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Preface

Version Description

Manual version: V1.1

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Disclaimer

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Brief Introduction

This User's Manual describes the installation and operation of Large Volume Modular Voice Optical Transmission Device. Before you use our device for the first time, please read all the included materials carefully, and install and operate this series of products in keeping with items listed in the manual, so as to avoid damaging the device resulting from malpractice. Thank you for choosing our products.

Environmental Protection

This product complies with the design requirements associated with environmental protection. The storage, use and disposal of the product should be conducted in accordance with related national laws and regulations.

We welcome you to put forward advice and suggestion to our work, which shall be viewed as the ultimate support to us.

Chapter One General Information

1.1 Introduction

Voice broadband multiplexing optical transmission device is a new generation highly-integrated single-board PCM base group multi-connection equipment based on independent software and thick & thin film technology. It can provide a 16~192-line voice interface directly upon the optical transmission channel, a 2-line(100M shared) Ethernet data interface and an E1 interface card for transmission of data with a bandwidth of 2M

. Voice Broadband multiplexing optical transmission equipment is mainly used in implementing connections between telephones and SPC exchanges through transmission network, as well as providing various kinds of data operation interfaces.

The device is widely used in: places such as telephone bars, middle and small scale companies, expressways and some temporary construction sites which demand quick solutions to the need of telephone and data operation, and the "Village-village Connection" telephone accessing project which is now in progress.

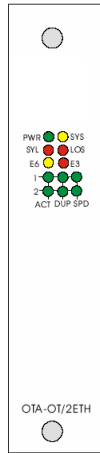
1.2 Features

- High-density single-board design, improved system reliability, easy installing & commissioning, maintenance free and stable performance.
- Fiber interface provides optical circuit E-3 and E-6 bit error warning detection, indicating circuit quality for builders and helping circuit maintenance.
- The system can provide maximally 192-line telephone interface and adopts the traditional PSTN voice, with 16 lines as a module occupying a channel of 64K, uncompressed, with high voice quality. Caller ID function available.
- Voice Card can display the indication of the connection between the display card and optical transmission card and the status of the peer-end voice card connection. At the same time, the voice card provides 1 line voice picking-up display function to facilitate the provisioning of voice channel.
- E1 function card provides users with one-way of transparent E1 data passage and the resistance of 75Ω/120Ω can be set by DIP switch
- 2-way Ethernet interface with 100M bandwidth. Optional 10M/half duplex, 10M/full duplex, 100M/half duplex, 100M/full duplex and self adaptive. VLAN supported. VLAN isolation of the 2-line Ethernet interface under user settings.
- Peer-to-peer networking mode, FXO/FXS mode supported. Fixed the telephone transmission problems of marginal customers.
- 1.9 inches structure with 4U height supported, and lower machine room occupancy; the modular insert structure of voice makes the expansion of system easier.

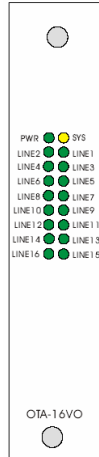
Chapter Two Function Description

2.1 Front Panel Introduction of Mainframe

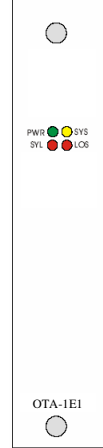
Currently, the mainframe is compatible with three function cards: optical transmission card, voice card and E1 interface card, which are shown as follows:



Front Panel of Optical Fiber Transmission Card (Vertical)



Front Panel of Voice Card (Vertical)



Front Panel of E1 Interface Card (Vertical)

2.1.1 Front Panel Indicators on Mainframe

The three types of function cards have 32 indicators with different functions. Their functions are described as follows:

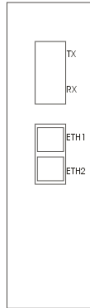
Name	Color	Function	Description	
PWR	Green	Indication of power supply status	ON	Power supply of function card is OK.
			OFF	No power input of function card.
SYS (Transmission Card)	Yellow	Indication of operating	ON	In normal operation.
			OFF	Not in operation.
SYS (Voice Card)	Yellow	Indication of operating	ON	In normal operation
			OFF	Disconnection between voice card and optical fiber transmission card.

