



# Loop-AM3440-D Access DCS-MUX



## Description

The Loop-AM3440-D is the latest product in the Loop Access DCS-MUX series that combines various digital access interfaces into E1 lines for convenient transport and switching. With 9 hot-pluggable mini size slots design, the Loop-AM3440-D provides access for a variety of TDM, IP, and voice interfaces. These interfaces are compatible with other Loop products.

With Loop products such as the AM3440-D, a DTE interface can be extended over copper wire pairs or any E1 transport facility. For each mini Quad E1 plug-in card, each card can have as many as DS0 124 time slots from RS232, X.21, V.35, and EIA530 interfaces, which can be multiplexed to fill 4 E1 lines. The AM3440-D also supports fiber optical plug-in cards, which can be used to aggregate up to 4 E1 channels onto a single fiber optical interface to connect with other AM3440 devices or O9310 devices.

The AM3440-D has 9 mini size plug-in slots. The plug-in cards are compatible with all mini size slots of the AM3440-A/B/C series.

This unit is a full cross-connect and can act as a mini DACS: one or more of the WAN ports can be used as a Drop & Insert with fractional E1 lines, which can then be multiplexed into a full E1 line.

Redundancy is available in dual CPU controller and power supply options, making it an excellent fit for critical applications. The chassis does not contain a fan and has no need for fan cooling.

The Loop-AM3440-D supports local control and diagnostics by using an external 2-line, 40-character LCD display and keypads, or by using a VT-100 terminal connected to the console port. The Loop-AM3440 also supports Ethernet, Telnet, and SNMP management so it can be controlled and diagnosed from remote locations. An in-band management channel with GUI is available.

The Loop-AM3440-D consists of a rugged reinforced aluminum chassis, giving this equipment a durable structure and a long-lasting physical life.

## Features

- 2U height, Full front access (ETSI) Shelf
- Support of DS0 DACS (Digital Access Cross-Connect System) with full cross-connect
- Dual controller, dual DC power with load sharing
- 1 for 1 protection, Y-BOX
- 1 for 1 protection, E1, T1, FOM
- PDH ring protection, FOM, Mini QE1
- Console, Telnet, SNMP, and Inband management support
- Craft interface port for connection to external LCD display
- Compatible to a SNMP-based GUI network management system and supported by iNET and Loop iNMS
- All the plug-in cards are hot-pluggable

Item	AM3440-D
Chassis	2U
# of Mini-slots	9
Max. E1 Ports	36
Max. T1 Ports	9
Cross-Connect Backplane Capacity	72 Mbps

## Comparison List for AM3440-D and V4200 Plug-in Cards

	AM3440-D	V4200-9
1T1	✓	✓
1E1 (E75)	✓	✓
1E1 (E120)	✓	✓
4E1 (M4E75)	✓	✗
4E1 (M4E120)	✓	✗
1ATM/FR E1 (AFRE)	D	D
1ATM/FR T1 (AFRT)	D	D
Router (RT)	✓	✓
Router-A (RTA)	✓	✗
1FOM-E1 (FOM)	✓	✗
3TS (TS)	<b>SW V2.02.01 and up</b>	✓
1V.35 (1V35)	<b>SW v3.06 and up</b>	✓
1EIA530 (1E530)	<b>SW v3.06 and up</b>	✓
1X.21 (1X21)	<b>SW v3.06 and up</b>	✓
1RS232 (1RS232)	<b>SW v3.06 and up</b>	✓
Q2WE&M (Q2EM)	D	D
Q4WE&M (Q4EM)	D	D
QEMA	✓	✓
4FXS(QFXS)	D	D
4FXO(QFXO)	✓	✓
QFXSA	✓	✓
Phone Line Monitor (PLM) cards	✓	✓
1ODP	✓	✓
Echo Canceller Card	✓	✗
QMAGA Card	✓	✗
Analog Bridge Card	✓	✗

✓ : Support

✗ : Not available

D : Discontinued

## Ordering Information

To specify options, choose from the list below:

**Note:** RoHS compliant units are identified by the letter **G** appearing immediately at the end of ordering code.

Model (RoHS compliant)	Description	Notes
<b>Main Unit</b>		
Loop-AM3440-CHD- <b>G</b>	Wideband Main Unit without CPU, power and plug-in cards	AM3440-D type Chassis
<b>CPU Module</b>		
Loop-AM3440-CCA- <b>mgmt-G</b>	CPU card with management software	For <b>mgmt</b> option, please refer to the following table for detailed information.
Loop-AM3440-CCB- <b>mgmt-G</b>	CPU card with management software	For <b>mgmt</b> option, please refer to the following table for detailed information. Includes a 1.8 meter conversion cable (Loop-ACC-CAB-DB15M-180-1 DB09F)

