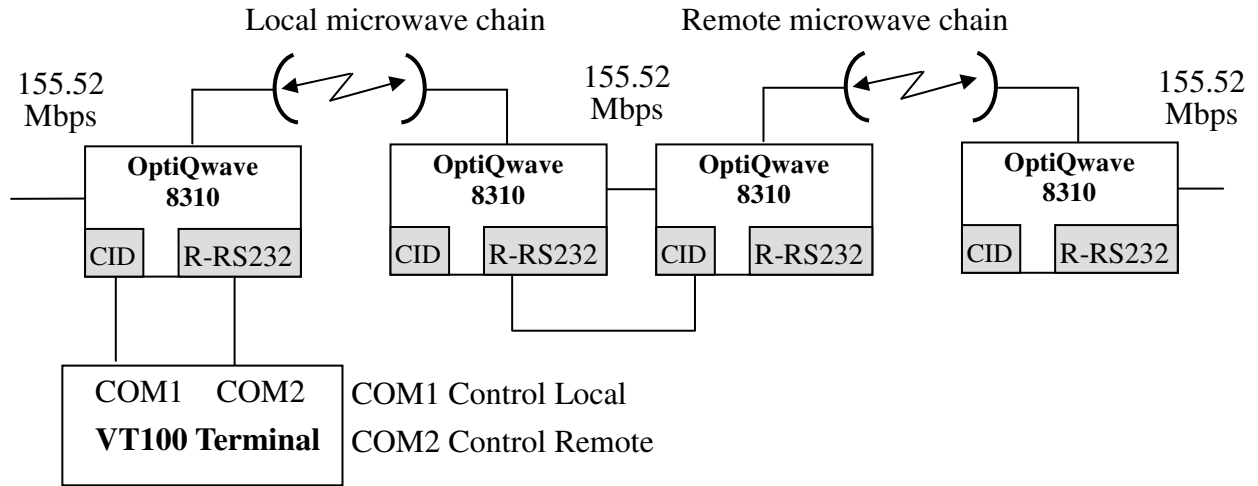
Figure 5.3 RS-232 Connection

5.4 Orderwire Interface

The connector is RJ11 Female.   It can be connected to handset or headset (2-line).   It is useful for personnel communications inbetween the microwave links.

5.5 Alarm Output Relay

The connector is DB9 Female.

- Audible RADIO Alarm (AR)   Normal Open
- Visual RADIO Alarm (VR)   Normal Open
- Audible SONET/SDH LINE Alarm (AL)   Normal Open
- Visual SONET/SDH LINE Alarm (VL)   Normal Open
- Common Ground (C)   Common GND

5.6 System Functionalities

Maintenance and performance monitoring can be performed via LCD, CID, Telnet, and FiberLogic GUI, operated on PC Windows 98^{TM} and above OS.

System Menu Tree	LOCAL	REMOTE
System Configuration and System Description	◯	△
SNMP Configuration	◯	◯
MODEM Configuration	◯	◯
User/Password Configuration	◯	✕
System Rest (RST)	◯	◯
Radio Interface Configuration and Status	◯	△
SONET/SDH Configuration and Status Checking	◯	◯
TPL Configuration & RF Signal Checking	◯	◯
Radio Loopback and Release	◯	✕
SONET/SDH Loopback and Release	◯	◯
PRBS Enable and Release	◯	◯
1-hour Performance Report at 15-min Interval for SONET/SDH	◯	◯
1-day Performance Report at 15-min Interval for SONET/SDH	◯	◯
7-day Performance Report at 24-hr Interval for SONET/SDH	◯	◯
Clear History and Report	◯	◯
ES SES B1BER Threshold Settings in 15 Minutes for SONET/SDH Interface	◯	◯
ES SES B1BER Threshold Settings in 1 Hour for SONET/SDH Interface	◯	◯
ES SES B1BER Threshold Settings in 1 Day for SONET/SDH Interface	◯	◯
View Radio Interface Alarm	◯	◯
View SONET/SDH Interface Alarm	◯	◯
View Alarm History	◯	◯
Clear Alarm History	◯	◯

◯: executable   x: not executable   △: partial executable

Note:
- The Frequency Plan and the remote log in user/password cannot be altered from the local system.
- The remote RADIO baseband loopback cannot be activated from local.
- The remote RADIO security code cannot be altered from the local LCD; however, it can be altered via other interfaces locally.

5.7 LED Status Indication

System Power PWR

Ethernet

- Link
- Speed (100/10)
- Full Duplex/Half Duplex (FDX/HDX)
- Collision (COLLISION)

ETHERNET
LINK
100/10
FDX/HDX
COLLISION
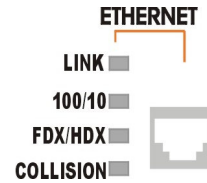
Alarm Suppress (ACO) Key ACO

System Status LED

LCL (Local) for Radio Alarm, SONET/SDH Alarm and Test

RMT (Remote) for Radio, SONET/SDH Alarm and Test

LCL   RMT
RADIO
SONET/SDH
TEST
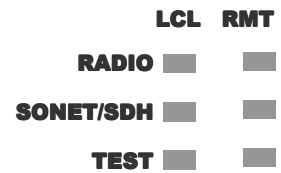
Radio Interface LED

RADIO Fail (RADIO FAIL), RADIO Synchronization (RX SYNC)

RADIO Bit Rate Error (RADIO BER), AIS Out (AIS OUT),

Test (TEST), FAN (FAN)

RADIO
RADIO FAIL
RX SYNC
RADIO BER   TEST
AIS OUT   FAN
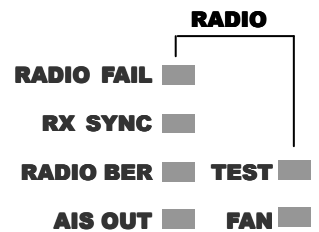
SONET/SDH Interface LED

O/E, SONET

SDH, LOS

LOF, AIS/RDI

TEST

SONET/SDH
LOS
O/E   LOF
SONET   AIS/RDI
SDH   TEST
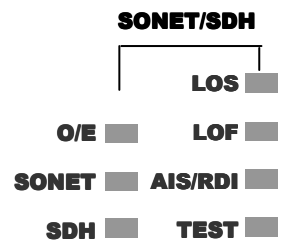
5.8 Test Point

TX_PWR, AGC, GND, RSL

TEST POINT
AGC   GND   RSL   TX_PWR
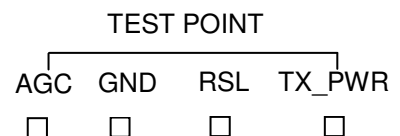
5.9 Power Supply

AC	90~240V or 47Hz to 63Hz
DC	-36 ～ -72V
Connector Type	AC: AC Plug
	DC: secured with screws
Power consumption	≦ 60 Watts

5.10 Operation Temperature

Temperature：0～50℃.

Humidity：5 ％～95%, non-condensing.

5.11 Dimension

W445mm x D326mm x H88mm

The unit is desktop stackable and 19- or 23- inch rack mountable.

5.12 EMI

Conforms to FCC Part15, Subpart B, Class B; CISPR22 Class B.

5.13 MTBF (Mean Time Between Failure)

MTBF is greater than 45,000 hours.

6. System Installation & Test

The OptiQwave-8310 SDH STM-1 DIGITAL MICROWAVE is indoor equipment.   It can be placed at desktop or rack-mounted on 19" or 23" rack.

6.1 Power

The system uses dual power module, AC and DC with auto-switching mechanism. Please see Figure 6.1 for DC pins definition.   See Figure 6.2 for AC pins definition.

AC 100-240V
50-60Hz
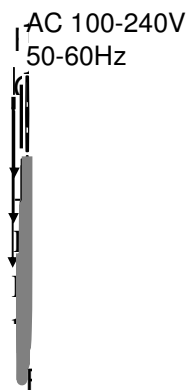
Note: When installing the power to the unit, please make sure the switch is at the OFF position. When using DC power, please take off the fuse at the fuse panel.   Restore the fuse back after the power installation is finished.

Note: When applying the power to the unit, please make sure the antenna or 50Ω terminal resistance or RF power meter is attached to the RF interface so that the transmitter will not be damaged.

6.2 Antenna Installation

SDH STM-1 DIGITAL MICROWAVE is used in point-to-point; therefore, it has to be used in pairs (with opposite transmitting and receiving frequencies).   The antenna has to be in the line of sight, shown as figure 6.3.   Therefore, it is recommended to fix the antenna at tower, roof, or open spaces to ensure better transmission.   It is recommended to use antenna with radius of 1 inch at least.   The antenna has to be grounded to avoid lightening or any electrical shortage.

6.3 Transmission Line (RF Interface)

50Ω Coax cable is used to connect from the antenna to the DIPLEXER N type connector at the rear panel.　See Figure 6.4.　Use 50Ω transmission line (cable) with low attenuation and high return loss and connect it to the antenna, as shown in Figure 6.3.

Figure 6.4 N Type Female
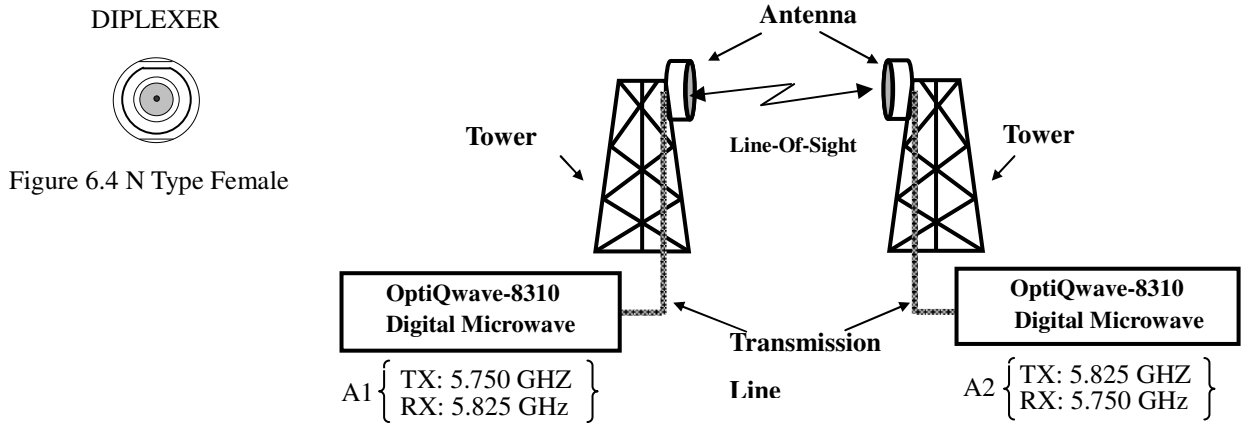
Figure 6.3 Transmission Line & Antenna

Note:　When installing transmission line, a CPR137G and PDR70 to the N-type femaleadapter is needed.　In addition, two short flexible cables (around 5 feet, of up to 6GHz) are needed to connect the transmission line to the antenna and RF interface.　The bending of the flexible cables will affect the RSL readings.　Therefore it is important that the length is not too long.

6.4 RF Output Power Adjustment

EIRP (Effective Isotropic Radiated Power) states that:

RF Output Power(dBm) $\leqq$ E – G + FL;

Where E = 48 dBm, when working at the 5.725~5.850 GHz frequency

G = Antenna Gain

FL= Feeder Loss

Therefore, the RF Output Power has to be calculated using the above formula according to the deployment.　The computed value can be entered via the LCD by performing the following step: "RADIO→RSL/TPL→LCL-TPL-CFG"　Use the arrow key to select the appropriate selection so that it does not exceed the maximum allowable value.

Note:　The typical value of RF output power is 22dBm where there is no inside attenuation. When the value is set below 12 dBm, LCD will not show the TPL value (you can still lower it). The TX_PWR and GND voltage can be measured by tool and then the RF output power can be achieved by referencing Table 6-9.

6.5 Alignment

After the antenna and transmission cable are installed, alignment has to be adjusted so that the angels are optimized for maximum RF power receiving.   Alignments are done in two steps, coarse alignment and fine alignment.   Make sure the location provides line-of-sight path clearance.   The antenna polarization must be the same at both ends of the link, either vertical or horizontal.   To coarse align the antenna, first set it for flat elevation.   Then point it at the heading marker obtained using a compass.   To fine align the antenna, RSL readings will be used.   RSL values can be obtained by measuring the values of RSL with respect to the GND at the front panel.   See Section 6.14 for details.   First adjust the azimuth and then the elevation of the local antenna will maximize the RSL signal level.   The far antenna is adjusted the same way.   It is important to fine adjust the antenna for maximum RSL readings.

Note:
- Perform the following steps to get RSL readings from LCD
  "RADIO→RSL/TPL→STATUS"
- RSL readings of the remote system can be obtained if two systems are in synchronizations.

6.6 Loopback & PRBS BER Test

The PRBS BER test can be used to test the transmission performance of the system after the installation and alignment.   Before performing the PRBS BER test, both RADIOS have to be in synchronization.

The PRBS BER test can be performed by performing the following:
- Use LCD control panel at the front to enable local loopback. ("LOCAL→TEST→ LOOPBACK→SDH/SONET→REMOTE→LOCAL")
- Enable local SDH STM-1 DIGITAL MICROWAVE PRBS Test (155.52Mbps 2^{15-1} Inverted PRBS) to replace STM-1 payload and observe the BER result. ("LOCAL→TEST→PRBS →PATTERN→2^15-1→VIEW").
- After 15 seconds, you should observe the following from the LCD panel.
  "2^15-1_INV   SYNC   Bit Err=0   Elapse=15   Unsync=0"
  The above statement indicates there is not bit error and the systems are in synchronization. Disable the loopback/PRBS tests afterwards.   (Press ESC key and "PATTERN→STOP→ YES")
  Diable remote loopback. ("LOCAL→TEST→LOOPBACK→SONET/SDH→REMOTE→ NONE")

6.7 SONET/SDH Interface (STM-1)

Located at the rear panel.   There are two interfaces: 75 Ω IEC 169-13 1.6/5.6mm female connector for electrical and FC/PC female connector for optical.   Shown as Figure 6.5.6.5。

Parameters can be configured via the LCD located at the front panel.   For example, perform the following to configure Frame Format:
"LOCAL→CONFIG→SDH/SONET→FORMAT→SDH" and O/E Module"LOCAL→CONFIG→ SDH/SONET→O/E_MODULE→OPTICAL or ELECTRICAL".
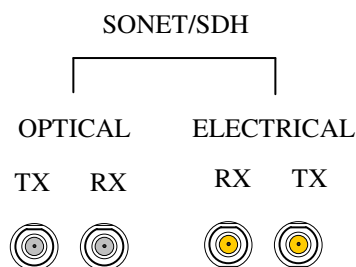
Figure 6.5 SONET/SDH Interface

6.8 Console (CID) Interface

- Connect CID Interface with Computer
  Connect the CID interface to the COM port located at the front panel with the console cable provided.   The CID interface of OptiQwave 8310 SDH STM-1 Digital Microwave is RJ45 Female.   For RJ45 pin assignment, please refer to Table 6.1.

Figure 6.6   CID Connector

RJ45 (Plug) to CONSOLE	Signal	DB9 (Female) To PC COM port
1	NC	
2	NC	
3	NC	
4	Signal Ground	5
5	Receive Data	3
6	Transmit Data	2
7	NC	
8	NC	

＊NC: Not Connected

Table 6.1 Console I/F Pin Assignment and Console Cable Pin Connection

- Use Hypertrm program or the tera term VT100 emulation program or others.
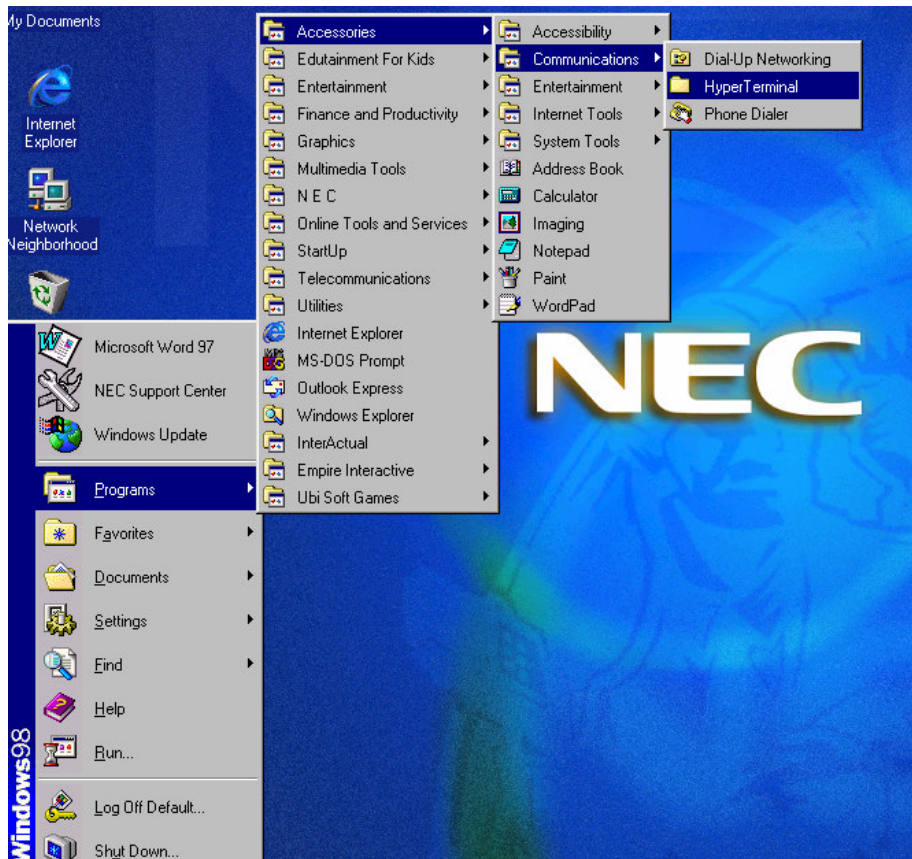
- Select the appropriate port.   Set the parameters as follows:
    i.   Speed: 9600
    ii.   Byte: 8
    iii.   Parity Check: None
    iv.   Flow Control: None
    v.   Stopping Bit: 1

- Click Enter to go back to the system main menu.   Enter the correct system password to configure or read-only mode will be activated.   The default setting of the user/password is fiber/5638889.

  Note: Users can change the password from the Supervisor Mode using the LCD screen ("LOCAL→SYSTEM→PASSWD").
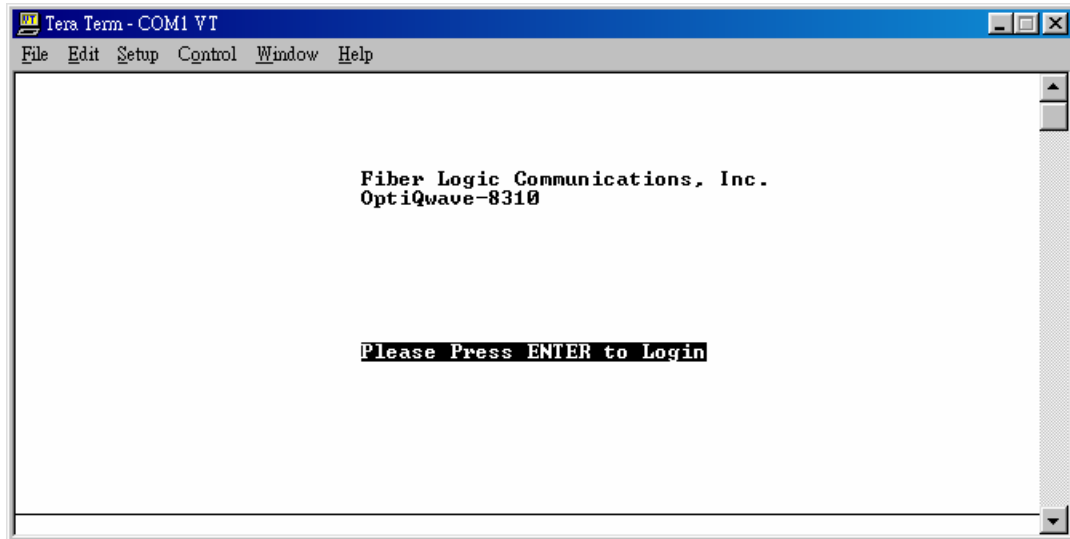
- Shown below is the system main menu.   You can now start to configure the DS3 Digital Microwave Radio.
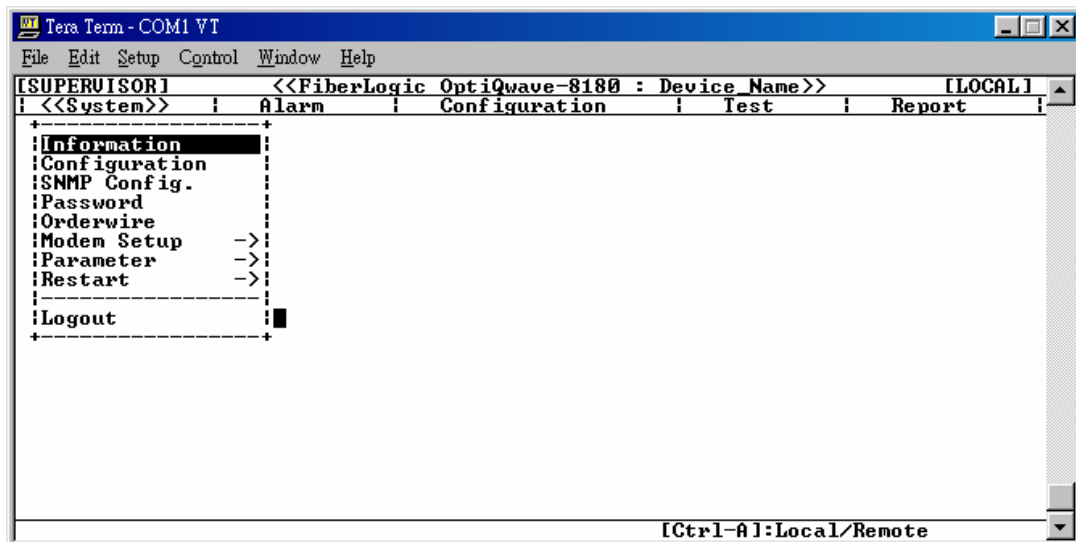
6.9 Ethernet Interface

Located at the front panel.   The connector is RJ45 Female.   Please see Table 6.2 for pin assignment.

