OBCC

GQ2016ED
Ethernet & Optical Transmission System

User Manual

V1.5

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Guangzhou Optical Bridge Communications Equipment Co. Ltd.

Version Record

Version No.	Date	Remark
V1.0	04-25-2006	Document Created.
V1.1	07-10-2006	Order wire interface and RS232 for management are added.
V1.2	10-09-2006	Available options are added.
V1.3	10-10-2006	Description on the order wire is added.
V1.4	02-02-2007	Description on the dual optical interfaces and LIU4, ET100, PMCU is added.
V1.5	10-25-2007	Description on some cards is added.

Content

1. INTRODUCTION

1.1 Overview

GQ2016ED is a type of compact and high-performance PDH transmission equipment which is developed based on the our own ASIC. With the simple but advanced single-board design and the multiplexing technique, GQ2016ED can be used to enable the mixed transmission of 4-8 E1 and 100Mb/s Ethernet data, as well as Engineering Order Wire(EOW) and serial user channel. GQ2016ED is featured with the comprehensive alarm & monitoring, high-level of integration, low power consumption, excellent stability and easy-to-use.

1.2 Key Features

- Line bit rate is 150Mb/s, and the regular transmission distance is no less than 50Km;
- Auto-Protection Switching (APS) of 1＋1 optical interface and Auto-Laser Shutdown (ALS);
- Transparent transmission of 4-8 E1 with HDB_3;
- 1 wire speed 100Mb/s Ethernet supporting auto-negotiation mode;
- Comprehensive alarm function between local and remote
- Optional Remote Power Detection (RPD) and Port Management Card Unit (PMCU);
- Remote E1 tributaries loopback for equipment operation and management;
- Capability of costructing point-to-point topology, as well as star network by co-working with centralized equipment;
- A serial user channel with a baud rate up to 115.2Kb/s;
- Single-board design, compact, 1U height and low power consumption.

1.3 Technical Parameters

Table 1-3-1: Key Technical Parameters

Name	Items	Parameters	
Optical Interface	Wave Length	1310nm	
	Bit Rate	150Mb/s±50ppm	
	Power	-4～-12dBm	
	Receiving Sensitivity	Better than -36dBm	
	Dynamic Range	34dB	
	Connector	FC, SC is optional(If SC is select, please declare in order)	
	Transmission Distance	Dual fiber	Single fiber
		Regular distance is 50KM; Enabling 80KM-00K transmission with SC enabled (please declare SC in order).	Regular distance is 25KM; Enabling 40KM transmission (please declare in order).

Name	Items	Parameters
E1 Interface	Coding format, Jitter transfer, Jitter Tolerance, etc.	Compatible with ITU-T G.703, G.823 and G.742.
	Bit Rate	2.048Mb/s±50ppm
	Impedance	Unbalanced 75Ω, Balanced 120Ω is optional (please declare in order).
Network Management Interface and Transparent User channel	Baud Rate	Network Management Interface: 9600b/s
		User Interface: 115.2Kb/s
	Definition of connector	2: Input from the Network Management Interface 3: Output from the Network Management Interface 6: Input from the User Interface 7: Output from the User Interface 5: GND 4: +5V
Ethernet Interface	Bit Rate, Impedance, Negotiation, etc.	IEEE802.3、802.3u; Auto-negotiation is default
Power Supply	Voltage Range	DC: -36V~ -72V AC: 176V~264V
	Power Consumption	8W±10％
Installation	Rack	
Dimension	434mm×44mm×155mm (Wide × High × Deep)	
Weight	2.0 kg	
Operating Conditions	Operating Temperature	-5℃～45℃
	Storage Temperature	-40℃～70℃
	Relative Humidity	≤95％, no condensation