■ Where **mgmt** is used to select the following functions. Please replace **mgmt** with your selection, or leave it blank for nothing.

mgmt=	Description	Note
<b>LCT</b>	Loop-AM3440-LCT activation license	Used with Loop-LCT Graphical Configuration Software for management
<b>iXC</b>	Loop-AM3440-iXC activation license	Used with Loop-iXC3440 cross-connect mapping tool for management
<b>[blank]</b>	No configuration tool for management	

### Mini Plug-in Module (Select 1 to 9 cards from list below)

Loop-AM3440-D-1T1- <b>G</b>	1-channel T1 interface card	
Loop-AM3440-D-1E75- <b>G</b>	1-channel of E1 plug-in card w/ 75 ohm	
Loop-AM3440-D-1E120- <b>G</b>	1-channel of E1 plug-in card w/ 120 ohm	
Loop-AM3440-D-M4E75- <b>G</b>	Mini Quad E1 plug-in card with 75 ohm	Includes a three meter conversion cable (Loop-ACC-CAB-DB25M-300-8BNM)
Loop-AM3440-D-M4E120- <b>G</b>	Mini Quad E1 plug-in card with 120 ohm	Includes a three meter conversion cable (Loop-ACC-CAB-DB25M-300-4RJ48M)
Loop-AM3440-D-M1C37- <b>LSFOM-G</b>	1- channel C37.94 plug-in mini card	For <b>LSFOM</b> option, please refer to the table below for detail information
Loop-AM3440-D-RT- <b>G</b>	2-LAN ports/32 WAN port Router/Bridge plug-in card	
Loop-AM3440-D-RTA- <b>G</b>	2-LAN ports/64 WAN port router/bridge plug-in card	
Loop-AM3440-D-FOM-opt- <b>G</b>	Fiber Optical plug-in card	For <b>opt</b> option, please refer to the table below for detail information
Loop-AM3440-D-TS- <b>G</b>	3-chanel Terminal Server plug-in card	Includes a one meter conversion cable (Loop-ACC-CAB-DB44M-100-2DB25F-1DB09F-TS)
Loop-AM3440-D-1V35- <b>G</b>	1-channel V.35 plug-in card	

Loop-AM3440-D-1E530-G	1-channel EIA530 plug-in card	
Loop-AM3440-D-1X21-G	1-channel X.21 plug-in card	
Loop-AM3440-D-1RS232-G	1-channel RS232 plug-in card	
Loop-AM3440-D-PLM(A)	Phone Line Monitor card (A)	<ul style="list-style-type: none"> <li>• Must order in pair for first time purchase</li> <li>• Only non-RoHS compliant model available</li> </ul>
Loop-AM3440-D-PLM(B)	Phone Line Monitor card (B)	
Loop-AM3440-D-QEMA-wr-m-Tn-x-G	Jumper selectable: 2/4 WIRE; A/B side Quad E&M voice card, complied with IEEE1613 standard.	For -48 Vdc and AC (100 to 240 Vac) power supply only.  For wr, m, n and x option, please refer to the table below for detail information
Loop-AM3440-D-QFXO-x-G	Quad FXO voice plug-in card used with 4 RJ11	GS = Ground Start
Loop-AM3440-D-QFXO-M-x-G	Quad FXO with MP 16 KHz voice plug-in card used with 4 RJ11	MP = Metering Pulse Receive 12/16 KHz
Loop-AM3440-D-QFXO-M12-x-G	Quad FXO with MP 12 KHz voice plug-in card used with 4 RJ11	For -48 Vdc and AC (100 to 240 Vac) power supply only.
Loop-AM3440-D-QFXO-GS-x-G	Quad FXO with GS plug-in card used with 4 RJ11	
Loop-AM3440-D-QFXO-GM-x-G	Quad FXO with GS and MP 16 KHz voice plug-in card used with 4 RJ11	For x option, please refer to the table below for detail information
Loop-AM3440-D-QFXSA-x-pt-G	Quad FXSA voice plug-in card	Jumper setting options: Loop Strt, Ground Start (GS), Metering Pulse Transmit 12/16 KHz (MP).
Loop-AM3440-D-QFXSA-M-x-pt-G	Quad FXSA with MP 16 KHz voice plug-in card	
Loop-AM3440-D-QFXSA-M12-x-pt-G	Quad FXSA with MP 12 KHz voice plug-in card used	For x & pt option, please refer to the table below for detail information.
Loop-AM3440-D-QFXSA-GS-x-pt-G	Quad FXSA with GS plug-in card	
Loop-AM3440-D-QFXSA-GM-x-pt-G	Quad FXSA with GS and MP 16 KHz voice plug-in card	
Loop-AM3440-D-QMAGA-G	Quad channel magneto plug-in card	
Loop-AM3440-D-ECA-G	Echo canceller card	
Loop-AM3440-D-ABRA-G	Analog Bridge Card for AM3440-D	
Loop-AM3440-D-1ODP	1 port OCU DP Interface card	Limited Quantity Only non-RoHS compliant model available