ETHERNET

RJ45 Female

RJ45 Male
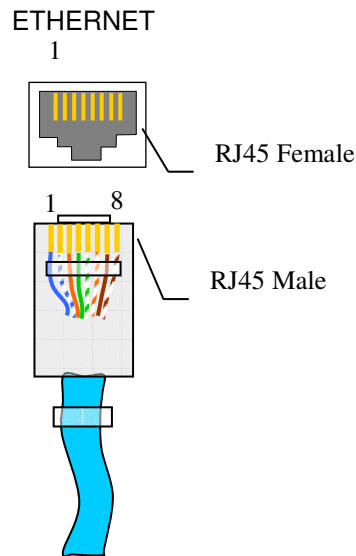
Figure 6.7 Ethernet Connection

PIN No.	Definition
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC
9	GND (for STP)

*NC: Not Connected

Table 6.2 Ethernet Pin Assignment

OptiQwave 8310 is connected to LAN via 100/10BaseT port.   SNMP network management can be performed via the connection.   If the LAN is connected to the Internet, remote SNMP management can be performed too.   See figure 6.8.

Users have to use the LCD control panel to configure Ethernet related parameters.   For example

- For 10/100Mpbs and Half/Duplex Mode, perform the following:
  "LOCAL→SYSTEM→CONFIG→ETHER→AUTO/100Full/100Half/10Full/10Half"

- For IP address, network mask and gateway, perform the following:
  "LOCAL→SYSTEM→CONFIG→IP→IP-ADR/NETMASK/GATEWAY"

- To enable SNMP, perform the following:
  "LOCAL→SYSTEM→CONFIG→SNMP→ON"

- To enable Ethernet Bridge, perform the following:
  "LOCAL→SYSTEM→CONFIG→BRIDGE→ON"

Note: The system has to reboot (software or hardware) for the new configurations of IP address, netmask and gateway to be effective.   Software reboot will not interfere with the current transmission of data, but hardware reboot will interrupt the transmission.   To reboot the system, perform the following: "LOCAL→SYSTEM→RESTART→Soft-Boot/Hard-Boot".
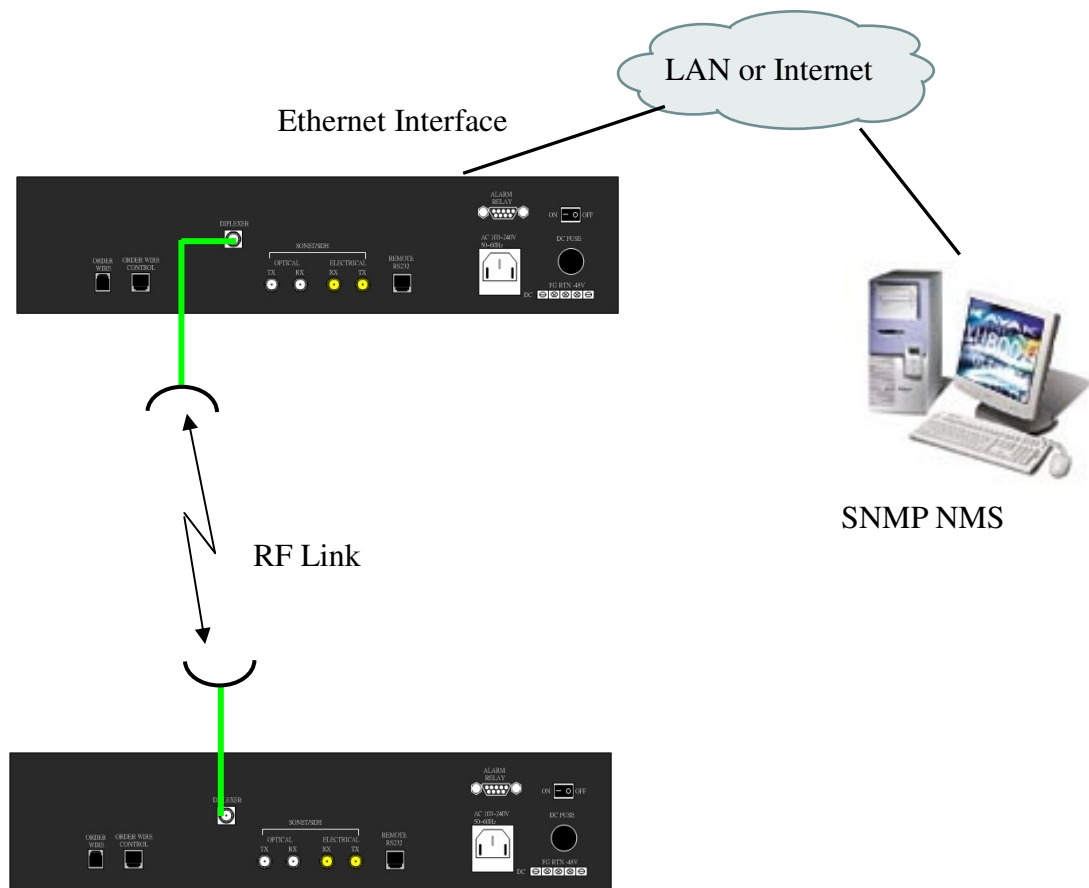
Figure 6.8   SNMP NMS & OptiQwave-8310 System

6.10 Alarm Output Relay

Located at the rear panel.   The connector is DB9 Female.

Alarm Relay
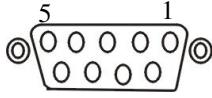
Figure 6.9 Alarm Relay DB9 Female

PIN No.	Definition
1	AR (Audio Radio)
2	AL (Audio SONET/SDH Line)
3	COM
4	VR (Video Radio)
5	VL (Video SONET/SDH Line)

Table 6.3 Alarm Relay Pin Assignment

6.11 Modem Interface

Located at the front panel.   The connector type is RJ45.   Please refer to Table 6.4 for pin assignment.   Use the modem cable provided with the unit and connect the modem interface with a MODEM.   Please refer to Section 12.1 for Modem Installing.

Note: Users have to configure the MODEM type to be either Dial-up or Leased-Line via the LCD interface ("LOCAL→SYSTEM→MODEM→TYPE").
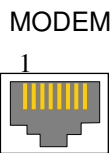
MODEM

Table 6.10
MODEM RJ45 Female

RJ45 (Plug) to MODEM	Signal	DB9 (Male) to Modem COM Port
1	Ring Indicator	9
2	Data Carrier Detect	1
3	Data Terminal Ready	4
4	Signal Ground	5
5	Receive Data	2
6	Transmit Data	3
7	Clear To Send	8
8	Request To Send	7

Table 6.4 Pin Assignment

6.12 Orderwire Interface

Located at the rear panel.   The connector type is RJ11 Female (Figure 6.11).   Please refer to Table 6.5 for pin assignment.   Connect the phone or headset to the orderwire interface.   It provides means of communication between maintenance personnel.   Local personnel can dial the number ("10"~"99" or "**") for the remote SDH STM-1 DIGITAL MICROWAVE, and the remote maintenance personnel will be alerted by the ringing.   This way, voice communication can be done without the PSTN network.

Note: The phone number between the local unit and the remote unit can be checked via LCD interface by performing the following step: "O.W.→LCL_Phone_No, RMT_Phone_No".

ORDERWIRE

Figure 6.11 Orderwire RJ11 Female

PIN No.	Definition
3	Handset Tip
4	Handset Ring

Table 6.5 RJ11 Pin Assignment

6.13 RS-232 Interface

- Connect the RS-232 Interface to the terminal with the cable provided.
  Located at the rear panel.   The connector type is RJ45 Female, shown in Figure 6.12).
  Please refer to Table 6.6 for pin assignment.

REMOTE
RS232
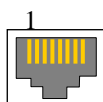
Figure 6.12 Remote RS232 RJ45 Female

RJ45 (Plug) to R-RS232	Signal	RJ45 (Plug) to CONSOLE
1	NC	
2	NC	
3	NC	
4	Signal Ground	4
5	Receive Data	6
6	Transmit Data	5
7	NC	
8	NC	

＊NC: Not Connected

Table 6.6 R-RS232 I/F Pin Assignment and R-RS232 Cable Pin Connection

A. Connect the Remote RS232 interface with the next level SDH console in chain by using the R-RS232 cable provided.   Please see Figure 5.3.

B. Use Hypertrm program or the tera term VT100 emulation program or others.   After entering the correct username and password, you are able to configure the local and remote systems.

6.14 Test Point Interface

The Test Point is located at the front panel.   See Figure 6.13.   DC current is used to measure the values of TX_PWR and RSL with respect to the ground.   Compare the values to the Factory Test Data Sheet and then the RSL (dBm) and TPL (dBm) of RF transmitter can be calculated.   See Table 6.7 and Table 6.8.

TEST POINT

AGC   GND   RSL   TX_PWR

☐   ☐   ☐   ☐
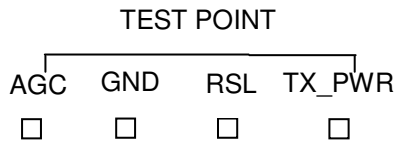
Figure 6.13 TEST POINT Pins

Table 6.7

RSL	
DBm	Voltage
-80	1.07
-70	1.30
-60	1.51
-50	1.59
-40	1.72
-30	1.84
-20	1.91
-10	1.97
-5	2.01

Table 6.8

TPL	
DBm	Voltage
7	0.162
9	0.33
11	0.35
13	0.39
15	0.44
17	0.51
19	0.62
21	0.77
23	0.87

Note: Please see Appendix 12-3 for Graph of AGC Voltage (Volt.) and RF Receive Power Level (dBm).

6.15 Note

- The low power level of digital microwave system should not interfere with the aviation or any legal communication.   Should interference occurs, the system has to be adjusted.
- The separation distance to be maintained between the antenna and all persons is suggested more than 2 meters at least.
- The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.To comply with the FCC RF exposure compliance requirements, this device and its antenna must not be co-located or operating to conjunction with any other antenna or transmitter.
- Users cannot alter the frequency, power level or enhance the original design of a digital microwave system that is already certified.

7. System Operation

7.1 Power Up

When power is applied to the system correctly, the PWR LED will be lighted.   A green LED means the system is up and running.   If not, the reasons might be one of the following:

- The system enters self-protection mode if the power is faultily applied.
- The system clock is lost.   CPU is not turned on.   To power up again means to reset.

7.2 Radio (RF+Digital Modem) Interface

The OptiQwave-8310 utilizes unlicensed frequency of 5.725~5.850GHz.   It is an all-indoor microwave system and the RF unit and the digital modem are equipped in the same hard housing.

The system conforms to the FCC standard and is certified by China Telecom, the largest Telecom operator in Taiwan.   The output power level of the transmitter is at least 17 dBm and with adjustable range of 24 dBm.   Its stability is of ±20ppm.   The transmitter sensitivity is –73 dBm (10^{-6}BER) or lower and the maximum receiving signal is at least –15 dBm with no bit error.   The system gain is greater than 90 dB.   The TPL and RSL readings are shown on the LCD screen.   Test Point (TX_PWR, RSL, AGC and GND) is located at the front panel.

The classic RF channel is 40 MHz, with frequency division duplex (FDD) modulation.   The upper and lower chain (namely A1 channel and A2 channel) uses different frequency for transmitting and receiving.   The transmitting frequency of LOCAL A1 is the same as the receiving frequency of REMOTE A2.   Please see the frequency plan, as shown in Figure 7.1.
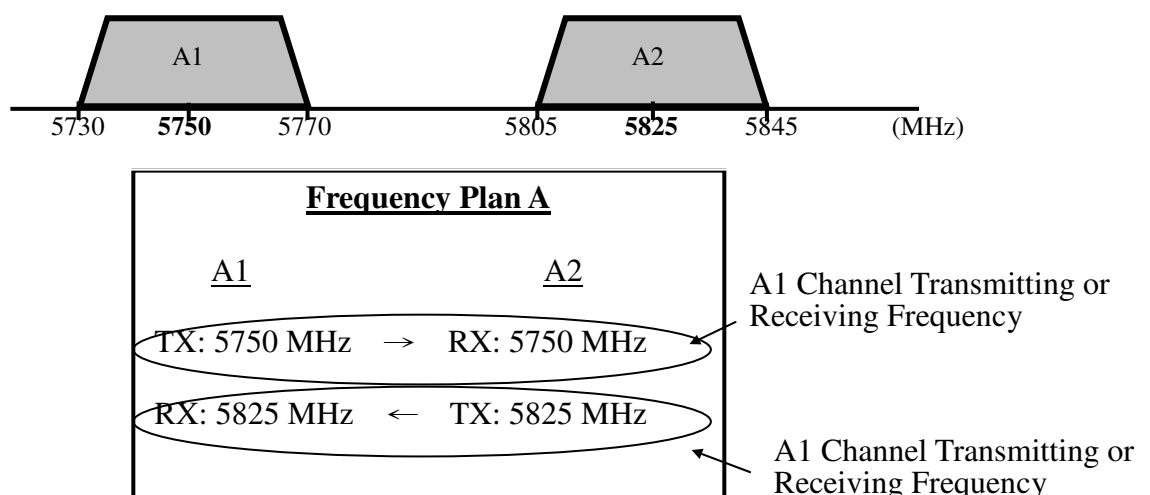
Figure 7.1 Frequency Plan

When interference occurs, users can switch the SDH STM-1 DIGITAL MICROWAVE from local to remote and vice versa.　Or users can change the diplexer or change its frequency plan.

Note:
- To change the frequency plan, perform the following:
  "LOCAL→CONFIG→RADIO→RF-FREQ→Plan_A1 or Plan_A2".
- The system uses 32 QAM modulation.　It provides the transmission capacity of STM-1 (155.52 Mbps), an orderwire (64 kbps) and a remote RS-232 interface (9600bps).

TPL, RF plan, security code, LED AIS_Out Reflection (ON/OFF) can be adjusted for the RADIO interface.　The LEDs for RADIO located at the front panel are shown below:

RADIO

RADIO FAIL

RX SYNC

RADIO BER　TEST

AIS OUT　FAN
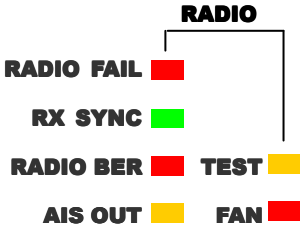
LED	Color	Indication	Description
RADIO FAIL	Red	RADIO Interface Alarm	ON: The RADIO RF RX or RF TX or digital modem module fails. OFF: No alarm.
RX SYNC	Green	RADIO Synchronization	ON: RADIO interface is in synchronization. OFF: RADIO interface is not synchronized. 　　　(RADIO_RX_UNSYNC occurs.)
RADIO BER	Red	RADIO Interface High Bit Error Rate	ON: The BER of the traffic exceeds the threshold value of $1X10^{-6}$. OFF: The threshold value is within limit.
AIS OUT	Orange	AIS Alarm	ON: Both SONET/SDH_AIS_OUT and AIS_OUT LED reflection are ON for RADIO interface. OFF: There is no SONET/SDH_AIS_OUT alarm or an alarm occurs but the AIS_OUT LED Reflection is set as OFF.
FAN	Red	FAN	ON: One or both FANs fail. OFF: Both FANs are fine.
TEST	Orange	Loopback or PRBS Test Status	ON: Local baseband loopback or PRBS test is enabled. OFF: No loopback or PRBS test is enabled for the RADIO interface.

Note: When the RADIO interface is out of synchronization, RADIO_RX_UNSYNC alarm will occur.   At this moment, the RADIO, SONET/SDH, and TEST LEDs at the RMT row will flash simultaneously.

7.2.1 AIS OUT Mechanism

Under some system status or alarm, SDH MS-AIS signal will replace the normal STM-1 signal output.

- **Send AIS to SONET/SDH (STM-1) Interface**
    i.   RF RX module fails.
    ii.   Digital Modem module fails.
    iii.   RADIO_RX_UNSYNC occurs.
    iv.   RADIO_BER alarm occurs.
    v.   RADIO_SECURITY_ERR alarm occurs*.
    vi.   Remote SONET/SDH LOS alarm occurs.
    vii.   Remote SONET/SDH AIS alarm occurs.
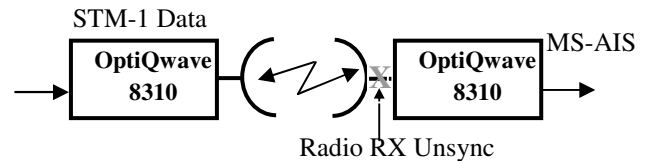
Figure 7.2 Example of AIS Out

When the situations described above happened, the MS_AIS signal will replace the normal STM-1 signals and SONET_AIS_OUT alarm will occur.   The AIS_OUT LED for RADIO interface will be ON.   (This is when the RADIO AIS_OUT Reflection is set as ON.)

*The security code for remote and local systems have to be the same.   The default security code is FiberLogic.   If the security code is different, RADIO_SECURITY_BRR will be ON.   In addition, MS_AIS signal will be sent out from SONET/SDH interface and the EOC channel will be disabled (RADIO, SONET/SDH, and TEST LEDs at the RMT row flash simultaneously).   When changing the security code, please change the remote first and then the local.

- **Send AIS Closed**
Under the following situations, the SONET/SDH interface is AIS OUT:

    i.   The LINE, and payload loopback is enabled for SONET/SDH interface or the baseband loopback is enabled for RADIO interface at the local system.
    ii.   The local loopback or PRBS is enabled for the remote SONET/SDH interface.

For testing purpose, the MS-AIS signal is disabled for the local SONET/SDH interface and the SONET/SDH_AIS_OUT alarm is cleared temporarily.   The AIS OUT LED for RADIO interface is OFF until the PRBS or loopback is deactivated.

7.3 SONET/SDH (STM-1) Interface

The LED indications for SONET/SDH interface is shown below:
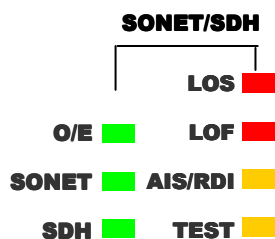
Please note that when ALL LED Reflection is set as OFF, the LED will no longer reflect the STM-1 interface alarm status.   The default is ON.

LED Signal	Color	Description	ON/OFF
O/E	Green	Optical or Electrical	ON: Optical interface is selected. OFF: Electrical interface is selected.
SONET	Green	SONET Frame	ON: SONET frame is selected. OFF: SDH frame is selected.
SDH	Green	SDH Frame Indication	ON: SDH frame type is selected. OFF: SONET frame type is selected.
LOS	Red	Loss of Signal	ON: Loss of signals for STM-1. OFF: Everything is normal.
LOF	Red	Loss of Frame	ON: Loss of frame for STM-1. OFF: Everything is normal.
AIS/RDI	Orange	AIS/RDI Alarm	ON: Receiving MS-AIS (SDH) signals. Flash: Receiving MS-RDI (SDH) signals. OFF: No alarm.
TEST	Orange	Test in progress	ON: Loopback is activated for SONET/SDH interface. OFF: Loopback is not activated for SONET/SDH interface.

Please note that only electrical or optical interface can be selected simultaneously.

7.4 System LED Indication

Located at the lower left corner of the LCD panel.   LCL is the local system and RMT is the remote system.

- • RADIO: Alarm occurs for the RADIO interface and is not solved.
- • SONET/SDH: Alarm occurs for the SONET/SDH interface is not solved.
- • TEST: Whether or not loopback or PRBS test is enabled.
- • ACO: Press this key to suppress audible alarm.

See below for details.

LED	Color	Indication	Description
RADIO	Red	RADIO Alarm	ON: might be one of the following: ✓ RADIO_FAIL ✓ RADIO_RX_UNSYNC ✓ RADIO_BER ✓ RADIO_SONET/SDH_AIS_OUT & AIS_OUT LED Reflection is ON ✓ RADIO_SECURITY_ERR ✓ RADIO_FAN OFF: none of the above
SONET /SDH	Red	SONET/SDH Alarm	ON: might be one of the following minor alarms: ✓ SONET/SDH loss of signal ✓ SONET/SDH loss of frame ✓ SONET/SDH AIS alarm ✓ SONET/SDH RDI alarm OFF: none of the above
TEST	Orange	Test In Progress	ON: loopback is enabled. OFF: no loopback or PRBS test is enabled.
ACO	Orange	Suppress Audible Alarm	ON: alarm occurs at the local system and ACO is enabled. OFF: ✓ No local system alarm. ✓ Local system alarm occurs but ACO is not activated. ✓ Local system alarm occurred and is solved. ✓ New local system alarm occurs and the alarm level is greater than the original. ACO is pressed to release the alarm and audible alarm re-activate again due to the newer and more serious alarm.

