Loop-AM3440-E
IP/TDM DCS-MUX

AM3440-E-CHEA

AM3440-E-CHEA

Features

Cross Connect Capability

- Support full non-blocking DS0 cross connect matrix between TDM interfaces and TDMoE Pseudowires
- Suitable for DACS (Digital Access Cross-Connect System) and ADCB (Add/Drop Channel Bank) applications
- Auto A-law/μ-law conversion

Ethernet Interface

- 2 x Combo GbE (SFP 100/1000BaseFX and 10/100/1000BaseT)
- IEEE 802.3ad Ethernet Link Aggregation*

Pseudowires

- Up to 64 concurrent pseudowires
- Encapsulation format
  - SAToP
  - CESoPSN
  - MEF-8 (CESoETH)
- Configurable CoS and VLAN
- Packet Delay Variation Compensation Depth up to 256 ms

Timing

- System clock source can be chosen from Internal, External or E1/T1 Line with SSM
- Automatic/Manual Clock Recovery modes
- Adaptive Clock Recovery for Pseudowires
- Jitter and Wander conforms to G.823/824 for Traffic Interface
- SyncE

Management

- RJ45 Ethernet management interface
- SNMPv1/v3, compatible to SNMP-based GUI network management systems and supported by Loop-iNET and Loop-iNMS
- Telnet and SSH v2
- Web GUI Configuration (optional)
- USB console port with VT-100 menu driven interface
- 64K timeslot inband management
- Support Access Control List (ACL)

Mechanical and Electrical

- 1U height, 19” rack width. ANSI shelf.
- Up to 7 slots for AM3440 series mini-slot modules.
- All plug-in interface modules are hot swappable
- Up to two ±48Vdc or 100 ~ 240 Vac hot swappable power modules
- Dual DC or AC power with load sharing
- Temperature ranges from -20° to 65°C
- RoHS compliant

Model	AM3440-E-CHEA
Chassis	1U
# of Mini-slots	5
# of HS-slots	2[Note]
Max. E1/T1 Ports	28
Cross-Connect Backplane Capacity	184 Mbps
Note: Supports Mini-slot modules via HS-Slot adapters	

*Future Option

Description

The Loop-AM3440-E-CHEA is a compact IP/TDM Access Multiplexer in the Loop Access DCS-MUX series that combines various access interfaces and transport over GbE or E1 uplinks. The Loop-AM3440-E supports SAToP/ CESoPSN/ MEF8 Protocols to transport TDM data streams over packet switched network.

The Loop-AM3440-E provides full non-blocking DS0 cross-connect matrix for up to 28 x E1/T1 + 64 Pseudowires. Traffic grooming and segregation between the TDM interfaces and the Pseudowires provides flexibility and efficiency and makes the Loop-AM3440-E an ideal solution for DACS (Digital Access Cross-Connect System) and ADCB (Add/Drop Channel Bank) applications.

Loop-AM3440-E IP/TDM DCS-MUX
MPLS-TP/CE SWITCH

AM3440-E-CHEB

AM3440-E-CHEB

Features

Cross Connect Capability
- Support full non-blocking DS0 cross connect matrix between TDM interfaces and TDMoE Pseudowires
- Suitable for DACS (Digital Access Cross-Connect System) and ADCB (Add/Drop Channel Bank) applications
- Auto A-law/μ-law conversion

Ethernet Switch
- 10G Switching Capacity
- 4GE SFP and 4 FE/GE dual rate SFP

Ethernet Services
- E-Line, E-LAN, E-Tree services as defined by MEF 9 and 14 and using VPWS/VPLS
- Native Ethernet packets supported
- Encapsulation: PW/LSP (MPLS-TP), VLAN tagging (1Q), VLAN double tagging (Q-in-Q)

Pseudowires
- Up to 64 concurrent pseudowires
- Encapsulation format
  - SAToP
  - CESoPSN
  - MEF-8 (CESoETH)
- Configurable CoS and VLAN
- Packet Delay Variation Compensation Depth up to 256 ms

Timing
- System clock source can be chosen from Internal, External (from SCLKa/SCLKb*/SCLKc*) or E1/T1 Line with SSM
- Automatic/Manual Clock Recovery modes
- Adaptive Clock Recovery for Pseudowires
- Jitter and Wander conforms to G.823/824 for Traffic Interface
- SyncE