### Accessories

#### Power Module

Loop-AM3440-SDB-G	Single -48 Vdc (-36 to -75 Vdc) Power Module (100W)	Order 2 single DC for redundancy
Loop-AM3440-SAB-G	Single AC plug-in power supply (100 to 240 Vac, 50/60 Hz)	For AC choose an appropriate power cord


#### User's Manual

Loop-AM3440-UMD	User's Manual (paper, hard copy-optional). A CD version of the manual is already included as standard equipment.	For AM3440-CHD only
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#### Power Cord (All power cord are RoHS compliant)

Loop-ACC-PC-USA	AC power cord for Taiwan/America	
Loop-ACC-PC-EU	AC power cord for Europe	
Loop-ACC-PC-UK	AC power cord for UK	
Loop-ACC-PC-AUS	AC power cord for Australia	
Loop-ACC-PC-CH	AC power cord for China	

#### Power Adaptor (All power adaptor are RoHS compliant)

Loop-ACC-APA-240-G	240 Watt, AC (3.6A, auto sensing) to DC (+48 Vdc, 5A) adaptor for USA	
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Loop-ACC-APE-240- <b>G</b>	240 Watt, AC (3.6A , auto sensing) to DC (+48 Vdc, 5A) adaptor for Europe	**
Loop-ACC-APU-240- <b>G</b>	240 Watt, AC (3.6A, auto sensing) to DC (+48 Vdc, 5A) adaptor for UK	— —
<b>FXO Box</b>		
Loop-AM3440-FXOBOX	Support FXO Interface Battery Feed	
<b>Mounting Ear</b>		
19"/23" ear mounts	A pair of 19"/23" ear mounts is supplied as part of standard package. <b>Note:</b> For other sizes, please contact your nearest Loop sales representative.	
<b>Feature Activation License</b>		
Loop-AM3440- iXC	Feature Activation License for AM3440 CPU card to support iXC3440 Craft GUI Mapping tool.	Used with Loop-iXC3440 Software.
Loop-AM3440-LCT	Feature Activation License for AM3440 CPU card to support LCT Graphical Configuration Software	Used with Loop-LCT Software.
Loop-AM3440-ERING	Feature Activation License for AM3440 CPU card to support framed E1 PDH-Ring function.	Used with M4E75, M4E120 and FOM.
<b>Conversion Cables (All conversion cables are RoHS compliant)</b>		
Loop-ACC-CAB-DB25M-100-8BNM	DB25/Male to eight BNC/Male cable; Length: 100 cm	Used in Loop-AM3440-D-M4E75 plug-in card
Loop-ACC-CAB-DB25M-300-8BNM	DB25/Male to eight BNC/Male cable; Length: 300 cm	Used in Loop-AM3440-M4E75 plug-in card
Loop-ACC-CAB-DB25M-100-4RJ48M	DB25/Male to four RJ48C/Male cable; Length: 100 cm	Used in Loop-AM3440-D-M4E120 plug-in card
Loop-ACC-CAB-DB25M-300-4RJ48M	DB25/Male to four RJ48C/Male cable; Length: 300 cm	Used in Loop-AM3440-M4E75 plug-in card
Loop-ACC-CAB-DB44M-100-2DB25F-1DB09F-TS	DSUB-44 pin/Male to two DSUB-25 pin/Female- one DSUB-9 pin/Female (8P8C) plug; Length:100 cm	Used in Loop-AM3440-D-TS plug-in card
Loop-ACC-CAB-DB25M-30-1M34F	DSUB-25pin/Male to M34/Female V.35 Conversion cable Length: 30 cm	Used in Loop-AM3440-D-1V35- <b>G</b> plug-in cards
<b>Blank Panels (All blank panels are RoHS compliant)</b>		
30.001257.A00- <b>G</b>	Blank Panel for Power Supply Slot (flat)	
30.000349.A00- <b>G</b>	Blank Panel for Controller Slot (flat)	
30.000112.A00- <b>G</b>	Blank Panel for mini Slot 1-9 (flat)	
30.001029.A00- <b>G</b>	Blank Panel for Controller (u-shape)	
<b>Y-Box (All Y-Box are RoHS compliant)</b>		
Loop-VV-B- <b>G</b>	1 for 1 protection Y-Box with BNC connectors (4-E1)	Used with 4E1
Loop-VV-R- <b>G</b>	1 for 1 protection Y-Box with RJ48C connectors (16-E1)	Used with 4E1