2. FRONT PANEL AND INTERFACES

2.1 Front Panel

Figure 2-1-1 Front Panel

Table 2-1-1: LED on Front Panel

NAME	COLOR	DESCRIPTION
PWR	GREEN	POWER LED; Lighting indicates normal power supply.
ALM	RED	ALARM LED; Lighting indicates alarms from the local end, and flashing indicates alarms from the remote end. The local alarm prevails.
RPD	YELLOW	REMOTE POWER-OFF LED; lighting indicates power off of the remote equipment. (Applicable only when PMCU is enabled).
WORKA	GREEN	WORK LED: lighting indicates the interface A is in normal working conditions.
WORKB	GREEN	WORK LED: lighting indicates the interface B is in normal working conditions.
NOPA	RED	NO OPTICAL SIGNAL: Lighting indicates no signal input into the optical interface A. LOF, E-3 and E-6 alarms will be masked by NOPA. 【Note】 NOPA will be flashing when ALS function on the remote end is enabled.
NOPB	RED	NO OPTICAL SIGNAL: Lighting indicates no signal input into the optical interface B. LOF, E-3 and E-6 alarms will be masked by NOPB. 【Note】 NOPB will be flashing when ALS function on the remote end is enabled.
LOF	RED	LOSS OF FRAME: lighting indicates loss of frame of the optical line. E-3 and E-6 alarms will be masked by LOF.
E-3	RED	E-3 LED: lighting indicates that the bit error of the optical line is higher than 10^{-3}. E-6 alarm will be masked by E^{-3}.
E-6	YELLOW	E-6 LED: lighting indicates that the bit error of the optical line is higher than 10^{-6}.
E1 LOS1～8	RED	E1 LOSS LED: lighting indicates the E1 signals are lost.

Table 2-1-2: Switches and interfaces on the front panel

NAME	DESCRIPTION
R_ALM	REMOTE ALARM SWITCH: "ON" is used to show remote alarms. Remote alarms to be shown includes NOP, LOF, E-3, E-6 and E1 LOS1～8.
MUTE	MUTE SWITCH: "ON" is used to mute the audible alarm. But ringing of the Engineer order wire will not be muted.
MASK	MASK SWITCH: "ON" is used to mask the current alarm rising from the E1 tributaries loss. Afterward, the alarm will be triggered when the E1 signals lose again.
ALS_EN	ALARM-ENABLING SWITCH: "ON" is used to enable ALS.
LOOP1-8	E1 LOOP SWITCH: "ON" is used to enable remote E1 tributaries loopback.

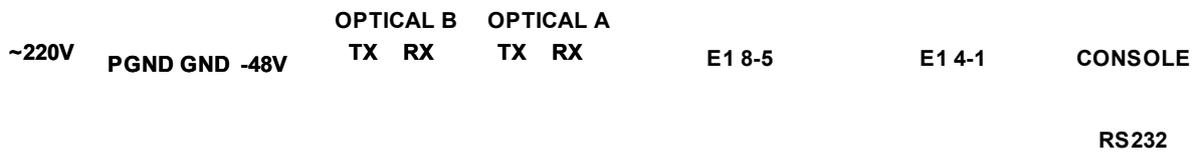| NAME	DESCRIPTION
ETH	ETHERNET INTERFACE: connected with RJ45; the straight through cable and crossover cable are available. Green LED indicates that Ethernet connection has been established, and flashing LED indicates that the data is being transmitted. Yellow LED indicates that Ethernet is running at 100Mb/s, OFF indicates that Ethernet is running at 10Mb/s.
PHONE	PHONE INTERFACE: Users can call the remote end without dialing up after off-hook.
POWER	POWER SWITCH:"I" indicates that the power is on; "O" indicates that the power is off.

2.2 Back Panel

OPTICAL B   OPTICAL A

~220V   PGND GND -48V   TX   RX   TX   RX   E1 8-5   E1 4-1   CONSOLE

RS232

Figure 2-2-1 Back Panel

Table 2-2-1: Interfaces on Back Panel

IDENTIFIER	DESCRIPTION
～220V	～220VAC, 176～264VAC.
PGND GND -48V	-48VDC, -36～-72VDC. "PGND": Power Ground; "GND": Ground "-48V": -48V input terminal
OPTICAL A OPTICAL B	Optical interface A and B When FC is used, point the optical fiber connector to the locating notch and then screw tightly; when SC is used, insert the optical fiber connector directly.
E1 8—5 E1 4—1	E1 tributaries interfaces; unbalanced 75Ω is default. Connection instructions: In case of unbalanced E1 interfaces, the coaxial adapter in the accessory packing box should be inserted into the DB37 socket. "IN" port is used to input E1 signal, and "OUT" port is used to output E1 signal.
CONSOLE RS232	Network management interface and serial user channel; DB9 connector
	Anti-static interface.
	Grounding

3. GQ2016ED CARDS

GQ2016ED is designed with many cards, and users can choose appropriate card to meet their specific requirements.