Management
- RJ45 Ethernet management interface
- SNMPv1/v3, compatible to SNMP-based GUI network management systems and supported by Loop-iNET and Loop-iNMS

MPLS-TP
- MPLS Transport Profile per RFC-5921
- Any Ethernet port can be configured as NNI (MPLS port) or UNI (Ethernet service port)
- Static MPLS LSP label provisioning via NMS
- Pseudo Wire (PW) to support
  - Ethernet Pseudo Wire(VPWS, VPLS, H-VPLS)
- MPLS-TP OAM
  - Section/LSP/PW TP-OAM using BFD (Per IEEE 8113.2)
- MPLS-TP QoS
  - 64K Granularity Rate Limit Per Flow
  - Ingress/Egress TC/EXP Class Mapping
  - TC/EXP Priority-based Queuing (8 Queues)
  - Tunnel Traffic Engineering CIR/PIR and CBS/PBS Policing/Shaping
  - PW Traffic Engineering CIR/PIR and CBS/PBS Policing/Shaping
  - WRE
  - Strictly Priority / WRR

Carrier Ethernet (CE)
- L2 Switching/Bridging
- RSTP/MSTP (IEEE 802.1w/1s)
- VLAN 1Q 802.1q/ Q in Q8 802.1ad
- VLAN Operation: Stack/Switch/Strip
- EPL, EVPL, EP-LAN, EPV-LAN, EP-Tree
- EPL-Access, EPVL-Access
- Link Aggregation (802.3ad): Static/LACP

L3 Routing*
- Static Route
- RIPv1 and RIPv2
- OSPFv2 and OSPFv3

VPLS
- VPLS bridging
- H-VPLS bridging
- 32K MAC addresses
- 2K VPLS instances per device
- Split horizon to prevent forwarding loops

Mechanical and Electrical
- 1U height, 19” rack width. ANSI shelf.
- Up to 6 mini-slots for AM3440 series interface modules.

- Telnet and SSH v2
- Web GUI Configuration (optional)
- USB console port with VT-100 menu driven interface
- 64K timeslot inband management
- Supports RADIUS authentication

Network Protections

- MPLS-TP
  - MPLS LSP 1+1/1:1
  - Dual-homing PW Protection
  - LSP E2E protection switching within sub 50ms
- CE
  - ERPS Ring (G.8032) Protection
  - ELPS (G.8031) Linear Protection
- E1/T1/TDMoEA 1+1 protection,
- DS0 Level Nx64K circuit protection
- PDH ring protection, QE1/QT1, FOM, Mini QE1/QT1

PWE3 Services

- Ethernet over CE
  - Port-based and VLAN-based services
  - EPL, EVPL, EPLAN, EVPLAN, E-Tree services as defined by the MEF 9&14
  - Encapsulation: VLAN 802.1Q/802.1ad Q in Q
- Ethernet over MPLS
  - Port-based and VLAN-based services
  - VPWS, VPLS, H-VPLS services as defined by the MEF 9 and 14
  - Encapsulation: PW over MPLS-TP
- PDH over MPLS/CE/IP
  - Framed E1/T1:CESoPSN, and MEF8 for emulation of TDM circuits
  - Unframed E1/T1: SAToP PW
  - PDH Clock Recovery: ACR/System Clock per PW configurable

- Up to 4GE SFP and 4 FE/GE SFP on-board.
- All plug-in interface modules are hot swappable
- Up to two ±48Vdc or 100 ~ 240 Vac hot swappable power modules
- Dual DC or AC power with load sharing
- Temperature ranges from 0° to 55°C
- RoHS compliant

Model	AM3440-E-CHEB
Chassis	1U
# of Mini-slots	6
Max. E1/T1 Ports	24
Maximum GE Ports	8
Cross-Connect Backplane Capacity	96 Mbps
Packet Switching Capacity	10G

Description

The Loop-AM3440-E-CHEB is the latest product in the Loop Access DCS-MUX series that combines various access interfaces and transport over GbE or E1 uplinks. The Loop-AM3440-E-CHEB supports SAToP/ CESoPSN/ MEF8 Protocols to transport TDM data streams over packet switched network.