**For FOM and 1FOMA card**

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

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

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

**For QEMA card (Quad E&MA card):**

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

<b>wr =</b>	<b>Description</b>	<b>Notes</b>
<b>2w</b>	2 wire	
<b>4w</b>	4 wire	

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

<b>m =</b>	<b>Description</b>	<b>Notes</b>
<b>B</b>	B (carrier side) connects to A side.	
<b>A</b>	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):

<b>n =</b>	<b>Description</b>	<b>Notes</b>
<b>0</b>	For voice transmission only.	Circuit Type doesn't matter.
<b>1</b>	Type I (Original) E&M Signaling Circuit	M lead provides discharge for the A side.
<b>2</b>	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.
<b>3</b>	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
<b>4</b>	Type IV Circuit. Based on the Type 2 circuit. This E&M circuit provides symmetry.	
<b>5</b>	Type V Circuit. For applications where ground noise is not an issue. Based on the Type 2 circuit.	

**For voice card (QEMA/QFXO/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.

<b>QEMA</b>	<b>E</b>	Follows ETSI signaling bits	This option applies to controller version v8.36.XX and before.
	<b>A</b>	Follows ANSI signaling bits	
	<b>S</b>	Follows customer's special bits assignment	
<b>QFXO</b>	<b>A</b>	Follows ANSI signaling bits	
	<b>S</b>	Follows customer's special bits assignment	
	<b>E</b>	Follows ETSI signaling bits	
	<b>T</b>	Trunk condition OFF-HOOK	
	<b>AT</b>	Follows ANSI signaling bits w/ trunk condition OFF-HOOK	
<b>ST</b>	Follows customer's special bits assignment w/ trunk condition OFF-HOOK		
<b>QFXSA</b>	<b>A</b>	Follows ANSI signaling bits	
	<b>E</b>	Follows ETSI signaling bits	
	<b>S</b>	Follows customer's special bits assignment	

**Note:**

1. For S (customer's special bit), please contact your nearest Loop 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 QFXSA:**

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

pt=	Description	Notes
<b>PWR</b>	complied with ±48 Vdc (SDB) and AC (SAB) power modules	

**For mini LS Optical module (mini C37.94):**

■ Where **LSFOM** is to select **LS-Fiber Optical Module** option, each module has 5 letters.

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

**For Firmware Conversion:**

Firmware Conversion		
Loop-AM3440-card-FWCOVT	Firmware conversion for AM3440 plug-in cards to be compatible with O9550. The plug-in cards for AM3440 could be converted to work on the O9550 after firmware conversion. This will upgrade the firmware to the most current version for O9550 and provide an additional 12 months of support.	For available card types, please refer to the table below for detail information.

Note: Once the plug-in card is converted to work on the O9550, it will no longer work on the AM3440.

**■ Where card is used to select card type:**

card=	Description	Notes
M4E	Mini quad E1 card	
RTA	RTA card	

**Examples:**

**Loop-AM3440-CHD, Loop-AM3440-CCA-G, Loop-AM3440-SD, Loop-AM3440-D-M4E75,  
Loop-AM3440-D-TS:**

For 3440-D type chassis with a CPU card, a single -48 Vdc power module, one Mini Quad E1 interface with 75 ohm and one 3-channel Terminal Server interface.



## Loop-AM3440-D Access DCS-MUX Product Specifications

### Network Line Interface - T1

Line Rate	1.544 Mbps $\pm$ 50 bps	Output Signal	DSX1
Line Code	AMI or B8ZS	Framing	D4/ESF (selectable)
Input Signal	ABAM cable length up to 655 feet	Connector	RJ48C

### Network Line Interface - E1

Line Rate	2.048 Mbps $\pm$ 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 $\pm$ 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

### Mini C37.94 Card

Source	LED Opticla	Line Rate	2.048Mbps
Wavelength	820nm 2KM reach	Line Code	NRZ
Connector	ST Fiber	Type	Multimode
Optical Power Budget	62.5 Micron core/ 15db	Optical Power	-12dBm

### ATM Frame Relay Network Line Interface

Supports Network Interworking (FRF.5) and service interworking (FRF.8)

Network Interface:

- T1 Module: *T1 ATM UNI*  
*FR (n x 64 Kbps, n=1 to 24)*
- E1 Module: *E1 ATM UNI*  
*FR (n x 64 Kbps, n= 1 to 31)*

Up to 31 logical FR channels can be concentrated / de-concentrated to FR or ATM

Service Ports:

- T1/FT1 interface: *n x 64 Kbps, n=1 to 24*
- E1/FE1 interface: *n x 64 Kbps, n= 1 to 31*

