Smart solutions for smart networks

Version V137a

CXR-QX3440

Access DCS-IP-MUX

Features

- Full frontal access (ETSI) Shelf
- DACS (Digital Access Cross-Connect System) with full non-blocking nx64K (DS0) cross-connect support Dual controller, dual power with load sharing
- E1/T1 1+1 protection, switching time <50ms
- DS0 Level Nx64K circuit protection
- PDH ring protection, QE1/QT1, FOM, Mini QE1/QT1
- Console, Telnet, and Inband management support SNMP v.1 and v.3, Radius authentication, Web GUI (optional).
- Compatible with SNMP based GUI network management system and supported by CXR iNET and CXR iNMS
- Two chassis types available: QX3440-A-CHPAa (5U), QX3440-C-CHPCa (3U)
- Support SAToP(CCPA T1 SAToP*), CESoPSN, and MEF8 for emulation of TDM circuits

All the plug-in cards are hot-pluggable

Item	QX3440-A-CHPAa	QX3440-C-CHPCa
Chassis	5U	3U
# of Mini-slots	4	4
# of Single long slots	12	5
Maxi E1/T1 Channels	64	36
Maxi GE Ports	32 (2)	4
Pseudowire bundles	64	64
DS0 Cross-Connect Backplane Capacity	128 Mbps	72 Mbps

Description

The CXR-QX3440 series products are Access DCS-MUXs which support multiplexing of various digital access interfaces into E1 or T1 lines for convenient transport and switching. The CXR-QX3440 Access DCS-MUX provides access for a variety of TDM, packet, and voice interfaces detailed on the next page. These interfaces are compatible with other CXR products. The QX3440 can act as a mini DACS: one or more of the WAN ports can be used as a Drop & Insert function with fractional E1/T1 lines, which can be muxed into a full E1/T1 line. Furthermore, the QX3440 also supports TDM circuit emulation protocols. TDM data and voice services can be encapsulated as Pseudowires and transported over ETH/IP/MPLS packet switch networks.

The QX3440 controller module provides full non-blocking Nx64K cross-connect matrix up to 2048 DS0. System redundancy is available in dual controller and power modules, making it an excellent fit for critical applications.

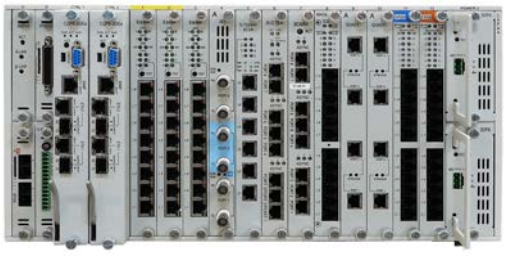
While 1+1 link protection is available for E1, T1, and TDMoEA modules, path protection for end-to-end Nx64K circuit protection is available for 3E1/T1.

The QX3440 supports local control and diagnostics by using a VT-100 terminal connected to the console port. It supports Ethernet, Telnet, and SNMP, so that it can be controlled and diagnosed from remote ends. An in-band management channel with GUI is available as well.

The QX3440 has a number of plug-in slots in regular size and mini size. (Card size to slot compatibility is detailed on the next page.) Most of the plug-in cards have LED indications.

The QX3440 consists of a rugged reinforced aluminum chassis, giving this equipment a durable structure and a long-lasting physical life.

QX3440-A-CHPAa (5U)



QX3440-C-CHPCa (3U)

CXR Networks

* Future Option, (2) 8GEA and Dual controllers

CXR-QX3440 plug-in cards:

The mini-slot cards plug into the mini-slots of the QX3440. The single-slot cards plug into single slots.
The dual-slot cards plug into two adjacent single slots.

Tributary Modules	Controller / Plug-in Cards	CCPB-DCS	CCPB-2GE	CCPB-CCPSWA
Single-Slot	3-channel E1	√	√	√
	3-channel T1	√	√	√
	4-channel E1	√	√	√
	4-channel T1	√	√	√
	4-channel TDMoEA	√*	√*	√*
	1FOMA	√	√	√
	2-channel G.SHDSL (2 pairs) w/o line power	√	√	√
	4-channel G.SHDSL (1 pair) w/o line power	√	√	√
	Serial and Digital access			
	6-channel UDTEA (6RS-4SERIAL)	√	√	√
	8-channel UDTEA	√	√	√
	6-port RS232 card (6RS232A) with V.110	√*	√*	√*
	8-channel RS232 with X.50 subrate	√	√	√
	8-channel G.703 card at 64 Kbps data rate	√	√	√
	8-channel Subrate Data Unit (8SRU)	√	√*	√*
	6-channel Co-Directional card (6CDA)	√*	√*	√*
	Voice and Analog Access			
	8-channel 2W/4W E&M (8E&MA)	√	√	√
	12-channel FXSA	√	√	√
	12-channel FXOA	√	√	√
	12-channel Magneto	√	√	√
	Data processing			
	8-channel Dry Contact I/O Type (D)	√	√	√
	8-channel Dry Contact I/O Type B	√	√	√
	8-channel Dry Contact I/O Type C	√*	√*	√*
	8-channel Data Bridge	√	√	√
	Packet Access			
	8-LAN-port/ 64-WAN-port Router-B	√	√	√
	Teleprotection Access			
	4-channel low speed optical (C37.94)	√	√	√

Mini-Slot	**Transportation**			
	1-channel E1 (Single E1 interface) with 75ohm	√	√	√
	1-channel E1 (Single E1 interface) with 120ohm	√	√	√
	1-channel T1 (Single T1 interface)	√	√	√
	Mini Quad E1 (Four E1 interfaces) with 75ohm	√	√	√
	Mini Quad E1 (Four E1 interfaces) with 120ohm	√	√	√
	Mini Quad T1 (Four T1 interfaces)	√	√	√
	Fiber Optical Interface	√	√	√
	Serial and Digital Access			
	1-channel X.21	√	√	√
	1-channel V.35	√	√	√
	1-channel RS232	√	√	√
	3-port RS232 card (3RS232a-DTE-DCE)	√	√	√
	1-channel OCU-DP	√	√	√
	1-channel G.703 Co-Directional	√	√	√
	Voice and Analog Access			
	Quad E&M (QEMA)	√	√	√
	QFXSA (Four FXS voice interface)	√	√	√
	QFXOA (Four FXO voice interfaces)	√	√	√
	QMAGA (Four magneto voice interfaces)	√*	√*	√*
	Data Processing			
	Echo Canceller card	√	√	√
	Analog Bridge card	√	√	√
	2-LAN port/64 WAN port Router-A	√	√	√
	Teleprotection Access			
	LS Optical M1C37 Card	√	√	√
	Clock and Alarm Module			
	CLKa (external clock in/out – alarm in/out)	√	√	√
	CLKb (external clock in/out – alarm in/out)	√*	√*	√*
	CLKc (external clock in/out – alarm in/out)	√*	√*	√*
High Speed Single slot	8 GbE Interface card*	×	×	√*

Note: √ = Supported × = not Supported * = Future Option

ORDERING INFORMATION

To specify options, choose from the list below:

Notes:

1. QX3440 is ROHS compliant
2. QX3440: 5U chassis with 128 Mb/s cross-connect capacity backplane.

Model	Description	Note
Main Unit		
QX3440-A-CHPAa	QX3440-A-CHPA type 5U Chassis. Wideband Main Unit without CPU, power and plug-in cards	5U chassis, CXR-QX3440a is applicable to use with CXR-QX3440-CCPB / CCSWA controller and CXR-QX3440-4GEAa card.
QX3440-C-CHPCa	QX3440-C-CHPC type 3U Chassis. Wideband Main Unit without CPU, power and plug-in cards	3U chassis, CXR-QX3440a is applicable to use with CXR-QX3440-CCPB / CCSWA controller and CXR-QX3440-4GEAa card.
CPU Module		
QX3440-CPU-CCPB-DCS	CPU controller module, support cross-connect function. One USB console port and one RJ45 SNMP port on board.	Chassis QX3440-A-CHPAa and QX3440-C-CHPCa only
QX3440-CPU-CCPB-2GE	Packet controller module, support cross-connect function and two physical Combo GbE (SFP/RJ45) interface for TDMoE uplink. One USB console port and one RJ45 SNMP port on board. ● Supports SAToP, CESoPSN, and MEF-8 ● Up to 64 Pseudowires ● Supports SyncE	Chassis QX3440-A-CHPAa and QX3440-C-CHPCa only
QX3440-CPU-CCPSWA	Packet controller module, support cross-connect function, 4 x GbE SFP and 2 x GbE RJ45 interface with built-in L2 switch and one GbE RJ45 SNMP. ● Supports SAToP, CESoPSN, and MEF-8 formats for TDMoE uplink, up to 64 pseudowires. ● Supports SyncE	QX3440-CPU-CCPSWA* is applicable to use with Chassis QX3440-CHPAa/CHPCa/CHPDa only

*Future Option

■ Where **licence** is used to select the following functions.

Licence	Description	Note
LCT	QX3440-LCT activation license	Used with CXR-LCT Graphical Configuration Software for management
E1-RING	QX3440-E1-RING activation license	Used with E-RING ULSR licence.
WEBLIC	QX3440-WEBLIC activation license	Used with QX3440-E, QX3440-CCPA and QX3440-CCPB for WEB GUI management

Mini Plug-in Module (Select 1 to 4 cards from list below)

Model	Description	Note
CXR-QX3440-E75	1-channel of E1plug-in card w/ 75 ohm	
CXR-QX3440-E120	1-channel of E1 plug-in card w/ 120 ohm	
CXR-QX3440-T1	1-channel T1 plug-in card	
CXR-QX3440-M4T1	Mini Quad T1 plug-in card	Includes a three meter conversion cable (CA-DB25M-4RJ45-E1-1)
CXR-QX3440-M4E75	Mini Quad E1 plug-in card with 75 ohm	Includes a three meter conversion cable (CA-DB25M-8BNC-E1-1)
CXR-QX3440-M4E120	Mini Quad E1 plug-in card with 120 ohm	Includes a three meter conversion cable (CA-DB25M-4RJ45-E1-1)
CXR-QX3440-RTA	2-LAN ports/64 WAN port router/bridge plug-in card	
CXR-QX3440-FOM-opt	Fiber Optical plug-in card	For **opt** option, please refer to the table below for detail information
CXR-QX3440-TS	3-chanel Terminal Server plug-in card	Includes a one meter conversion cable (CA-DB44M-2DB25F-DB15F-1)
CXR-QX3440-1ODP	*1 port OCU-DP Interface card*	For QX3440 chassis K only Only non-RoHS compliant model available **Limited Quantity**
CXR-QX3440-1X21	1-channel X.21 plug-in card	
CXR-QX3440-1RS232	1-channel RS232 plug-in card	
CXR-QX3440-1V35	1-channel V.35 plug-in card	
CXR-QX3440-1E530	1-channel EIA530 plug-in card	
CXR-QX3440-3RS232a-DTE-DCE*	3-port RS232 card with V.110 encoding, with DB44 connector for Async and Sync ports	One conversion cable is included, DB44 connector to two DB25 and one DB9 connectors. (CA-DB44M-2DB25F-DB15F-1)
CXR-QX3440-QEMA-**wr**-**m**-T**n**-**x**	Jumper selectable: 2/4 WIRE; A/B side Quad E&M voice card, complied with IEEE1613 standard.	For QX3440 chassis K and chassis J only For **wr**, **m**, **n** and **x** option, please refer to the table below for detail information
CXR-QX3440-QMAGA- **G**	Quad channel magneto plug-in module with ring across L1&GND and L1&L2. Software programmable.	For QX3440 chassis K and chassis J only Please use with 100-240Vac or ±48Vdc powered main units.
CXR-QX3440-QFXO-**x**	Quad FXO voice plug-in card	For QX3440 chassis K and chassis J only **GS** = Ground Start **MP** = Metering Pulse Receive 12/16 KHz For **x** option, please refer to the table below for detail information QFXOM includes all QFXO card functions
CXR-QX3440-QFXO-M-**x**	Quad FXO with MP 16 KHz voice plug-in card	
CXR-QX3440-QFXO-M12-**x**	Quad FXO with MP 12 KHz voice plug-in card	
CXR-QX3440-QFXOS-**x**	Quad FXO with GS plug-in card	
CXR-QX3440-QFXOM-**x**	Quad FXO with GS and MP 16 KHz voice plug-in card	
CXR-QX3440-QFXOM12-**x**	Quad FXO with GS and MP 12 KHz voice plug-in card used with 4 RJ11	
CXR-QX3440-QFXSA-**x**-**pt**	Quad FXSA voice card	For QX3440 chassis K and chassis J only
CXR-QX3440-QFXSA-M-**x**-**pt**	Quad FXSA with MP 16KHz voice card	