The Loop-AM3440-E-CHEB provides full non-blocking DS0 cross-connect matrix for up to 24 x E1/T1 + 64 Pseudowires. Traffic grooming and segregation between the TDM interfaces and the Pseudowires provides flexibility, efficiency and makes the Loop-AM3440-E-CHEB an ideal solution for DACS (Digital Access Cross-Connect System) and ADCB (Add/Drop Channel Bank) applications.

The Loop-AM3440-E-CHEB supports both MPLS-TP and Carrier Ethernet functions as Packet Transport Network. In addition to the native Ethernet transport, the Loop-AM3440-CHEB can be used as the gateway of PDH into the PSN network using circuit emulation technologies. The TDM encapsulation technologies supported are TDMoE and TDMoIP. In parallel, the Circuit Emulation supported are CESoPSN (Nx64K) and SAToP (Unframed E1/T1).

With hot-pluggable mini size slots design, the Loop-AM3440-E-CHEB provides access for E1, T1, FOM, FXS, FXO, E&M, Magneto*, C37.94, RS232, X.21 and V.35 interfaces. These interfaces are compatible with other Loop products.

Table of Tributary Modules Applicable to AM3440-E

Mini-Slot Tributary Modules	Description	Supported by AM3440-E-CHEA	Supported by AM3440-E-CHEB
1T1	1-channel T1 (Single T1 interface)	✓	✓
1E1(E75)	1-channel E1 (Single E1 interface) with 75ohm	✓	✓
1E1(E120)	1-channel E1 (Single E1 interface) with 120ohm	✓	✓
4E1(M4E75)	Mini Quad E1 (Four E1 interfaces) with 75ohm	✓	✓
4E1(M4E120)	Mini Quad E1 (Four E1 interfaces) with 120ohm	✓	✓
4T1(M4T1)	Mini Quad T1 (Four T1 interfaces)	✓	✓
M1C37	1-channel C37.94 mini plug-in card	✓	✓
1CD	1-channel G.703 Co-Directional	✓	✓
Router-A	2-LAN ports/64WAN port router/bridge plug-in card	✓	✓
FOM	Fiber Optical Module	✓	✓
1X.21	1-channel X.21 plug-in card	✓	✓
1V.35	1-channel V.35 plug-in card	✓	✓
1RS232	1-channel RS232 plug-in card	✓	✓
3RS232a	3-channel RS232 plug-in card	✓	✓
QEMA	4-channel E&M voice plug-in card	✓	✓
QFXSA	4-channel FXS voice plug-in card	✓	✓
QFXO(D)	4-channel FXO voice plug-in card	✓	✓
QFXOA	4-channel FXO voice plug-in card	✓	✓
QMAGA	4-channel Magneto voice plug-in card	*	*
ECA	Echo Cancellation plug-in card	✓	✓
ABRA	Analog Bridging plug-in card	✓	✓
OCU-DP	1-channel OCU-DP plug-in card	*	✓
CLKa	Clock and Alarm plug-in card	*	✓
CLKb	Clock and Alarm plug-in card	*	*

Note: ✓ = Supported * = Future Option (D) =Discontinued

Ordering Information

To specify options, choose from the list below:
Note: RoHS compliant units are identified by the letter **G** at the end of the ordering code.

Main Unit

Ordering Code	Description	Note
Loop-AM3440-E-CHEA-**mgmt**-**G**	1U height rack chassis with fixed CPU for AM3440-E. • Supports cross-connect and TDMoE onboard. • Supports SAToP, CESoPSN, and MEF-8 • Up to 64 Pseudowires • Supports SyncE	• 19”/23” ear mount included. • Please order SFP modules separately from SFP optical modules brochure. • Includes two High Speed Slot Adapters (Loop-ACC-HSADTa-**G**) for mini plug-in cards to be used in H1 and H2 slots. • With fixed AM3440-CCPA controller
Loop-AM3440-E-CHEA-NPW-**mgmt**-**G**	1U height rack chassis with fixed CPU for AM3440-E. • Support cross-connect • Supports SyncE	• 19”/23” ear mount included. • Please order SFP modules separately from SFP optical modules brochure. • Includes two High Speed Slot Adapters (Loop-ACC-HSADTa-**G**) for mini plug-in cards to be used in H1 and H2 slots. • If TDMoE uplink function is required in the future, it can be activated via an activation license. • With fixed AM3440-CCPA controller • If TDMoE uplink function is required in the future, it can be activated via a feature activation license. See Loop-AM3440-CHEA-PWLIC
Loop-AM3440-E-CHEB-**mgmt**-**G**	1U height rack chassis with fixed CPU for AM3440-E. • 4 x GbE and 4 x FE/GbE SFP interface onboard. • Built-in L2 switch and one GbE RJ45 SNMP. • Support cross-connect • Supports SAToP, CESoPSN, and MEF-8 formats for TDMoE uplink, up to 64Pseudowires. Supports SyncE	• 19”/23” ear mount included. • Please order SFP modules separately from SFP optical modules brochure. • With fixed AM3440-CCPB-8GEHSWa controller • Please order SCLKa/SCLKb*/SCLKc* module for clock in/out, and alarm in/out.