Supports HDLC to FR

Supports HDLC to ATM

Supports FR to FR multiplexing

Supports up to 128 DLCIs for total of 31 FR interfaces

Supports up to 128 VCs

Peak cell rate on DLCI basis

Manufacturing disable/enable ATM scrambling for internal testing (E1 ATM only)

AAL0 and AAL5 are supported in the ATM adaptation layer

Supports VBR service

ANSI and ITU FR management protocols are supported

Flash memory software download through RS485

Only the PVC type of ATM/FR service is supported

### Router Interface

Number of Ports	2 LAN ports, Max. 32 WAN ports
Physical Interface	10 BaseT x 1, 10/100 BaseT x 1
Connector	RJ45
Routing Protocol	RIP-I, RIP-II
Data Rates	Channelized N x 64 Kbps up to E1 capacity
Supporting Protocols	TCP/IP, PPP, HDLC

**Router-A Interface**

Number of Ports	2 LAN ports, Max. 64 WAN ports, Each WAN port has data rate $n \times 64K$ bps, $1 \leq n \leq 32$ ( $\leq 4Mbps$ 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

**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	SLIP or raw data
Layer 2 Protocol of RS232 Sync	PPP
Terminal Server Function	Supports Telnet
Router Function	RIP-I, RIP-II, Static Route

**Optical Fiber Interface Characteristics**

Optical Module	Fiber Direction	Wavelength (nm)	Connector	Distance (km)	Power (dB)
SAA	Dual uni-directional	1310	SC (Subscriber Connector)	30	19
SBB	Dual uni-directional	1310	SC (Subscriber Connector)	50	30
SCC	Dual uni-directional	1310	FC (Fiber Connector)	30	20
SDD	Dual uni-directional	1550	SC (Subscriber Connector)	20	12
SEE	Dual uni-directional	1550	SC (Subscriber Connector)	100	30
SSM	Single bi-directional (master)	1310/1550	SC (Subscriber Connector)	30	20
SSS	Single bi-directional (slave)	1550/1310	SC (Subscriber Connector)	30	20

**NOTE: Other fiber optical options available on special order**

**DTE Interface (X.21)**

Data Port	Up to nine 1-port DTE X.21 card
Data Rate	56 or 64 Kbps, $n = 1$ to 32
Connector	DB15

**DTE Interface (V.35)**

Data Port	Up to nine 1-port DTE 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)**

Data Port	Up to nine 1-port EIA530 DTE card
Data Rate	56 or 64 Kbps, $n = 1$ to 32
Connector	DB25S

**DTE Interface (RS232)**

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

**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
Loop to Network Test Codes	Zero code suppression, Idle, latch/non-latch, DSU loop-back

**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

**Voice Card (Q2EM, Q4EM)**

Connector	One 44-pin connector, adapter cable included for 4 RJ45 connectors.
Power	110-220Vac, -24Vdc, -48Vdc
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or $\mu$ -law, user selectable as a group
Impedance	Balanced 600 $\Omega$ or 900 $\Omega$
Longitudinal Rejection	55 dB
Longitudinal Max	2.5 volts peak AC
Longitudinal Balance	> 63dB
Gain Adjustment	0, -3, -6 or +7 dB for transmit (D/A) gain
(all port settings)	0, -3, -6 or +10 dB for receive (A/D) gain

Signal/Distortion	> 46dB with 1004 Hz, 0dBm input
Frequency Response	+0.5 to -0.9 dB from 300 to 3400 Hz
Idle Channel Noise	< 20 dBmC0
Signaling	Type 1, Type 2, Type 3, Type 4, Type 5, and also TO (Transmit Only)
Modems	Full compatibility with V.90 modems
E Lead Sensor Current	0.25 mA (minimum)
Signaling Bit Setting	Jump selectable
Operational Temp.	0°C to +50°C
Relative Humidity	0% to 95%

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 (QEMA)**

Connector	One 44-pin connector, adapter cable included for 4 RJ45 connectors.
Power	110-220Vac, $\pm$ 48Vdc
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or $\mu$ -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 -10 to +14 dB / 0.1dB step for receive (A/D) gain
Gain Variation	$\pm$ 0.5 dB at 0 dBm0 input
Frequency Response	$\pm$ 0.5 dB at 0 dBm0 input
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 also TO (Transmit Only)
M Lead Output Current	18 mA (maximum)
E Lead Sensor Current	0.3 mA (minimum)
EM Type Setting	Jump Selectable
Operational Temp.	0°C to +50°C
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 (QFXO)

Quad FXO voice card (4 FXO per plug-in)	
Connector	QFXO: 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 $\mu$ -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	- 0.25 to -1 dB from 300 to 3400 Hz
FXS Loop Feed	Supports line power with 25mA (default) current limit (30mA and 35mA, Jump selectable)
FXO	Ringing REN 0.5B (AC)
	Detectable Ringing 25 Vrms
	Loop Resistance $\leq 1800 \Omega$
	DC impedance > 1M $\Omega$
	(ON-HOOK)
	DC 235 $\Omega$ @ 25mA feed
	impedance(OFF-HOOK) 90 $\Omega$ @ 100mA feed
FXS Ringing	Supports 2 REN per port (1 REN = 6930 $\Omega$ + 8 $\mu$ F) 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.