Model	Description	Note
CXR-QX3440-QFXSA-M12-**x-pt**	Quad FXSA with MP 12KHz voice card	Jumper setting options: Loop Start, Ground Start (GS), Metering Pulse Transmit 12/16 KHz (MP) For **x** and **pt** options, please refer to the table below for detail information Work with controller firmware v8.38.01 or up for software programmable signaling bits.
CXR-QX3440-QFXSAS-**x-pt**	Quad FXSA with GS	
CXR-QX3440-QFXSAM-**x-pt**	Quad FXSA with GS and MP 16KHz voice card	
CXR-QX3440-ECA	Echo canceller plug-in card	For QX3440-CHAK, CHB, CHC and CHCJ only
CXR-QX3440-ABRA	Analog voice bridging plug-in card	For QX3440-CHAK, CHB, CHC and CHCJ only
CXR-QX3440-M1C37-**LSFOM-G**	1- channel C37.94 plug-in mini card	For QX3440-CHAK, CHB, CHC and CHCJ only For **LSFOM** option, please refer to the table below for detail information
CXR-QX3440-CLKa	QX3440-CLKa small slot card provides 1 x ALM_IN, 2 x ALM_OUT, 2 x CLK_IN and 1 x CLK_OUT with 14 pin terminal block for connection. Optional card for CHPAa chassis and QX3440-CPU-CCPSWA	For QX3440-CHAa only

Single Slot Plug-in Module

Model	Description	Note
CXR-QX3440-8UDTEA-**opm**	8-port universal data interface card that supports RS232/RS422/RS485 full-duplex DCE interface which is software configurable Available option mode: Terminal Server, Omnibus, and Clock Pass Through	For **opm** option, please refer to the table below for detail information.
CXR-QX3440-3E1-**cc**	3-channel E1 plug-in card with DS0 (64K bps) SNCP circuit level protection Note: DS0 SNCP circuit level protection only support E1 frame mode	Order with CXR-QX3440 **chassis J** ONLY For **cc** option, please refer to the table below for detail information For controller hardware version **J** and software version **8.02.01** or newer versions.
CXR-QX3440-3T1	3-channel T1 Interface	Order with CXR-QX3440 **chassis J** ONLY For controller hardware version **J** and software version **8.38.01** or newer versions.
CXR-QX3440-TDMoEA-PPM	TDMoEA card with 2 GbE combo interfaces and 2 Ethernet interfaces (10/100/1000BaseT) plug-in module Support G.823 Traffic SFP optical module is not included.	Order with CXR-QX3440 **chassis J** ONLY Please order separately for SFP optical modules from SFP optical brochure.
CXR-QX3440-4GEAa*	High-Speed Plug-in Module 4 GbE interface plug-in module with 10/100/1000BaseT RJ45	Applicable to Slot 1~4 of **QX3440-a*** only. SFP optical module is not included. Please order separately for SFP optical modules from SFP optical brochure.
CXR-QX3440-4E1-**cc**	4-channel E1 plug-in card	For **cc** option, please refer to the table below for detail information
CXR-QX3440-4T1	4-channel T1 plug-in card	
CXR-QX3440-2GH	2-channel G.SHDSL plug-in card (2 pair)	This card can be used in QX3440 only.
CXR-QX3440-4GH	4-channel G.SHDSL plug-in card (1 pair)	
CXR-QX3440-8CD	8-channel G.703 plug-in card at 64 Kbps data rate	
CXR-QX3440-8DC	8-channel dry contact type A plug-in card with maximum voltage 100 Vdc or 250 Vac	
CXR-QX3440-8DCB	8-channel dry contact type B plug-in card with maximum voltage 220 Vdc or 250 Vac	
CXR-QX3440-1C37- **LSFOM** – **G**	1- channel C37.94 plug-in card	For **LSFOM** option, please refer to the table below for detail information
CXR-QX3440-4C37- **LSFOM** – **G**	4- channel C37.94 plug-in card	
CXR-QX3440-ODP-**typ**	8-channel OCU-DP plug-in card	For QX3440 chassis A only. Only **non-RoHS** compliant model available **Limited Quantity**
CXR-QX3440-8RS232-RJ	8-port RS232 plug-in card with X.50 subrate multiplexing scheme and X.54 encoding, with 8 RJ48 connectors for 8 RS232 Async ports	
CXR-QX3440-8RS232-DB	8-port RS232 plug-in card with X.50 subrate multiplexing scheme and X.54 encoding, with 2 RJ48 connectors and 2 DB44 connectors for Async and Sync ports	Two conversion cables are included (DB44 connector to two DB25 and one DB9 connector; (CA-DB44M-2DB25F-DB15F-1).
CXR-QX3440-6RS232A-RJ	6-port RS232 card with V.110 encoding, with 6 RJ48 connectors for 6 RS232 Async ports	This card can be used in QX3440-A/B/C only.
CXR-QX3440-8DBRA-RJ	8-channel data bridge plug-in card, with 8 RJ48 connectors for 8 data bridge Async ports	
CXR-QX3440-8DBRA-DB	8-channel data bridge plug-in card, with 2 RJ48 connectors and 2DB44 connectors for 8 data bridge Async ports	Two conversion cables are included (DB44 connector to two DB25 and one DB9 connector; (CA-DB44M-2DB25F-DB15F-1).

CXR-QX3440-1FOMA-**opt**	1FOMA Fiber Optical Interface with 1x9 optical port	For **opt** option, please refer to the table below for detail information For controller hardware version **F** and software version **V8.15.01** or newer versions.
CXR-QX3440-RTB	8-LAN ports/64 WAN ports router/bridge plug-in card	For controller hardware version **F** and software version **6.05.02** or newer versions.
CXR-QX3440-8EMA-**x-pt- typ**	8-channel 2W/4W E&MA plug-in card	**pt** = power type For **x, pt** and **typ** options, please refer to the table below for detail information
CXR-QX3440-12FXSA-**sn-pta-typ**	12-channel FXSA plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and PLAR. Without Ground Start and Metering Pulse. Used with 12 RJ11.	12FXSAMP includes all FXS card functions For **sn** option, please refer to the table below for detail information **pta**= power type. For **pta** option, please refer to the table below for detail information The IEEE1613 standard applies to QX3440 only Please use with 100-240Vac or ±48Vdc powered main units.
CXR-QX3440-12FXSA-P**-sn-pta-typ**	12-channel FXSA plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [PLAR bit programmable]. Without Ground Start and Metering Pulse. Used with 12 RJ11.	
CXR-QX3440-12FXSA-M-**sn-pta-typ**	12-channel FXSA plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [Metering Pulse]. Used with 12 RJ11.	
CXR-QX3440-12FXSA-MPP-**sn-pta-typ**	12-channel FXSA plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [PLAR bit programmable] and [Metering Pulse]. Used with 12 RJ11.	
CXR-QX3440-12FXSAS- **sn-pta-typ**	12-channel FXSA plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [Ground Start]. Used with 12 RJ11.	12FXSAMP includes all FXS card functions **pta**= power type. For **sn, pt, and typ** options, please refer to the table below for detail information. The IEEE1613 standard applies to QX3440-A/C only Please use with 100-240Vac or ±48Vdc powered main units.
CXR-QX3440-12FXSAM-**sn-pta-typ**	12-channel FXSA plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [Ground Start] and [Metering Pulse]. Used with 12 RJ11.	
CXR-QX3440-12FXSAMP- **sn-pta-typ**	12-channel FXSA plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [PLAR bit programmable], [Ground Start] and [Metering Pulse]. Used with 12 RJ11.	
CXR-QX3440-12FXOA-**typ**	12-channel FXOA plug-in card with 600/900 Impedance, Battery Reverse and Loop Start. Without Ground Start and Metering Pulse. Used with 12 RJ11.	12FXOAM includes all FXO card functions For **typ** option, please refer to the table below for detail information. Please use with 100-240Vac or ±48Vdc powered main units.
CXR-QX3440-12FXOA-M-**typ**	12-channel FXOA plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and [Metering Pulse]. Used with 12 RJ11.	
CXR-QX3440-12FXOAS-**typ**	12-channel FXOA plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and [Ground Start]. Used with 12 RJ11.	
CXR-QX3440-12FXOAM-**typ**	12-channel FXOA plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, [Ground Start] and [Metering Pulse]. Used with 12 RJ11.	
CXR-QX3440-12MAGA-**typ**	12-channel Magneto plug-in module with ring across L1&GND and L1&L2. Software programmable.	Please use with 100-240Vac or ±48Vdc powered main units. For **typ** option, please refer to the table below for detail information

CXR-QX3440-VoIPGA-**pt**	VoIP Gateway card with 1 WAN and 2 LAN 10/100Base-T interfaces. Supports up to 60 voice channels. Support G.711 a/mμ-law, G.726-32K, G.729 and G.723.1 voice compression formats SIP compliant.	For QX3440-A/B/C For QX3440-CCB controller only For the **pt** option, please refer to the table below for details
CXR-QX3440-6RS-4SERIAL (CXR-QX3440-6UDTEA)	6-port universal data interface card that supports three software configurable modes: Port 1 to 4: two DB44 connectors Port 5 to 6: two RJ48 connectors Mode 1: Port 1 to 4: RS232/RS422/X.21, Async/Sync 64kbps and subrate with V.110 encoding Port 5 to 6: RS232 for ASYNC only Mode 2: Port 1 to 4: X.21/RS422 SYNC N*64k (N=1~32) Port 5 to 6: Disabled Mode 3: Port 1 to 3: X.21/RS422 SYNC N*64k, (N=1~32). Port 4: X.21/RS422 SYNC, N*64k, (N=1~20). Port 5 to 6: RS232 N*64k (N=1~6) oversampling for ASYNC data. Mode 4: Port 1 to 4: RS232/RS422/X.21/V.35/V.36/EIA530 SYNC 38.4K and subrate Port 5 to 6: Disabled Mode 5: Port 1 to 4: X.21/RS449/RS422/RS232/V.35/V.36 /EIA530 SYNC N*64k (N=1~32) Port 5 to 6: Disabled	No conversion cable is included. Please order conversion cable separately from below table. Six conversion cable types are available: - CA-DB44M-100-2DB25F-VB - CA-DB44M-100-2DB15F-VB - CA-DB44M-100-1DB15F-1DB25F-VB - CA-DB44M-100-2M34F-VB - CA-DB44M-100-2DB37F-VB - CA-DB44M-100-1DB37F-1M34F-VB
CXR-QX3440-6CDA-cdm	6-channel G.703 Interface at 64 Kbps data rate. Per port configurable for Co-directional or Contra-directional interfaces.	For **cdm** option, please refer to the table below for detail information.