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

mgmt=	**Description**	**Note**
LCT	Loop-AM3440-LCT activation license	Used with Loop-LCT Graphical Configuration Software for TDM application.
iXC*	Loop-AM3440-iXC activation license	Used with Loop-iXC3440 cross-connect mapping tool for management.
web	Web GUI configuration activation license	Used with Loop-AM3440-E-CHEA and Loop-AM3440-E-CHEB models.
[blank]	No configuration tool for management	If LCT is required in the future, it can be activated by an activation license.

When a web management is selected, AM3440-E can be configured on the web GUI together with the following plug-in modules.

Model / Card	AM3440-E-CHEA	AM3440-E-CHEB
M4E1	√	√
CLKa	√	√
ABRA	√	√
3RS232a	√	√
ECA	√	√

Mini Plug-in Module (Select 1 to 7 cards for CHEA and 1 to 6 cards for CHEB from the list below)		
Transportation		
Loop-AM3440-S1T1-**G**	1-channel T1 interface card	
Loop-AM3440-S1E75-**G**	1-channel of E1plug-in card w/ 75 ohm	
Loop-AM3440-S1E120-**G**	1-channel of E1 plug-in card w/ 120 ohm	
Loop-AM3440-SM4T1-**G**	Mini Quad T1 plug-in card	Includes a three meter conversion cable (Loop-ACC-CAB-DB25M-300-4RJ48M-**G**).
Loop-AM3440-SM4E75-**G**	Mini Quad E1 plug-in card with 75 ohm	Includes a three meter conversion cable (Loop-ACC-CAB-DB25M-300-8BNCM).
Loop-AM3440-SM4E120-**G**	Mini Quad E1 plug-in card with 120 ohm	Includes a three meter conversion cable (Loop-ACC-CAB-DB25M-300-4RJ48M).
Loop-AM3440-SFOM-**opt**-**G**	Fiber Optical plug-in card	For **opt** option, please refer to the table below for detail information
Serial and Digital Access		
Loop-AM3440-S1V35-**G**	1-channel V.35 plug-in card	
Loop-AM3440-S1X21-**G**	1-channel X.21 plug-in card	
Loop-AM3440-S1RS232-**G**	1-channel RS232 plug-in card	
Loop-AM3440-S3RS232a-**G**	3-channel RS232 async/Sync, DCE/DTE plug-in card	• To use with 3RS232a interface card, it is recommended to purchase a conversion cable (Loop-ACC-CAB-DB44M-150-2DB25F-DB9F-DCE-**G,** or Loop-ACC-CAB-DB44M-150-2DB25F-DB9F-DTE-**G)**
Loop-AM3440-S1ODP	1 port OCU-DP Interface card	Only non-RoHS compliant model available **Limited Quantity**