### Voice Card (QFXSA)

Quad FXSA voice card (4 FXS per plug-in)	
Connector	1, 2, 3, or 4 FXS per RJ11 connector
Power for QFXS	$\pm 48$ Vdc
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or $\mu$ -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	- 0.25 to -1 dB from 300 to 3400 Hz
Loop Feed	$\pm 48$ Vdc with 25mA current limit per port Jumper selectable: 25mA, 30mA, 35mA
Ringing	Support 2 REN per port (1 REN = 6930 $\Omega$ + 8 $\mu$ F) 16.7Hz, 20Hz, 25Hz, 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(QMAGA)

Connector	RJ11 x 4
Power	110-220 Vac or $\pm 48$ Vdc
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or $\mu$ -law, user selectable per card configurable
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	- 0.25 to -1 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
Ring 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
Ring 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	Programmable
	<ul style="list-style-type: none"> <li>• Signaling is carried transparently by the digitizing process.</li> <li>• Use Magneto card default setting for communications between magneto telephones</li> <li>• Use Magneto card PLAR mode setting for communications between a magneto telephone and a regular telephone</li> </ul>

### PLM Cards

Connector	Four RJ11 connectors
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or $\mu$ -law, user selectable as a group
Impedance	Balanced 15K Ohm for PLM (A) and PLM(B) cards
Total Distortion	> 35dB with 1004 Hz, 0dBm input
Frequency Response	0 ~ -0.5 dB from 300 to 2000 Hz -0.5 dB ~ -2 dB from 2000 to 3300 Hz
Idle Channel Noise	> -60 dBm0
Input Gain Adjustment	0, -3, -6 or +3dB for PLM (A) from phone line receive gain (A/D) in all four ports
Output Gain Adjustment	0, -3, -6 or +7 dB for PLM (B) to monitor line transmit gain (D/A) in all four ports
Off-Hook Detect Level	< -6V Line to GND

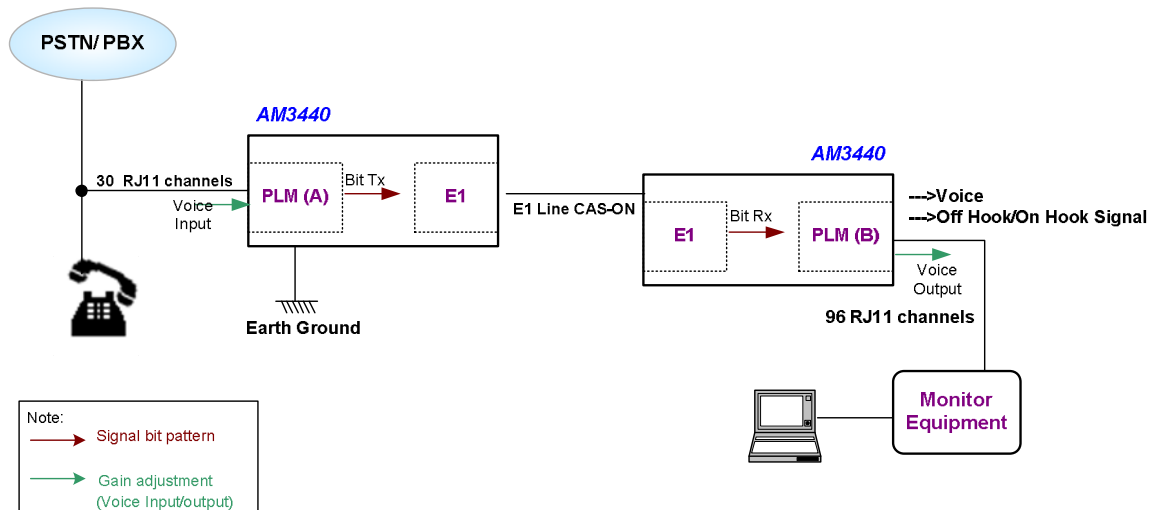
Operational Temp. 0°C to 50°C  
 Relative Humidity 0% to 95%  
 Power 110 ~ 220 VAC, -48 Vdc  
 All in-band signaling tones are carried transparently by the digitizing process.