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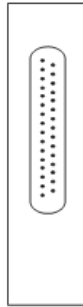
			FLASH	Peer-end voice card fault
SYS (E1 Interface Card)	Yellow	Working indication of E1 main transmission channel	ON	In normal operation
			OFF	Signal loss warning of E1 main transmission channel
			FLASH	All-1 warning of E1 main transmission channel
SYL (Transmission Card)	Red	Indication of loss of frame in optical link	ON	There is an alarm of loss of frame in optical link.
			OFF	Normal
SYL (E1 Interface Card)	Red	All-1 warning of E1 channel	FLASH	All-1 warning of E1 business transmission channel
			OFF	Normal
E3	Red	Error signal in optical link $\geq 10^{-3}$	ON	Error signal in optical link $\geq 10^{-3}$
			OFF	Normal
E6	Yellow	Error signal in optical link $\geq 10^{-6}$	ON	Error signal in optical link $\geq 10^{-6}$
			OFF	Normal
ACT1~2	Green	Working status of line1~2 Ethernet interface	ON	Ethernet connected properly
DUP1~2	Green		OFF	Disconnection
			FLASH	Data packet transferring of Ethernet
SPD1~2	Green		ON	Full duplex
			OFF	Half duplex
LINE1~8	Green		ON	100M
			OFF	10M
LINE1~8	Green		Line 1~16 picking-up display	ON
		OFF		Phone Stand by
		FLASH		Ringing

LOS	红色 Red	Signal loss warning indication of E1 channel	ON	Signal loss warning indication of E1 business transmission channel
			OFF	Normal

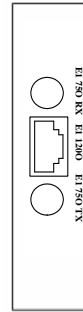
2.2 Function Card Rear Panel on Mainframe



Rear Panel of Optical Fiber Transmission Card (Vertical)



Rear Panel of Voice Card (Vertical)



Rear Panel of E1 Interface Card (Vertical)

2.2.1 Optical Transmission Interface

RX: Optical Signal Input TX: Optical Signal Output

2.2.2 Ethernet Interface

There are 2 RJ45 ports, providing 3 Ethernet interfaces (100M bandwidth shared) and these two Ethernet are a shared exchanger, which can transmit on optical fiber simultaneously. The Ethernet interface supports automatic recognition/adaptation of cross-wires and direct-type-wires, ridding the trouble of remaking the wires.

2.2.3 VOICE Interface

It provides a DB37 physical interface up to 16 lines of voice.

2.2.4 E1 Interface

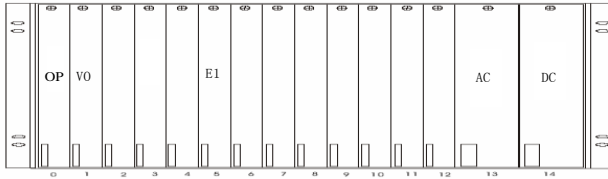
1-way E1 channel is provided by selecting a resistance of 75Ω or 120Ω/75Ω by DIP switch

2 Q9 interfaces;

120Ω resistance: 1 RJ45 interface.

Chapter Three Introduction to Centralized Frame

3.1 Frame Front Panel Description



Note: There are 15 slots on the frame totally, two of which are for power source and the rest 13 slots are for voice function cards and optical fiber transmission cards.

3.1.1 Optical Fiber Transmission Card

In order to facilitate the maintenance and installation, the optical fiber transmission card is fixed on the 0th slot and only one optical fiber transmission card can be configured on one frame. Each optical fiber transmission card can provide one-way optical transmission port and two-way Ethernet interfaces sharing 100M bandwidth.

3.1.2 Voice Function Card

One frame can be inserted with up to 12 voice function card, corresponding to Slot "1~12"; each voice card can provide 16 lines of voice with 192 line voice interfaces maximally when it is fully inserted. Classified by the using status, there are two types of voice cards available: FXO and FXS.

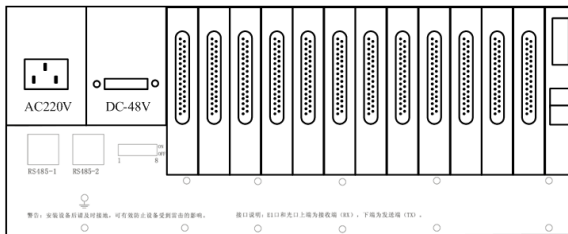
3.1.3 E1 Function Card

One frame can be inserted with up to 12 E1 function cards, corresponding to Slot "1~12"; each E1 function card can provide 1-way transparent 2M interface.