Table 3-1: Available Cards

NO.	MODEL	NAME	DESCRIPTION
1	CEOWP	Engineering order wire Card	For speech communication
2	LIU4	LIU4 Card	Provide 4 E1 interfaces
3	PMCU	Network Management Card	For RPD and serial network management
4	ET100	ET100 100Mb/s Ethernet Card	Provide one 100Mb/s Ethernet interface

3.1 CEOWP

3.1.1 Definition

CEOWP is a type of card designed to enable easy communication for users. The Engineering order wire interface is applicable for common 2-wire telephone and is coded with 64Kb/s PCM. When there are calls coming in, the equipment will give the analog rings, and the user may pick up the phone in the accessory package to start communication.

3.1.2 Application Instructions

- After the calling party on the local end picks up the telephone, the called party will receive the ringing while the calling party will hear the ringing back at the same time.

- After one party hooks on the telephone, the other party will hear the busy tone.

Note: when the calling party does not hook on the telephone within one minute after the called party has hooked, there will be a howler tone.

3.2 LIU4 Card

LIU4 E1card enables users to access 4 X E1 service. The interface is compatible with ITU-T G.703, G.823 and G.742. Moreover, the unbalanced 75Ω and the balanced 120Ω are available for impedance option, and the micro-coax connector is adopted.

3.3 PMCU

3.3.1 Definition

PMCU card can be used to enable RPD and serial network management and deliver the configuration management, alarm query and monitoring, as well as trouble Diagnosis.

3.3.2 RPD

During the project launching and daily maintenance, there will be defects such as the broken optical fiber line or power-off of the remote equipment. RPD can be used to identify these two defects to realize easier maintenance.
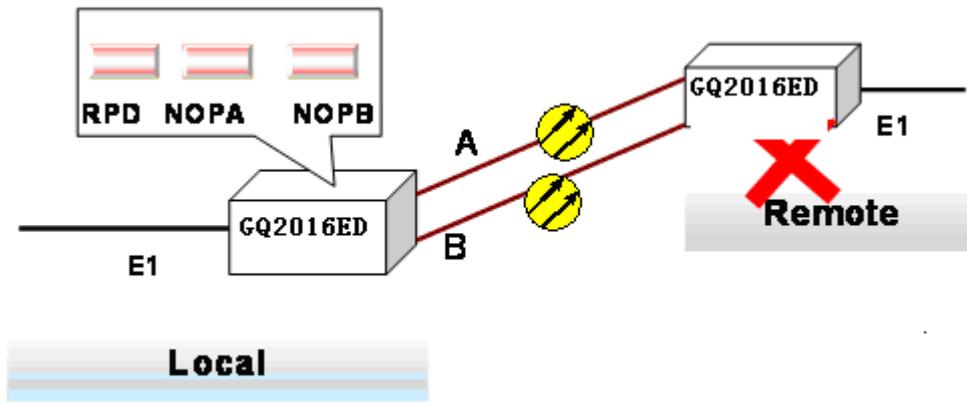
Figure 3-3-2-1 Remote Power-Off