Power supply for CHPA 5U chassis

Model	Description	Note
Power Module		
QX3440-PW18-75-**150**	DC -18Vdc to -75Vdc (-48V) 150W power for chassis QX3440-A-CHPAa only, maxi 2.	For QX3440-A-CHPA only For shared redundancy, order 2 single DC 
QX3440-PW80-150-250	DC -80Vdc to -150Vdc (-48V) 250W power for chassis QX3440-A-CHPAa only, maxi 2.	For QX3440-C-CHPC only For shared redundancy, order 2 single DC

Power supply for CHPC 3U chassis

Model	Description	Note
Power Module		
QX3440-PW36-75-100	DC -36 to -75Vdc (-48V) 100W power for QX3440-C-CHPCa only, maxi 2,	For QX3440-A-CHPA only For shared redundancy, order 2 single DC 
QX3440-PW-SAPB-AC	Single AC plug-in power supply (100 to 240 Vac, 50/60 Hz) for QX3440-C-CHPC. **Order 1 maximum**. No redundancy on AC power.	For QX3440-C-CHPC only For shared redundancy, order 2 single DC 

Accessories

Model	Description	Note
Mounting Ear		
19”/23” ear mounts	A pair of 19”/23” ear mounts is supplied as part of standard package.	For other sizes, please contact your nearest CXR sales representative.
User’s Manual		
CXR-QX3440-UM-CCB-A	User’s Manual (optional, paper copy). A CD version of the manual is already included as standard equipment.	For QX3440-A CCB controller.
CXR-QX3440-UM-CCB-C	User’s Manual (optional, paper copy). A CD version of the manual is already included as standard equipment.	For QX3440-C CCB controller.
CXR-QX3440-UM-CCPA	User’s Manual (optional, paper copy). A CD version of the manual is already included as standard equipment.	For QX3440 CCPA controller.
CXR-QX3440-UM-CCPSWa	User’s Manual (optional, paper copy). A CD version of the manual is already included as standard equipment.	For QX3440 CCPSWa controller.
Fan Tray		
CXR-QX3440-FAN	Fan tray	For QX3440-A only , optional Power supplied from rear of chassis CHA.

Air Flow Guide Rack & Cable Management		
CXR-QX3440-CMA	Cable Management for QX3440, 1U (44mm) with 10cm ring	For QX3440-CHA, CHCJ, CHD
FXO Box		
CXR-QX3440-FXO BOX	Support FXO Interface Battery Feed	Non-RoHS compliant
Conversion Cables (All conversion cables are RoHS compliant)		
Model	**Description**	**Note**
23.D09D15.100	DB15/Male to DB9/Female cable; Length: 25 cm	For CCB controller Console/LCD interface connection.
CA-HDB15M-100-RJ48M	DB15/Male to RJ48/Male cable; Length: 100 cm	For CCPA controller Clock interface connection, including external clock, PPS*, and ToD*
CA-DB25M-100-8BNCM	DB25/Male to eight BNC/Male cable; Length: 100 cm	Used in CXR-QX3440-M4E75 plug-in card
CA-DB25M-100-8BNCF	DB25/Male to eight BNC/Female cable; Length: 100 cm	Used in CXR-QX3440-M4E75 plug-in card
CA-DB25M-8BNC-E1-1	DB25/Male to eight BNC/Male cable; Length: 300 cm	Used in CXR-QX3440-M4E75 plug-in card
CA-DB25M-300-8BNCF	DB25/Male to eight BNC/Female cable; Length: 300 cm	Used in CXR-QX3440-M4E75 plug-in card
CA-DB25M-100-4RJ48M	DB25/Male to four RJ48C/Male cable; Length: 100 cm	Used in CXR-QX3440-M4E120 plug-in card
CA-DB25M-4RJ45-E1-1	DB25/Male to four RJ48C/Male cable; Length: 300 cm	Used in CXR-QX3440-M4E120 plug-in card
CA-DB44M-100-2DB25F-1DB09F-DB	DSUB-44 pin/Male to two DSUB-25 pin/Female- one DSBU-9 pin/Female (8P8C) plug, Length:100cm	Used in CXR-QX3440-8RS232-DB, CXR-QX3440-8DBRA-DB, CXR-QX3440-6RS232A-DB and CXR-QX3440-3RS232a-DTE-DCE plug-in card
CA-DB44M-2DB25F-DB15F-1	DSUB-44 pin/Male to two DSUB-25 pin/Female- one DSBU-9 pin/Female (8P8C) plug, Length:100cm	Used in CXR-QX3440-TS plug-in card
CA-DB25M-30-1M34F	DSUB-25pin/Male to M34/Female V.35 Conversion cable Length: 30 cm	Used in CXR-QX3440-1V35 plug-in card
CA-DB44M-100- 2DB25F-VB	DSUB-44 pin/Male to two DSUB-25 pin/Female plug, Length:100cm	Used in V.35 and RS232 interfaces.
CA-DB44M-100- 2DB15F-VB	DSUB-44 pin/Male to two DSUB-15 pin/Female plug, Length:100cm	Used in X.21 interface.
CA-DB44M-100- 1DB15F-1DB25F-VB	DSUB-44 pin/Male to one DSUB-15 pin/Female plug + one DSUB-25 pin/Female plug, Length:100cm	Used in RS232, V.35 and X.21 interfaces.
CA-DB44M-100- 2M34F-VB	DSUB-44 pin/Male to two M34 pin/Female plug, Length:100cm	Used in V.35 interface.
CA-DB44M-100- 2DB37F-VB	DSUB-44 pin/Male to two DSUB-37 pin/Female plug, Length:100cm	Used in EIA530/RS449 and RS422 interfaces.
CA-DB44M-100-1DB37F-1M34F-VB	DSUB-44 pin/Male to one DSUB-37 pin/Female plug + one M34 pin/Female plug, Length:100cm	Used in V.35, EIA530/RS449 and RS422 interfaces.
CA-1SCM-200-1LCF	One SC/Male to one LC/Female fiber optic adaptor cable. Length: 200 cm	Used with CXR-QX3440-4C37-**T** and CXR-QX3440-1C37-**T**

*Future option

Y-Box (All Y-Box are RoHS compliant)		
Y-BOX-QX-4E1-BNC	1 for 1 protection Y-Box with BNC connectors (4-E1)	Used with 4E1
Y-BOX-QX-16E1-RJ	1 for 1 protection Y-Box with RJ48C connectors (16-E1)	Used with 4E1
Y-BOX-QX-16T1	1 for 1 protection Y-Box with RJ48C connectors (16-T1)	Used with 4T1

Blank Panels(All blank panels are RoHS compliant)	
QX3440-PAN-PW	Blank Panel for Power Supply Slot (flat)
QX3440-PAN-CPU	Blank Panel for Controller Slot (flat)
QX3440-PAN-MSLOT	Blank Panel for mini Slot A-D (flat)
QX3440-PAN-SLOT	Blank Panel for Slot 1-12 (flat)
QX3440-PAN-PW-EMI	Blank Panel for Power Slot (u-shape) QX3440-PAN-PW-CHPAa
QX3440-PAN-CPU-EMI	Blank Panel for Controller (u-shape) QX3440-PAN-CPU-CHPx
QX3440-PAN-MSLOT-EMI	Blank Panel for mini Slot A-D (u-shape)
QX3440-PAN-SLOT-EMI	Blank Panel for Slot 1-12 (u-shape)

SFP Optical Modules
Please place your order using the 5-digit alphanumeric codes listed in the separate SFP Optical Module Brochure.

Feature Activation License		
CXR-QX3440-ERING	Feature Activation License for QX3440 CPU card to support framed E1 PDH-Ring function	Used with 4E1, M4E75, M4E120 and FOM
CXR-QX3440-TRING	Feature Activation License for QX3440 CPU card to support framed T1 PDH-Ring function	Used with 4T1
CXR-QX3440-LCT	Feature Activation License for QX3440 CPU card to support LCT Graphical Configuration Software	Used with CXR-LCT Software
CXR-QX3440-CCPA-PW*	Feature Activation License for QX3440 CCPA controller to support TDMoE uplink.	Used with QX3440-CCPA-NPW controller.
CXR-QX3440-WEBLIC	Feature Activation license for QX3440 CPU card to support Web Configuration Software. License based on serial number. Supports GUI graphic PDH/DS0 cross connect	. Available for QX3440-E, QX3440-CCPA, QX3440-CCPB

For 4E1 and 3E1 cards

■ Where **cc** is used to select connector:

cc =	**Description**	**Note**
RJ	RJ48C connector	
BNC	BNC connector	

For FOM and 1FOMA card

■ Where **opt** is used to select optical module type (All optical modules are RoHS compliant):

opt =	**Description**	**Note**
SAA	Single optical module with dual uni-directional fiber, 1310 nm, SC optical connector, 30 km ***- S1.1***	Use dual fiber Units delivered ITU-T G.957 application code
SBB	Single optical module with dual uni-directional fiber, 1310 nm, SC optical connector, 50 km ***– L1.1***	
SCC	Single optical module with dual uni-directional fiber, 1310 nm, FC optical connector, 30 km ***– S1.1***	
SDD	Single optical module with dual uni-directional fiber, 1550 nm, SC optical connector, 20 km ***– S1.2***	
SEE	Single optical module with dual uni-directional fiber, 1550 nm, SC optical connector, 100 km ***– L1.2***	
SSM	Single optical module with single bi-directional fiber (master), 1310 nm transmit and 1550 receive, SC optical connector, 30 km ***– S1.1/ S1.2***	1310 nm from master to slave Order **SSM** to use with **SSS** Use 1 fiber ITU-T G.957 application code
SSS	Single optical module with single bi-directional fiber (slave), 1310 nm receive and 1550 transmit, SC optical connector, 30 km ***- S1.1/ S1.2***	1550 nm from slave to master Order **SSS** to use with **SSM** Use 1 fiber ITU-T G.957 application code

Note: For other special optical modules, please contact your nearest CXR sales representative.