Mini Plug-in Module (Select 1 to 7 cards for CHEA and 1 to 6 cards for CHEB from the list below)		
Loop-AM3440-S1CD-**G**	1-channel G.703 Co-Directional Interface at 64 Kbps data rate	
Voice and Analog Access		
Loop-AM3440-SQEMA-**wr**-**m**-T**n**-**x**-**G**	Jumper selectable: 2/4 WIRE; A/B side Quad E&M voice card, complied with IEEE1613 standard.	• Not applicable to ±24 Vdc powered main units. • For **wr**, **m**, **n** and **x** option, please refer to the table below for detail information. • Includes a 0.6 meter conversion cable (Loop-ACC-CAB-DB44M-60-4 RJ45M-G)
Loop-AM3440-SQFXOA-**G**	Quad FXO voice plug-in card used with 4 RJ11	• Not applicable to ±24 Vdc powered main units. • GS = Ground Start
Loop-AM3440-SQFXOA-GS-**G**	Quad FXO with GS plug-in card used with 4 RJ11	
Loop-AM3440-SQFXSA-**x-pt**-**G**	Quad FXSA voice plug-in card	• Jumper setting options: Loop Start, Ground Start (GS), Metering Pulse Transmit 12/16 KHz (MP). • For **x** & **pt** option, please refer to the table below for detail information.
Loop-AM3440-SQFXSA-M-**x-pt**-**G**	Quad FXSA with MP 16 KHz voice plug-in card	
Loop-AM3440-SQFXSA-M12-**x-pt**-**G**	Quad FXSA with MP 12 KHz voice plug-in card used	
Loop-AM3440-SQFXSA-GS-**x-pt**-**G**	Quad FXSA with GS plug-in card	
Loop-AM3440-SQFXSA-GM-**x-pt**-**G**	Quad FXSA with GS and MP 16 KHz voice plug-in card	
Loop-AM3440-SQMAGA-**G***	Quad channel magneto plug-in card	• Not applicable to ±24 Vdc powered main units.
Data Processing		
Loop-AM3440-SECA-**G**	Echo canceller card	
Loop-AM3440-SABRA-**G**	Analog Bridge Card	
Package Access		
Loop-AM3440-SRTA-**G**	2-LAN ports/64 WAN port router/bridge plug-in card	
Teleprotection Access		
Loop-AM3440-SM1C37-**LSFOM**-**G**	1- channel C37.94 plug-in mini card	For **LSFOM** option, please refer to the table below for detail information.
Clock and Alarm		
Loop-AM3440-SCLKa-**G**	CLKa Mini Slot plug-in card. - Clock in x2, clock out x1 - Alarm in x1, Alarm out x2	
Loop-AM3440-SCLKb-**G***	CLKb Mini Slot plug-in card. - Fuse ALM x1 - Critical ALM x1, MJR ALM x1, MIN ALM x1 - Clock in x2, clock out x2	

*Future Option

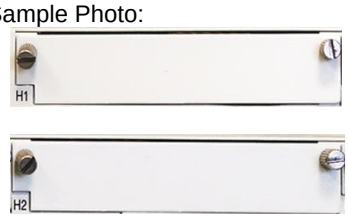
Accessories		
Power Module		
Loop-AM3440-E-SAC-**G**	Single AC plug-in power supply (100 to 240 Vac, 50/60 Hz)	• For AC, choose an appropriate power cord. • Order two DC or two AC (or one DC and one AC) power modules for redundancy.  • For AM3440-E-CHEA
Loop-AM3440-E-SAPC-**G**	Single AC plug-in power supply (100 to 240 Vac, 50/60 Hz)	• For AC, choose an appropriate power cord. • Order two DC or two AC (or one DC and one AC) power modules for redundancy.  • For AM3440-E-CHEA and AM3440-E-CHEB
Loop-AM3440-E-SDC-**G**	Single -48 Vdc (-36 to -72 Vdc) Power Module	• Order two DC or two AC (or one DC and one AC) power modules for redundancy. • For AM3440-E-CHEA
Loop-AM3440-E-SDPC-**G**	Single -48 Vdc (-36 to -72 Vdc) Power Module	• Order two DC or two AC (or one DC and one AC) power modules for redundancy. • For AM3440-E-CHEA and AM3440-E-CHEB
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	

Ordering Code	Description	Notes
Power Adaptor		
Loop-ACC-AC**x**-DC48-320W-**G**	320 Watts, AC (88 ~ 264Vac or 124~370Vdc to dc (+48Vdc, 6.7A) adaptor Working temperature: -30 to 70°C	

■ Where **x** is used for selecting AC power plug type:

x =	Description	Note
A	adaptor power plug type for USA and Taiwan	
E	adaptor power plug type for Europe	
U	adaptor power plug type for UK	