Other than situations described above, if the RADIO, SONET/SDH, TEST LEDs flash simultaneously, that indicates the local system cannot receive controlling signals from the remote via the EOC channel and therefore cannot control/maintain the remote system.

7.5 Ethernet Port and LED Indication

Ethernet
- Link
- Speed (100/10)
- Full Duplex/Half Duplex (FDX/HDX)

Collision (COLLISION)
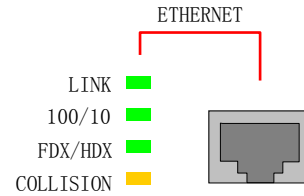
7.6 Menu Tree

The OptiQwave-8310 SDH/STM-1 DIGITAL MICROWAVE provides the following management interface: LCD control panel, Console, Modem, Telnet, SNMP or FiberLogic GUI.   As described in Chapter 1, SDH/STM1 DIGITAL MICROWAVE is point-to-point application, the remote and local systems use the EOC channel to communicate.   This does not compromise the SDH capacity. System maintenance, configuration and performance monitoring can be done using the interfaces provided.   These interfaces are menu-driven.

Note:
- At the VT terminal or the LCD screen, items with "*" indicates it is read-only or the only option in this menu.
- When local system cannot detect the EOC signals from the remote system, the RADIO, SONET/SDH, and TEST LEDs will blink simultaneously.   And "Can't talk to Remote System!!" will appear on the LCD screen when users are trying to enter the REMOTE MENU.

Menu Tree Explanation

System：   [   ] : factory default
    Information：
        (System information, Read Only)
            Date/Time   : 10/23/2003 17:45:52 (system date and time)
        Uptime   : 20 hour 56 min 50 sec (system uptime)
        Company Name   : Fiber Logic Communication Inc.
           Model Name   : OptiQwave-8310
        Software Version   : V1.26 (14:34:54 10/22/2003)
           Board Version   : SONET/SDH STS-3/OC-3/STM-1
           Manufacture Time   : 10/09/2003 20:00:00
        MAC Address   : 00.03.54.00.83.12
           Local IP Address   : [192.168.0.122]
           Local netmask   : [255.255.255.0]
           Local gateway   : [0.0.0.0]

Card Type	Status
Digital Modem Card	Exist
RF Rx Card	Exist
RF Tx Card	Exist

Configuration：

(Configure Host Name, date and time, TCP/IP, Ethernet Speed, Console Port Speed, SNMP Activation , Bridge Enable/Disable, LCD Lock/Unlock, ACO Enable/Disable.)

```
                Host Name        :  [Device_Name] (user definable)
                Date             :  10/23/2003 (user definable)
                Time             :  17:45:52 (user definable)
                Local IP Address :  [192.168.0.122] (user definable)
                Local netmask    :  [255.255.255.0] (user definable)
                Local gateway    :  [0.0.0.0] (user definable)
                Ethernet Mode    :  [AutoSense]
                SNMP             :  [ON]/OFF
               Bridge :   [OFF]/ON
               Console1 Baud Rate : [9600]
               LCD Panel Lock   :   [OFF]/ON (LCD display ON/OFF)
             ACO Button         :   PUSH/[POP] (audible alarm ON/OFF)
            Protection Switch Option : [OFF]/ON (auto-protection switch ON/OFF)
            Protection Switch Group ID : [0] (auto-protection switch moduleID,user definable
               between 1~65535)
```

SNMP Config:

(SNMP configuration – message description, read-only and read-write community name, trap IP address)

```
                Description       : [FiberLogic OptiQwave-8310 SNMP agent] (user definable)
                Contact Name      : [service@fiberlogic.com] (user definable)
                Location          : [HsinChu] (user definable)
                System Name       : [OptiQwave-8310] (user definable)
                Get Community    : [public] (user definable)
                Set Community    : [private] (user definable)
                Trap Community : [public] (user definable)
                Trap IP Address1 : [0.0.0.0] (user definable)
                Trap IP Address2 : [0.0.0.0] (user definable)
             Trap IP Address3 : [0.0.0.0] (user definable)
                Trap IP Address4 : [0.0.0.0] (user definable)
             Trap IP Address5 : [0.0.0.0] (user definable)
```

Password：

(change the password for CID, Modem and Telnet interface)

```
                New SuperUser Name      : fiber (user definable)
                New SuperUser Password: ******* (user definable)
                Confirm New Password   : ******* (user definable)
```

Orderwire :

(telephone)

```
                Orderwire Phone Number      : 45 (user definable: 10~99)
                Trigger Remote Buzzer Now :    [No]/Yes
```

Modem Setup：

(modem setup)

Configuration

```
                Modem Mode              :   [Dial Up]/Leased Line
                Initialization String:    [AT E0Q1&D0&K0 S0=1] (user definable)
                Escape Code             :   [43] (user definable)
                Dial String         :    ATDT<phone#> (dial the number, user definable)
                Alarm Trigger DialOut       :   [OFF]/ON
                Alarm Trigger Threshold     :   [5] (user definable)
```

Hang Up (On-Hook)

Parameter :

(System, RADIO, and SDH/SONET factory default)

Set to Default (return to factory default)

```
                Restore the Default Parameters, it will Soft Reboot the system
                Are you sure (Yes or No) ?
```

Backup Parameters (backup parameters)

```
                The Backup Parameters are saved at : 10/22/2003 11:27:21
                Save the Current Parameters to the Backup Parameters .
                Are you sure (Yes or No) ?
```

Restore Parameters (restore parameters)

```
                The Backup Parameters are saved at 10/23/2003 19:38:32
                Restore the Backup Parameters, it will Soft Reboot the System.
```

Are you sure (Yes or No)？

Restart：

(restart, includes hardware and software)

Soft Boot：

Soft Reboot the System.
Are you sure (Yes or No) ?

Hard Boot：

Hard Reboot the System, it will Affect the Service
Are you sure (Yes or No) ?

Logout：

(logout)

Alarm：

Alarm View：

(Alarm view for RADIO interface and SONET/SDH interface)
Radio Alarms`
SONET/SDH Alarms

Alarm History

(show alarm history)

Alarm Clear

(clear alarm)
Clear the Alarm History
Are you sure (Yes or No)?

Configuration：

(Configure parameters for Radio interface, and SONET/SDH interface)

RF Status:

RF Receive   : SYNC/Unsync
RF Frequency : PLAN_A1/PLAN_A2
RSL   : -46 dBm (1.637 V) (RF receive signal level)
TPL   : 17 dBm (0.412 V) (RF output power level)
RSL Bar   : RSL bar graph
TPL Bar   : TPL bar graph

TPL Configuration:

TPL   : 17 dBm (0.412 V) (RF output power level)
V-control : [1 2 ……….62 63 64] (RF output level adjustment, 64 steps in total)

Radio Status :

RF Status
Digital Modem Status
Radio Test Status

Radio Configuration:

RF Frequency Plan   : A1/A2
Radio Security Code   : [FiberLogic] (user definable)
AIS_OUT LED Reflection   : [ON]/OFF

SONET/SDH Config. :

SONET/SDH Format   : [SDH]
O/E Module   : [Optical]/Electrical
All LED Reflection   : [ON]/OFF
Threshold Alarm Enable   : [No]/Yes
Threshold Setting   : (user definable)

Load to Remote :

Load Configuration   : [NONE]/ALL/RADIO/SONET/SDH/
If Selection is not 'NONE',
Remote Configuration except 'RF Frequency Plan'
will be Modified after Press [TAB] key.
 (copy the configurations for local to remote, expect the "RF Frequency Plan and TPL)

TEST：
(Loopback and PRBS test)

    Setup LoopBack：

        (Loopback for local and remote)

            local loopback : [None]/Line/Local/Payload/Baseband

            remote loopback : [None]/ Line/Local/Payload

            [note] local and remote loopback can be performed under Local Menu.   Basebandloopback can only be performed locally.

    Setup Test Pattern：

        (Enable or disable 155.52 Mbps, Unframed, Non-inverted/Inverted, $2^{9\text{-}1}/2^{11\text{-}1}/2^{15\text{-}1}/2^{20\text{-}1}/2^{23\text{-}1}$ Pattern,ToRadio, PRBS test)

REPORT：

    Summary：(Radio and SONET/SDH interface report such as interface parameters, alarm status, loopback and PRBS status, and availability summary report)

    Clear Statistics：(Clear SONET/SDH interface statistics.)

    7-Day Statistics：(7-day statistics at 24-hr interval for SONET/SDH interface.)

    24-Hour Statistics：(24-hr statistics at 15-min interval for SONET/SDH interface.)

    1-Hour Statistics：(1-hr statistics at 15-min interval for SONET/SDH interface.)

7.6.1 LCD Interface

The LCD control panel, with green viewing background, consists of 4 control keys, ←, → keys are for selection, "Enter" key is for confirmation of selected item, and "ESC" key is for cancellation or returning to the pervious menu.   Please refer to Chapter 9 for details.

OptiQwave-8310

RADIO   O.W.   LOCAL   REMOTE
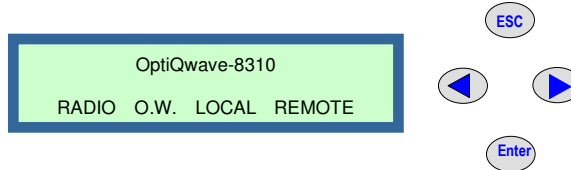
7.6.2 CONSOLE (CID) & Modem Interface

- Connect CID Interface with Computer
  Connect the CID interface to the COM port.   The CID interface of OptiQwave 8200 DS3 Digital Microwave is RJ45.   See Section 6.8, 6.11 and 12.1 for connection details.

- CID and Modem interface is password protected.   Please enter the correct username/password in order to configure the system (Supervisor Mode).   If not, the system is read-only (Normal User Mode).

- The default timeout period is 15 minutes.   The system will logout from the CID interface.

- Dial-up modem can be seen as two parts: dial-in connection and dial-out connection.   For dial-in connection, system maintenance personnel can dial the number any time.   After 15 mintues of idle, the system will logout from the MODEMinterface.   For dial-out connection, system maintenance personnel can dial the number when the alarm trigger threshold is violated.   The default value is 5.   After 15 mintues of idle, the system will logout from the MODEMinterface.

- When using leased line modem, it is activate as long as the power for both sides are up.   No dialing is needed.   The system will logout from the MODEM interface after 15 minutes of idle.

- The interface is pull-down menu driven.   Arrow keys, space, enter, tab, esc and ctrl keys are used to control.

- CID and MODEM uses menu tree too.
- When entering the local menu vial CID and MODEM interface, all local configurations can be done.   However, when entering the remote menu, Looback and frequency plan functions will be inhibited.
- To switch between local and remote system, press Ctrl-A at the samte time.
- When alarm occurs at the local and remote microwave system, it will be recorded to the alarm history accordingly.   Wordings such as "LCL ALM" and/or "RMT ALM" will appear on the terminal to alert the personnel.   The wordings will only disppear after performing the following steps:

  1. Local Menu or Remote Menu
  2. Alarm→Alarm View→Radio Alarms (or SONET/SDH Alarms) or Alarm→ Alarm History
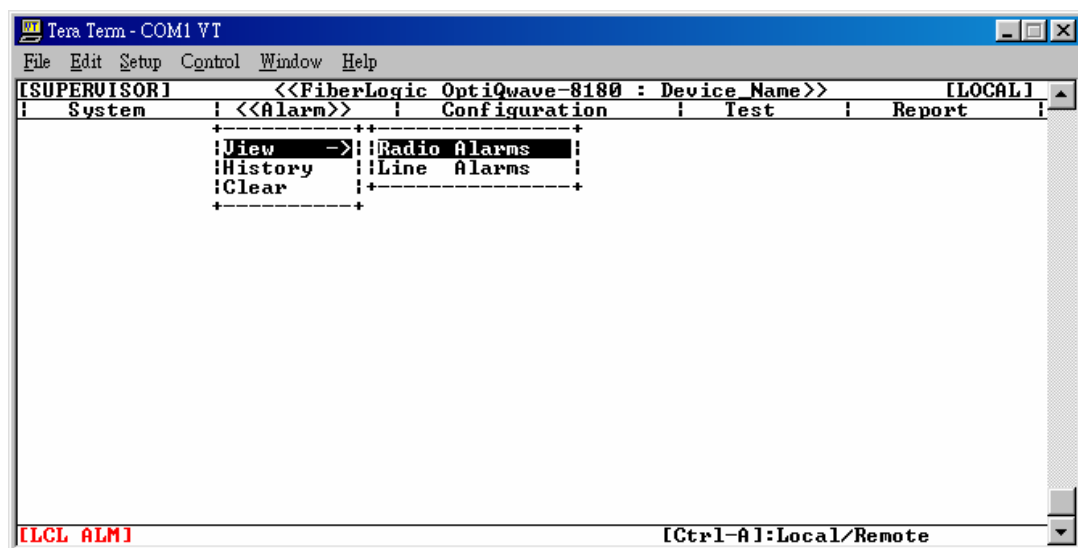
7.6.3 Telnet, SNMP and GUI (OS Interface)

The application of SNMP management has been implemented for quite some time. The main objective is to simplify network management in a diverse environment (different equipments from different vendors).

- Built-in SNMP agent is connected to the SNMP network management system or FiberLogic GUI (under PC Windows 98^{TM}OS and up) via the 100/10BaseT Ethernet Interface.
- SNMP management or FiberLogic GUI is connected via the 100/10BaseT interface.
- Same as CID and LCD, SNMP uses menu tree.   Therefore, SNMP can execute the same system commands as CID and LCD.
- Built-in SNMP agent executes commands from NMS or FiberLogic GUI and sends back alarm history report to the SNMP NMS using UDP/IP datagram.
- IP Address, Subnet Mask, Gateway and Trap IP Address must be configured correctly before SNMP agent can work properly.
- The system has to reboot before the new Ethernet settings to be effective.
- FiberLogic supports FiberLogic MIB.   Please see "MIB" manual for details.

7.7 Alarm Monitoring

- Any alarm occurs will reflect on the LEDs accordingly and the output relay.　Moreover, it will be output to CID, MODEM and TELNET interface.　"LCL ALM" and "RMT ALM" will show on the screen to alert personnel.　The icon of the system under the GUI software will turn to red to indicate alarm alert.

- Alarm types are major alarm (RADIO) and minor alarm (SONET/SDH).　See Section 7.4 for details.

- Every alarm occurs will be recorded in History.　Up to 120 entries can be recorded.　Date, time, event, and current status will also be recorded for trouble shooting purpose.

- RADIO interface - RADIO_FAIL, RADIO_RX_UNSYNC, RADIO_BER, RADIO_SONET/SDH_AIS_OUT, RADIO_SECURITY_ERR, and RADIO_FAN alarms will be detected.

- SONET/SDH interface – LOS, LOF, AIS, and RDI will be recorded.　15-min, 1-hour, and 24-hour threshold alarms are provided.

- Alarm history can be cleared.

7.8 Alarm Output Relay

RADIO Interface
- AR (Audible Radio Alarm)
- VR (Visible Radio Alarm)

SONET/SDH Interface
- AL (Audible SONET/SDH Line Alarm)
- VL (Visible SONET/SDH Line Alarm)

ACO

Please refer to Appendix 12.4 for connection details.
- When system functions properly, all output relays are OPEN.
- When RADIO alarm occurs, AR and VR become SHORT.
- ACO key can be pressed to suppress the audible alarm.　When pressed, AR becomes OPEN. However, VR cannot be released by pressing the ACO key.　VR remains SHORT.
- When problems are solved, ACO key will be off and all the points are back to OPEN.
- For SONET/SDH, AL and VL function act like the AR and VR.　The difference is that AL and VL are for SONET/SDH interface.　Please note that if the ALL LED Reflection is set as OFF, LEDs will not reflect the system status although alarm occurs.　Therefore, under the situation where ALL LED Reflection is not enabled, alarm will not cause AL and VL to be SHORT.　They will remain as OPEN.
- RADIO alarm level is of higher importance than SDH/SONET alarm.

7.9 Loopback and PRBS Test

The system offers local and remote loopback and PRBS test for both RADIO and SONET/SDH interfaces for the ease of maintenance; shown as Figure 7.3. The loopback and PRBS test can be performed under the TEST option in the menu tree.
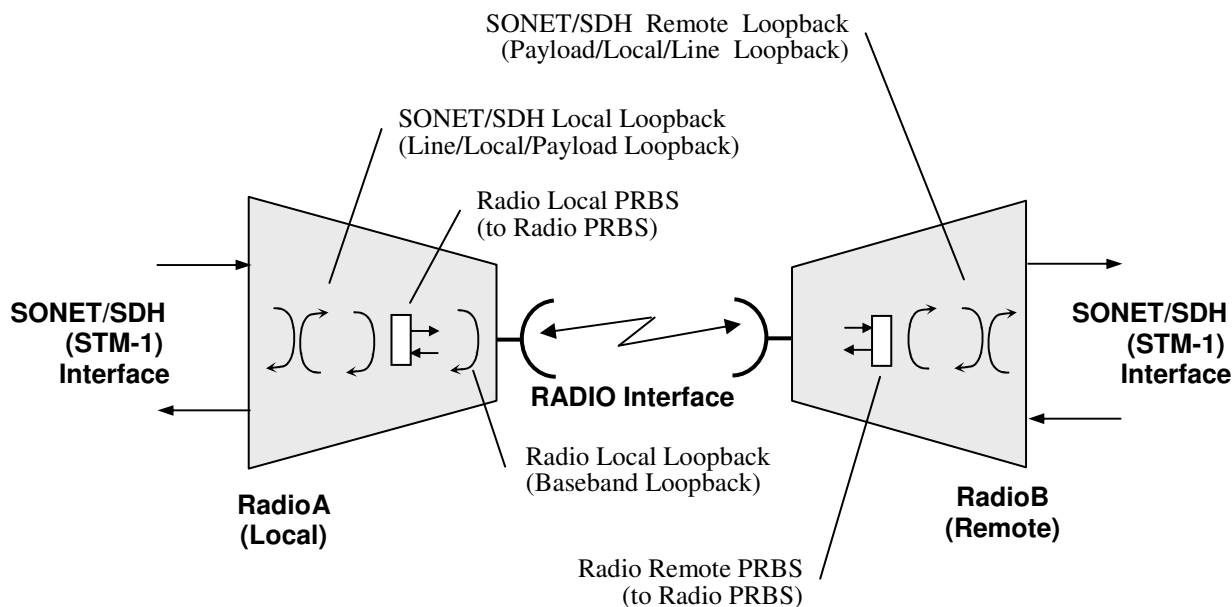
Figure 7.3 Loopback & PRBS

- Local loopback and PRBS means the Local System commands the Local System to perform loopback or PRBS test.
- Remote loopback and PRBS means the Local System commands the Remote System to perform such tests.
- The according TEST LED will be ON if there is any local or remote loopback/PRBS test. This is to remind personnel of unusual activity. The TEST LED will be off when the loopback or PRBS test is disabled.
- The LCL TEST LED is ON if there is local loopback/PRBS test.
- The RMT TEST LED is ON if there is remote loopback/PRBS test.
- When local loopback is enabled for RADIO interface and local and remote loopback is enabled for SONET/SDH interface, the data will still be transmitting using the pass through method.

7.10 Summary and Statistics Report

- It concludes the parameters associated with RADIO and SONET/SDN interfaces.

- The performance monitoring for SONET/SDH interface is shown below:

Parameter	Criteria
Error Second (ES)	LOS or LOF or AIS Alarm per second or B1ERR>0
Severely Error Seconds (SES)	LOS or LOF or AIS Alarm per second or B1ERR$\geq$2400
B1 Parity Bit Error (B1ERR)	B1 Parity Error Detected

- Statistics report for the current hour at 15-min interval, the current 24-hour at 15-min interval and 7-day at 24-hr interval.
- The statistics report can be retrieved and cleared from all the interfaces.
- Should the threshold values be violated, alarm will sound to alert maintenance personnel.
- The threshold values can be set via all the interfaces for the current 15 minutes, the current hour, and the current 24 hours.

7.11 ACO Key

ACO key is used to suppress the audible alarm.   ACO key cannot suppress the visual alarm.   It will only disappear after the problem is solved.

7.12 Orderwire

The orderwire is used as another means of voice communication between two locations without dialing via the PSTN service.   For orderwire connection, please refer to Section 6.12 for details.

7.13 Remote RS-232

The connector is RJ45 female.   It is the standard EIA RS232C controlling signal.   It can be connected to the local VT-100 terminal.   Menu Driven tree can be accessed and therefore system configurations can be performed.   The configuring data are transmitted via the independent EOC channel, and therefore does not take up other system resources.   Please see Section 5.13 for connection details.