For 8UDTEA card

■ Where **opm** is to select 8UDTEA functions:

opm	Description
DCE	Support RS232/RS422/RS485 DCE interface which is software configurable
TS	Support Terminal Server Function and DCE
OMNI	Support Omnibus Function and DCE
CPT	Support Clock Pass Through function and DCE
TSOMNI	Support Terminal Server, Omnibus Function and DCE
HD	Support RS232/RS422/RS485 DCE interface with Full- and Half-Duplex modes
TSHD	Support Terminal Server Function and DCE with Full- and Half-Duplex modes
OMNIHD	Support Omnibus Function and DCE with Full- and Half-Duplex modes
TSOMNIHD	Support Terminal Server, Omnibus Function and DCE with Full- and Half-Duplex modes
FULL	Support Terminal Server, Omnibus Function, Clock Pass Through and DCE with Full- and Half-Duplex modes
Feature Activation License	**Description**
CXR-QX3440-8UDTEA-UPGR-TS	Feature Activation License for QX3440 8UDTE card to support Terminal Server function
CXR-QX3440-8UDTEA-UPGR- OMNI	Feature Activation License for QX3440 8UDTE card to support Omnibus function
CXR-QX3440-8UDTEA-UPGR-CPT	Feature Activation License for QX3440 8UDTE card to support Clock Pass Through function
CXR-QX3440-8UDTEA-UPGR-TSOMNI	Feature Activation License for QX3440 8UDTE card to support Terminal Server function and Omnibus function
CXR-QX3440-8UDTEA-UPGR-HD	Feature Activation License for QX3440 8UDTE card to support Full- and Half-Duplex modes
CXR-QX3440-8UDTEA-UPGR-TSHD	Feature Activation License for QX3440 8UDTE card to support Terminal Server function with Full- and Half-Duplex modes
CXR-QX3440-8UDTEA-UPGR-OMNIHD	Feature Activation License for QX3440 8UDTE card to support Omnibus function with Full- and Half-Duplex modes
CXR-QX3440-8UDTEA-UPGR-TSOMNIHD	Feature Activation License for QX3440 8UDTE card to support Terminal Server function and Omnibus function with Full- and Half-Duplex modes
CXR-QX3440-8UDTEA-UPGR-FULL	Feature Activation License for QX3440 8UDTE card to support Terminal Server, Omnibus and Clock Pass Through functions with Full- and Half-Duplex modes

For Quad E&M A card:

■ Where **wr** is used to select wire type:

wr =	Description	Note
2w	2 wire	
4w	4 wire	

■ Where **m** is used to select QEM card signaling side (must select one):

m =	Description	Note
B	B (carrier side) connects to A side.	
A	A (exchange side) connects to B side. A side M lead to B side M lead, A side E lead to B side E lead.	

■ Where **n** is used to select QEM card signaling type (must select one):

n =	Description	Note
O	For voice transmission only.	Circuit Type doesn't matter.
1	Type I (Original) E&M Signaling Circuit	M lead provides discharge for the A side.
2	Type II Circuit. This design attempts to reduce ground noise by adding two leads: SB (Signal to Battery) and SG (Signal to Ground)	Reduced ground noise. Ground current is eliminated at the cost of two more wires per circuit.
3	Type III Circuit. The SG lead serves as a discharge for the M lead. Reduces delay caused by combination of (a) low current electronic detectors, and (b) long runs of the E and M leads.	Type III is rare because ground currents on the E return would cause noise
4	Type IV Circuit. Based on the Type 2 circuit. This E&M circuit provides symmetry.	
5	Type V Circuit. For applications where ground noise is not an issue. Based on the Type 2 circuit.	

For voice card (8EMA, QFXO, QEMA, and QFXSA):

■ Where **x** is used to select all of voice card signaling bits. If this option is not required, omit the **x** field in the ordering code.

	x =	Description	Note
8EMA	**E**	Follows ETSI signaling bits	
	A	Follows ANSI signaling bits	Jumper selectable for all channels
	R	Reverse for ON-HOOK and OFF-HOOK signaling bits exchange	
	AR	Follows ANSI signaling bits and reverse bit	
	S	Follows customer's special bit or function assignment	
	S4	Disable the function of the test button	
	S5	Forcing all ports to be OFF-HOOK when an alarm occurs	
	S6	Forcing all ports to be ON-HOOK when an alarm occurs	
QFXO	**x =**	**Description**	**Note**
	A	Follows ANSI signaling bits	
	E	Follows ETSI signaling bits	
	S	Follows customer's special bits assignment	
	T	Trunk condition OFF-HOOK	
	AT	Follows ANSI signaling bits w/ trunk condition OFF-HOOK	
	ST	Follows customer's special bits assignment w/ trunk condition OFF-HOOK	
QEMA	**x =**	**Description**	**Note**
	A	Follows ANSI signaling bits	Jumper selectable for all channels.
	E	Follows ETSI signaling bits	
	S	Follows customer's special bits assignments	
QFXSA	**x =**	**Description**	**Note**
	A	Follows ANSI signaling bits	■This option applies to controller version v8.36.XX and before.
	E	Follows ETSI signaling bits	
	S	Follows customer's special bits assignment	■If this option is not required, omit the **x** field in the ordering code.

Note:

1. For S (customer's special bit), please contact your nearest CXR sales representative.
2. If x is not selected from table above, the default setting for signaling bits is ETSI and for trunk condition is ON-HOOK.

For 8EMA card:

■ Where **pt** is used to select the following functions:

pt=	Description	Note
24	For QX3440-A type chassis using SDA power module with ±24Vdc input power	
PWR	For QX3440-A type chassis using SDA power module with ±48Vdc input power, or QX3440-A type chassis using SD125 power module with ±125Vdc input power or QX3440-B/C type chassis using SDB power module with ±48Vdc input power, or QX3440-B/C type chassis using SAB power module with 100 to 240Vdc input power.	
PWRIE1613	For QX3440-A type chassis using SDA power module with ±48Vdc input power, compiled with IEEE1613 standard For QX3440-C type chassis using SDA power module with ±48Vdc input power, compiled with IEEE1613 standard	

■ Where **typ** is used to select the connector type:

typ=	Description	Note
RJ	8 x RJ45	
TELCO	1 x Telco 64 Connector	

For 12-channel FXSA card:

■ Where **sn** is used to select special function. If this option is not required, omit the **sn** field in the ordering code.

sn =	Description	Note
sn = omit	FXS Loop Feed = -48 Vdc with 25 mA current limit; alarm tone enable; normal ring	
S1	FXS Loop Feed = -48 Vdc with 35 mA current limit	
S4	Remove alarm tone	
S5	Double ring tone transmit	

Note: For sn (special function), please contact your nearest CXR sales representative.

■ Where **pta** is used to select the following functions.

pta=	Description	Note
24	For QX3440-A type chassis using SDA power module with ±24Vdc input power	
PWR	For QX3440-A with ±48Vdc (SD, SDA, or SD125) For QX3440-B/C with ±48Vdc (SDB) and AC (SAB) power modules	
PWRIE1613	For QX3440-A with ±48Vdc (SDA) power complied with IEEE1613 standard For QX3440-C with ±48Vdc (SDB) power complied with IEEE1613 standard	

■ Where **typ** is used to select the connector type:

typ=	Description	Note
RJ	8 x RJ45	
TELCO	1 x Telco 64 Connector	

For 12FXOA/12MAGA

■ Where **typ** is used to select the connector type:

typ=	Description	Note
RJ	12 x RJ11	
TELCO	1 x Telco 64 Connector	

For ODP

■ Where **typ** is used to select the connector type:

typ=	Description	Note
RJ	8 x RJ45	
TELCO	1 x Telco 64 Connector	

For QFXSA card:

■ Where **pt** is used to select the following functions.

pt=	Description	Note
24	For QX3440 type chassis using SDA power module with ±24Vdc input power	For QX3440 chassis K only
PWR	For QX3440-A with ±48Vdc (SD, SDA, or SD125)	
PWRIE1613	For QX3440 with ±48Vdc (SDA) power complied with IEEE1613 standard	
24IE1613	For QX3440 with ±24Vdc (SDA) power complied with IEEE1613 standard.	

For C37.94 Card:

■ Where **LSFOM** is to select **LS**-**F**iber **O**ptical **M**odule option, please replace **LSFOM** with your selection.

LSFOM Code	Description										Note
	Mode		Data Rate		Wave Length		Distance		Connector		
	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	
ZHHTT	Z	Multi-mode	H	155 M	H	820nm	T	2km	T	ST connector	1 * 8 Separate transceiver & receiver
QHATT	Q	Multi-mode	H	155 M	A	850nm	T	2km	T	ST connector	1 * 9

NFB3T	N	Single mode	F	125 M	B	1310nm	3	30km	T	ST connector	
QFBTT	Q	Multi-mode	F	125 M	B	1310nm	T	2km	T	ST connector	
NHC2S	N	Single mode	H	155 M	C	1550nm	2	20km	S	SC connector	
T	Single mode, 1310nm, Tx_min -13dBm, Rx_max -30dBm, SC type connector. Works with Toshiba teleprotection device										Must use 3*DS0
S	Single mode,1310nm, Tx_min -14dBm, Rx_max -36dBm, ST type connector Works with SEL teleprotection device										Must use 8*DS0

For mini C37.94 Card:

■ Where **LSFOM** is to select **LS**-**F**iber **O**ptical **M**odule option, please replace **LSFOM** with your selection.

LSFOM Code	Description										Note
	Mode		Data Rate		Wave Length		Distance		Connector		
	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	
ZHHTT	Z	Multi-mode	H	155 M	H	820nm	T	2km	T	ST connector	1 * 8 Separate transceiver & receiver
QHATT	Q	Multi-mode	H	155 M	A	850nm	T	2km	T	ST connector	1 * 9
NFB3T	N	Single mode	F	125 M	B	1310nm	3	30km	T	ST connector	
QFBTT	Q	Multi-mode	F	125 M	B	1310nm	T	2km	T	ST connector	
NHC2S	N	Single mode	H	155 M	C	1550nm	2	20km	S	SC connector	

For Transfer Trip (TTA) Card:

■ Where **pwr** is used to select the following functions.

pwr=	Description	Note
24*	Complied with 24/48V voltage	
48	Complied with 48/125V voltage	
125*	Complied with 125/250V voltage	

*Future option

For 6CDA Card:

■ Where **cdm** is used for co-directional/contra-directional mode selection. Must select one from table below.

cdm=	Description	Note
cc	Supports G.703 Contra-directional controlling (DCE) and Co-directional interface configuration	
cs	Supports G.703 Contra-directional subordinate (DTE) and Co-directional interface configuration	
mixed	Supports G.703 Contra-directional controlling (DCE), Contra-directional subordinate (DTE) and Co-directional interface configuration	

For TDMoE/TDMoEA:

SFP Optical/Electrical Module Plug-in option, please go to SFP Optical Module Brochure for detail.

For VOIPGA

■ Where **pt** is used to select the power type:

pt=	Description	Note
PWR	For QX3440 with -48Vdc (SDA) power module	For QX3440 chassis K

ORDERING EXAMPLES

Example:

CXR-QX3440-A-CHPAa, QX3440-CPU-CCPB, QX3440-PW18-75-100, QX3440-4E1-RJ, QX3440-8RS232:
For QX3440 chassis with a CPU card, a single -48 Vdc 100W power module, 4-channel E1 interface with RJ48C connectors, one 8RS232 plug-in module.

