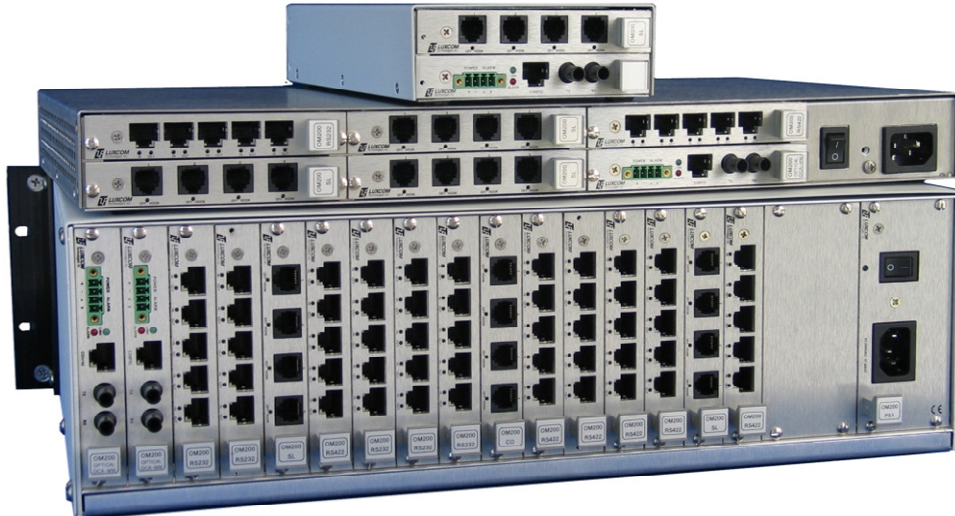


E&M (Ear and Mouth) Interface For OM200 SONET-OC3 Multiplexer



Chassis

- Chassis sizes of 2, 4, 6, and 16 slot.
- Optical data rate of 155Mbps
- Single or multimode fiber versions
- Point-to-point topology
- Add/drop topology
- Fiber protection ring switching

Interfaces

Telephony

Subscriber Loop & CO
Digital - MC300
Digital – M3903/4
T1 or E1

Data

EIA530, RS232, V.35
RS485/RS232 - Add/Drop
RS232
RS485
Ethernet

Audio

Analog 2-wire
Analog 4-wire
E&M
Radio - Harris RF5800H

Other

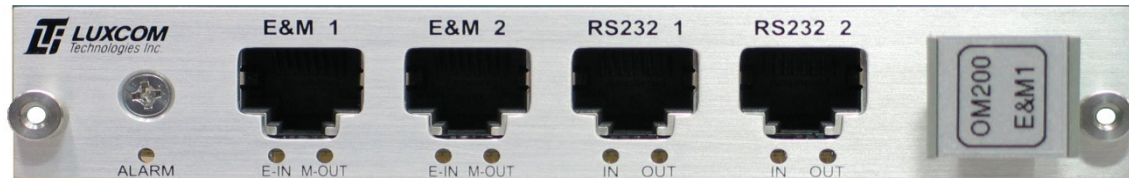
Contact sense/closure
Alarm - chassis monitor
Radar - video
Optical SONET

General

Every chassis requires at least one *Optical SONET* card and one *Interface* card.
Full details can be found at: www.luxcom.com/product/om200

**Interface: OM200-E&M1 (2 Ch. E&M + Push-to-Talk)
OM200-E&M3 (3 Ch. E&M + Push-to-Talk)**

Front Panel of versions with two channel E&M



Description

The E&M card is line side equipment which connects to E&M trunk lines from a PBX (Private Branch Exchange). Each of the two E&M ports communicates with a corresponding E&M port at the remote node. Two wire or four wire audio can be selected. E&M signaling Types 1 to 5 are supported. North America normally uses Type 1 signaling, while Type 4 signaling is common in the rest of the world. This card has very high fidelity and audio bandwidth.

OM200-E&M Jumper Setting

These cards have two jumpers behind each RJ45 E&M connector. If these jumpers are near the RJ45, the card has E&M contact sense/closure signaling, and the interface type must be selected in the Management interface. If these jumpers are furthest from the Rj45 connector, the interface is set to push-to-talk. In this mode pins 1&2 are the sense inputs and in the open circuit condition pin 1 is +5 Volt with respect to pin 2. The active state is sensed when these pins are shorted (3 mA will flow), and this state is passed to the remote OM200-E&M1 card where the isolated contact closure pins 7/8 become shorted. The network management interface should set to Type 5 signaling.