7.14 Test Point

Located at the front panel.   It provides points for TX_PWR, RSL, AGC and GND points. Personnel can use DC power and measure the voltage of TX_PWR, RSL, and AGC with respect to the Ground.   Use the values measured and the Factory Test Data Sheet, RF TPL and RSL can be calculated.   See Section 6.14.   TPL and RSL values can be read off from the LCD screen for the local system.   If the both systems are in synchronization, the remote TPL and RSL values can be read off too.   Please see Appendix 12.3 for AGC (Volt.) and RF (dBm) curve diagram.

8. System Setting

8.1 CONSOLE (CID)，MODEM and Telnet Operation
8.1.1 Connecting Method of CID, MODEM and Telnet Interfaces
Please refer to Chapter 6 of this manual.

8.1.2 The Control Key of CID Interface

CID, MODEM and Telnet Interface is using pull down menu driven, using the direction button ←, →, ↑, and ↓ and the buttons such as Space, Enter, Tab, Esc and Ctrl of standard keyboard to control system function menu. Use ← and → to select the items of main menu, and pull down sub menu by ↓, and come back to main menu from sub menu by ← button. After going into submenu, use ↑ and ↓ to select the items of sub menu, and once the pointer is moved to the item you want to configure, just push the button Enter to execute that sub function configuration. While configuring sub item functions, use ↑ and ↓ buttons to select the items you want to change, and use SPACE button to select the setting value you want to change or re-display the current setting values or status, use Ctrl-B or Ctrl-E to initiate or close scan mode (display the current setting values or status repeatedly), use ENTER button to finish the setting values entered by users themselves, use Tab button to save and execute the renewed setting values, and use ESC button to end the configuration of sub items.

8.1.3 Switch Over the Near End to Far End

The OptiQwave-8310 microwave equipment uses point-to-point network topology, and two linked OptiQwave-8310 microwave devices have EOC channel to exchange control order signals. You can use computer to execute terminal virtual program or use Telnet program to connect the OptiQwave-8310 microwave equipment of one end to configure the system operation parameters of the OptiQwave-8310 microwave equipment of far end. Please notice that the upper right corner of system main menu will display whether the object you're controlling is local or remote OptiQwave-8310 microwave equipment, and when you log in the system main meni for the first time you will connect to local OptiQwave-8310 microwave equipment, and while you push Ctrl-A buttons at the same time on main menu picture, you will switch the object you control from the original local OptiQwave-8310 microwave equipment to remote OptiQwave-8310 microwave equipment, while at this moment all the operations you have done will generate at far end OptiQwave-8310 microwave equipment. Go back to main menu and push Ctrl-A again, you will switch back to local OptiQwave-8310 microwave equipment.

8.1.4 Configure RADIO Interface

A、 Under main menu, use ← and → buttons to move the cursor to >>Configuration<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "Radio Config", and press Enter button to enter RADIO interface configuration picture, as the following figure:

```
Tera Term - COM1 VT                                                    _ □ ×
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]              <<FiberLogic OptiQwave-8310 : NO_1>>          [LOCAL]  ▲
│    System      │     Alarm     │ <<Configuration>> │     Test    │    Report   │

                            [ Radio Configuration ]
      _____

      RF Frequency Plan         : A1 [Tx=5.730~5.770  Rx=5.805~5.845]

      Radio Security Code       : FiberLogic

      AIS_OUT LED Reflection    : ON




             Select:[Space], Item:[UP/DOWN], Accept:[ENTER]
             Save & Exit:[TAB], Exit:[ESC]
```
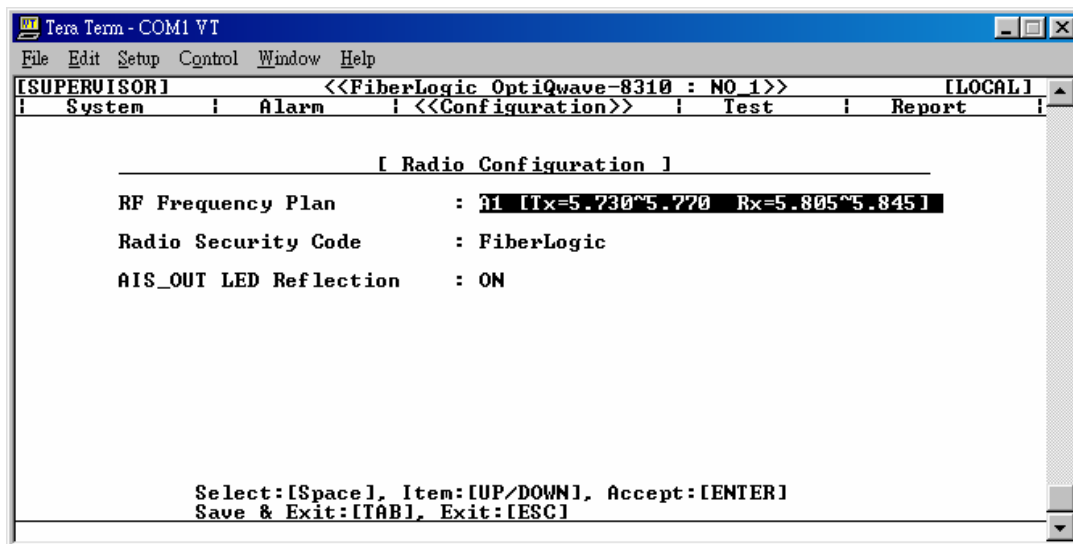
B、   Instruction of Each Option of Configuration:
   Use ↑ and ↓ buttons to select the sub options you want to configure.
      RF Frequency Plan: Under local menu, use SPACE button to select Frequency Plan A1
            or A2 of the equipment of near end, but under remote menu the Frequency Plan
            configuration of the euipment of far end. Factory defaults will be different due to
            Diplexer, and if the setting value is different with Diplexer the both ends of
            microwave link will not be able to link.
      Radio Security Code: Key in the "security code" you want to set and then press ENTER;
            factory default is FiberLogic, and users can set by themselves.If the ptiQwave-8310
            security codes of both ends are not the same, there will come out the
            RADIO_SECURITY_ERR alarm, and the STM-1 data ouput of SONET/SDH
            interface will be interrupted, and output by SDH MS-AIS signal instead, and EOC
            channels are no longer linked, so if you have the need to change security code,
            please change the equipment of far end first and change the equipment of near end
            next, or changing near end first will make EOC channels not linked, that on single
            end you can not change the equipment of far end futher. The goal of security code
            is to provide the security function of the same microwave link.
      LED AIS_OUT Reflection: use SPACE button to choose ON/OFF, start or close the
            display of RADIO AIS OUT LED, while the factory default is ON.   Then press
            Tab button to save and execute the new setting value, and the configuration is
            done.
C、   Exit from the configuration picture of this item
      Press ESC and you can leave the cofiguration picture, and go back to the option of last
         layer. If you want to give up configuration, you do not need to press Tab button, and can
         directly press ESC to exit.

8.1.5 Configure SONET/SDH Interface

A. Under main menu, use ← and → buttons to move the cursor to >>Configuration<<, and press ↓ button to pull down sub menu, and press ↓ button to move the reversed cursor to "SONET/SDH Config", and press   Enter button to enter SONET/SDH interface configuration picture, as the following figure:
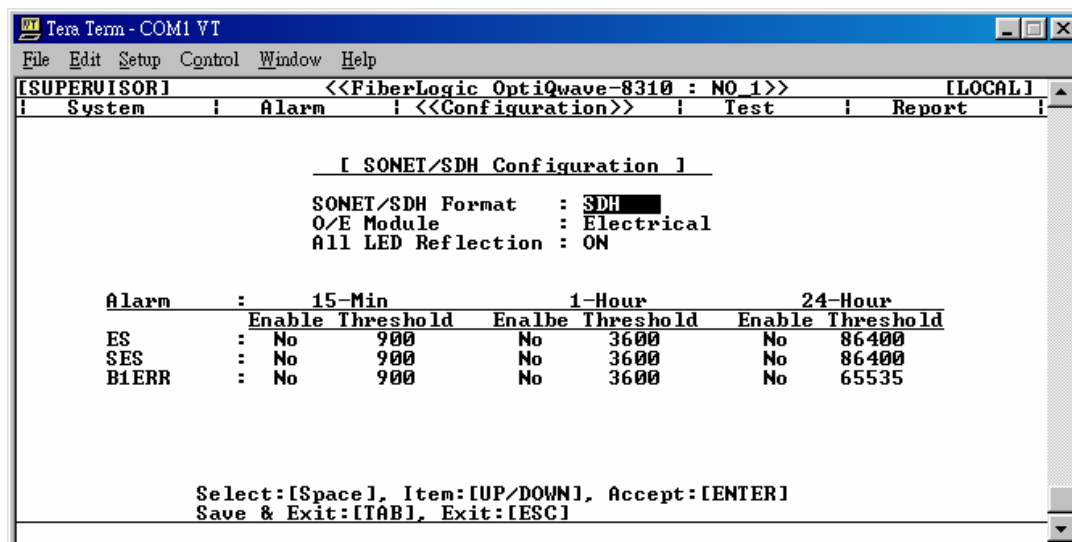
B. Instruction of Each Option of Configuration:

Use ↑ and ↓ buttons to select the following sub options you want to configure.

SONET/SDH Format: use SPACE button to select client interface as specification SDH.

O/E Module: use SPACE button to select client interface as optical or electrical interface.

All LED Reflection: use SPACE button to select ON/OFF, start or closeall the displays of LED of SONET/SDH interface, and the factory default is ON.

Alarm Enable: use SPACE button to choose YES/NO, start or close the generation of threshold alarm of 15 minutes, 1 hour or 24 hours, and co-operate with the configuration of threshold setting, while the factory default is NO.

Threshold Setting: key in the "threshold"you want to configure and then press ENTER button, to configure the effect parameter threshold values including ES, SES and B1EER in 15 minutes, 1 hour and 24 hours, and if the signal effect parameter statistics go beyond the set threshold value, the system will give 15 minutes, 1 hour or 24 hours threshold alarm, and the factory defaults are 900 (for 15 minutes), 3600 (for 1 hour), 86400 or 65535 (for 24 hours).   Then press Tab button to save and execute the new setting value, and the configuration is done.

C. Exit from the configuration picture of this item

Press ESC and you can leave the cofiguration picture, and go back to the option of last layer. If you want to give up configuration, you do not need to press Tab button, and can directly press ESC to exit.

8.1.6 Adjust RF Output Power

A. Under main menu, use ← and →buttons to move the cursor to >>Configuration<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "TPL Config", and press Enter button to enter RF output power adjustment picture, as the following figure:

```
Tera Term - COM1 VT                                              _ □ ✕
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]          <<FiberLogic OptiQwave-8310 : NO_1>>        [LOCAL]
!   System      !   Alarm    ! <<Configuration>> !   Test    !   Report   !

                    [ Local RF TPL Configuration ]
TPL      : 17 dBm (0.412 V)
V-control: [  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22

          23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

          45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64]
                                                                   ]

                    [ Remote RF TPL Configuration ]
TPL      : 15 dBm (0.284 V)
V-control: [  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22

          23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

          45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64]
                                                                   ]

          Execute & Save:[<-][->], Item:[UP/DOWN], Exit:[ESC]
          Refresh:[SPACE], Scan ON/OFF:[Ctrl-B][Ctrl-E]
```

B. Instruction of Each Option of Configuration:

Use ↑ and ↓ buttons to choose the RF transmit power level (TPL) adjustment of the equipment of near end or far end.

Use ← and → button to decrease or increase the current RF transmit power level (TPL) value and save the new setting value. RF transmit power level adjustment is accomplished by adjusting the quantity of an internal reference voltage.

Use SPACE button to display again the current RF transmit power level (TPL) of near end and far end.

Use Ctrl-B or Ctrl-E to start or close scan mode (display repeatedly the current RF transmit power level TPL of the equipment of near end and far end).

C. Exit from the configuration picture of this item

Press ESC button and you can leave this configuration of this item, andgobackto the item of last layer.

8.1.7 Retrive the Status of RADIO Interface

A. Under main menu, use ← and → button to move the cursor to >>Configuration<<, and press ↓ button to pull down the sub menu, and push ↓ button to move the reversed cursor to "Radio Status", and press Enter button to enter the picture of the current state of RADIO interface, as the following figure:

```
Tera Term - COM1 VT                                                      _ □ ×
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]              <<FiberLogic OptiQwave-8310 : NO_1>>          [LOCAL] ▲
|    System      |    Alarm    | <<Configuration>> |    Test    |    Report    |

                              [ Radio Status ]


     RF Status
     RF Receive          : SYNC      Received Signal Level  <RSL>: -46 dBm
     RF Frequency Plan   : PLAN_A1   Transmitted Power Level <TPL>: 17 dBm

     Digital Modem Status
     Mode                : 32QAM     Payload Rate            : 158.4000 Mbps
     Demodulator Signal  : LOCK      Symbol Rate             : 37.7143 Mbaud
     Receive Security Code : VALID   Send AIS to SONET/SDH   : STOP
     BER Status          : NORMAL    FAN Status              : NORMAL


     Radio Test Status
     Baseband Loopback   : OFF       ToRadio PRBS    : OFF




     Refresh:[SPACE], Scan ON/OFF:[Ctrl-B][Ctrl-E], Exit:Other Key■
```

B. Use SPACE button to display again the current setting value or status of RADIO interface.
    Use Ctrl-B or Ctrl-E to start or close scan more (repeatedly display the current setting
    value or status of RADIO interface).

RF Status:

RF Receive : SYNC or UNSYNC (receiving synchronously or un synchronously)

RF Frequency Plan: PLAN_A1 or PLAN_A2 (the frequency plan or the equipment is
    A1 or A2)

Received Signal Level (RSL): the current level of the received signal of RF (dBm)

Transmitted Power Level (TPL): the current level of the transmitted signal of RF
    (dBm)

Digital Modem Status:

Modem Mode: 32 QAM or other more advanced ways digital modulation

Demodulator Signal: LOCK or UNLOCK (whether the demodulator signal is locked
    or unlocked)

Receive Security Code: VALID or INVALID (whether the matching of received
    security code is correct or incorrect)

BER Status: NORMAL or WORSE (Radio BER value is lower or higher than
    threshold)

Payload Rate: 158.4000 Mbps

Symbol Rate: 37.7143 Mbaud

Send AIS to SONET/SDH: START or STOP (SONET/SDH interface MS-AIS signal
    output is started or stopped)

FAN Status: NORMAL or WORSE (the operation of radiating fan is normal or
    worse)

Radio Test Status:

Baseband Loopback: ON or OFF (Baseband loopback is on or off)

ToRadio PRBS: ON or OFF (ToRadio PRBS is on or off)

C、 Exit from the configuration picture of this item

Press any of the other buttons and you can leave the status picture of this item, and go

back to the options of the last layer.

8.1.8 Retrive the Status of RF Interface

A. Under main menu, use ← and → buttons to move the cursor to >>Configuration<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "RF Status" and press Enter to enter the cuttent state of RF interface, as the following figure:

```
Tera Term - COM1 VT                                              _ □ ✕
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]              <<FiberLogic OptiQwave-8310 : NO_1>>           [LOCAL] ▲
┊     System      ┊    Alarm     ┊  <<Configuration>>  ┊     Test      ┊    Report    ┊
                              [ Local RF Status ]
      RF Receive    : SYNC
      RF Frequency  : PLAN_A1 [Tx=5.730~5.770   Rx=5.805~5.845] GHz
      RSL           : -46 dBm <1.650 V>
      TPL           : 17 dBm <0.412 V>
                    : [ 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]
      RSL Bar       : [                                                          ]
      TPL Bar       : [████████████████            ]

                              [ Remote RF Status ]
      RF Receive    : SYNC
      RF Frequency  : PLAN_A2 [Tx=5.805~5.845   Rx=5.730~5.770] GHz
      RSL           : -46 dBm <1.637 V>
      TPL           : 15 dBm <0.284 V>
                    : [ 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]
      RSL Bar       : [                                                          ]
      TPL Bar       : [██████████████            ]

      Refresh:[SPACE], Scan ON/OFF:[Ctrl-B][Ctrl-E], Exit:Other Key
```

B. Use SPACE botton to display again the current setting value and status of the RF interface of the equipment of near end and far end.
Use Ctrl-B or Ctrl-E to start or stop scan mode (display repeatedly the current setting value or status of the RF interface of the equipment of near end and far end).
The items and definitions are as same as RADIO interface status picture, except the bar diagram of RSL and TPL added.

C. Exit from the status picture of this item
Press any of the other buttons and you can leave the status picture of this item, and go back to the options of the last layer.

8.1.9 Copy the Near End Parameters to Far End

A. Under main menu, use ← and → buttons to move the cursor to >>Configuration<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "Load to Remote", and press Enter to enter interface selecting picture, as the following figure:
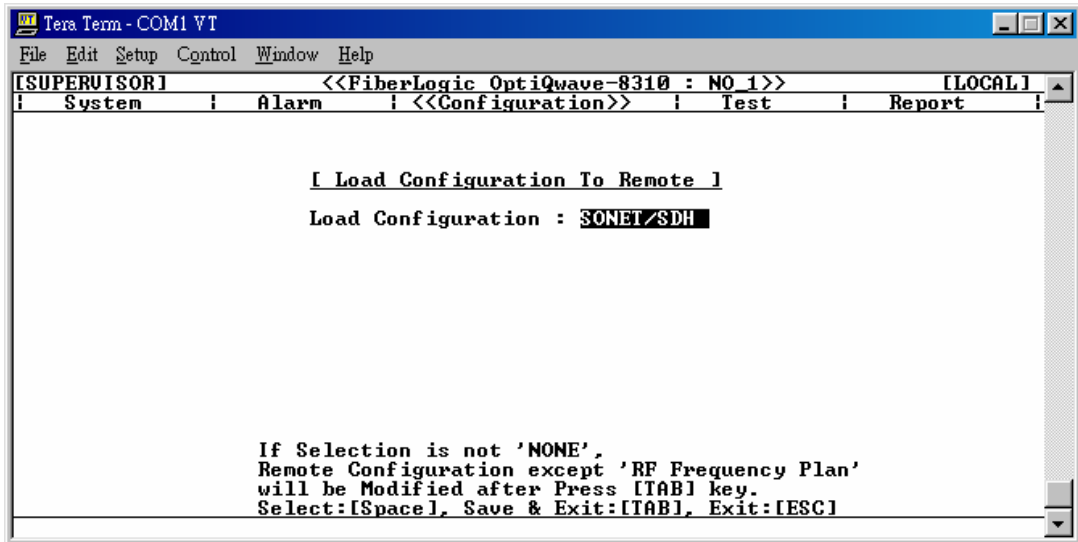
B. **Load Configuration:** use SPACE button to select the interface of the equipment of near end, ALL (all the interfaces), RADIO, SONET/SDH, or NONE.

   Then, press Tab button to copy the operation parameters of all the interfaces, RADIO interface or SONET/SDH interface of the equipment of near end (besides RF Frequency Plan and RF TPL) to the equipment of far end, to make the configurations of both ends same.

   p.s. if you select "NONE", it will not execute the action to copy the interface parameters of near end to far end.

8.1.10 Retrive the Status & Alarm of Radio Interface

A. Under main menu, use ← and → to move the cursor to >>Alarm<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "Alarm View" and press → to enter sub menu to select " Radio Alarms", and push Enter button to enter the alarm table of Radio interface, as the following figure:
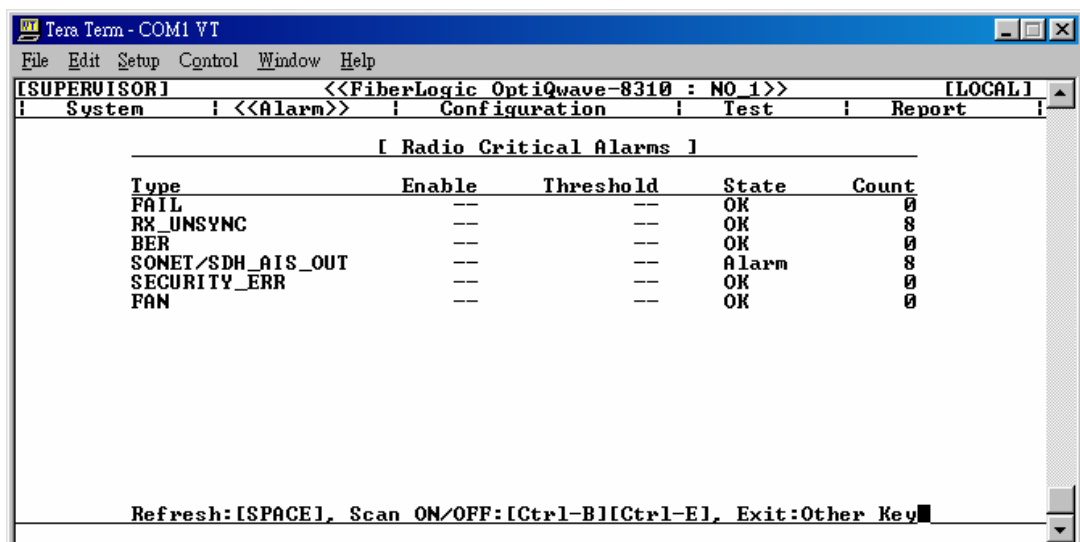
B. Use SPACE button to display again the current status of critical alarm of RADIO interface (Alarm is ocurred or the clearing is OK) and the times of occurrence.
   Use Ctrl-B or Ctrl-E to start or stop scan mode (display repeatedly the current status and

times of occurrence of critical alarm of RADIO interface).
C. This function is Read-only, and you can push any of the other buttons to leave this status picture, and go back to the options of last layer.