Physical /Electrical

Model	QX3440	QX3440-C
Dimensions	432.4 x 220 x 223.5 mm (W×H×D)	438 x 132 x 224 mm (W×H×D)
Power	Single/ Dual -48 Vdc: -36 to -75 Vdc, 100 Watts max.	57 Watts max.
	Single/ Dual -48 Vdc: -36 to -75 Vdc, 150 Watts max.	57 Watts max.
	Single/ Dual -24 Vdc: -18 to -36 Vdc, 150 Watts max	57 Watts max.
	Single/ Dual -125 Vdc: -40 to -150 Vdc, 100 Watts max	57 Watts max.
Temperature	Operating	Storage
	-20 to 65°C	-30 to 70°C
Weight	Net Weight	Max. Weight
	6.0 Kg (13.23lbs) 5.0Kg	16 Kg (35.28lbs) 15Kg
Humidity	0-95%RH (non-condensing)	
Mounting	Desk-top stackable, 19" / 23" rack mountable	
Line Power Supply	Available only with DC power for G.SHDSL card only	
Power Consumption	Max 110 Watts , Max 57 Watts	
MTBF	421.91 years	

Certification

QX3440
EN55022 Class A, EN50024, EN300 386, FCC Part 15 Class A, FCC Part 68, CS-03, IEC60950, UL60950, IEC 61850-3, IEEE 1613

Compliance

ITU G.703, G.704, G.706, G.732, G.736, G.823, G.826, G.711, G.712, G.775, O.151, V.11, V.28, V.54
IETF SNMP v.3 (RFC2571~2575), ITU-T Rec.G.821, ITU-T Rec.G.827

CXR-VV Y-BOX

LINE

Connector	BNC or RJ48C
Port Number	For Y-BOX with BNC connectors: 4 line ports
	For Y-BOX with RJ48C connectors: 16 line ports
Protection	For Y-BOX with BNC connectors: support 2 Quad E1 plug-in card, 4 active E1, 4 standby E1
	For Y-BOX with RJ48C connectors: support 8 Quad E1 plug-in cards, 16 active E1, 16 standby E1
	For Y-BOX with RJ48C connectors: support 8 Quad T1 plug-in cards, 16 active T1, 16 standby T1

Mechanical

Height	44.5 mm/ 1.75 in
Width	432 mm/ 17 in
Depth	100 mm/ 3.9 in

Network Line Interface - T1

Line Rate	1.544 Mbps ± 32ppm	Output Signal	DSX1w/0, -7.5, -15 dB LBO
Line Code	AMI or B8ZS	Framing	D4/ESF (selectable)
Input Signal	DSX-1 0 dB to -30 dB w/ALBO	Connector	RJ48C

Network Line Interface - E1

Line Rate	2.048 Mbps ± 50 ppm	Framing	ITU G.704
Line Code	AMI or HDB3	Connector	BNC/RJ48C
Input Signal	ITU G.703	Electrical	75 ohm Coax/120 ohm twisted pair
Output Signal	ITU G.703	Jitter	ITU G.823

Network Line Interface - Mini 4E1

Line Rate	2.048 Mbps ± 50 ppm	Framing	ITU G.704
Line Code	AMI or HDB3	Connector	DB25S
Input Signal	ITU G.703	Electrical	75 ohm Coax/120 ohm twisted pair
Output Signal	ITU G.703	Jitter	ITU G.823

Network Line Interface - Mini 4T1

Line Rate	1.544 Mbps ± 32 ppm	Framing	D4/ESF
Line Code	AMI/B8ZS	Connector	DB25S
Input Signal	ITU G.703 DSX-1 0dB to -30dB w/ALBO	Output Signal	ITU G.703 DSX-1 w/o, -7.5, -15dB LBO ITU G.703 DSX-1 w/short (0-110, 110-220, 220-330, 330-440, 440-550, 550~660 feet)
Jitter	AT&T TR 62411	Pulse Template	AT&T TR 62411
Data Rate	n * (64) Kbps (n=1-24)		

Network Line Interface - 3E1

Line Rate	2.048 Mbps ± 50 ppm	Framing	ITU G.704
Line Code	AMI or HDB3	Connector	BNC/RJ48C
Input Signal	ITU G.703	Electrical	75 ohm Coax/120 ohm twisted pair
Output Signal	ITU G.703	Jitter	ITU G.823
Function	Support DS0-SNCP circuit level protection		

Network Line Interface - 3T1

Line Rate	1.544 Mbps ± 32 ppm	Framing	D4/ESF
		Output Signal	DSX-1 w/0, -7.5, -15dB LBO
Line Code	AMI/B8ZS	Connector	RJ48C
Input Signal	DSX-1 0dB to -30dB w/ALBO	Pulse Template	AT&T TR 62411
Jitter	AT&T TR 62411	Surge Protection	FCC Part 68 Sub Part D
Data Rate	N * (64) Kbps (n = 1 to 24)		

Network Line Interface - 4E1

Line Rate	2.048 Mbps ± 50 ppm	Framing	ITU G.704
Line Code	AMI or HDB3	Connector	BNC/RJ48C
Input Signal	ITU G.703	Electrical	75 ohm Coax/120 ohm twisted pair
Output Signal	ITU G.703	Jitter	ITU G.823

Network Line Interface - 4T1

Line Rate	1.544 Mbps ± 32 ppm	Output Signal	DSX1w/0, -7.5, -15 dB LBO
Line Code	AMI or B8ZS	Framing	D4/ESF (selectable)
Input Signal	DSX-1 0 dB to -30 dB w/ALBO	Connector	RJ48C

Router-A Interface

Number of ports	2 LAN ports, Max. 64 WAN ports, Each WAN port has data rate n x 64K bps, 1≤ n ≤32 (≤ 4Mbps for total of all 64 WAN ports
Physical Interface	10/100 BaseT x 2
Connector	RJ45
Routing protocol	RIP-I, RIP-II, OSPF, Static
Supporting Protocols	PPP (IPCP/BCP), MLPPP, HDLC, Frame Relay, and Cisco compatible HDLC, NAT/NAPT, DHCP
Diagnostic	Ping, Trace route
QoS	Rate limit

Router-B Interface

Number of ports	8 LAN ports, Max. 64 WAN ports. Each WAN port has data rate n x 64K bps, 1≤ n ≤32 (≤ 8Mbps for total of all 64 WAN ports
Physical Interface	10/100 BaseT x 8
Connector	RJ45
Routing protocol	RIP-I, RIP-II, OSPF, Static
Supporting Protocols	PPP (IPCP/BCP), MLPPP, HDLC, Frame Relay, and Cisco compatible HDLC, NAT/NAPT, DHCP

Diagnostic	Ping, Trace route
QoS	Rate limit, Policy based Diffserv/DSCP
VLAN Q-in-Q	IEEE 802.1ad

Terminal Server Interface

Connector	One DB-44 conversion cable to one DB-9 and two DB-25 connectors
Ports	One Async RS232 port, two Async/Sync RS232 ports. The two Async/Sync ports can be configured independently as Asynchronous or Synchronous.
Data Rate	Async: 1.2kbps, 2.4kbps, 4.8kbps, 9.6kbps, 19.2kbps, 38.4kbps Sync: 64 kbps
Layer 2 Protocol of RS232 Async	raw data
Layer 2 Protocol of RS232 Sync	PPP
Terminal Server Function	Supports Telnet
Router Function	RIP-I, RIP-II, Static Route

Fiber Optical Interface (FOM, 1FOM-A)

Source	MLM Laser	Line Code	Scrambled NRZ
Wavelength	1310 ± 50 nm, 1550 ± 40 nm	Detector Type	PIN-FET
50 Km reach		Protection	Optional 1+1 APS

NOTE: Longer or shorter, 15 to 120Km, on special order.

Optical Module	Fiber Direction	Wavelength (nm)	Connector	Distance (km)
SAA	Dual uni-directional	1310	SC (Subscriber Connector)	30
SBB	Dual uni-directional	1310	SC (Subscriber Connector)	50
SCC	Dual uni-directional	1310	FC (Fiber Connector)	30
SDD	Dual uni-directional	1550	SC (Subscriber Connector)	20
SEE	Dual uni-directional	1550	SC (Subscriber Connector)	100
SSM	Single bi-directional (master)	1310/1550	SC (Subscriber Connector)	30
SSS	Single bi-directional (slave)	1550/1310	SC (Subscriber Connector)	30

NOTE: Other fiber optical options available on special order

G.SHDSL Line Interface

Number of ports	2 or 4
Line Rate for 4-channel G.shdsl	n x 64Kbps (n= 3 to 31)
Line Rate for 2-channel G.shdsl	n x 64Kbps (n= 3 to 15)
Line Code	16-TCPAM, full duplex with adaptive echo cancellation
Connector	RJ45
Electrical	Unconditioned 19-26 AWG twisted pair
Sealing current	Max. 20 MA source current
Clock Source	From System, Line
Diagnostic Test	G.SHDSL Loopback: To-LINE, To-bus BERT: QRSS

DTE Interface (X.21)

Data Port	1-port DTE X.21 card
Data Rate	56 or 64 Kbps, n = 1 to 32
Connector	DB15S

DTE Interface (V.35)

Data Port	1-port V.35 card
Data Rate	56 or 64 Kbps, n = 1 to 32
Connector	DB25S (optional conversion cable DB25S to M34 connector)

DTE Interface (EIA530/RS449)

Data Port	1-port EIA530 card
Data Rate	56 or 64 Kbps, n = 1 to 32
Connector	DB25S (optional conversion cable DB25S male to DB37 female connector for RS449)

DTE Interface (RS232/V.24)

Data Port	1-port RE232 card
Data Rate	56 or 64 Kbps *n, n=1 - 2
Mapping	Any sequential time slots

DTE Interface (RS232-X.50 mux. 8-port)

Data Port	Up to twelve 8-port RS232 cards							
MUX	Maximum 5 subrate port per 64K bps							
Data Rate	Asynchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K					
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K					
	Synchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K					
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, 64K					
Card Type	Port Number							
	1	2	3	4	5	6	7	8
Eight RJ48	Async/ Sync Note 1	Async/ Sync Note 1	Async	Async/ Sync Note 1	Async/ Sync Note 1	Async	Async	Async
Two DB44 + Two RJ48	Async/Sync	Async/Sync	Async	Async/Sync	Async/Sync	Async	Async	Async
Connector	Eight RJ48 (port 1 to port 8)							
	DB44 (port1, port2, port3), DB44 (port4,port5,port6), RJ48 (port7) and RJ48(port8)							
Conversion Cable	A three-into-one conversion cable adapts the DB44 connector to 3 connecters (one DB9S and two DB25S)							
Electrical	RS232 Interface, DCE							

Note 1: Sync- with rate up to 19.2 Kbps achieved by oversampling at 64 Kbps

DTE Interface (RS232 with V.110 encoding, 6-port)

Data Port	Up to 6 port					
MUX	Maximum 6 subrate port / 64Kbps					
Protocol	Supports V.110					
Data Rate	Asynchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K			
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K			
	Synchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K,			
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, 64K			
Card Type	Port Number					
	1	2	3	4	5	6
RJ48	Async	Async	Async	Async	Async	Async
DB44	Sync/Async	Sync/Async	Async	Sync/Async	Sync/Async	Async
Connector	DB44 (port1, port2, port3) DB44 (port4,port5,port6) or					
	RJ48 (port 1 to Port 6 are 6RJ48)					
Alarm	Remote Alarm					
	RTS Loss					
Loopback	To-DTE					
	To-DS1 (To Line)					
Electrical	RS232 Interface, DCE					

DTE Interface (Data Bridge Card)

Data Port	Up to twelve 8-port data bridge card (each card supports up to 120 DS0 for data bridge)	
Feature	20 end points per multi-drop circuit to into a logical ended 56K or 64K channel	
	Per port supports bridge function to N remote Trib. Site (N=1~20)	
Data Rate	Asynchronous	Support to receive 1200 to 19200 bps asynchronous data via oversampling channel
Bridge function	one port with one DS-0 to many (Maximum is 20 for remote Tributary data box)	

20 drops for each DS0 to remote Tributary data box and 8 ports RS232 shared the 128 channels.