When the remote equipment is powered off, the RPD LED, NOPA LED and NOPB LED on the front panel will be lighting. When the power of remote is on, the communication between remote and local will restore therefore the RPD and NOP LED of local equipment will be off.
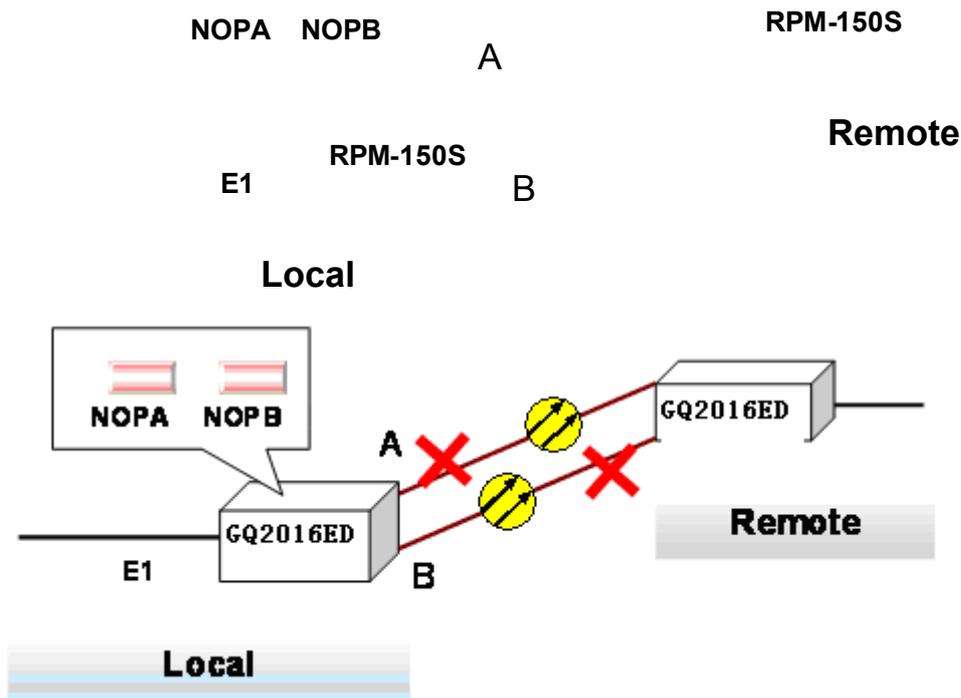

Figure 3-3-2-2 Optical Line Defect

When the optical line A is disconnected, NOPA LED on the front panel of the local equipment will be lighting, but the RPD LED will be off.

When the optical line B is disconnected, NOPA LED on the front panel of the local equipment will be lighting, but the RPD LED will be off.

When both the optical line A and B are disconnected, NOPA LED and NOPB LED on the front panel of the local equipment will be lighting, but the RPD LED will be off.

Note: The RPD function acts only when the PMCU are installed on the two point-to-point equipments.

3.3.3 Serial-Port Network Management

When PMCU is installed on the equipment, users may use the network management software to complete configuration management and kinds of alarm monitoring. Please refer to *EASYPDH Manual* for details.

3.4 ET100 100Mb/s Ethernet Card

3.4.1 Description

ET100 100Mb/s Ethernet card can be used to provide one 100Mb/s Ethernet channel with the embedded switch module.
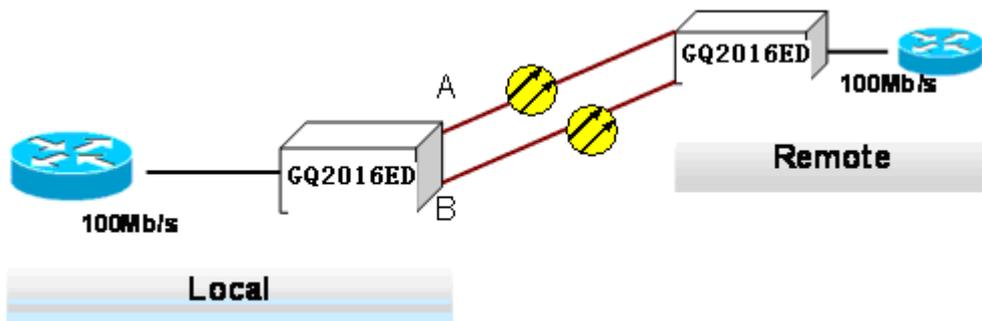
3.4.2 Applications

Table 3-4-2 ET100 Ethernet Applications

4. REMOTE LOOPBACK

Hardware and software loopback are available. The hardware loopback for E1 can be enabled with DIP switch of LOOP1-8 on the front panel, and the software loopback can be started with the network management software only when PMCU is installed.