Mounting Ear		
19”/23” ear mounts	A pair of 19”/23” ear mounts is supplied as part of standard package. **Note**: For other sizes, please contact your nearest Loop sales representative.	
Conversion Cables (All conversion cables are RoHS compliant)		
Loop-ACC-CAB-HDB15M-100-RJ48M-**G**	One HD-sub 15 pin/Male connector to one RJ48/Male connector; Length: 100 cm	For external clock interface connection
Loop-ACC-CAB-DB25M-300-8BNCM-**G**	DB25/Male to eight BNC/Male cable; Length: 300 cm	Used with Loop-AM3440-SM4E75-**G**
Loop-ACC-CAB-DB25M-300-	DB25/Male to four RJ48C/Male cable;	Used with

4RJ48M-**G**	Length: 300 cm	Loop-AM3440-SM4E120-**G** and Loop-AM3440-SM4T1-**G** plug-in cards
Loop-ACC-CAB-DB25M-30-1M34F-**G**	DSUB-25pin/Male to M34/Female V.35 Conversion cable Length: 30 cm	Used with Loop-AM3440-S1V35-**G** plug-in card
Loop-ACC-CAB-DB44M-60-4RJ45M-**G**	DSUB-44pin/Male to four RJ45 Male (8P8C) conversion cable. Length: 60 cm	Used with Loop-AM3440-SQEMA plug-in card
Loop-ACC-CAB-DB44M-150-2DB25F-DB9F-DCE-**G**	DSUB-44 pin/Male to two DSUB-25 pin/Female and one DSUB-9 pin/Female (8P8C) plug. Length:150cm	Used with Loop-AM3440-3RS232a-**G** and Loop-AM3440-S3RS232a-**G** plug-in card for DCE mode
Loop-ACC-CAB-DB44M-150-2DB25F-DB9F-DTE-**G**	DSUB-44 pin/Male to two DSUB-25 pin/Female and one DSUB-9 pin/Female (8P8C) plug. Length:150cm	Used with Loop-AM3440-3RS232a-**G** and Loop-AM3440-S3RS232a-**G** plug-in card for DTE mode
Blank Panels		
30.002582.A00-**G**	Blank Panel for Power Supply Slot Panel Size: 169 x 43 mm (L x W)	For AM3440-E-CHEA and AM3440-E-CHEB
30.000112.A00-**G**	Blank Panel for Mini Slot A-E Panel Size: 68.7 x 20.35 mm (L x W)	For AM3440-E-CHEA
	Blank Panel for Mini Slot A-F Panel Size: 68.7 x 20.35 mm (L x W)	For AM3440-E-CHEB
30.002583.A00-**G**	Blank Panel for H1 and H2 Slot Panel Size: 102.9 x 20.35 mm (L x W)	For AM3440-E-CHEA only Sample Photo: 
HS-Slot Adapter		
Loop-ACC-HSADTa-**G**	Mechanical adapter for HS-Slot. Applicable to AM3440-E-CHEA. Panel Size: 39.8 x 20.35 mm (L x W)	• For AM3440-E-CHEA only • Use with mini-slot modules in H1 and H2 Slots Sample Photo:  Usage Example: 
Y-Box		
Loop-VV-B-**G**	1 for 1 protection Y-Box with BNC connectors (4-E1)	Used with M4E75
Loop-VV-R-**G**	1 for 1 protection Y-Box with RJ48C connectors (16-E1)	Used with M4E120
Loop-VV-T-**G**	1 for 1 protection Y-Box with RJ48C connectors (For 16 T1 ports)	Used with M4T1
User's Manual		
Loop-AM3440-UMEA	Optional hard-copy (paper) User's Manual. A CD version of the manual is already included as standard package.	For AM3440-E-CHEA
Loop-AM3440-UMEB	Optional hard-copy (paper) User's Manual. A CD version of the manual is already included as standard package.	For AM3440-E-CHEB

Feature Activation License		
Loop-AM3440-ERINGLIC	Feature Activation License for AM3440 CPU card to support framed E1 PDH-Ring function	Used with M4E1
Loop-AM3440-TRINGLIC	Feature Activation License for AM3440 CPU card to	Used with M4T1.

	support framed T1 PDH-Ring function	
Loop-AM3440-LCTLIC	Feature Activation License for AM3440 CPU card to support LCT Graphical Configuration Software	Used with Loop-LCT Software.
Loop-AM3440- iXCLIC*	Feature Activation License for AM3440 CPU card to support iXC3440 Craft GUI Mapping tool.	Used with Loop-iXC3440 Software
Loop-AM3440-CHEA-PWLIC	Feature Activation License for AM3440-E-CHEA-NPW to support TDMoE uplink.	Used with AM3440-E-CHEA-NPW
Loop-AM3440-WEBLIC	Feature Activation License for AM3440 to support Web GUI Configuration function.	Used with Loop-AM3440-E-CHEA and Loop-AM3440-E-CHEB models.