3.1.4 Power Card

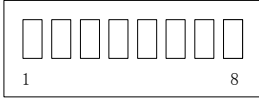
The user can insert power card into the frame according to actual configuration. There are two types of power cards: 220V and -48V, with two powers consumption of 200W and 300W (optional), and hot stand-by capability.

3.2 Description of Frame Rear Panel



3.2.1 Address Switches

A total of 8 DIP switches are accessible at the rear panel (rear view), of which ON denotes “1” and OFF denotes “0”. The switches are defined as follows:



Bit 1- 4: these four bits are used to set the frame address, with S1 being the lowest bit and S4 being the highest bit.

The SNMP address is defined as a code of 8 binary bits. The card address contains two parts, with the lower 4 bits being the slot address and higher 4 bits being the frame address. Higher bits are arranged on the left and lower bits on the right of the 8-bit address.

Slot Address: the address of the first slot from the left of the front view of the front panel, i.e. slot 0, is defined as “0000”. The second slot from the left, i.e. slot 1, is addressed as “0001”. The address increases from left slots to right slots. The power slot at the farthest right, i.e. slot 14, is addressed as “1110”.

Frame Address: the S1-S4 DIP switches at the rear panel of the frame are defined as the frame address, with S1 being the fifth bit of SNMP address and S4 being the eighth bit.

For example, suppose that the address of a frame is set as “1100”.The address of the third slot from the left of the frame, i.e. slot 2, is “0010”, therefore the SNMP address of the card shall be “1100 – 0010”.

Bit 5-6: reserved.

Bit 7-8: S7 – S8 are used to select matched resistance of the frame device when in SNMP mode, with the seventh bit for RX and eighth bit for TX.

When in SNMP mode, a matched resistance should be added to the terminal device of the hub, which means that the S7-S8 switches of the last terminal device should be both on “ON” positions.

Note:

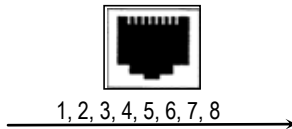
- ◆ This version does not support SNMP currently and the above-mentioned functions are reserved for new version in the future.

- ◆ The device governed by the same network management card should have a unique address. Address conflicts can paralyze the network management system, which can be solved by changing the conflicting addresses and then rebooting the network management system.

- ◆ In the event of cascade connection when all frames (or desktop device), are connected to SNMP system, make sure that only the last frame (or desktop device) linked to the SNMP hub has a matched resistance. That is, the S7-S8 of the last frame should be both on “ON” position and the S7-S8 of other frames (or desktop device) should be all on “OFF” position.

3.2.2 Cascade Connection Connector

On the right of the 8 DIP switches at the rear panel (rear view) are two RJ45 cascade connection connectors, which are defined as follows:



Pin #	Signal Definition	Direction
2 and 4	GND	Ground
5	RS485TP	Output
6	RS485TN	Output
8	RS485RN	Input
7	RS485RP	Input

Special connecting cable should be made when the connectors are used as PC network management interface. While used in multi-frame cascade connection, two RJ45 connectors should be linked with straight-through cable.

Note: When cascade connection is needed, the number of frames should be set in network management card and the frame address should be set at the rear panel and be different from each other, based on real circumstances. For example, when the cascade connection involves two frames, the number of frames in the network management card should be set as 2, and the frame number at the rear panel can be set as “0000” and “0001” respectively. The network management card and software should be rebooted after such setting.

Chapter Four Technical Specifications

4.1 Operating Environment

The device has a wide range of operating temperature and is able to work normally and stably in highly adverse environment.

Operating Temperature: 0°C ~ +50°C

Storage Temperature: -40°C ~ +70°C

Relative Humidity: 10%~95%

Atmospheric Pressure: 70~106 kpa

The environment should be free of corrosive and solvent gases, dust, and magnetic interference.

4.2 Power Supply

Using high-quality power adaptor, the device has a wide fluctuation tolerance, strong anti-interference and isolation quality to ensure a stable operation.