8.1.11 Retrieve the Status and Alarm of SONET/SDH Interface

A. Under main menu, use ← and → to move the cursor to >>Alarm<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "Alarm View", and press→ button to enter the sub menu to select individually "SONET/SDH Alarms", and press Enter button to enter the alarm table of SONET/SDH interface (STM-1), as the following figure:

```
Tera Term - COM1 VT                                                   _□×
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]           <<FiberLogic OptiQwave-8310 : NO_1>>        [LOCAL] ▲
    System      ¦ <<Alarm>>    ¦   Configuration   ¦    Test    ¦   Report   ¦
                       [ SONET/SDH Alarms ]

       Type                 Enable        Threshold       State     Count
       LOS                    --             --           Alarm       1
       LOF                    --             --           OK          0
       AIS                    --             --           OK          0
       RDI                    --             --           OK          0
       T15M_ES                No            900           OK          0
       T15M_SES               No            900           OK          0
       T15M_B1ERR             No            900           OK          0
       T1H_ES                 No            3600          OK          0
       T1H_SES                No            3600          OK          0
       T1H_B1ERR              No            3600          OK          0
       T24H_ES                No            86400         OK          0
       T24H_SES               No            86400         OK          0
       T24H_B1ERR             No            65535         OK          0


       Refresh:[SPACE], Scan ON/OFF:[Ctrl-B][Ctrl-E], Exit:Other Key█     ▼
```

B. Use SPACE button to display again the current status of critical and threshold alarm (Alarm is ocurred or the clearing is OK) and times of occurrence of SONET/SDH interface.
Use Ctrl-B or Ctrl-E to start or stop scan more (display repeatedly current status of critical and threshold alarm and times of occurrence of SONET/SDH interface)
C. This function is Read-only, and you can push any of the other buttons to leave this status picture, and go back to the options of last layer.

8.1.12 Retrive and Clear the Alarm History
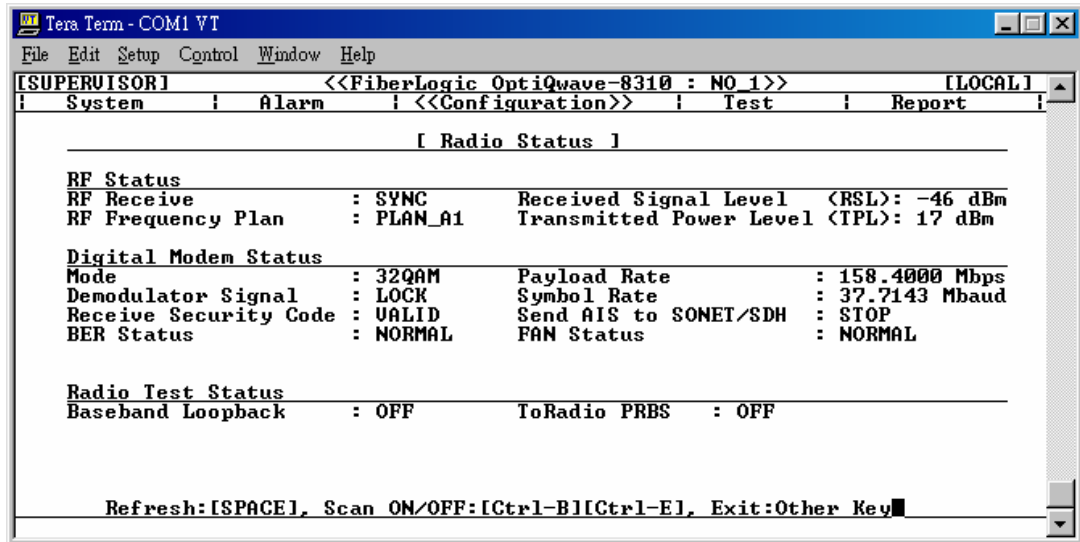
A. Under main menu, use ← and → buttons to move the cursor to >>Alarm<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "Alarm History", press Enter and you can enter the alarm hitory table, as the following figure:

```
WT Tera Term - COM1 VT                                                   _ □ ×
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]              <<FiberLogic OptiQwave-8310 : NO_1>>        [LOCAL] ▲
!     System      ! <<Alarm>>    !   Configuration     !   Test    !   Report  !

                          [ Alarm History ]      Total Alarms = 32
          1   10/21/2003 20:56:33    SONET/SDH_AIS_OUT      Alarm
          2   10/21/2003 20:56:32    SONET/SDH_AIS_OUT      OK
          3   10/21/2003 20:56:32    RX_UNSYNC             OK
          4   10/21/2003 20:56:31    SONET/SDH_AIS_OUT      Alarm
          5   10/21/2003 20:56:31    RX_UNSYNC             Alarm
          6   10/21/2003 20:56:31    SONET/SDH_AIS_OUT      OK
          7   10/21/2003 20:56:30    RX_UNSYNC             OK
          8   10/21/2003 20:56:29    LOS                   Alarm
          9   10/21/2003 20:56:29    SONET/SDH_AIS_OUT      Alarm
         10   10/21/2003 20:56:29    RX_UNSYNC             Alarm
         11   10/21/2003 20:55:27    SONET/SDH_AIS_OUT      OK
         12   10/21/2003 20:55:27    RX_UNSYNC             OK
         13   10/21/2003 20:55:26    SONET/SDH_AIS_OUT      Alarm
         14   10/21/2003 20:55:26    RX_UNSYNC             Alarm
         15   10/21/2003 20:55:26    SONET/SDH_AIS_OUT      OK
         16   10/21/2003 20:55:26    RX_UNSYNC             OK

                    Page:[UP/DOWN], Exit:Other Key
```

B. It can record totally 120 alarm records happened recently. Use ↑ and ↓ button to control page turning, and push any of the other buttons to leave this status picture, and go back to the options of last layer.

C. Under main menu, use ← and → buttons to move the cursor to >>Alarm<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "Alarm Clear", and press Enter button to enter the query picture to clear alarm history, as the following picture. Press [Y] (Yes) to execute the action to clear alarm history immediately, then press any of the other buttons to leave this picture, and go back to the options of last layer.

```
WT Tera Term - COM1 VT                                                   _ □ ×
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]              <<FiberLogic OptiQwave-8310 : NO_1>>        [LOCAL] ▲
!     System      ! <<Alarm>>    !   Configuration     !   Test    !   Report  !


                          [ Clear Alarm History ]
         Clear the Alarm History

         Are you sure (Yes or No)?
```
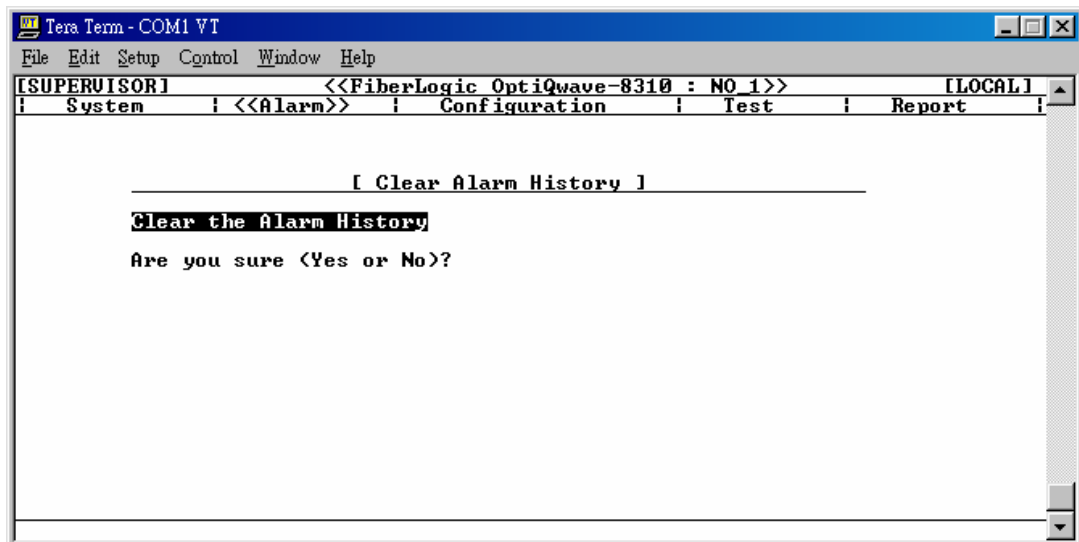
8.1.13 Loopback Test

A. Under main menu, use ← and → buttons to move the cursor to >>Test<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "Setup Loopback", press Enter button and you can enter the picture of loopback configuration function, as the following figure:
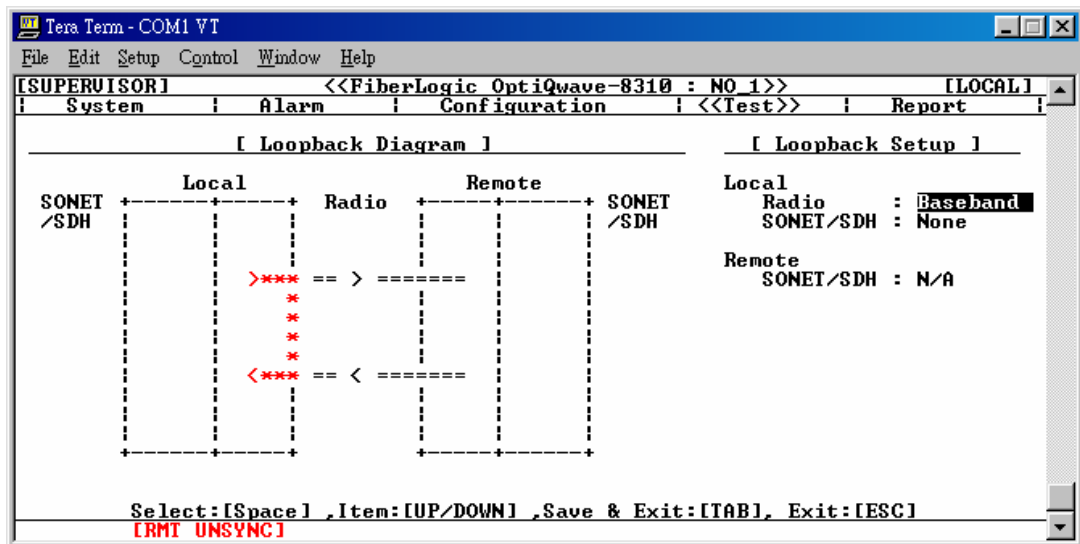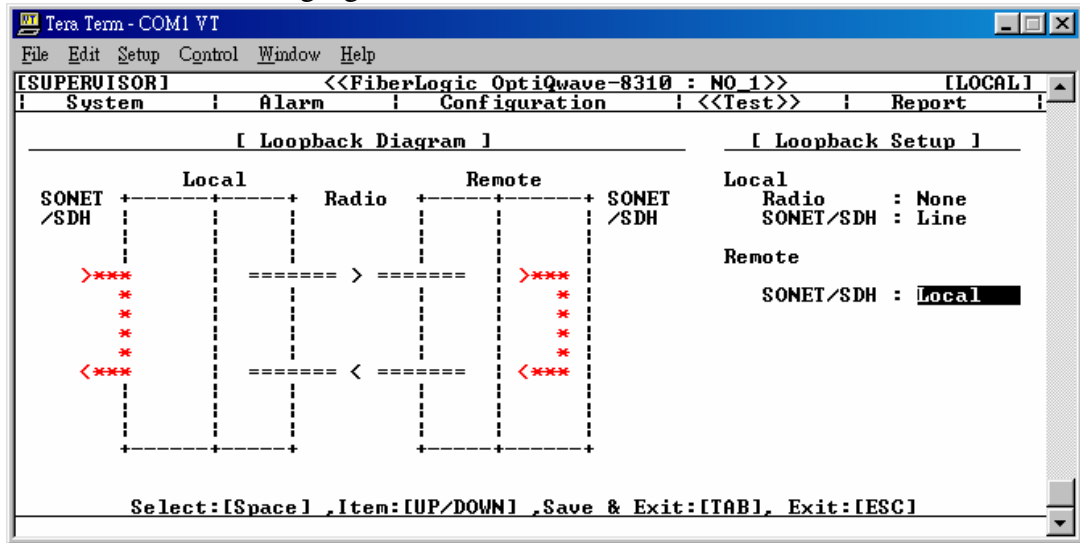
B. Use ↑ and ↓ to select whther to execute local or remote loopback, and use SPACE button to select the type of loopback, including the baseband loopback of Radio interface, the line of SONET/SDH interface, payload and local loopback or None (No Loopback, which means the loopback is closed).
Then, press Tab button to save and execute the new setting value, and theconfiguration is completed.
p.s. After you initiate the baseband loopback of near end, there will be "RMT UNSYNC" (**on the line of RMT of the front panel, the three light signal RADIO, SONET/SDH and TEST blink at the same time**), that you cannot access and control the equipment of far end futhur.
p.s. if you see the icon of baseband loopback of far end, that means at the far end they have initiated baseband loopback, but the system can not initiate baseband loopback of far end from near end.

C. Exit from the configuration picture of this item
Press ESC button to leave the configuration picture of this item, and go back

to the options of the last layer. If you want to give up the configuration,

you do not need to press Tab button and can directly press ESC to leave.

8.1.14 PRBS Testing

A. Under main menu, use ← and → buttons to move the cursor to >>Test<<, and push ↓
button to pull down the sub menu, push ↓ button to move the reversed cursor to "Setup
Test Pattern" and press Enter button to enter ToRadio PRBS testing picture, as the
following picture:

```
TT Tera Term - COM1 VT                                              _ □ ×
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]              <<FiberLogic OptiQwave-8310 : NO_1>>        [LOCAL] ▲
!   System      !    Alarm      !   Configuration    ! <<Test>>   !   Report    !
                       [ Setup ToRadio Test Pattern ]
         PRBS = 2^15-1 ToRadio Invert

         PRBS SYNC,                            Stop PRBS
         error bits =        0                 Start 2^9-1 PRBS
                                               Start 2^11-1 PRBS
                                               Start 2^15-1 PRBS
                                               Start 2^20-1 PRBS
         +------------------------------+      Start 2^23-1 PRBS
         !      Start Date:10/22/2003!       Invert PRBS Pattern
         !      Start Time:09:52:38  !        Non-Invert PRBS Pattern
         !    Current Date:10/22/2003!        Inject One Error Bit
         !    Current Time:09:53:30  !        Clear Error Bits
         ! Elapsed Seconds:       30 !        Send AIS to SONET/SDH if Radio Error
         ! UNSYN Seconds  :        0 !        Stop AIS to SONET/SDH if Radio Error
         +------------------------------+
         Transmit PRBS Start.

         Send AIS to Line if Radio Error
Refresh:[SPACE], Run:[ENTER], Action:[UP/DOWN], Scan:[Ctrl-B/Ctrl-E], Exit:[ESC]
```

B. Use ↑ and ↓ buttons to select the items of PRBS testing functions, and then press
ENTER button to execute.

Stop PRBS: stop PRBS testing.

Start 2^9-1 (2^11-1, 2^15-1, 2^20-1, 2^23-1) PRBS: start the PRBS testing of 155.52
Mbps, Unframed 2^{9-1}, 2^{11-1}, 2^{15-1}, 2^{20-1}, or 2^{23-1} type.

Invert PRBS Pattern: make the PRBS signal you select inverted

Non-Invert PRBS Pattern: make thePRBS signal you select non-inverted

Inject One Error Bit: inject a bit Error

Clear Error Bits: clear the current error bit statistics to 0.

Send AIS to SONET/SDH if Radio Error: send MS-AIS signal output to replace SDH
STM-1 data signal, while the equipment of this end (the end which initiates
PRBS testing) has detected Radio_BER alarm.

Stop AIS to Line_x if Radio Error: stop sending MS-AIS signal output to replace SDH
STM-1 data signal, even the equipment of this end (the end which initiates
PRBS testing) has detected Radio_BER alarm.

Use SPACE button to display again the result of current PRBS testing.

Use Ctrl-B or Ctrl-E to start or stop scan mode (display repeatedly the current result of
PRBS testing).

In it, the data of test result include:

PRBS: SYNC or UNSYNC (PRBS receiving is synchronous or unsynchronous)

error bits: from starting PRBS testing until now, the statistics of bit error detected.

Start Date & Time: the date and time PRBS test starts.

Current Date & Time: the date and time until now of the testing.

Elapsed Seconds: the number of seconds until now of the testing.

UNSYNC Seconds: the number of unsynchronous seconds of PRBS receiving.

p.s. PRBS test includes PRBS signal generation (Unframed 2^{9-1}, 2^{11-1}, 2^{15-1}, 2^{20-1}, or 2^{23-1}

type, 155.52 Mbps, derection to Radio, replacing SDH STM-1 data signal) and the detection and statistics of PRBS signal receiving bit error.

C. Exit from the Testing Picture of This Item

If you have not executed Stop PRBS and just press ESC button to exit from the testing picture of this item, the PRBS testing will go on.

8.1.15 Summary Table

A. Under main menu, use ← and → to move the cursor to >>Report<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "Summary", press Enter button and you can enter the interface configuration and status summary table, as the following figure:

```
Tera Term - COM1 VT                                              _ □ ×
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]        <<FiberLogic OptiQwave-8310 : NO_1>>        [LOCAL]
| System      | Alarm    | Configuration    | Test     | <<Report>> |
        Radio                  SONET/SDH            Radio Alarms
Frequency      : PLAN_A1    SONET/SDH      : SDH      FAIL
RSL  (dBm/V)   : -46/1.650  O/E Module     : Electrical RX_UNSYNC
TPL  (dBm/V)   : 17/0.412   LED Reflection: ON        BER
Demodulator    : LOCK       Loopback       : None      SONET/SDH_AIS_OUT
BER Status     : NORMAL                                SECURITY_ERR
LED Reflection: ON                 Alarm Relay         FAN
Loopback       : None       AudioRadio  VideoRadio
ToRadio PRBS   : Stop       Audio155M   Video155M        SONET/SDH Alarms
                                                          LOS   AIS
                               LCL/RMT  LED               LOF   RDI
                          L Radio SONET/SDH TEST   15M: ES   SES   B1ERR
                          R Radio SONET/SDH TEST   1H : ES   SES   B1ERR
                                                   24H: ES   SES   B1ERR

                            [ Availability Report ]
Type      % Available    Available Seconds    24-Hour Elapsed Seconds
Radio     100.0000%            2938                   2938


    Refresh:[SPACE], Scan ON/OFF:[Ctrl-B][Ctrl-E], Exit:Other Key
```

B. Use SPACE button to display again the current configuration and status of Radio and SONET/SDH interface operation parameters, the status of critical and threshold alarm (occurr or being cleared), the status of loopback and PRBS testing (start or stop), the status of alarm output relay (open or short), the status of the system status indicator light of naer end and far end (on or off) and the availability of radio interface.

Use Ctrl-B or Ctrl-E to start or stop scan mode (display repeatedly the configuration and status…etc. of each interface currently).

% Available (Avalibility Percentage): the percentage value of available seconds to the elapsed seconds in current 24 hours.

P.S. The status picture of this item is to present currently what alarms occur, what output relays are short and what alarm output relays are short and what system status indicators are on by the display type "reverse".

P.S. The "available second" of radio interface is defined as: the RF RX SYNC without RADIO_SECURITY_ERR alarm and without RADIO_BER per second.

C. This function is read-only, and you can press any other button to leave this picture of status and go back to the options of last layer.