When the loopback is enabled, the signal of E1 interface of the remote equipment will be looped back to the optical line.
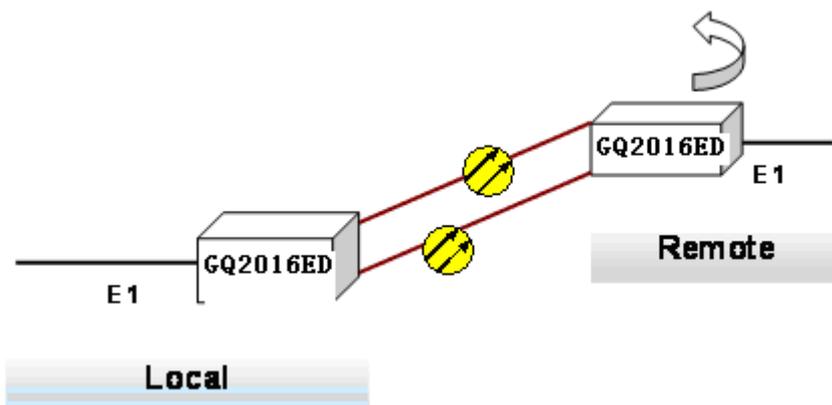

Figure 4-1 Remote Loopback

5. INSTALLATION & TROUBLESHOOTING

5.1 Installation

- Unpack the package and check the model and number of the included equipment and accessories according to the Packing List. For any damage, contact with the supplier instantly.
- Mount the equipment on the 19-inch rack, then connect, pack and organize E1 and optical fiber cable.
- Connect PGND port on the back panel to the ground of the equipment room.
- Check the power configuration for the equipment. If the AC power is applied, only use the 3-core power cable in the package; if the DC power is applied, please identify the battery polarity and connect the power cable rightly, and turn on the power switch.

5.2 Troubleshooting

When the equipment is broken down, please firstly identify that it is the problem of the equipment or the cable defect.

To find out the cause, enable the self-loop of the optical interface with fiber. If the equipment still fails to be working, you may determine that the reason lies on the equipment itself, and then you may start troubleshooting based on the information in the table below. If the equipment remains broken down, please contact with your supplier for maintenance.

Table 5-2-1 Failure Analysis and Treatment

Fault Symptom	Causes	Treatment
NOP Lighting	Fail to receive optical signal. Causes: 1. The remote equipment is disabled. 2. The optical fiber is disconnected. 3. The optical interface is loose. 4. The optical fiber splice is stained. 5. The optical module is damaged.	1. Check the remote equipment status. 2. Check the interface connection status. 3. Clean the optical interface. 4. Use the optical power meter to check whether there are optical signals transmitted into the equipment. If there are optical signals, enable the self-loop for the optical path, and then check whether the optical module is damaged; contact with your supplier immediately for any defect.
LOF Lighting	Loss of the optical line frame Causes: 1. The optical fiber splice is stained. 2. The optical line is over attenuated. 3. Sensitivity of the local optical components is low, or the optical power of the opposite components is low.	1. Clean the optical interface. 2. Check the length of optical line and determine whether it is applicable for the optical module. If the actual optical line distance exceeds tolerated range, contact with your supplier to replace the equipment with capability of farther transmission distance. 3. If the fault comes from the equipment itself, contact with your supplier for help.
E-3 Lighting	There are bit errors with large rate in the optical line. Causes:	1. The treatment method is the same as that for LOF Lighting above. 2. If the fault comes from the equipment itself, c

Fault Symptom	Causes	Treatment
	1. Causes are the same as that of LOF Lighting above. 2. The equipment is faulty.	ontact your supplier for help.
E-6 Lighting	There are bit errors with tiny rate in the optical line. Causes: 1. Causes are the same as that of LOF Lighting above. 2. The equipment is faulty.	The treatment method is the same as that for E-3 Lighting above.
E1-LOS 1～8 Lighting	E1 tributary signals are lost. Causes: 1. E1 tributaries are not uesed. 2. Connection between the input and output of E1 tributaries is reversed. 3. E1 cable is faulty. 4. The internal E1 circuitry is damaged.	1. Use the MASK switch to mask the alarms for the unused E1 tributary. 2. Check the input direction of E1 interface. 3. Check the quality of E1 cable. 4. If the fault comes from the equipment itself, contact with your supplier for help.
LINK OFF	The Ethernet interface is disconnected. Causes: 1. The Ethernet interface is disabled. 2. The Ethernet interface is loose. 3. The opposite equipment in the Ethernet network is unavailable.	1. Check the Ethernet connection status. 2. Exchange the equipments.

FIGURE INDEX

TABLE INDEX