6UDTEA Card Specifications

Mode 1: Sub-Rate mode

DTE Interface (RS232)

Data Port	Up to 2		
MUX	Maximum 6 subrate port / 64Kbps		
Data Rate	Asynchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K
	Synchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K,
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, 64K
Connector	RJ48-ASYNC (Port5, Port6)		
Alarm	Remote Alarm		
	RTS Loss		
Loopback	To-DTE		
	To-DS1 (To Line)		
Electrical	DCE		
Protocol	V.110		

DTE Interface (X.21/RS232/RS422)

Data Port	Up to 4		
MUX	Maximum 4 subrate port / 64Kbps		
Data Rate	Asynchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K
	Synchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K,
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, 64K
Connector	DB44 (Port1, Port2), DB44 (Port3, Port4)		
Alarm	Remote Alarm		
	RTS Loss		
Loopback	To-DTE		
	To-DS1 (To Line)		
Electrical	DCE		
Protocol	V.110		

Mode 2: N*64K Mode

DTE Interface (X.21/RS232/V.35/V.36/EIA530/RS449)

Data Port	Up to 4 (Port 1 to 4)
Data Rate	Synchronous N*64kbps, N = 1 to 32
	Asynchronous mode is not supported.
Connector	DB44 (Port 1, Port 2), DB44 (Port 3, Port 4)
Alarm	RTS Loss
Loopback	To-DTE
	To-DS1 (To Line)
Electrical	DCE

Note: When oversampling is enabled in MODE2, port 5 ~ 6 will be disabled.

Mode 3: Hybrid Mode

DTE Interface (X.21/RS232/V.35/V.36/EIA530/RS449)

Data Port	Up to 4 (Port 1 to 4)
Data Rate	Synchronous N*64kbps, N = 1 to 32 for port 1 ~ 3 ; N = 1 to 20 for port 4
	Asynchronous mode is not supported.
Connector	DB44 (Port 1, Port 2), DB44 (Port 3, Port 4)
Alarm	RTS Loss
Loopback	To-DTE
	To-DS1 (To Line)
Electrical	DCE

DTE Interface (RS232)

Data Port	Up to 2 (Port 5 and Port 6)
MUX	Maximum 2 oversampling port
Data Rate	No Synchronous mode supported
	Asynchronous 200, 300, 0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 57.6K, 115.2K, 128K
Connector	RJ48 (Port 5, Port 6)
Alarm	Remote Alarm
	RTS Loss
Loopback	To-DTE
	To-DS1 (To Line)
Electrical	DCE

Mode 4: Clock Pass Through

DTE Interface (X.21/RS449/RS422/RS232/V.35/V.36/EIA530)

Data Port	Up to 4 (Port 1 to 4)
Data Rate	Synchronous 0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K Tx and Rx byte count
Connector	DB44
Alarm	LOLC, LOCH, CRE
Loopback	To-DTE, To-DS1 (To Line)
Electrical	DCE

Note: Port 5~6 are disabled in Mode 4.

Mode 5: N x 64K with Local and Remote Loopback

DTE Interface (X.21/RS449/RS422/RS232/V.35/V.36/EIA530)

Data Port	Up to 4 (Port 1 to 4)
Data Rate	Synchronous N*64kbps, N = 1~32
Connector	DB44
Protection	DTE signal duplicated via Y-box and transported by working and protection cards
Alarm	RTS Loss, FPGA fail
Diagnostics	DTE Loopback: To-DTE, To-DS1 (To Line) Local and Remote Loopback (except for X.21 interface) V.54 standard BERT
Electrical	DCE

Note: Port 5~6 are disabled in Mode 5.

1 Port OCU-DP Interface Card

Ports	1 Ports card
Operating Modes	4-wire DDS or switched 56
Dedicated Rates	SYNC: 2.4, 4.8, 9.6, 19.2, 56 and 64k clear channel Conforms with AT&T Pub 41458
OCU DP Operation	Conforms with AT&T 62310 and ANSI T1.410
Local Loop Signal	Bipolar Return to zero, 50% duty cycle
Transmit Amplitude	+/- 1.5 V (+/- 10%) peak, all rates except 9.6k +/- 0.75 V (+/- 10%) peak at 9.6k
Transmit Source Impedance	135 Ohms +/- 20%
Receive Input Impedance	135 Ohms +/- 20%
Receiver Sensitivity/ Dynamic Range	0 to 43 dB loop loss at 72K & 56K 0 to 34 all other rates
Physical Interface	4-wire loop interface RJ45 modular connector
Network to Loop Test Codes	Zero code suppression, Idle, out of service, UMC, MOS, TC, ABS, channel loopback, OCU and DSU loop-back, latch loop-back (TIP, LSC, LBE, FEV)
Loop to Network Test Codes	Zero code suppression, Idle

8 Port OCU-DP Interface Card

Ports	8 Ports for each card
Line Status Indicator	Per Port 1 dual color LED; Red for LOS, Green for SYNC
Network Connector	RJ48S
Electrical Network Connection	Tip/Ring and Tip1/Ring1
Transmit Source Impedance	135 Ohms +/-20%
Receive Input Imdednace	135 Ohms +/-20%
Receiver Sensitivity	0 to 43 dB loop loss at 72K & 56K
Dynamic Range	0 to 34 all other rates Automatic line equalization
Pulse Amplitude	+/- 1.5V (+/-10%) peak, all rates except 9.6K +/-0.75 (+/-10%) peak at 9.6K Bipolar Return to zero, 50 duty cycle
Sealing Current	Typically, 16mA DC
Operating Modes	4-wire DDS Switched 56 support is optional
Circuit Rates	SYNC: 2.4, 4.8, 9.6, 19.2, 56, 72 kbps (64k) clear channel Conforms with AT&T Pub 41458
Encoding and decoding rules	Use bipolar violation to indicate control information: Idle, out of service, Zero Substitution using unframed loops
Maintenance control	DSU Non-latching loop-back code (for 2.4, 4.8, 9.6, 19.2, 56k circuit rate) DSU Latching loop-back (TIP, LSC, LBE, FEV) code (for 72k circuit rate)

	Machine maintenance OCU/DP card operation: Payload loopback OCU loopback Local loopback Bi-directional loopback V.54 remote loopback code Custom defined remote loopback code BERT test support all ones, all zeros, 2047,511,63 pattern.
Fault and Performance	LOS, OOS, ES, SES and UAS alarm. Current, last 96 registry and 7 days performance storage.
Environment	Operating: 0-50°C Storage: -25-75°C Humidity: Up to 90% RH non-condensing
Specification Standard	ANSI T1.410; AT&T Pub 62319, AT&T Pub 62310, ITU-T V.54

Co-directional Interface

Interface	ITU G.703 64 Kbps co-directional interface
Connector	120ohm, RJ48
Line Distance	Up to 500 meters
Loopack	DTE Payload Loopback, Local Loopback

C37.94 Interface

820nm

Source	LED	Optical Line Rate	2.048Mbps
Wavelength	820nm	Line Code	NRZ
Connector	ST	Fiber Type	Multi-mode
Optical Power	-12dBm		

850nm

Source	VCSEL	Optical Line Rate	2.048Mbps
Wavelength	850nm	Line Code	NRZ
Connector	ST Duplex Plastic Connector	Fiver Type	Multi-mode
Optical Power	-5.5dBm		

1310nm

Source	LED	Optical Line Rate	2.048Mbps
Wavelength	1310nm	Line Code	NRZ
Connector	ST	Fiber Type	Single & Multiple
Optical Power	-14dBm		

1550nm

Source	LED	Optical Line Rate	2.048Mbps
Wavelength	1550nm	Line Code	NRZ
Connector	SC	Fiber Type	Single & Multiple
Optical Power	-14dBm		

Dry Contact Type A Interface

Inputs -		**Outputs -**	
8-channel	2-port per card, 4-pair per port	8-channel	8-pair per card
Connector	RJ45	Connector	Screw type
Internal Resistance	1 K	Initial Insulation Resistance	Min. 100M ohm (at 500 Vdc)
Activation Current	3 ma	Max. Current	5A
Deactivation Current	1.5 ma	Max. Voltage	100 Vdc, 250 Vac
Allowable Current	4 ma	Short-circuit Current	5A
Input port	Provide 3.3V output		

Dry Contact Type B Interface

Inputs -		**Outputs -**	
8-channel	2-port per card, 4-pair per port	8-channel	8-pair per card
Connector	RJ45	Connector	Screw type
Internal Resistance	100 K	Initial Insulation Resistance	Min. 1000M ohm (at 500 Vdc)
Activation Current	3 ma	Max. Current	2A
Deactivation Current	1.5 ma	Max. Voltage	220 Vdc, 250 Vac
Allowable Current	4 ma		

Voice Card (QEMA)

Connector	One 44-pin connector, adaptor cable included for 4 RJ45 connectors.
Power	110-220Vac, ±48Vdc
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or μ-law, user selectable as a group
Impedance	Balanced 600 or 900□
Gain Adjustment (Per-port setting)	-10 to +7 dB / 0.1dB step for transmit (D/A) gain
Gain Variation	± 0.5 dB at 0 dBm0 input
Frequency Response	± 0.5 dB from 300 to 3400 Hz, coincide with ITU-T G.712
I/O Power Range	A/D Analog input level: -66 dBm (0.00039 Vrms) ~ + 3 dBm (1.09 Vrms) D/A Analog output level: -66 dBm (0.00039 Vrms) ~ + 4 dBm (1.22 Vrms)
Longitudinal Balance	> 63dB
Longitudinal Conversion Loss	> 46dB
Total Distortion	> 35 dB at 0 dBm0 input
Idle Channel Noise	< -65 dBm0p
Wire Mode	2 wire and 4 wire
Signaling	Type I, Type II, Type III, Type IV, Type V, and TO (Transmission Only)
M Lead Output Current	18 mA (maximum)
E Lead Sensor Current	0.3 mA (minimum)
EM Type Setting	Jump Selectable
Relative Humidity	0% to 95%
Carrier Connection	Side A and side B setup by Jump

All in-band signaling tones are carried transparently by the digitizing process.
Customer is responsible for in-band signaling compatibility between a telephone and a switch, or between a PBX and a switch.