Input Voltage AC 220V / DC—48V

Power Fluctuation 165VAC~265VAC or—36VDC~—72VDC

Power Consumption <300 W (The power consumption will vary in result of the quantity difference of voice configurations)

4.3 Mechanical Specifications

Dimension: Width483mm×Height178mm×Depth257mm

4.4 Optical Interface

Wavelength: 850, 1310 and 1550nm optional

Mean Transmit Power: ≥-8dBm(single mode, 1310)

≥-18dBm(multimode, 850)

≥-25dBm(multimode, 1310)

Connector Type: FC/SC optional; single mode/multimode optional;
single-strand/dual-strand optional.

4.5 Ethernet Interface

Ethernet Interface Rate: 10M/100M adaptive, 10M half-duplex, 10M full-duplex, 100M half-duplex or 100M full-duplex optionalCompatible Portocol: IEEE802.3

Transmission Rate: 100M

4.6 FXO (FXS) Telephone Interface

Line Property: Comply with the *Technical specifications for telephone exchange equipment by Ministry of Posts and Telecommunications*

Voice encoding: PCM encoding, 64Kbps per line

Relay Interface (FXO): Connected to switch

Second-tier AC input impedance: 200 +680 // 0.1 Ω (three components)

Ringing voltage: 35 ~ 150 V

Ringing frequency: 17 ~ 60 HZ

Return Loss: 20 db

User Interface (FXS): connect users' telephone

Second-tier AC input impedance: 200 +680 // 0.1 Ω (three components)

Loop Resistance of Subscriber Line: less than 1 K Ω (including the phone)

Ringing voltage-peak: 110 ~ 150V

Ringing frequency: 22 ~ 28HZ

Feed voltage: 28 V

Return Loss: 20 db

4.7 E1 Interface Criteria

Electrical Performance: compatible with ITU-T G.703

Transfer Performance: compatible with ITU-T G. 823

Jitter Performance: compatible with ITU-T G. 823

Rate: Transmission port 2048Mbps \pm 50ppm

Code Type: HDB3

Interface Impedance: 75 Ω /120 Ω

Interface Connector: Q9 (75 Ω) or RJ45(120 Ω)

Chapter Five Installation

5.1 Safety Requirement

Please read the following safety items before installation to avoid physical injury and damage to this product or any other products connected. To avoid potential hazard, the product can be used only within specified scope. **Maintenance can be conducted only by technical personnel authorized by our company.**

1. Avoid fire or physical injury.
2. All power supply should be shut off during installation, which can be turned on only when all terminals have been connected correctly and checked to be free from mistakes.
3. Connect and disconnect in a properly. When device is powered up, do not connect or disconnect data cable without due cause.
4. Grounding. The product should be linked to the ground through earthed conductor. To avoid electric shock, the earthed conductor must be in connection with the ground. Make sure that the product is correctly earthed before connecting with the input or output terminals.
5. Correct connection. Users are expected to use accompanied accessories. In the event that special connections are needed, please pay attention to the corner allocation requirements.
6. Don't operate when there is no cover plate over the device . Do not operate the product if the cover plate or panel has been dismantled.
7. No contact with bare circuit is allowed. Do not touch bare connectors or components when power is on.
8. No operation is allowed if there is suspicion of failure. Call authorized maintenance personnel for examination and reparation should the product be suspected of damage.
9. Good ventilation. Do not operate under humid or explosive environment.
10. Maintain the surface of the product clean and dry.
11. Do not direct the optical header at the eye, lest that laser injures the retina.

5.2 Inspection upon Unpacking

After unpacking the product, inspect the type, quantity and condition of device and accessories inside according to the list of contents specified in this manual. Contact the Company or its distributors and agencies immediately should abnormal circumstances arise.

5.3 Power Supply

Check the power supply of the device. The power input should be configured in accordance with related requirements. Pay particular attention to the voltage and polarity if the power supply is DC. **Before you plug and unplug the power cable, please disconnect the power supply. Connect the power supply again after**

operation. And use the equipment under the operating condition required in the manual.