The OM200-E&M3 has an additional pair of jumpers in the bottom-middle of the card. These jumpers are in the *Enable Outputs* position for normal use. If these cards are used with Luxcom's OM200-E&M-PSP (Protection Switch) panel then the jumpers should be in the bottom *Alarm Panel* position. This Alarm panel allows OM200-E&M3 cards on separate networks to be connected in parallel for redundancy. See the *OM200-E&M-PSP* accessory on Luxcom's website for details.

E&M Ports

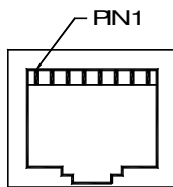
The external equipment connects to the E&M interface through the RJ45 connectors. One end of a standard Ethernet cable can be used to connect to the OM200-E&M; the other end of the cable will have to be custom to interface to the attached equipment. The tip/ring wires for the audio connection can be reversed without affecting performance. The pin-out is shown in the following table; pin1 is on the left when looking at the panel shown above.

Pin #	Name	Function	OM200-E&M Signal
1	SB	Send Battery	-24V Output used for M-lead signaling
2	M	M lead	Input
3	R2	RING 2	Input in 4-Wire mode, unused in 2-Wire mode
4	R1	RING 1	Output in 4-Wire mode, Bidirectional in 2-Wire mode
5	T1	TIP 1	Output in 4-Wire mode, Bidirectional in 2-Wire mode
6	T2	TIP 2	Input in 4-Wire mode, unused in 2-Wire mode
7	E	E lead	Output
8	SG	Signal Ground	Common * Note 1

*Note 1: Historically earth ground was the return path for E&M signalling; the return path for the OM200-E&M card is the Signal Ground pin; therefore it should be connected to the signalling ground of the attached equipment.

RS232 Ports

Two RS232 serial ports are included on this card; these follow the EIA/TIA 561 pin-out standard. Any data rate up to 64 kbps can be passed. A computer is a DTE (data terminal equipment), and a modem is a DCE (data communication equipment). These ports act as a DCE. A DCE usually interfaces with a DTE, so a straight through cable is used. The pin assignment is shown below.



NC = No Connection
 Hi = Always high
 Low = Always Low

Pin #	Pin Name		Direction
1	RI	Ring indicator (optional)	Output NC
2	DCD	Data Carrier Detect	Output Hi
3	DTR	Data Terminal Ready	Input NC
4	GND	Ground	
5	RXD	Receive Data	Output
6	TXD	Transmit Data	Input
7	CTS	Clear To Send	Output
8	RTS	Request to Send	Input

Indicators

ALARM On (red) indicates there is no connection with a remote partner, or a card failure.

IN is on when the OM200-E&M has sensed an off-hook condition on its M-lead, or when the RS232 data input is active.

OUT is on when the OM200-E&M is outputting an off-hook condition on its E-lead, or when the RS232 data output is active.

Management Port Settings:

Transmit Audio gain

Average audio signals are usually about 0.7 Vpp (-10 dBm) with peak levels up to 7 Vpp; the E&M card will accept these levels without distortion. If the input audio is significantly lower, the full range of the analog to digital converter is not used, and the signal output at the remote end will have slightly higher noise level. If the input audio is too high, the signal will clip causing distortion. To rectify these conditions, the transmit gain (input to the E&M card) can be adjusted using the management interface. The card is initially shipped with 0dB gain setting which should only be adjusted if problems arise.