Voice Card (8EMA)

Connector	Eight RJ45
Power	100-240Vac or ±48 Vdc for 8EMA
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or μ-law, user selectable together for all
Impedance	Balanced 600 or 900 ohms
Gain Adjustment (Per-port setting)	-16 to +7 dB / 0.1dB step for transmit (D/A) gain -16 to +14 dB / 0.1dB step for receive (A/D) gain
I/O Power Range	A/D Analog input level: -66 dBm (0.00039 Vrms) ~ + 3 dBm (1.09 Vrms) D/A Analog output level: -66 dBm (0.00039 Vrms) ~ + 4 dBm (1.22 Vrms)
Gain Variation	±0.5 dB at 0 dBm0 input
Frequency Response	±0.5 dB from 300 to 3400 Hz, coincide with ITU-T G.712
Longitudinal Conversion Loss	> 46dB
Total Distortion	> 35 dB at 0 dBm0 input
Idle Noise	< -65 dBm0p
Carrier Connection	Side A (exchange side) and Side B (carrier side) setup by side switch
Idle Channel Noise	Max. –65 dBm0p
Wire Mode	2 wire and 4 wire (programmable)
Signaling	Type 1, Type 2, Type 3, Type 4, and Type 5, Transmit only (programmable)
Modems	Full compatibility with V.90 modems

- All in-band signaling tones are carried transparently by the digitizing process.
- Customer is responsible for in-band signaling compatibility between a telephone and a switch, or between a PBX and a switch.

QMAGA (old crank-handle hot-line telephones), MRD (Manual Ring Down) Voice Card

Connector	RJ11 x 4
Power	110-220 Vac or ±48 Vdc
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or μ-law, user selectable together for all
Impedance	Balanced 600 or 900 ohms (for magneto telephone impedance)
Longitudinal Conversion Loss	> 46dB
Gain Adjustment	-16 to +7 dB / 0.1dB step transmit gain (D-A)

	-16 to +13 dB/0.1dB step receive gain (A-D)
Signal/ Distortion	> 25dB with 1004 Hz, 0dBm input
Frequency Response	± 0.5 dB from 300 to 3400 Hz, coincide with ITU-T G.712
Idle Channel Noise	Max. –65 dBm0p
Signaling	
Minimum Detectable Ringing Voltage	16 Vrms
Crank Detectable Across	L1 & L2 Mode (Tip and Ring), L1 & GND Mode(Tip and GND)
Crank Detected time	Valid crank: more than 250 ms Invalid crank: less than 160 ms
Ringing Generation	Voltage: 76 Vrms (sine wave) Frequency: 25Hz
Ring duration	Software configurable options: ***1. PLAR OFF*** **Continuous** Ring duration depends on cranking time **One Time** Crank the phone for one time, and the ring duration of the far-end phone could be 0.7, 1.0, 1.5 or 2.0 sec ***2. PLAR ON*** when FXS phone off-hooked, the ring duration of the far-end magneto phone could be 0.7, 1.0, 1.5 or 2.0 sec
Ringing Send Across	L1 & L2 Mode (Tip and Ring), L1 & GND Mode(Tip and GND)
Signaling	Turn Magneto Phone crank (Ringing across Tip and Ring or Tip and Ground)
Signaling Bit A,B,C,D	Programable

- Signaling is carried transparently by the digitizing process.
- Use Magneto card default setting (PLAR OFF) for communications between magneto telephones
- Use Magneto card PLAR ON mode setting for communications between a magneto telephone and a regular telephone
- PLAR stands for *Private Line Auto Ring down.*

12 MAGA (old crank-handle hot-line telephones), MRD (Manual Ring Down) Voice Card

Connector	RJ11 x 12
Power	110-220 Vac or ±48 Vdc
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or μ-law, user selectable per card configurable
Impedance	Balanced 600 or 900 ohms (for magneto telephone impedance)
Longitudinal Conversion Loss	> 46dB
Gain Adjustment	-21 to +7 dB / 0.1dB step transmit gain (D-A) -21 to +13 dB/0.1dB step receive gain (A-D)
Signal/ Distortion	> 25dB with 1004 Hz, 0dBm input
Frequency Response	± 0.5 dB from 300 to 3400 Hz, coincide with ITU-T G.712
Idle Channel Noise	Max. –65 dBm0p
Signaling	
Minimum Detectable Ringing Voltage	16 Vrms
Crank Detectable Across	L1 & L2 Mode (Tip and Ring), L1 & GND Mode(Tip and GND) per port software programmable
Crank Detected time	Valid crank: more than 250 ms Invalid crank: less than 160 ms
Ringing Generation	Voltage: 76 Vrms (sine wave) Frequency: 25Hz
Ring duration	Software configurable options: 1. PLAR OFF (Continuous Mode) Ring duration depends on cranking time 2. PLAR OFF (One-time) Mode Crank the phone for one time, and the ring duration of the far-end phone could be 0.7, 1.0, 1.5 or 2.0 sec 3. PLAR ON When FXS phone off-hooked, the ring duration of the far-end magneto phone could be 0.7, 1.0, 1.5 or 2.0 sec
Ringing Send Across	L1 & L2 Mode (Tip and Ring), L1 & GND Mode(Tip and GND)
Signaling	Turn Magneto Phone crank (Ringing across Tip and Ring or Tip and Ground)
Signaling Bit A,B,C,D	Programable

- Signaling is carried transparently by the digitizing process.
- Use Magneto card default setting for communications between magneto telephones
- Use Magneto card PLAR mode setting for communications between a magneto telephone and a regular telephone

Echo Canceller Card

Echo Cancellation	64ms uni-directional, 64ms bi-directional and 128ms uni-directional
Channel	Up to 64 channels
Functions	- one way or bi-direction cancellation from PCM bus to ECA card - E1/T1 multichannel echo cancellation
PCM encoder/decoder	Compatible with ITU-T G.711 A-law/Mu-law coding.
LED Indicator	Multi-color indication
Compliant	ITU-T G.165 and ITU-T G.168-2000 and 2002

ABRA Card

Group	Up to 8 groups per card, 16 members per group
Analog Bridge Mode	Master/Slave Architecture Downstream : 2 to many Upstream : many to 2
Voice Conference Mode with CAS Signalling	Any-to-any conference bridge Up to 16 members in one conference group Silence detection/suppression
RS232 Data Bridge Mode	Master/Slave Architecture Downstream : 2 to many (up to 14 Slave units) Upstream : many to 2
Voice Protection Mode	One Master to two Slaves for 1+1 protection Analog signals only 42 protection groups
OCU-DP Data Bridge Mode	Master/Slave Architecture Downstream: 1 to many (up to 14 Slave units) Upstream: many to 1
PCM encoder/decoder	Compatible with ITU-T G.711 A-law/Mu-law coding.
LED Indicator	Multi-color indication

M4TE Cards

The M4TE card supports DB37 to 4RJ48 connector, DB37 to 8BNC connector, and wire-wrap connector. E1/T1 per card is software configurable.

Network Line Interface - T1

Line Rate	1.544 Mbps ± 32 ppm	Framing	D4/ESF
Line Code	AMI/B8ZS	Connector	RJ48F, BNC, T1
Input Signal	DSX-1 0dB to –30dB w/ALBO	Output Signal	DSX-1 w/0, -7.5, -15 dB LBO
Jitter	AT&T TR 62411	Pulse Template	AT&T TR 62411
Data Rate	n * (64) Kbps (n=1 - 24)	Surge Protection	FCC Part 68 Sub Part D

Network Line Interface - E1

Line Rate	2.048 Mbps ± 50 ppm	Framing	ITU G.704
Line Code	AMI/HDB3	Connector	RJ48F or BNC
Input Signal	ITU G.703	Output Signal	ITU G.703
Jitter	ITU G.823	Electrical	75Ω coax/120Ω twisted pair
Data Rate	n * (64) Kbps (n = 1 - 32)		

Voice Card (QFXO)

Quad FXO voice card (4 FXO per plug-in)

Connector	1, 2, 3, or 4 FXO per RJ11 connector
Power for QFXO	110-220Vac, -24Vdc, and –48Vdc
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or μ-law, user selectable together for all
AC impedance	Balanced 600 or 900 ohms (selectable together for all)
Longitudinal Rejection	55 dB
Loss Adjustment	0, 3, 6, or 9 dB transmit & receive
Signal/ Distortion	> 46dB with 1004 Hz, 0dBm input
Frequency Response	± 0.5 dB from 300 to 3400 Hz, coincide with ITU-T G.712

FXS Loop Feed	-48Vdc with 25mA current limit per port Jumper Selectable: 25mA, 30mA, 35mA	
FXO	Ringing REN	0.5B (AC)
	Detectable Ringing	25 Vrms
	Loop Resistance	≤ 1800 Ω
	DC impedance (ON-HOOK)	> 1M Ω
	DC impedance(OFF-HOOK)	235 Ω @ 25mA feed
		90 Ω @ 100mA feed
FXS Ringing	Support 2 REN per port (1 REN = 6930Ω + 8 μF) 20 Hz, other frequencies: 16.7Hz, 25 Hz, 50Hz (Jump selectable) 78 Vrms (sine wave) (45 Vrms to 86 Vrms wide range by Resistor selectable) 2 sec on 4 sec off, or 1 sec on 2 sec off optional for PLAR	
Metering Pulse	12KHz/ 16KHz • Power: 10dBm • Sensitivity: -27dBm (-21dBm to -45dBm by Resistor selectable)	
Signaling	Loop Start, GND-Start, Metering Pulse (12KHz, 16KHz), DTMF, Dialing Pulse, PLAR, Battery Reverse (supports Line Reverse Signaling for Billing)	

- All in-band signaling tones are carried transparently by the digitizing process.
- Customer is responsible for in-band signaling compatibility between a telephone and a switch, or between a PBX and a switch.
- -24Vdc power is for FXS PCB version C and up

Voice Card (QFXSA)

Quad FXSA voice card (4 FXS per plug-in)

Connector	1, 2, 3, or 4 FXS per RJ11 connector
Power	±48Vdc
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or μ-law, user selectable
AC impedance	Balanced 600 or 900 ohms (user selectable)
Longitudinal Rejection	55 dB
Gain Adjustment	-21 to +3 dB / 0.1 dB step for transmit (D/A) & receive (A/D) gain
Signal/ Distortion	> 46dB with 1004 Hz, 0dBm input
Frequency Response	± 0.5 dB from 300 to 3400 Hz, coincide with ITU-T G.712
Loop Feed	±48Vdc with 25mA current limit per port Jumper Selectable: 25mA, 30mA, 35mA
Ringing	Support 2 REN per port (1 REN = 6930Ω + 8 μF) 16.7Hz, 20Hz, 25 Hz, 50Hz (user programmable) Default 78 Vrms (sine wave) (64 Vrms by Jumper setting) 2 sec on 4 sec off, or 1 sec on 2 sec off optional for PLAR (user programmable)
Metering Pulse	12KHz/ 16KHz (2.4Vrm/1Vrm user programmable)
Signaling	Loop Start (Metering Pulse, DTMF, Dialing Pulse, PLAR), GND-Start (Tip Open, Ring GND), OOS Alarm, Battery Reverse

- All in-band signaling tones are carried transparently by the digitizing process.
- Customer is responsible for in-band signaling compatibility between a telephone and a switch, or between a PBX and a switch.