5.4 Test

The following tests should be conducted before use:

1. When it is powered on, on optical fiber transmission card device, PWR and LOS are on, SYS flashes and the rests shall all be out; on voice card, PWR is ON, SYS flashes and the rests shall all be out; and on E1 function card, PWR and LOS are ON, SYS flashes and SYL is out;
2. When connecting FXO and FXS devices back to back using optical cable, both LOS lamps on two devices shall be out and the SYS lamp on voice card shall be ON normally;
3. When connecting FXO and FXS devices to exchanger and telephone respectively, the LINE lamp turns on when the phone is picked up and LINE lamp flashes if there is a incoming call;
4. When connecting both ends of E1 card with data, PWR and SYS lamps turn on and the rest out on E1 function card. If connected without data communication, PWR turns on, SYS and SYL flashes and LOS turns OFF.

5.5 Configuration and Connection

If indicators work correctly as described in 5.4, turn off the power, configure operating modes based on the overall requirements of network environment, plug on E1 cable and optical fibers, and then turn on the power. The device will enter into normal operation.

If the device fails to work properly as described in 5.4, see failure diagnoses and troubleshooting section of the manual. If the failure still exists, contact the Company or its distributors and agencies immediately.

Chapter Six Appendix

6.1 How to make the cable

6.1.1 How to make Ethernet interface connecting cable

Ethernet interface applied twisted pair cable. There are two international standards on how to make it, which are EIA/TIA568A and EIA/TIA568B. Put the crystal joint tail down (that is, flat side up), from left to right, enumerate as 1 2 3 4 5 6 7 8, respectively. The following is the distribution of lines:

(EIA/TIA568A Standard)			(EIA/TIA568B Standard)		
Pin	Connecting signal	Twisted-Pair	Pin	Connected signals	Twisted-pair
1	TX+(Transmit)	White-Green	1	TX+(Transmit)	White-Orange
2	TX-(Transmit)	Green	2	TX-(Transmit)	Orange
3	RX+(Receive)	White-Orange	3	RX+(Receive)	White-Green
4	Not Applicable	Blue	4	Not Applicable	Blue
5	Not Applicable	White-Blue	5	Not Applicable	White-Blue
6	RX-(Receive)	Orange	6	RX-(Receive)	Green
7	Not Applicable	White-Brown	7	Not Applicable	White-Brown
8	Not Applicable	Brown	8	Not Applicable	Brown

The twisted pair specification of RJ-45 is provided as follows:

- 1) 1, 2 are used to send, 3, 6 for the reception, 4,5,7,8 are two-way lines.
- 2) 1, 2 must be twisted pair, 3, 6 twisted pair, 4, 5 twisted pair, 7-8 twisted pair.

Straight-through cable: Both ends are connected according to the T568 B sequence standard.

Cross-line cable: one end uses the sequence of T568A, the other end uses line sequence T568B connection. Specific link:

- 1) Connect the equipment with PC or router directly: use straight-through cable, the connect method of two ends are the same
- 2) Connect the equipment and switches (or HUB) in cascade: use cross-line cable, the connect method of two ends are different.

6.1.2 Making of Voice Interface Connection

Pin No.	Description	Color	Pin No.	Description	Color
1	Line1	Blue-Dot	20	Line1	Blue-Dot
2	Line2	Blue--Dot	21	Line2	Blue--Dot
3	Line3	Blue---Dot	22	Line3	Blue---Dot
4	Line4	Blue----Dot	23	Line4	Blue----Dot
5	Line5	Pink-Dot	24	Line5	Pink-Dot
6	Line6	Pink--Dot	25	Line6	Pink--Dot

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7	Line7	Pink---Dot	26	Line7	Pink---Dot
8	Line8	Green-Dot	27	Line8	Green-Dot
9	Line9	Green--Dot	28	Line9	Green--Dot
10	Line10	Green---Dot	29	Line10	Green---Dot
11	Line11	Brown-Dot	30	Line11	Brown-Dot
12	Line12	Brown--Dot	31	Line12	Brown--Dot
13	Line13	Brown---Dot	32	Line13	Brown---Dot
14	Line14	Yellow-Dot	33	Line14	Yellow-Dot
15	Line15	Yellow--Dot	34	Line15	Yellow--Dot
16	Line16	Yellow---Dot	35	Line16	Yellow---Dot
17	/		36	/	
18	/		37	/	
19	/				

6.1.3 How to make E1 connecting cable

75Ω mode:

Core connects with core,
 Sheath connects with connects, and
 Core is isolated from sheath.