**Analog Bridge Card (ABRA)**

Analog bridge function Downstream : 2 to many  
 Upstream : many to 2  
 Group Up to 8 groups  
 PCM encoder/decoder Compatible with ITU-T G.711 A-law/Mu-law coding.  
 LED Indicator Multi-color indication

**Signaling Bits**

Signaling bit pattern		Normal								AB Bit Invert							
		Bit Tx				Bit Rx				Bit Tx				Bit Rx			
		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
PLM (A) (Line Card)	Line On Hook	1	1	0	1					0	1	0	1				
	Line Off Hook	0	1	0	1					1	1	0	1				
PLM (B) (Monitor Card)	Battery (-48V)					1	1	0	1					0	1	0	1
	Battery (-6V)					0	1	0	1					1	1	0	1



**Clock Source**

Internal, E1 Line, External (E1/2048 KHz)

**Alarm Relay**

Alarm Relay, fuse alarm, and performance alarm

**System Configuration Parameters**

Active Configuration, Stored Configuration, and Default Configuration (stored in non-volatile memory)

**Supervisor**

RS232 Console Port (VT100) 10 Base-T, Ethernet, SNMP

In-band 64 Kbps  
supports HDLC/PPP, SSH

### Performance Monitor

Performance Registers  
Separate Registers  
Performance Reports

Last 24 hours performance in 15 minute intervals and last 7 days in 24 hour summaries  
Network, user, and remote site  
Reports include E1 Bursty Errored Second, Severe Errored Second, Degraded Minutes,  
and Controlled Slip Second. Also available in statistics (%)

Alarm Queue  
Threshold

To record the latest alarm type, location, and date & time  
Bursty Seconds, Severely Errored Seconds, Degraded Minutes

### Diagnostics Test Line

Loopback

E1 interface (Line Loopback, Payload Loopback, Local Loopback), DTE Loopback  
(DTE-to-DTE, DTE to Line)

Test Pattern

For Controller: 2<sup>21</sup>-1, 2<sup>15</sup>-1, 2<sup>11</sup>-1, 2<sup>9</sup>-1, and 4-byte user define pattern

### Front Panel

LED

1 per V.35-interface, ACO, Power, SYNC/TEST, LOF, BPV, RAI/AIS

### Physical /Electrical

Dimensions

438 x88 x 224 mm (W×H×D)

Power

Single/ Dual -48 Vdc: -36 to -75 Vdc, 100 Watts max.

Single AC: 100 to 240 Vac, 50/60 Hz

Temperature

0-55°C

Humidity

0-95%RH (non-condensing)

Mounting

Desk-top stackable, 19" /23" rack mountable

Line Power Supply

N/A

Power Consumption

Max 45 Watts

### Certification

EN55022 Class A, EN50024, EN300 386,  
FCC Part 15 Class A , IEC60950-1, EN60950-1  
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

**Certification of IEC 61850-3 and IEEE1613:**

The certification only applies to AM3440-D with -48Vdc(100W).

	Plug-in cards	AM3440-D
<b>Power</b>	Power Module	-48Vdc(100W)
<b>CTRL</b>	Console and SNMP port of CCA	√, S
	CCB	√#, S#
<b>Mini-Slot</b>	1-channel E1 (Single E1 interface)	√
	1-channel T1 (Single T1 interface)	√
	Mini Quad E1 (Four E1 interfaces)	√
	Mini 1 Channel C37.94	√
	1-channel E1 ATM/Frame Relay	D, x
	1-channel T1 ATM/Frame Relay	D, x
	Fiber optical interface	√
	1-channel X.21	√, S
	1-channel V.35	√, S
	1-channel RS232	√, S
	1-channel EIA530	√, S
	Quad 2W/4W E&M (Four E&M voice interfaces)	√*
	QEMA (Quad E&M type A)	√
	QFXS (Four FXS voice interfaces)	D*
	QFXO (Four FXO voice interfaces)	√
	QFXSA (Four FXSA voice interfaces)	√
	QMAGA (Four magneto voice interfaces)	x
	2-LAN port/32 WAN port Router	√, S
	2-LAN port/64 WAN port Router-A	√, S
	3-channel Terminal Server	√, S
	Phone Line Monitor (PLM) cards	x
	1-channel OCU-DP	√
	Echo Canceller Card	x
	Analog Bridge Card	x
QMAGA	x	