Voice Card (12FXSA, 12FXOA)

Connector	Twelve RJ11	
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF	
Encoding	A-law or μ-law, user selectable together for all	
AC Impedance	Balanced 600 or 900 ohms (selectable together for all)	
Longitudinal Conversion Loss	> 46dB	
Cross talk measure	Max -70dBm0	
Gain Adjustment	FXSA: -21 to +3 dB / 0.1dB step transmit & receive FXOA: -21 to +10 dB / 0.1dB step transmit & receive	
Signal/ Distortion	> 25dB with 1004 Hz, 0dBm input	
Frequency Response	± 0.5 dB from 300 to 3400 Hz, coincide with ITU-T G.712	
Idle Channel Noise	Max. –65 dBm0p	
Variation of Gain	±0.5dB	
FXOA	Ringing REN	0.5B (AC)
	Detectable Ringing	25 Vrms
	Loop Resistance	≤ 1800 Ω
	DC Impedance (ON-HOOK)	> 1M Ω
	DC Impedance (OFF-HOOK)	235 Ω @ 25mA feed ; 90 Ω @ 100mA feed

FXSA Loop Feed	-48Vdc with 25mA current limit per port Jumper Selectable: 25mA(default=25mA), 30mA, or 35mA(sn=S1)
FXSA Signalling	Normal / PLAR: Private Line Auto Ring down
FXSA Ringing	1 REN at 5K meters per port. Ring Test Tone generator. 16.7Hz, 20Hz, 25Hz, 50Hz, user selectable for all ports Jumper selectable: 64, 76, and 85 Vrms (triangle wave), (default= 76 Vrms for Ring Voltage) 2 sec on 4 sec off, or 1 sec on 2 sec off optional for PLAR ON
FXSA Tone	Alarm Tone: 480Hz/620Hz/-24dBm Ring Back Tone: 440Hz/480Hz/-19dBm
FXSA functions	Basic functions: Bettary Reverse, Loop Star, PLAR Optional functions: PLAR ON/PLAR bit programmable, Ground Start, and/or Metering Pulse.
Signaling Bit A,B,C,D	Programable bit

- All in-band signaling tones are carried transparently by the digitizing process.
- Customer is responsible for in-band signaling compatibility between a telephone and a switch, or between a PBX and a switch.
- FXSA specification shown above support FXSA hardware version N and up.

TDMoEA

Combo Gigabit Ethernet (GbE) Interface

Number of Ports	2
Speed	10/100/1000M bps
Connector	RJ45 for twisted pair GbE, LC for optical GbE, auto detection

Gigabit Ethernet (GbE) Interface

Number of Port	2
Speed	10/100/1000 BaseT
Connector	RJ45

Ethernet Function

Basic Features	MDI/MDIX for 10/100/1000M BaseT auto-sensing Ping function contained ARP
Packet Transparency	Packet transparency support for all types of packet types including IEEE 802.1q VLAN and 802.1ad (Q-in-Q)
QoS	User configurable 802.1p CoS, ToS in outoing IP frame
Traffic Control	Ingress packet Rate limiting buckets per port for Ethernet port Supporting Rate-based and Priority-based rate limiting for LAN port Granularity: a. From 64 Kbps to 1 Mbps in increments of 64 Kbps b. From 1 Mbps to 100 Mbps in increments of 1 Mbps c. From 100 Mbps to 1000 Mbps in increments of 10Mbps Pause frame issued when the traffic exceeding the limited rate before packet dropped following IEEE802.3X
Link Aggregation	WAN supports Link Aggregation

Jitter & Wander

PPM: per G.823 Traffic

Standards Compliance

IEEE

802.1d	MAC Table Learning and STP
802.1p	Priority Code Point
802.1q	VLAN
802.1s	MSTP*
802.1w	RSTP
802.1ad	Tag Stacking (Q-in-Q)
802.3ad	Link Aggregation

MEF

8	CESoETH

IETF

RFC2236	IGMP Snooping v2*
RFC2495	E1/T1 OAM
RFC 4553	SAToP
RFC 5086	CESoPSN

ITU

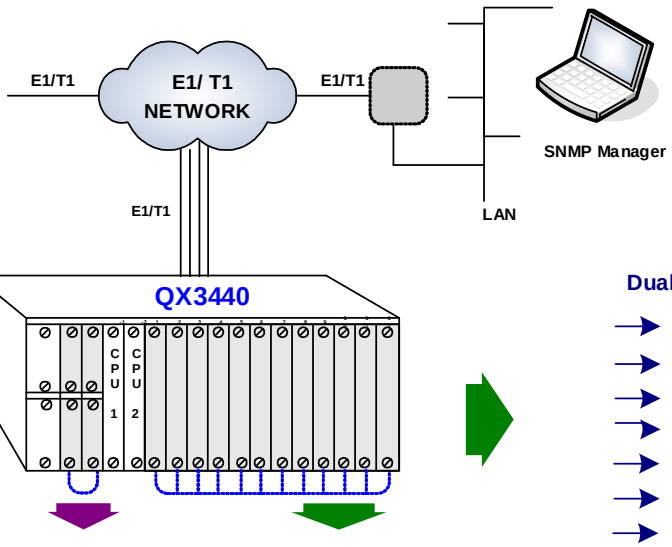
G.823/G.824	Traffic Interface

Certifications

EMC	EN55022 Class A, EN50024, FCC Part 15 Subpart B Class A
Safety	EN60950-1(CE)

* Future option

APPLICATION ILLUSTRATIONS



Mini-Slot plug-in Cards

- 1 - channel E1
- 1 - channel T1
- Mini Quad E1
- Mini Quad T1
- 32 WAN port Router
- 64 WAN port Router
- Fiber Optical Interface
- 3 - channel Terminal Server
- 1 - channel DTE (1X.21, 1V.35, 1RS232, or 1EIA530)
- ECA
- ABRA
- QMAGA*
- QFXO*
- QFXSA*
- QEMA*
- 1- channel OCU-DP*

Single- Slot plug-in Cards :

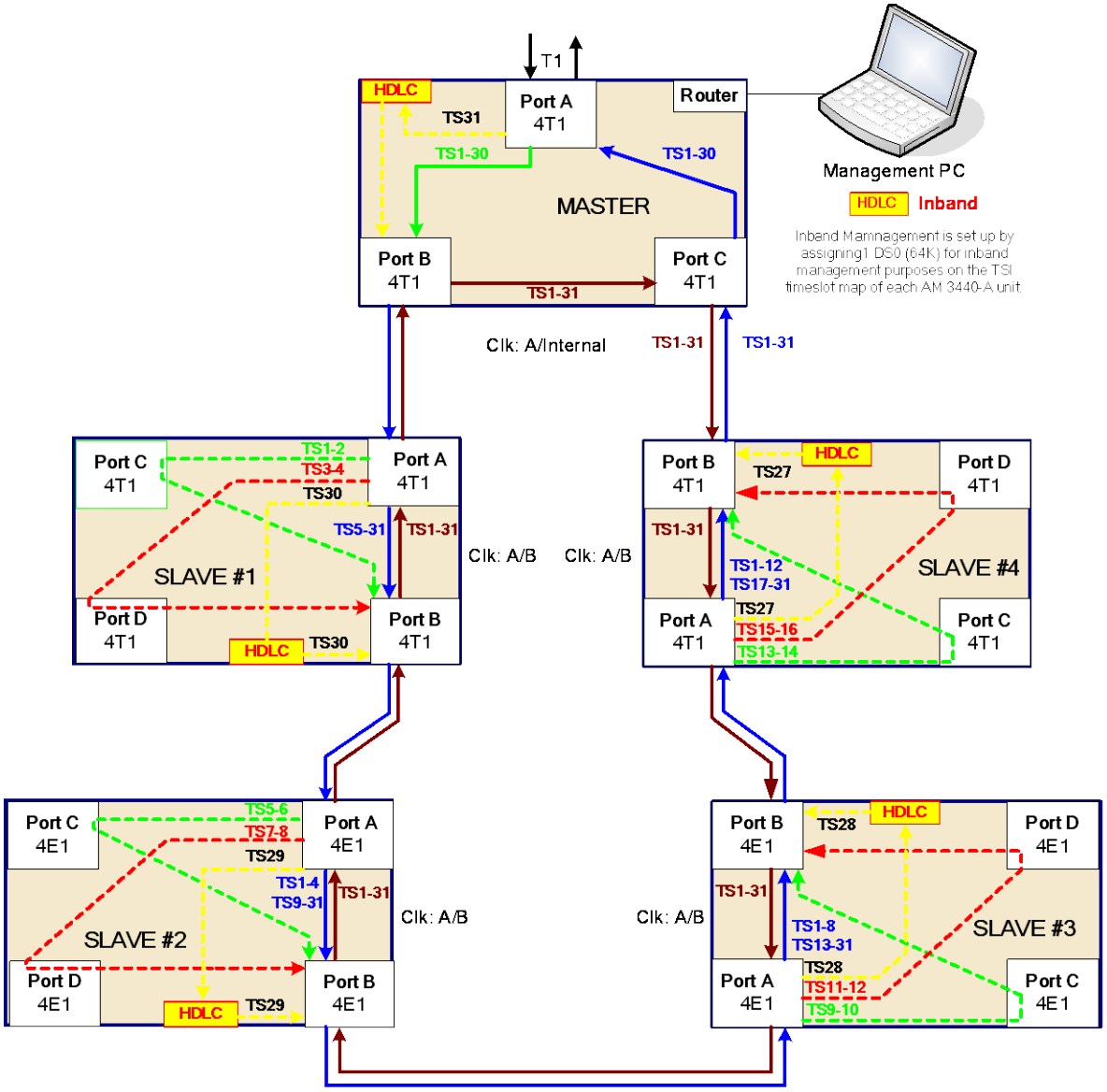
- 3 - channel E1 Note
- 4 - channel E1
- 4 - channel T1
- 8 - channel OCU-DP
- 2 - channel G.SHDSL w/o line power
- 4 - channel G SHDSL w/o line power
- 8 - channel G.703 64 Kbps
- 8 - channel Dry Contact I/O
- 8 - channel Dry Contact I/O type B
- 8 - channel 2W/4W E&M (D)
- 8 - channel 2W/4W E&MA
- 12 - channel FXS (D)/ FXSA
- 12 - channel FXO (D) / FXOA
- 12 - channel Magneto
- 1 - channel C37.94
- 4 - channel C37.94
- 8 - channel RS232 with X.50subrate
- 6 - channel V.110
- 8 - LAN - port /64 - WAN - port Router - B
- VOIPGA
- Conference card (D)
- TDMoE (D) / TDMoEA
- 8- Data Bridge
- 1FOM-A
- 8UDTEA
- 6UDTEA

Dual-slot plug-in cards:

- 6 - channel X.21/V.11(D)
- 6 - channel V.35 (D)
- 6 - channel V.36 (D)
- 6 - channel EIA530 / RS449 (D)
- 24 - channel FXS (D)
- 24 - channel FXO (D)
- 24 - channel FXOA (D)
- 2 - channel G.SHDSL w / line power (D)
- 4 - channel G.SHDSL w/ line power (D)
- Transfer Trip card

Note : Only Chassis J Unit applicable to DS0 SNCP function
(D) = Discontinued
*For Chassis AK only

ULSR Ring Application



Note: ULSR ring does not support E1 unframed mode. Users must use E1 framed mode to set up a ULSR ring.

QX3440 ULSR Ring Application through E1/T1 Radio