120Ω mode:

The Pinout of 120Ω mode are
 illustrated below



1, 2, 3, 4, 5, 6, 7, 8
 →
 1(+) and 2(-) are output pins
 4(+) and 5(-) are input pins

6.2 Failure Diagnoses and Troubleshooting

Symptom	Possible Cause	Measures
PWR is OFF	<ol style="list-style-type: none"> Control switch is not fully turned on. The power supply is not connected with correct polarity. Outside power source is not correctly plugged. Conductor is dropped into the frame, causing short-circuits between power source and the ground. Failure at power supply module. 	<ol style="list-style-type: none"> Fully turn on the control switch. Swap the polarity connection. Properly plug the outside power source. Remove the conductor. Contact the distributor.
LOS and SYL alarms after the optical interface are connected.	<ol style="list-style-type: none"> The RX and TX are reversed at optical interface. The cable is not made properly. The transmission distance exceeds specifications of the ordered product. Failure at optical interface module. 	<ol style="list-style-type: none"> Swap RX and TX. Make the cable properly. Set the transmission distance based on specifications of the ordered product. Contact the distributor.
Ethernet can be pinged, but there is packet loss.	<ol style="list-style-type: none"> The network cable is not twisted-pair The cascade of HUBER is too much Operating mode is not correct The device clock is not configured properly on the datalink. 	<ol style="list-style-type: none"> Make the cable properly. Change the network structure to reduce the multiple cascades of HUBER Set proper operating mode Set other device clock mode on the line
Flashing of SYS lamp on Voice Transmission Card	<ol style="list-style-type: none"> Improper connection to frame of peer-end voice card; Peer-end voice card damage. 	<ol style="list-style-type: none"> Check the connection of voice card and frame; Replace the voice card.
The telephone noise is too intense.	<ol style="list-style-type: none"> The voice line is not in the distribution frame, the contact is loose; The contact of telephone line connected to the telephone is bad. 	<ol style="list-style-type: none"> Check the distribution frame and fasten the lines; Re-make the telephone line;
E1 line alarms after the E1 interface is connected.	<ol style="list-style-type: none"> The RX and TX are reversed at E1 interface. The E1 connecting cable is not properly made. The transmission distance exceeds specified value. 	<ol style="list-style-type: none"> Swap RX and TX. Make the cable properly. 75Ω: 300M 120Ω: 500M

6.3 Warranty Card

Our company is committed to provide users with the following terms:

1. Warranty service

1) Within the charge free warranty term (within 12 months since the purchase of the product), damaged parts can be exchanged free of charge and maintenance charges will be free in the conditions that the device is considered to be malfunctioned in normal service by our company.

2) Within the charged warranty term (more than 12 months and within 36 months since the purchase of the product), damaged parts will be charged for corresponding cost with free maintenance service in the conditions that the device is considered to be malfunctioned in normal service by our company.

2. Users can not enjoy warranty service with the following cases and corresponding cost of damaged parts replacing and maintenance service will be charged

- 1) Exceed 36 months since the purchase of the product
- 2) If you can't provide certificate of purchasing date, and serial No. of product shows that ex-works term has exceeded 36 months;
- 3) Include but not limit to the abnormal service conditions such as violent knocking, extrusion, drop, liquid immersion that cause damages;
- 4) Fragile label on the device is damaged;
- 5) User disassembles this product himself
- 6) Force majeure that leads to product damage, such as earthquake, flooding and lightening stroke;

3. The newly installed parts after maintenance will be repaired free of charge within 12 months since the installation date.

4. When malfunction occurs, users can choose to send it to our company to receive maintenance service or to post it to maintenance points of our company all over the country to be repaired.

5. Our company does not undertake any responsibilities for losses caused by abnormal operation; for losses really caused by product itself, including but not limited to all direct or indirect losses due to data loss, our company will only undertake responsibilities within the selling price of products.

Repair and Maintenance Record

Product Name: Large Volume Voice Modular Optical Transmission Device		Device No.:
Maintenance date		No. of Service Bill
1		
2		

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3		
4		
5		