Receive Audio gain

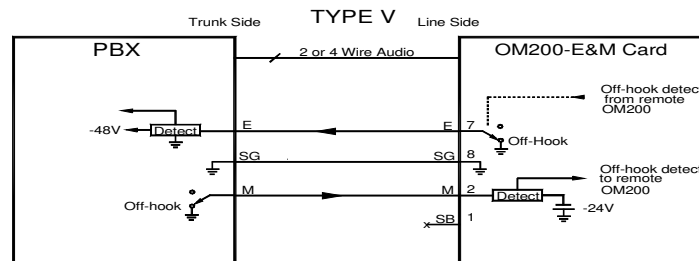
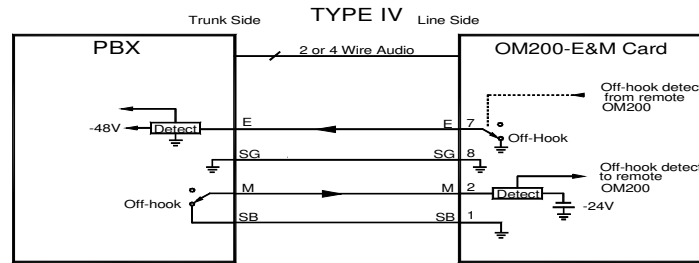
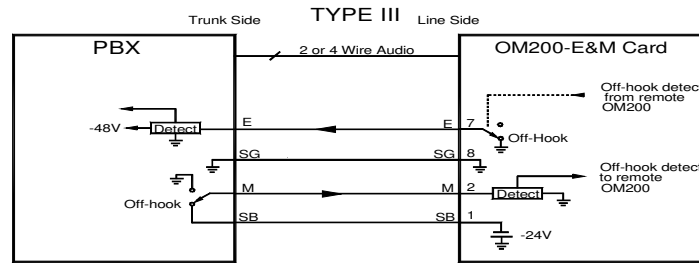
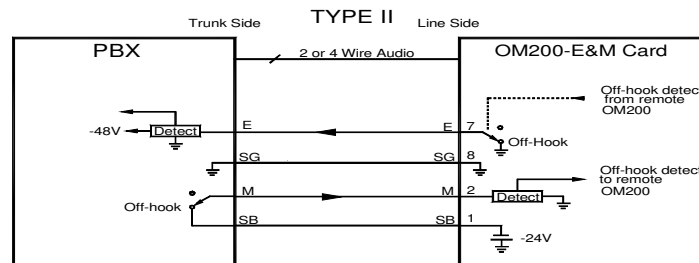
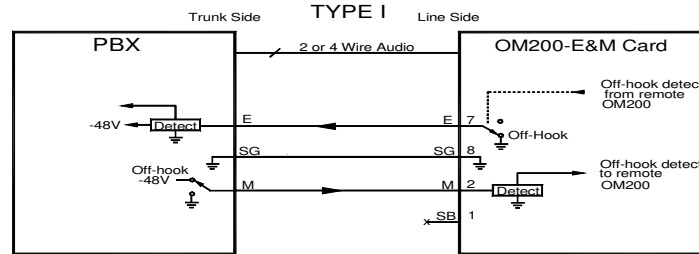
Normally the receive gain (output from the E&M card) should be set to unity (0 dBm); however, if the equipment attached to the E&M card is being over-driven, the received signal can be attenuated. The card is shipped from the factory with 0dB gain setting, and it should only be adjusted if problems arise.

Two-wire / Four-wire mode

If the interface attached to the E&M card has only two audio wires, the two-wire audio must be selected; otherwise the audio interface will have four wires, and the four-wire audio mode must be selected.

E&M signaling Types

Signaling Types I to 5 must be set using the management interface. Since the OM200 E&M card is always line-side equipment, be sure the PBX is set to act as Trunk side equipment. The signaling types are shown in the following figures.



Specifications

System bandwidth used by this card	4.3%
Current used by this card	< 350 mA
Power consumption	< 1.25 W
Operating temperature	-40C to +70C

Analog Channels

Input/Output connectors	RJ-45
Input/Output impedance nominal	600 ohms
Analog bandwidth	140 Hz to 22 kHz
Analog input Level without significant distortion.....	7 Vpp
Analog insertion gain (factory default)	0 dB
Gain Flatness (200 Hz to 20 kHz)	+/- 0.1 dB typical
Idle channel noise (C Message Weighted).....	< 2 dBBrnC0
Idle channel noise (3 kHz flat)	< 5 dBBrnC0
Idle channel noise (15 kHz flat)	< 9 dBBrnC0

RS232 Channels

Number of channels	2
I/O levels.....	EIA RS232C
I/O pin-out	EIA/TIA 561
Data rate	any up to 64 kbps
Data format.....	any
RTS/CTS time to pass across link.....	~0.5 milli sec

Ordering Information

Part numbers

OM200-E&M1 = 2 E&M channels + 2 RS232 channels

OM200-E&M3 = 3 E&M channels + 2 RS232 channels