8.1.16 Current 7-Day PM Statistics of SONET/SDH Interface

A. Under main menu, use ← and → buttons to move the cursor to >>Report<<, and push ↓ button to pull down the sub menu, push ↓ button to move the reversed cursor to "7-Day Statistics", and press Enter button to enter the current 7-Day vlidity statistics report per 24 Hours of SONET/SDH interface, as the following figure:

```
Tera Term - COM1 VT                                               _ □ ✕
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]           <<FiberLogic OptiQwave-8310 : NO_1>>      [LOCAL] ▲
┆   System    ┆   Alarm    ┆   Configuration   ┆   Test   ┆ <<Report>> ┆
                    [ SONET/SDH 7-Day Statistics ]
                       10/22/2003 11:24:28

            Elapsed sec in current 15-M interval:    550
            Elapsed sec in current 24-H interval: 67150

            Interval              ES       SES     B1ERR
            Current 24 Hour      395       395         0

            Previous
            24-H(1)                -         -         -
            24-H(2)                -         -         -
            24-H(3)                -         -         -
            24-H(4)                -         -         -
            24-H(5)                -         -         -
            24-H(6)                -         -         -
            24-H(7)                -         -         -
                       Valid Intervals: 0/7█

        Refresh:[SPACE], Scan ON/OFF:[Ctrl-B][Ctrl-E], Exit:Other Key
```
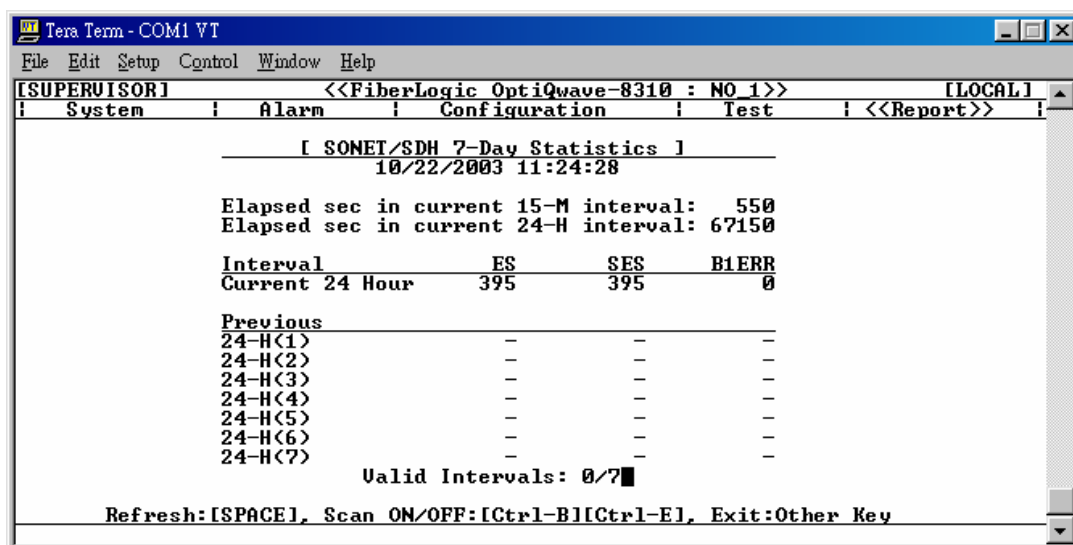
B. Use SPACE button to display again the current 7-Day vlidity statistics report per 24 Hours of SDH STM-1 interface.
   Use Ctrl-B or Ctrl-E to start or stop scan mode (display repeatedly the current 7-Day vlidity statistics report per 24 Hours of SDH STM-1 interface).
   The statistics picture of this item uncludes the information descriptions as follows:
   Elapsed seconds in current 15-M interval: the elapsed time in current 15-minute interval.
   Elapsed seconds in current 24-H interval: the elapsed time in current 24-hour interval.
   Current 24 Hour ES, SES, B1ERR: the current validity statistics report of SDH STM-1 interface in 24 Hours, while ES represents error second, SES stands for severly error second, and B1 ERR represents B1 Error.
   Previous 24-H (1), 24-H (2), 24-H(3), 24-H (4), 24-H(5), 24-H(6), 24-H(7): the current 7-day validity statistics report per 24 hours of SDH STM-1 interface, totally 7 items of statistics data.
   Valid Interval: the valid interval of the validity statistics of current 7 days per 24 hours.
C. The function of this item is read-only, and you can press any other buttons to leave this statistics report to go back to the options of last layer.

8.1.17 Current 1-Day PM Statistics Report of SONET/SDH Interface

A. Under main menu, use ← and → buttons to move the cursor to >>Report<<, and push ↓ button to pull down the sub menu, then continue to press ↓ button to move the reversed cursor to "24-Hour Statistics", and press Enter button to enter the current 24-day validity statistics report per 15 minutes of SONET/SDH interface, as the following figure.

```
Tera Term - COM1 VT                                          _ □ ✕
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]          <<FiberLogic OptiQwave-8310 : NO_1>>      [LOCAL]
I    System    I    Alarm    I    Configuration    I    Test    I  <<Report>>  I

               [ SONET/SDH 24-Hour Statistics ]    10/22/2003 11:37:15
               Elapsed sec in current 15-M interval:    417
               Elapsed sec in current 24-H interval: 67917

               Current       ES         SES        B1ERR
               24 Hour       395        395          0
               15 Min         0          0           0

        ES: Last 75/96 Intervals
          1-10:     0    0    0    0    0    0    0    0    0    0
         11-20:     0    0    0    0    0    0    0    0    0    0
         21-30:     0    0    0    0    0    0    0    0    0    0
         31-40:     0    0    0    0    0    0    0    0    0    0
         41-50:     0    0    0    0    0    0    0    0    0    0
         51-60:     0    0    0    0    0    0    0  168  227    0
         61-70:     0    0    0    0    0    0    0    0    0    0
         71-80:     0    0    0    0    0    -    -    -    -    -
         81-90:     -    -    -    -    -    -    -    -    -    -
         91-96:     -    -    -    -    -    -
Refresh:[SPACE], View Signal:[<-][->], Scan ON/OFF:[Ctrl-B][Ctrl-E], Exit:Others
```

B. Press ← and → buttons to select ES, SES or B1EER validity parameters.

Use SPACE button to display again the current 24-day validity statistics report per 15 minutes of SDH STM-1 interface.

Use Ctrl-B or Ctrl-E to start or stop scan mode (display repeatedly the current 24-day validity statistics report per 15 minutes of SDH STM-1 interface).

The information descriptions this statistics report include:

Elapsed seconds in current 15-M interval: the elapsed seconds in current 15-minutes interval.

Elapsed seconds in current 24-H interval: the elapsed seconds in current 24-hours interval.

Current 24 Hour ES, SES, B1ERR: the validity statistics of SDH STM-1 interface in current 24 horus, in which ES represents error second, SES represents severly error second, and B1 ERR represents B1 Error.

Current 15 Min ES, SES, B1ERR: the validity statistics of SDH STM-1 interface in current 15 minutes, in which ES represents error second, SES represents severly error second, and B1 ERR stands for B1 error.

1-10,11-20,…,81-90,91-96: the current validity statistics of SDH STM-1 interface in current 24 horus per 15 minutes, totally 96 items of statistics data.

Last Interval: the valid interval of the validity statistics of current 24 hours per 15 minutes.

C. The function of this item is read-only, and you can press any other buttons to leave this function to go back to the options of last layer.

8.1.18 Current 1-Hour PM Statistics of SONET/SDH Interface

A. Under main menu, use ← and → to move the cursor to >>Report<<, and push ↓ button to pull down the sub menu, and continue to press ↓ button to move the reversed cursor to "1-Hour Statistics", and press Enter button to enter the validity statistics report of SONET/SDH interface in current 1 hour per 15 minutes, as the following figure.

```
Tera Term - COM1 VT
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]          <<FiberLogic OptiQwave-8310 : NO_1>>          [LOCAL]
|     System     |    Alarm    |   Configuration   |    Test    | <<Report>> |

                    [ SONET/SDH 1-Hour Statistics ]
                         10/22/2003 11:48:14

            Elapsed sec in current 15-M interval:    176
            Elapsed sec in current 24-H interval: 68576

            Interval              ES        SES       B1ERR
            Current 24 Hour       395       395         0
            Current 15 Min          0         0         0

            Previous
            15-Min(1)               0         0         0
            15-Min(2)               0         0         0
            15-Min(3)               0         0         0
            15-Min(4)               0         0         0

            Last Valid Intervals: 76/96


        Refresh:[SPACE], Scan ON/OFF:[Ctrl-B][Ctrl-E], Exit:Other Key
```

B. Use SPACE button to display again the validity statistics report of SDH STM-1
   interface in current 1 hour per 15 minutes.
      Use Ctrl-B or Ctrl-E to start or stop scan mode (display repeatedly the validity statistics
      report of SDH STM-1 interface in current 1 hour per 15 minutes).
      This statistics picture includes the information descriptions such as:
      Elapsed seconds in current 15-M interval: the elapsed seconds in current 15-minute
            interval.
      Elapsed seconds in current 24-H interval: the elapsed seconds in current 24-hours
            interval.
      Current 24 Hour ES, SES, B1ERR: the validity statistics of the SDH STM-1 interface
            in current 24 hours, in which ES represents error second, SES represents severly
            error second, and B1 ERR stands for B1 Error.
      Current 15 Min ES, SES, B1ERR: the validity statistics of the SDH STM-1 interface in
            current 15 minutes, in which ES represents error second, SES represents severly
            error second, and B1 ERR stands for B1 Error.
      Previous 15-Min (1), 15-Min (2), 15-Min (3), 15-Min (4): the validity statistics of the
            SDH STM-1 interface in current 1 hour per 15 minutes, 4 items of statistics data
            in total.
      Last Valid Interval: the number of valid intervals of the validity statistics in current 24
      hours per 15 minutes.
C.   The function of this item is read-only, and you can press any other buttons to leave this
     function to go back to the options of last layer.

8.1.19 Clear the PM Statistics of SONET/SDH Interface

A. Under main menu, use ← and → buttons to move the cursor to >>Report<<, and push ↓
   button to pull down the sub menu, and continue to push ↓ button to move the reversed
   cursor to " Clear Statistics", and press Enter to enter the query picture of clearing the
   validity statistics report of SONET/SDH interface, as the following figure.
B. Click on [Y] (Yes) button to immediately execute the action of clearing the validity statistics
   report of SONET/SDH, and press any other button to leave the picture of this item, and go
   back to the options of last layer.
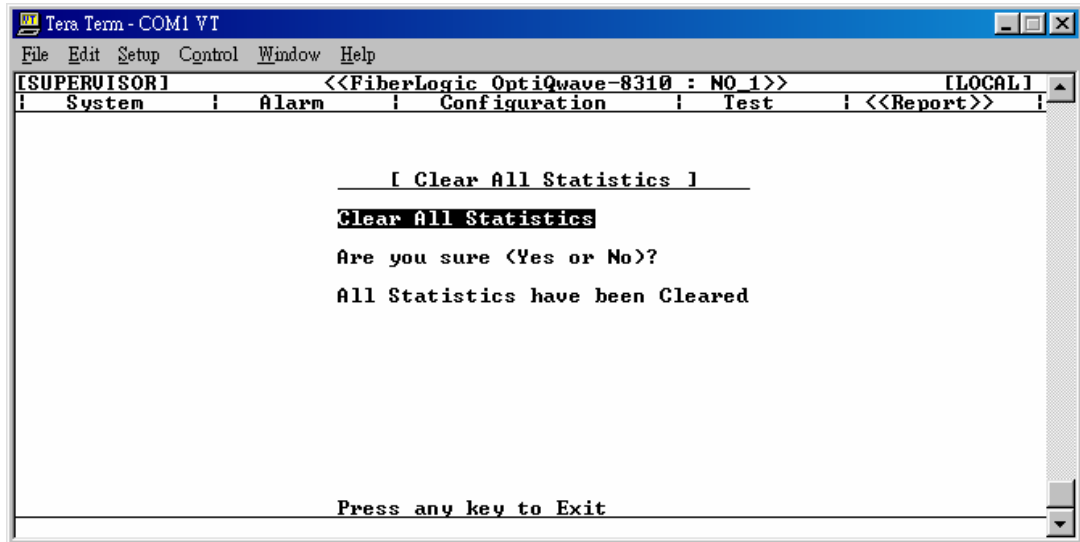
8.1.20 Retrive the Current System Parameters

A. Under main menu, use ← and → buttons to move the cursor to >>System<<, and push ↓ button to pull down the sub menu, and continue to press ↓ button to move the reversed cursor to "Information", the press Enter button to enter the display picture of this item immediately, as the following figure.
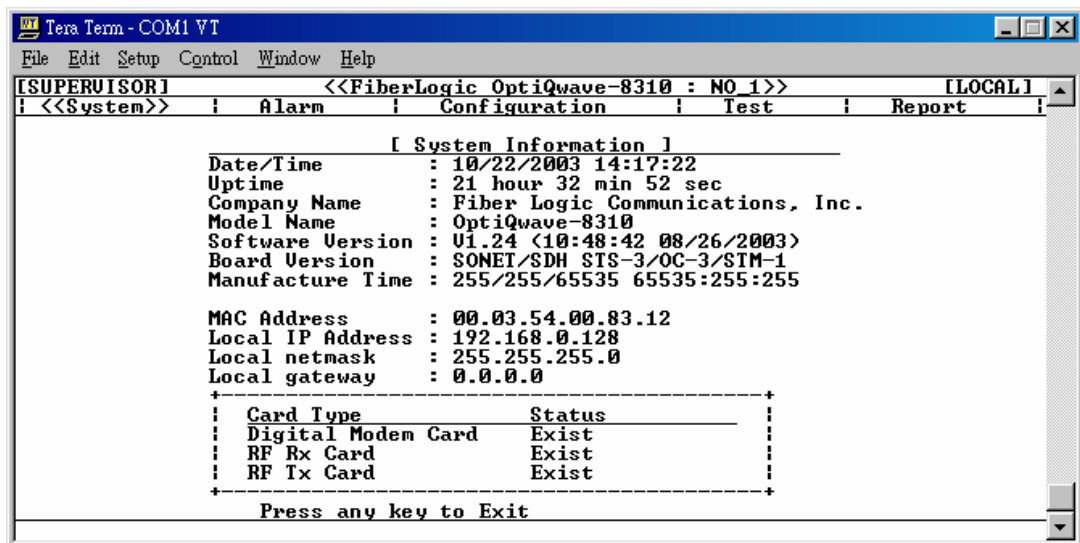
B. This display picture includes the information descriptions as:

Date/Time: the date and time of system

Uptime: the uptime of the system

Company Name: the name of the company (Fiber Logic Communication Inc.)

Model Name: OptiQwave-8310

Softwave Version: the version of the software

Board Version: the version of hardware

Manufacture Time: the manufacture time of the product

MAC Address: the address of ethernet port MAC

Local I/P Address: the address of Ethernet Port I/P

Local netmask: ethernet port netmask

54

Local gateway: the gateway address of ethernet port

Card Type: Digital Modem, RF RX and RF TX cards

Card Status: Exist or Not Exist

C. The function of this item is read-only, and you can press any other buttons to leave this function to go back to the options of last layer.

8.1.21 Set System Parameters

A. Under main menu, use ← and → buttons to move the cursor to >>System<<, and push ↓ button to pull down the sub menu, and then continue to press ↓ button to move the reversed cursor to "Configuration", and press Enter button to enter this system parameter configuration picture, as the following figure:

```
Tera Term - COM1 VT                                                      _ □ ×
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]          <<FiberLogic OptiQwave-8310 : Device_Name>>        [LOCAL]
¦ <<System>>    ¦    Alarm    ¦    Configuration    ¦    Test    ¦    Report   ¦
                          [ System Configuration ]
              Host Name            : Device_Name
              Date                 : 10/22/2003
              Time                 : 15:1:24

              Local IP Address   : 192.168.0.122
              Local netmask      : 255.255.255.0
              Local gateway      : 0.0.0.0
              Ethernet Mode      : AutoSense
              Console Baud Rate  : 9600

              SNMP               : ON
              Bridge             : OFF
              LCD Panel Lock     : OFF
              ACO Button         : POP

              Protection Switch Option    : OFF
              Protection Switch Group ID :      0

  Select:[Space], Item:[UP/DOWN], Accept:[ENTER], Save & Exit:[TAB], Exit:[ESC]
```

B. The instruction of each option of configuration:

Use ↑ and ↓ buttons to select the following sub items you want to set.

Host Name: Directly key in the "device name" (for example, "NO_1") you want to configure and then press ENTER button. This "device name" will appear on the first line of the screen of CID, and the factory default is Device_Name.

Date: Directly key in the "system date" you want to configure (the format is MM/DD/YYYY) and then press ENTER button.

Time: Directly key in the "system" (the format is hh:mm:ss) you want to configure and then press ENTER button.

Local I/P Address: Directly key in the "I/P address" you want to configure and then press ENTER button, and the factory default is 192.168.0.122.

Local netmask: Directly key in the "netmask" you want to configure and then press ENTER button, and the factory default is 255.255.255.0.

Local gateway: Directly key in the "gateway address" you want to configure and then press the ENTER button, and the factory default is 0.0.0.0.

Ethernet Mode: Use SPACE button to select the setting value. You can SELECT AutoSense, FullDuplex-100BaseTx, HalfDuplex-100BaseTx, FullDuplex-10BaseT, or HalfDuplex-10BaseT, and the factory default is AutoSense.

Console Baud Rate: Use SPACE button to select the setting value. You can select 1200, 2400, 4800, 9600, 19200 or 38400, and the factory default is 9600.

SNMP: Use SPACE button to select ON/OFF, to start or stop SNMP agent, and the factory default is ON.

Bridge: Use SPACE button to select ON/OFF, to start or stop the function of bridging,

and the factory default is OFF.

LCD Panel Lock: Use SPACE button to select ON/OFF, to lock or unlock the LCD panel control. When LCD panel is locked, users can not do the actions of system configuration from LCD panel. When users want to unlock from LCD panel, they will be asked to enter the correct password (same as Supervisor password, and the factory default is "5638889").

ACO Button: Use SPACE button to select PUSH/POP. When any alarm happens in the system, selecting PUSH will start audible alarm inhibition function (ACO LED light on) until all the failures are cleared, and after the failures are cleared ACO function will be stopped (ACO LED light off), and this value will recover as POP, and the factory default is POP.

Protection Switch Option: Use SPACE button to select ON/OFF, and the factory default is OFF. When OptiQwave-8310 needs to connect to FiberLogic Microwave Protection Switch OptiQwave-8155, this has to be set ON.

Protection Switch Group ID: Directly key in the "protection switch group ID" (the available range is 1..65535) and then press ENTER button, and the factory default is 0.

Then, press Tab button to store and execute the new setting value, and the configuration is done.

P.S. When the items such as IP Address, Netmask and Gateway are changed, the system has to be restarted (Soft or Hard Reboot) to start the new values.

C. Exit from the configuration picture of this item
Press ESC button and you can leave the configuration picture of this item, and go back to the options of last layer. If you want to give up the configuration, you do not need to press Tab button, and can directly press ESC to leave.

8.1.22 Set SNMP Parameters

A. Under main menu, use ← and → buttons to move the cursor to >>System<<, and push ↓ button to pull down the sub menu, and continue to push ↓ button to move the reversed cursor to "SNMP Config", and press Enter button to enter the configuration of this item, as the following figure.
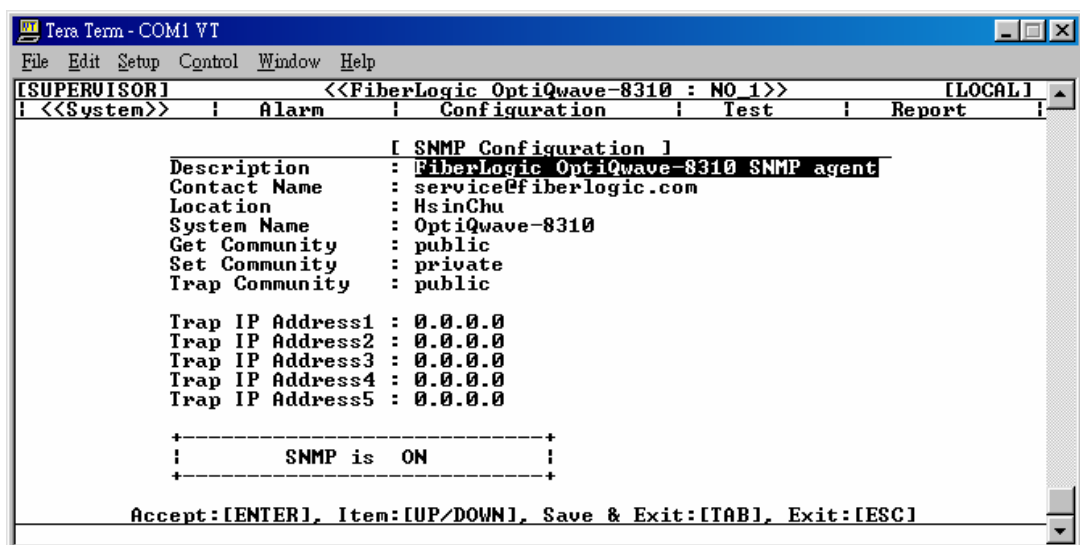
B. The instruction of the options of each item:

Use ↑ and ↓ buttons to select the sub items you want to configure.

Description: Directly key in the "description" you want to configure and then press ENTER button, and the factory default is FiberLogic OptiQwave-8310 SNMP agent.

Contact Name: Directly key in the "contact window" you want to configure and then press ENTER button, and the factory default is service@fiberlogic.com.

Location: Directly key in the "device location" you want to configure and then press ENTER button, and the factory default is HsinChu.

System Name: Directly key in the "system name" you want to configure and then press ENTER button, and the factory default is OptiQwave-8310.

Get Community: Directly key in the "get community" you want to configure and then press ENTER button, and the factory default is public.

Set Community: Directly key in the "set community" you want to configure and then press ENTER button, and the factory default is private.

Trap Community: Directly key in the "Trap community" you want to configure and then press ENTER button, and the factory default is public.

Trap I/P Address1~5: Directly key in the "Trap I/P address" you want to configure and then press ENTER button, and the factory default is 0.0.0.0, and there is totally 5 Trap I/P addresses.

Then, press Tab button to store and execute the new setting values, and the configuration is completed.

P.S. Community is code for passing of between SNMP network management work station or the GUI network software provided by FiberLogic and OptiQwave-8310 SNMP Agent.
P.S. 5 Trap IP Addresses: when there are alarms happned in OptiQwave-8310, SNMP Agent will automatically produce SNMP_trap packets to send to these 5 IP Addresses, and generally, these 5 IP Addresses should point to the IP address that the SNMP network work station or the GUI network management software provided by FiberLogic is located.