**Note:** √ = Supported

D = Discontinued

\* = Power Option: pt1613

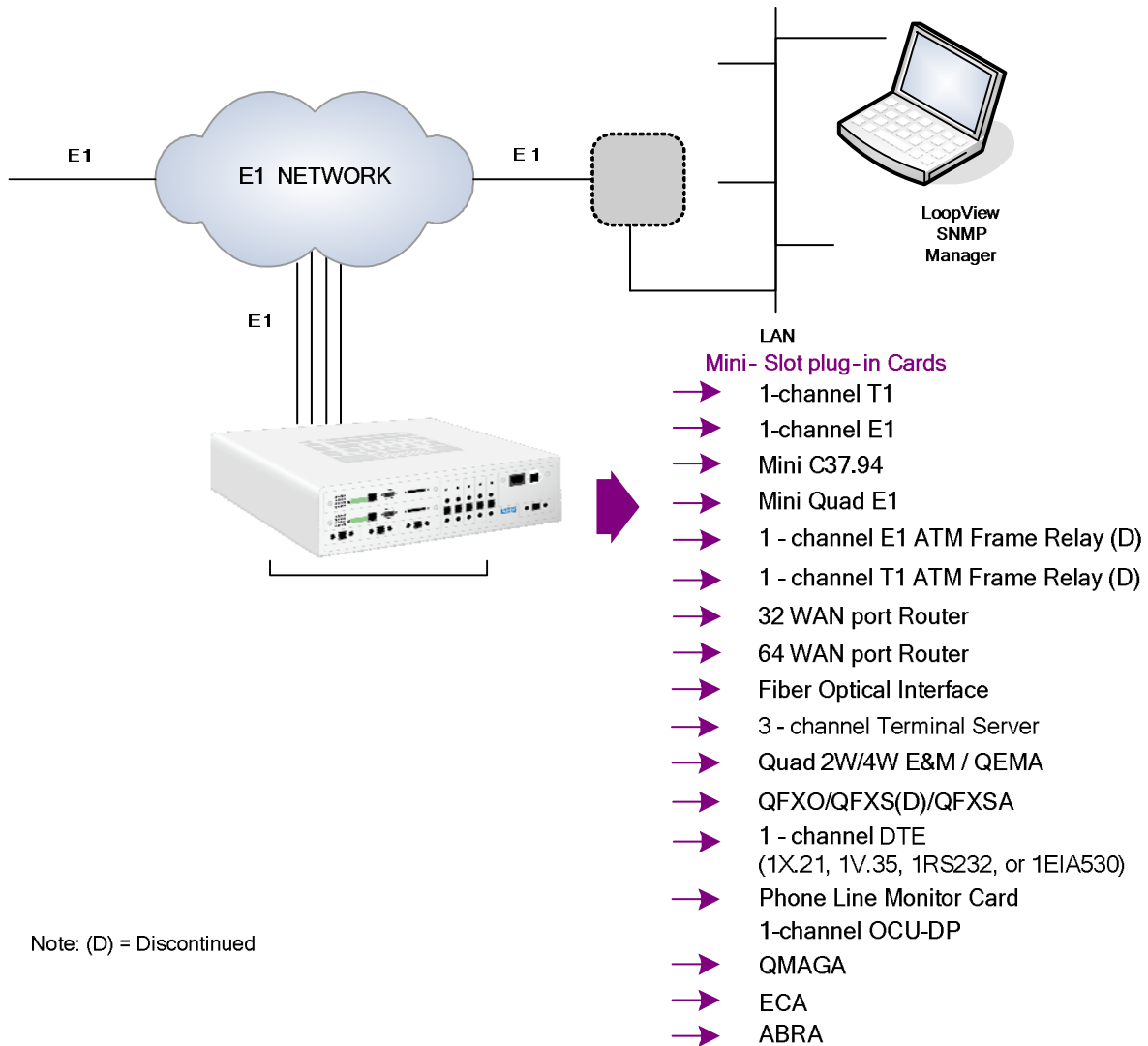
S = When Used Shield Cable

x = Not Support

# = Future Option



### Application Illustration



Note: (D) = Discontinued



**LOOP TELECOMMUNICATION INTERNATIONAL, INC.**  
**ISO 9001 / ISO 14001**

[www.looptelecom.com](http://www.looptelecom.com)

**Worldwide**

6F, No. 8, Hsin Ann Road  
 Hsinchu Science Park  
 Hsinchu, Taiwan 30078  
 +886-3-578-7696

[sales@looptelecom.com](mailto:sales@looptelecom.com)

**Europe**

Rue de Culot, 13  
 BE-1402 Nivelles  
 Belgique  
 +32-496-54-27-44

[eu\\_sales@looptelecom.com](mailto:eu_sales@looptelecom.com)

**Americas**

8 Carrick Road  
 Palm Beach Gardens  
 Florida 33418, U.S.A.  
 +1-561-627-7947

[nca\\_sales@looptelecom.com](mailto:nca_sales@looptelecom.com)

**Australia & New Zealand**

3 Imperial Ave, Mount  
 Waverley, Victoria 3149,  
 Australia  
 +61-413-382-931

[aus\\_sales@looptelecom.com](mailto:aus_sales@looptelecom.com)

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Version 22 1 December 2017

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