C. Exit from the configuration picture of this item

You can press ESC button to leave the configuration picture of this item, and go back to the options of last layer. If you want to give up configuration, you do not need to press Tab button and can just press ESC to leave.

8.1.23 Change User Name and Password

A. Under main menu, use ← and → buttons to move the cursor to >>System<<, and push ↓ button to pull down the sub menu, and continue to press ↓ button to move the reversed cursor to "Password", and just press Enter to enter the configuration picture of this item, as the following figure.

```
Tera Term - COM1 VT                                                  _ □ ×
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]              <<FiberLogic OptiQwave-8310 : NO_1>>        [LOCAL] ▲
| <<System>>  |    Alarm    |    Configuration    |    Test    |   Report  |

                       [ Setup New Superuser Name & Password ]
          _____
          New SuperUser Name    : fiber
          New SuperUser Password: **********************
          Confirm New Password  : **********************




          New Superuser name and password will take effect after re-login
          Accept:[ENTER], Item:[UP/DOWN], Save & Exit:[TAB], Exit:[ESC]    ▼
```

B. The instructions on each item of configuration:

      Use ↑ and ↓ buttons to select the following sub items you want to set.

      New SuperUser Name: Directly key in the "new SuperUser name" you want to change and then press ENTER button, and the factory default of SuperUser Name is fiber.

      New SuperUser Password: Directly key in the "new SuperUser password" you want to change and then press ENTER button, and the factory default of SuperUser Password is 5638889.

      Confirm New Password: Key in again the "new SuperUser name" you want to change and then press ENTER button, as the confirm mechanism.

      Then, press Tab button to restore and execute new setting value, and the configuration is done.

C. Exit from the configuration picture of this item

    Press ESC button to leave the configuration picture of this item, and go back to the options of the last layer. If you want to give up the configuration, you do not need to press Tab button, and can directly press ESC to leave.
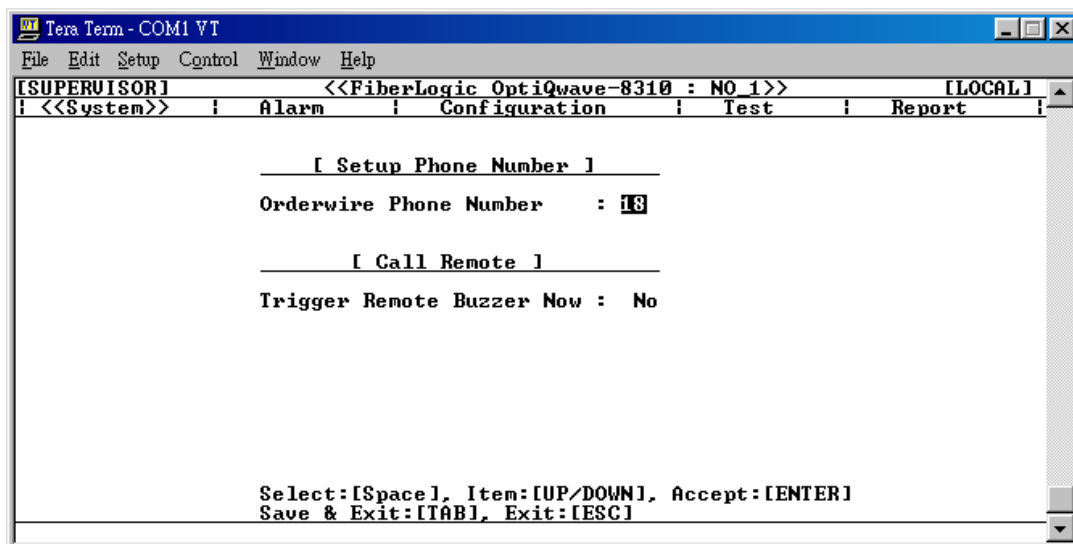
8.1.24 OrderWire Setting and Calling

A. Under main menu, use ← and → buttons to move the cursor to >>System<<, and push ↓ button to pull down the sub menu, and continue to push ↓ button to move the reversed cursor to "Orderwire", and just press Enter button tp enter this far end query picture of this OrderWire number setting and calling configuration, as the following picture.

```
┌─ Tera Term - COM1 VT ─────────────────────────────────┐─□×─┐
│ File  Edit  Setup  Control  Window  Help              │    │
│[SUPERVISOR]        <<FiberLogic OptiQwave-8310 : NO_1>>        [LOCAL] ▲│
│ i <<System>>    i  Alarm   i   Configuration   i   Test   i   Report  i │
│                                                                │    │
│              [ Setup Phone Number ]                            │    │
│        Orderwire Phone Number    : 18                          │    │
│                                                                │    │
│                  [ Call Remote ]                               │    │
│        Trigger Remote Buzzer Now :   No                        │    │
│                                                                │    │
│                                                                │    │
│                                                                │    │
│                                                                │    │
│        Select:[Space], Item:[UP/DOWN], Accept:[ENTER]          │    │
│        Save & Exit:[TAB], Exit:[ESC]                           │    ▼│
└───────────────────────────────────────────────────────────────┘────┘
```

B. Use ↑ and ↓ buttons to select the following sub items you want to configure.

   Orderwire Phone Number: Directly key in the "orderwire phone number" you want to configure and then press ENTER button. When the personnels at far end dial this set number or " **" by the handset (twisted pair) connected by the device, it will cause the handset connected by the near end device ring to call the maintenance personnels at the near end to pick up the handset to talk to the the maintenance personnels at the far end.

Trigger Remote Buzzer Now: Press SPACE button and select Yes, and then press Tab to make the buzzer in the OptiQwave-8310 equipment at the far end ring to inform the maintenance personnels at the far end to pick up the handset (twised pair) to talk to the maintenance personnels at the near end.

P.S. When calling far end, the buzzer in the OptiQwave-8310 equipment at near end will ring synchronously.

8.1.25 Set Modem Parameters

A. Under main menu, use ← and → buttons to move the cursor to >>System<<, and push ↓ button to pull down the sub menu, and continue to push ↓ button to move the reversed cursor to "Modem Setup", and press → button to enter the sub menu to select "Configuration or Hang Up", then press Enter button to enter this Modem parameters configuration and Hang Up query picture, as the following figure.

B. On Modem Configuration picture, use ↑ and ↓ buttons to select the following sub items you want to configure.

   Modem Mode: Use SPACE button to select the modem you use is Dial-Up or Leased Line, and the factory default is Dial-Up.

   Initialization String: Directly key in the "initialization string" you want to configure and then press ENTER button. It is the operation parameter to configure the modem at OptiQwave-8310 end when OptiQwave-8310 at far end wants to dial out to terminal because the accumulated number of alarms exceeds the threshold value, and the factory default is "ATE0Q1&D0&K0 S0=1".

   Escape Code: Directly key in the "escape code" you want to configure and then press ENTER button, and it is the control code when OptiQwave-8310 at the far end wants the modem it connects to enter command mode from communication mode, and the factory default is decimal "43", which is character "+".

60

Dial String: Directly key in the "dial string" you want to configure (the format is ATDT xxxxx, in which xxxxx is phone number) and then press ENTER button. When OptiQwave-8310 at far end needs to dial out the terminal it is used to configure dial string order, and the factory default is "ATDT".

Alarm Trigger DialOut: Use SPACE button to select ON/OFF, to start or stop the Dial Out function.

Alarm Trigger Threshold: Directly key in the "Dial Out Trigger Threshold"and then press ENTER button, and the factory default is "5".

Then, press Tab button to restore and execute new setting value to complete the configuration, and just press ESC to leave the configuration picture of this item, and go back to the options of last layer.
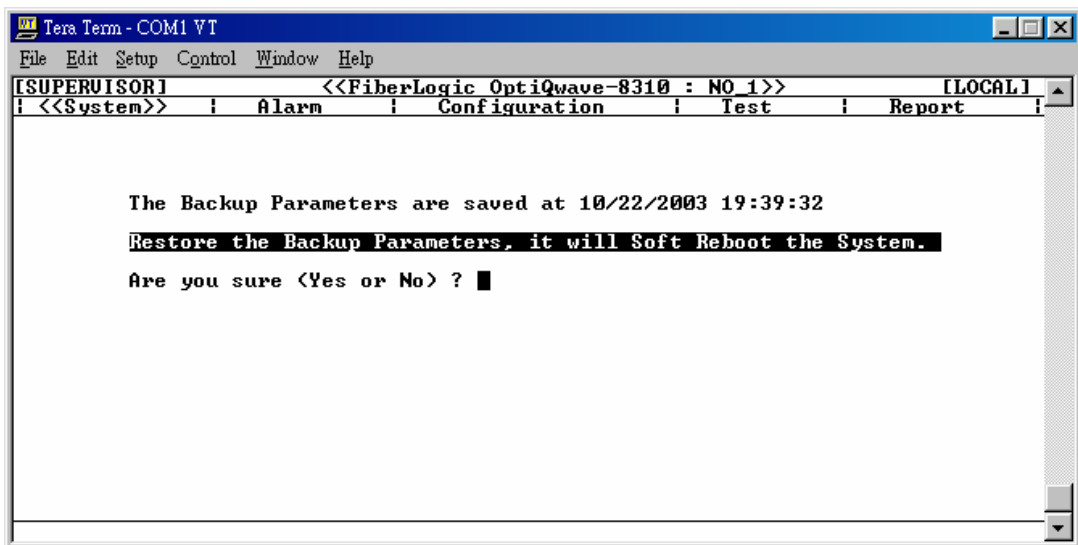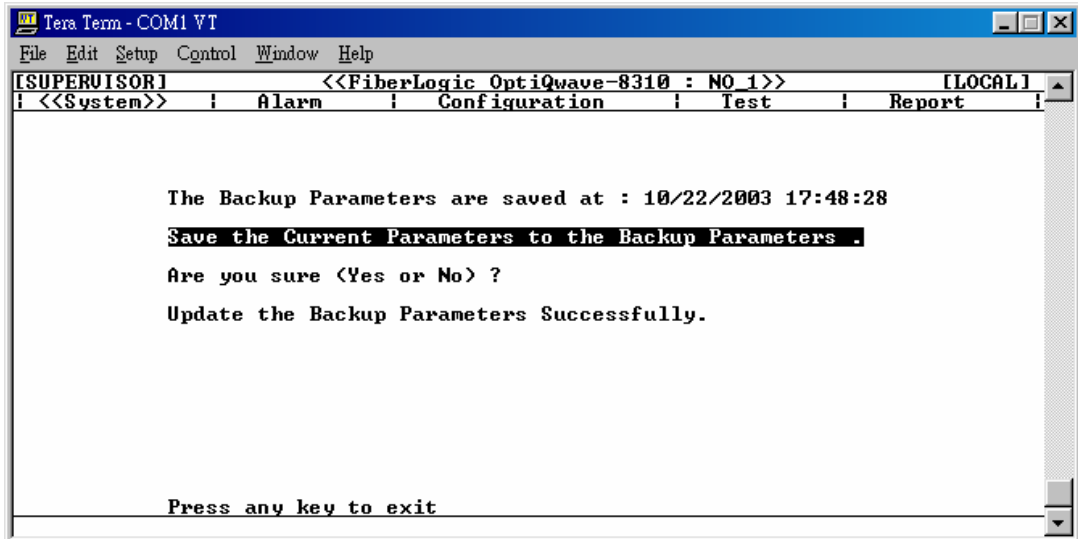
C. Drectly press Y (Yes) button on the query picture of Modem Hang Up, and the OptiQwave-8310 at the far end will automatically execute the hang-up order ("+++",ATH0) to cause the modem disconnect.

P.S. Only dial-up modem and be hung up, and leased line modem can not be hung up.

8.1.26 Reset to Default

A. Under main menu, use ← and → buttons to move the cursor to >>System<<, and press ↓ button to pull down the sub menu, and continue to push ↓ button to move the reversed cursor to " Parameter", and push → button to enter the sub menu to select "Set to Default" or "Backup Parameters" or "Restore Parameters", and press Enter button to enter the query picture of this item, as the following picture.

```
Tera Term - COM1 VT                                           _ □ ✕
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]            <<FiberLogic OptiQwave-8310 : NO_1>>        [LOCAL] ▲
|  <<System>>   |   Alarm   |    Configuration   |    Test   |   Report   |


        The Backup Parameters are saved at : 10/22/2003 17:48:28
        Save the Current Parameters to the Backup Parameters .
        Are you sure (Yes or No) ?
        Update the Backup Parameters Successfully.




        Press any key to exit                                         ▼
```



```
Tera Term - COM1 VT                                           _ □ ✕
File  Edit  Setup  Control  Window  Help
[SUPERVISOR]            <<FiberLogic OptiQwave-8310 : NO_1>>        [LOCAL] ▲
|  <<System>>   |   Alarm   |    Configuration   |    Test   |   Report   |


        The Backup Parameters are saved at 10/22/2003 19:39:32
        Restore the Backup Parameters, it will Soft Reboot the System.
        Are you sure (Yes or No) ? █
```

B. On the query picture of Set to Default, directly press Y(Yes) button, and all
the parameters (including system parameters and the operation parameter of each interface, except RF Frequency Plan, TPL and Orderwire Phone Number) will be load in the work section of system FLASH(NVRAM) and soft reboot will be automatically executed

C. On the query picture of Backup Parameters, directly press Y(Yes), and then all
the current value of the parameters (except RF Frequency Plan, TPL and Orderwire Phone Number) will be registered in the backup section of system FLASH.

D.   On the query picture of Restore Parameters, directly prees Y(Yes) button, and then all the
backup values of parameters will be load in the work section of system FLASH and be automatically soft rebooted.

8.1.27 Restart

A. Under main menu, use ← and → buttons to move the cursor to >>System<<, and press ↓

button to pull down the sub menu, and continue to press ↓ button to move the reversed cursor

to " Restart", and push → button to enter the sub menu to select "Soft Boot" or "Hard Boot", and

just press Enter button to enter the query picture of this item, as the following figure.
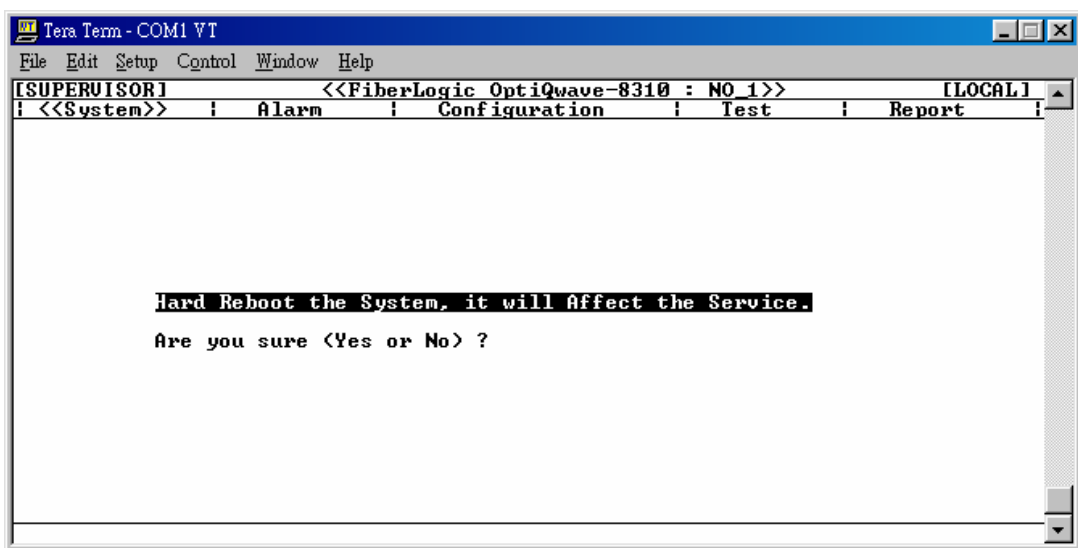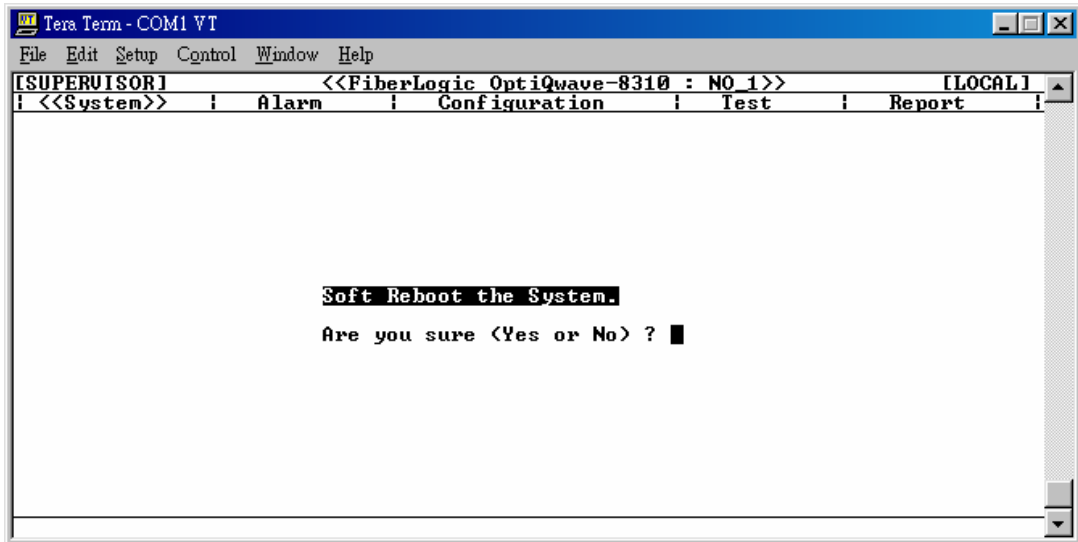
B. On the query picture of Soft Reboot, directly press Y(Yes) button, and then the system will reboot, but the hardware components will not be configure their initial values, so the transferring of current data will not be influenced or interrupted.

C. On the query picture of Hard Reboot, directly press Y(Yes) button, and then the system will reboot, but since it will configure the initial values of the hardware components in the equipment, the transferring of current data will be influenced or interrupted until the boot is finished.

8.1.28 Logout

A. Under main menu, use ← and → buttons to move the cursor to >>System<<, and press ↓ button to pull down the sub menu, and continue to press ↓ button to move the reversed cursor to " Logout", and just press Enter button to logout from system function menu.

B. If you press Enter button, you will enter the login system function menu again, as the following figure. Key in correct Username and Password, and you will enter system function main menu in Supervisor Mode.

Chapter 9
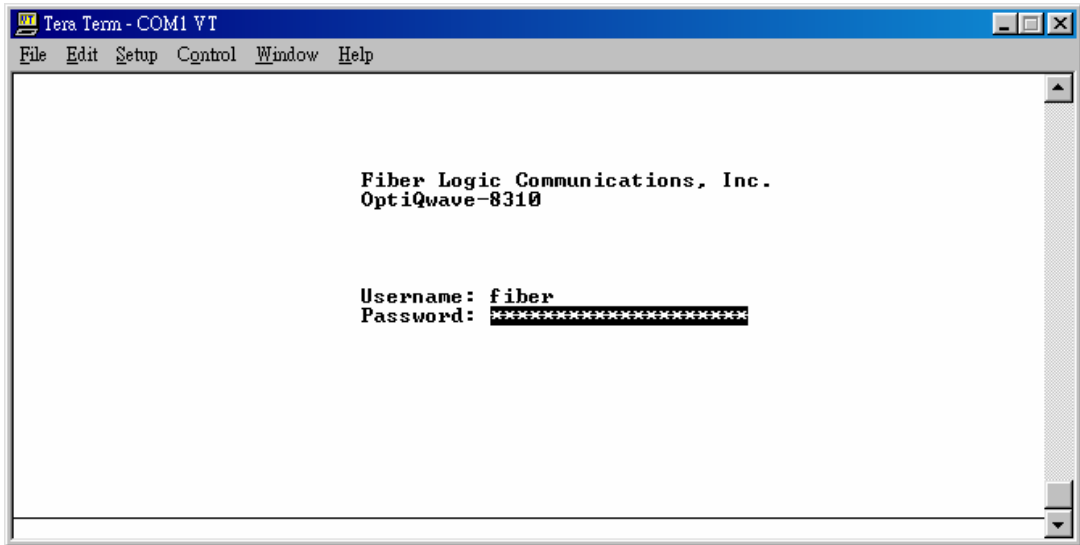
9. LCD Interface Operation

9.1 LCD & Key Control

Comoposed by green back-lighted LCD display panel and four control keys. ← and → keys are used to switch the options, and Enter key is used to confirm the configuration of items, and ESC is used to operate cancel or going back to the options of last layer
.

LCD system function menu tree is same as the interface of CONSOLE (CID), except that LCD module character legth limitation is different from the interface of CONSOLE (CID), that the system function table is displayed by numerics easily remembered, for example, O.W.—OrderWire, CONFIG—Configuration

If we use LCD interface to connect to local menu, we can execute all the function options of the system at near end. When we enter remote menu, the functions such as LoopBack, RF Frequency Plan and Radio Security Code will be inhibited to prevent the system of far end disconnect with the system of near end and the order can not be given, and all the rest system function options can still be executed. Besides, please refer to appendix 12.5 for the detail LCD Menu Tree

9.2 An example of LCD Operation

Start the Baseband Loopback of RADIO interface

OptiQwave-8310 RADIO O.W. LOCAL REMOTE	Use ← and →to move the cursor to LOCAL, and press Enter button
LOCAL SYSTEM ALARM CONFIG TEST REPORT	Use ← and → to move the cursor to TEST, and press Enter button
TEST [L] LOOPBACK PRBS	Use ← and → to move the cursor to LOOPBACK, and press Enter button
LOOPBACK [L] RADIO SONET/SDH	Use ← and → to move the cursor to RADIO, and press Enter button
BASEBAND LOOPBACK [L] LOCAL REMOTE	Use ← and → to move the cursor to LOCAL, and press Enter button

```
RADIO   LOCAL   LOOPBACK      [L]
        *NONE     BASEBAND
```

The item with * before it represents the current setting values, use ← and →to move the cursor to BASEBAND, and press Enter button, and symbol   * will appear before BASEBAND, to represent that Baseband loopback has been started.

Although on CID interface you have to press Tab button to restore and execute, on LCD interface, once you press ENTER to select the setting value, the configuration is done immediately.

When LCD panel is locked, users cannot do system configuration action from LCD panel, but they can read the system status. When users want to unlock from LCD panel ("LOCAL→SYSTEM→ CONFIG→LCD→Unlock"), they will be asked to enter correct password (same as CID interface Supervisor password, and the factory default is "5638889").

## 10. SNMP and GUI Interface (OS Interface)

SNMP network management has been applicated for a long time, and the main goal is to make the equipment produced by each companies obey common interface, so that single network management can manage the communication equipment produced by different companies, to simplify the works of network management.

Our product has built-in SNMP Agent, and connect to SNMP network management system from ETHERNET interface or the GUI network management software provided by FiberLogic (operated on the operating system newer than PC Windows 98[TM]). There goes the instruction:

A.   SNMP network management work station or the GUI network management software has to be connected to Ethernet interface to be used.

B.   Same as CID and LCD interfaces, SNMP and GUI interfaces use the same definitions of menu tree, so the system orders CID and LCD can execute can also be executed by SNMP and GUI.

C.   There is built-in SNMP Agent in OptiQwave-8310 to receive and execute the control orders of SNMP network management work station or the GUI network management software provided by FiberLogic, and automatically respond by sending the alarm and events (called "Trap") marked by the internal time of system to the SNMP network management work station or the GUI network management software at the far end in the mode of UDP/IP Datagram.

D.   The IP Address, Subnet Mask, Gateway and Trap IP Address has to be set correctly, so that the built-in SNMP Agent of the system can normally communicate with SNMP network management work station or the GUI network management software provided by FiberLogic.

E.   MIB follows the items that RFC have already defined, and our product defined the items that RFC have not defined by ourselves.   Bringing OptiQwave 8310 into SNMP network management system involves deeper network configuration, and you need the technology assistance about this, welcome to contact to our department of technical services.

E.   The GUI network management software providedbv by FiberLogic offers very friendly graph interface, as the following figure.
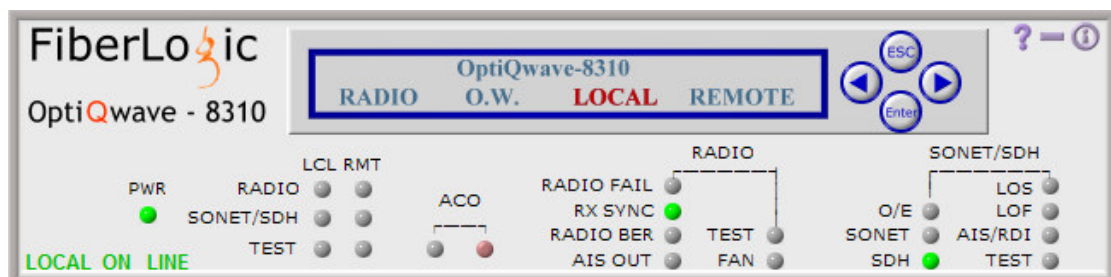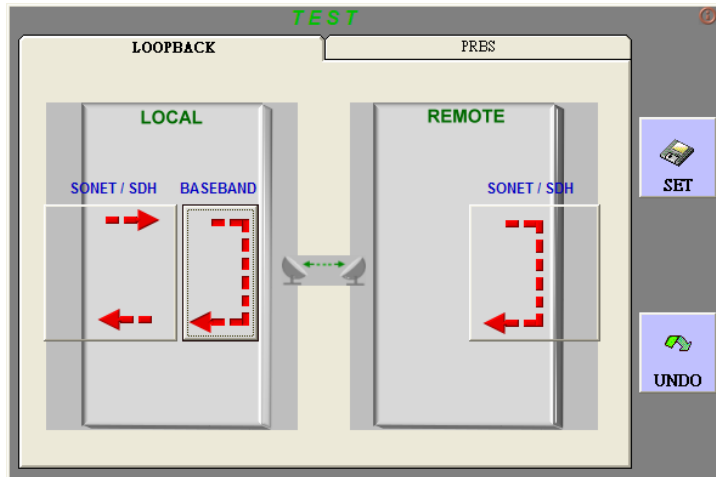
P.S. We suggest you to configure your PC screen resolution as 800x600 and character size Small Font.

11. Customer Service

Should you have any questions about the product or any other enquires, please don't hesitate to contact us. We will do the service as soon as possible.

Fiber Logic Communications, Inc.
Department of Technical Services
Address:
5F-3, No.9, Science-Based Industrial Park
Hsinchu, Taiwan
TEL：03-5638889
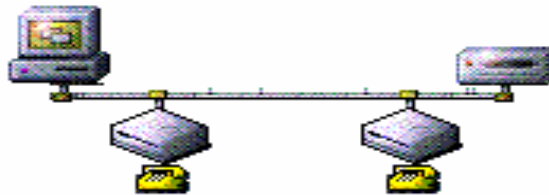FAX：03-5638899
E-mail：service@fiberlogic.com

12. Appendix

12.1 Modem Installation

1. The usages of modem are divided as Dial-Up and Leased Line, in which Dial-Up can be also devided as Dial In at far end and Dial Out at near end, that near end means the modem connected to microwave equipment.

The schematics of Dial-Up:

The schematics of Leased Line:

(I) Dial-Up - Dial Out from near end

　　a. microwave system configuration (System→Modem Setup→Configuration): connect to Console interface throughout the terminal at near end

　　　　　　　Modem Mode: needs to be set as Dial-Up

　　　　　　　Initialization String: the configuration to modem, but the modem itself has to be Dial-Up

　　　　　　　Escape Code: from comminication mode to enter command mode control code

　　　　　　　Dial String: ATDT <phone number>, dial up the modem of far end

　　　　　　　Alarm Trigger DialOut: On, open the function of DialOut at near end

　　　　　　　Alarm Trigger Threshold: 5, when the accumulating number of alarm happening times exceeds this threshold value, the system will execute DialOut at near end

```
con1 - HyperTerminal
File  Edit  View  Call  Transfer  Help

[SUPERVISOR]        <<FiberLogic OptiQwave-8180 : DaffyTest>>        [LOCAL]
[<<System>>    ]    Alarm    |    Configuration    |    Test    |    Report    ]
_____[ Modem Configuration ]_____
                            Modem Mode        : Dial Up

                            Initialization String  : AT E0Q1&D0&K0 S0=1
                            Escape Code       :  43
                            Dial String       : ATDT 5638889      |
                            Alarm Trigger DialOut   : ON
                            Alarm Trigger Threshold :   5


                    +----------------------------------------+
                    |Modem Status            : Disconnected  |
                    +----------------------------------------+

                        Select:[Space], Item:[UP/DOWN], Accept:[ENTER]
                        Save & Exit:[TAB], Exit:[ESC]

Connected 00:05:13    |Auto detect  |38400 8-N-1  |SCROLL |CAPS |NUM |Capture
```

b. the configuration of the modem at near end

   AT E0Q1&D0&K0&L0 S0=1

c. the configuration of the modem at far end

   AT E1Q0&D0&K0&L0 S0=1

P.S. The modems of both ends are both set as dial-up (&L0), and please refer
to Section 2 for the detail order definitions

(II) Dial-Up - Dial In from far end

   a. microwave system configuration (System→Modem Setup→Configuration): connect to
      Console interface throughout the modem at near end
      Modem Mode: needs to be set as Dial-Up

   b. the configuration of the modem of near end/far end
      Same as the configuration of Dial-Up - Dial Out at near end

   c. dial:
      Give order ATDT <phone number> to the modem at far end, to dial up the
      modem at near end

```
con2 - HyperTerminal
File  Edit  View  Call  Transfer  Help

at&v
ACTIVE PROFILE:
B1 E1 L1 M1 N1 Q0 T V0 W0 X4 Y0 &C1 &D0 &G0 &J0 &L1 &K0 &Q5 &R1 &S0 &T5 &X0 &Y0
S00:001 S01:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002 S09:006
S10:014 S11:095 S12:050 S18:000 S25:005 S26:001 S36:015 S37:000 S38:020 S46:138
S48:007 S95:000

STORED PROFILE 0:
B1 E1 L1 M1 N1 Q0 T V0 W0 X4 Y0 &C1 &D0 &G0 &J0 &L0 &K0 &Q5 &R1 &S0 &T5 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S36:007 S37:000 S40:104 S41:195 S46:138 S95:000

STORED PROFILE 1:
B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &L0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S36:007 S37:000 S40:168 S41:195 S46:138 S95:000

TELEPHONE NUMBERS:
0=                                    1=
2=                                    3=
ATDT 5638889_

Connected 00:00:22    ANSI    9600 8-N-1    SCROLL  CAPS  NUM  Capture
```

(III) Leased Line

    a. microwave system configuration (System→Modem Setup→Configuration): connect to Console interface throughout the modem at near end

      Modem Mode: needs to be set as Leased Line


```
con1 - HyperTerminal
File  Edit  View  Call  Transfer  Help

[SUPERVISOR]        <<FiberLogic OptiQwave-8180 : DaffyTest>>      [LOCAL]
[ <<System>> ]     Alarm        Configuration        Test        Report

_____[ Modem Configuration ]_____
Modem Mode               : Leased Line




                +----------------------------------+
                |Modem Status          : Disconnected  |
                +----------------------------------+


           Select:[Space], Item:[UP/DOWN], Accept:[ENTER]
_____Save & Exit:[TAB], Exit:[ESC]_____

Connected 00:05:54    Auto detect    38400 8-N-1    SCROLL  CAPS  NUM  Capture
```

    b. the configuration of the modem of near end

      AT E0Q1&D0&K0&L1 S0=1

  c. the configuration of the modem of f ar end

      AT E1Q0&D0&K0&L1 S0=0

    P.S. the modems of both ends are both set as leased line (&L1), but the auto answers of both ends are different,

      If near end is set as S0=0, the far end is set as S0=1.

      Once the powers of the modems of both ends are on, the modems will

build the connection, only turning off the power of the modem of plug

the phone wire can interrupt the connection.

2・The definitions of the modem configuration orders

AT: AT command prefix

DT <phone number> : dial the phone number of the modem of the other side

E0/E1: ECHO disable/enable, the terminal screen disable/enable to display the orders given by users to modem

Q1/Q0: Result codes disable/enable, the results of terminal screen disable/enable to display the orders given by users to modem

S0=1: auto answer on the first ring, the mode of auto answer

S0=0: auto answer disable, the mode of manual answer

&D0: Modem ignores DTR input
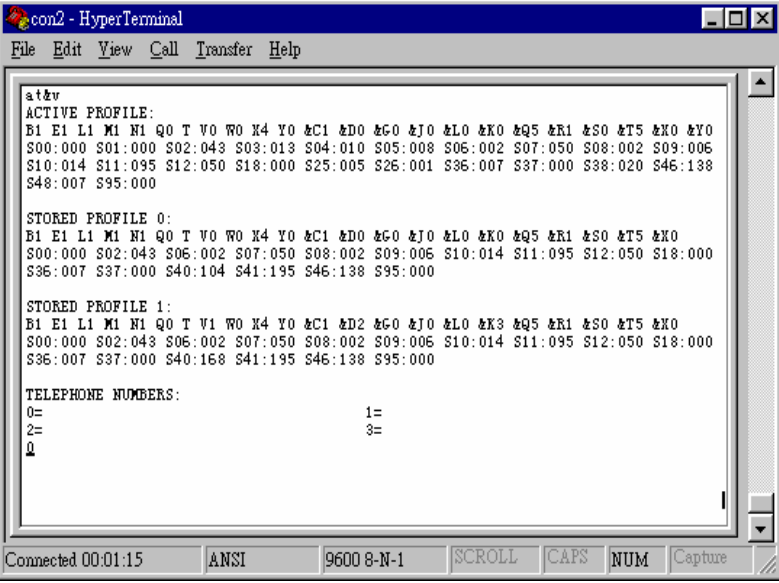
&K0: Data flow control disable

&W0: store active profile, storing the setting values

&L0: Line Type Selection: PSTN, dial-up

&L1: Line Type Selection: Leased Line

P.S. AT&L0 and AT&L1 are only used on the configuration of the work mode of the modem that can uses both diap-up and leased line

&V: view active configuration and stored profile, review the setting values of modem, as shown in the following figure.

12.2 Rack Installation

The height of OptiQwave-8310 is 2U (9cm), and the installtion gap is 3cm,
The height of Fuse Alarm Panel is 1U, and the gap with the cage is 1U.

12.3 Alarm Output Relay Installation
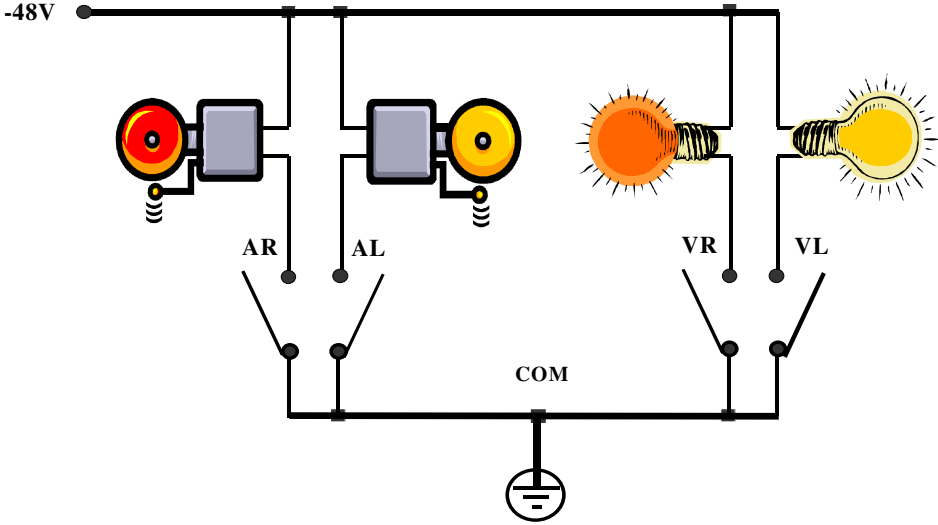
AR : Audible Radio Alarm Relay Contact
AL : Audible SONET/SDH Line Alarm Relay Contact
VR : Visible Radio Alarm Relay Contact
VL : Visible SONET/SDH Line Alarm Relay Contact
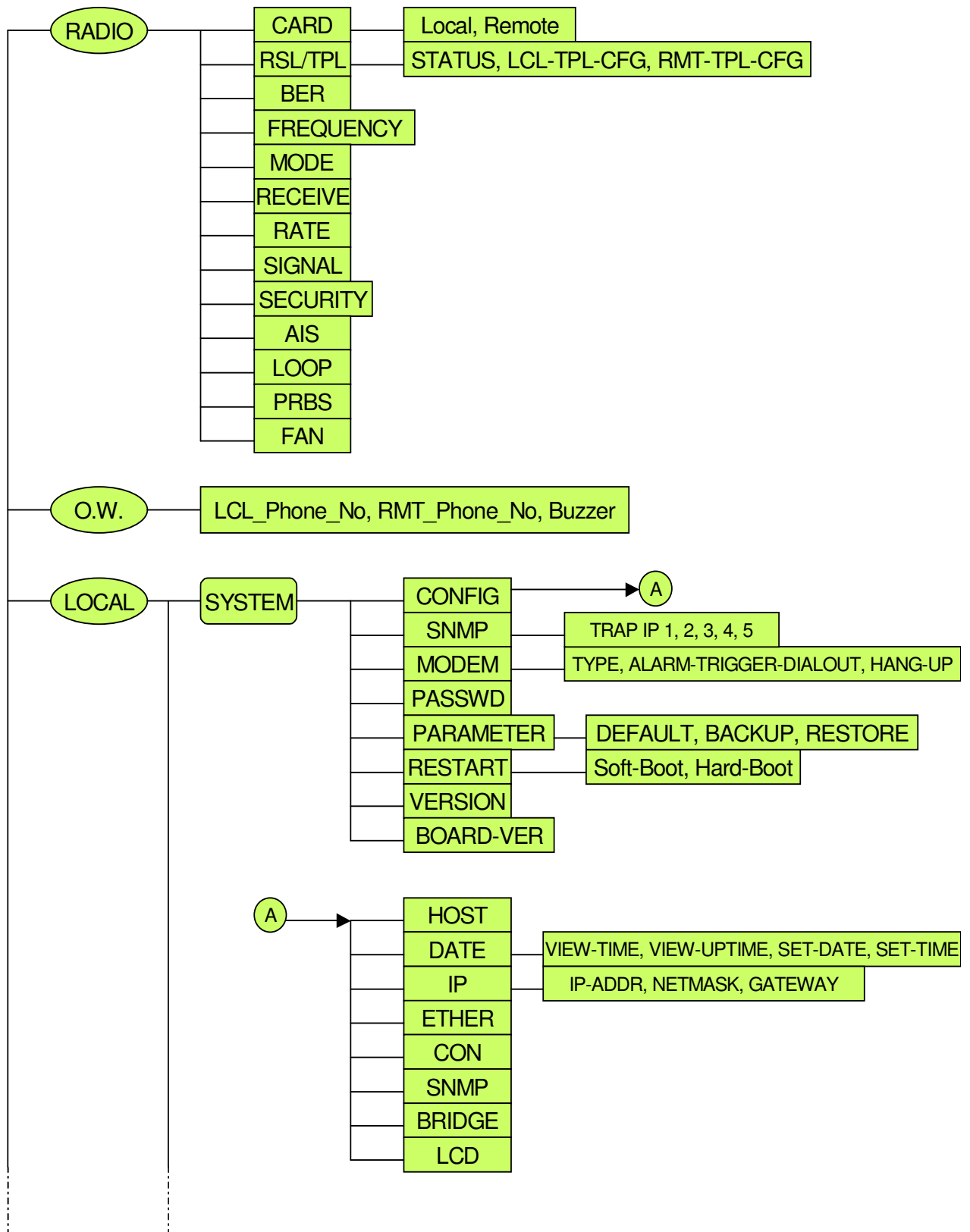
12.4 LCD Menu Tree

```
RADIO ─── CARD ─────── Local, Remote
         RSL/TPL ───── STATUS, LCL-TPL-CFG, RMT-TPL-CFG
         BER
         FREQUENCY
         MODE
         RECEIVE
         RATE
         SIGNAL
         SECURITY
         AIS
         LOOP
         PRBS
         FAN

O.W. ──── LCL_Phone_No, RMT_Phone_No, Buzzer

LOCAL ─── SYSTEM ─── CONFIG ──────→ A
                     SNMP ───────── TRAP IP 1, 2, 3, 4, 5
                     MODEM ──────── TYPE, ALARM-TRIGGER-DIALOUT, HANG-UP
                     PASSWD
                     PARAMETER ──── DEFAULT, BACKUP, RESTORE
                     RESTART ────── Soft-Boot, Hard-Boot
                     VERSION
                     BOARD-VER

          A ──────→ HOST
                    DATE ───────── VIEW-TIME, VIEW-UPTIME, SET-DATE, SET-TIME
                    IP ──────────── IP-ADDR, NETMASK, GATEWAY
                    ETHER
                    CON
                    SNMP
                    BRIDGE
                    LCD
```

ALARM
- VIEW
- HISTORY — RADIO / SONET/SDH — CRITICAL / 15-MINUTE / 1-HOUR / 24-HOUR
- CLEAR

CONFIG
- RADIO — RF-FREQ, SECURITY, LED-AIS-OUT
- SONET/SDH — FORMAT / O/E_MODULE / LED_REFLECT / ALARM / THRESHOLD — 15-MINUTE / 1-HOUR / 24-HOUR
- LOAD — NONE, All, Radio, SONET/SDH

TEST
- LOOPBACK — RADIO — Local, Remote / SONET/SDH — Local, Remote
- PRBS — PATTERN, POLARITY, VIEW, AIS-OUT

REPORT
- CLEAR
- SONET/SDH-PERF
- AVAILABILITY — 15-MIN / 24-HOUR / 7-DAY

REMOTE ······ (almost the same as LOCAL menu)

P.S. Each definition of function options of LCD panel is same as the definition of function options of Console interface

- 77 -

12.5 AGC Voltage versus RF RSL (dBm) Diagram

RSL / AGC at 25℃