Loop-iXC3440 software covers most of AM3440 plug-in cards. Below is the list of cards currently supported by Loop-iXC3440.

Mini Plug-in Module	Description	Note
E1	1-channel E1 plug-in card	
T1	1-channel T1 plug-in card	
sDTE	1-channel DTE plug-in card	
MQE1	Mini Quad E1plug-in card	
MQT1	Mini Quad T1plug-in card	
RTA	2-LAN ports/64 WAN port Router/Bridge plug-in card	
FOM	Mini Fiber Optical plug-in card	
QFXO	Quad FXO voice plug-in card	
1OCUDP*	1-channel OCU-DP plug-in card	
ECA	Echo Cancellation plug-in card	
ABRA	Analog Bridge plug-in card	
M1C37	Mini 1-channel C37.94 plug-in card	

For QEMA card (Quad E&MA card):

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

wr =	Description	Notes
2w	2 wire	
4w	4 wire	

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

m =	Description	Notes
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	Notes
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 (QEMA/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.

QEMA	**E**	Follows ETSI signaling bits	
	A	Follows ANSI signaling bits	
	S	Follows customer's special bits assignment	
QFXSA	**A**	Follows ANSI signaling bits	
	E	Follows ETSI signaling bits	
	S	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**
PWR	Use with ±48Vdc (SDC, SDPC) and AC (SAC, SAPC) power modules	Used with Loop-AM3440-E-CHEA
	Use with ±48Vdc (SDPC) and AC (SAPC) power modules	Used with Loop-AM3440-E-CHEB

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

■ Where **LSFOM** is to select **LS**-**F**iber **O**ptical **M**odule option, each module has 5 letters.

LSFOM	**Description**										**Note**
Code	**Mode**		**Data Rate**		**Wave Length**		**Distance**		**Connector/ Interface**		
	Code	**Description**	**Code**	**Description**	**Code**	**Description**	**Code**	**Description**	**Code**	**Description**	
ZRATT	Z	Multi-mode	R	2 M	A	820nm	T	2km	T	ST/UPC	
QRATT	Q	Multi-mode	R	2 M	A	850nm	T	2km	T	ST/UPC	
NRB2T	N	Single mode	R	2 M	B	1310nm	2	20km	T	ST/UPC	

For FOM card

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

opt =	**Description**	**Note**
NHB3S (was 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
NHB5S (was SBB)	Single optical module with dual uni-directional fiber, 1310 nm, SC optical connector, 50 km ***– L1.1***	• Use dual fiber • Units delivered ITU-T G.957 application code
NHB3F (was SCC)	Single optical module with dual uni-directional fiber, 1310 nm, FC optical connector, 30 km ***– S1.1***	• Use dual fiber • Units delivered ITU-T G.957 application code
***NHC2S (was SDD)**	Single optical module with dual uni-directional fiber, 1550 nm, SC optical connector, 20 km ***– S1.2***	• Use dual fiber • Units delivered ITU-T G.957 application code * For the orders of the listed optical modules, please contact your Loop sales representative.
NHCUS (was SEE)	Single optical module with dual uni-directional fiber, 1550 nm, SC optical connector, 100 km ***– L1.2***	• Use dual fiber • Units delivered ITU-T G.957 application code

WHD2S (was 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
WHE2S (was 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 Loop sales representative.

Loop-AM3440-E Access DCS-MUX Product Specifications

AM3440-E-CHEA with on-board CCPA Controller

Number of Ports	2
Speed	10/100/1000M bps
Connector	RJ45 for twisted pair GbE, LC for optical GbE, auto detection
Ethernet Function	
Basic Features	MDI/MDIX for 10/100/1000M BaseT auto-sensing Ping function contained ARP
Pseudowire	
Concurrent PW	Up to 64
Encapsulation Format	SAToP, CESoPSN, MEF-8 (CESoETH)
QoS	User configurable 802.1p CoS, ToS in out-going IP frame
Clock Source	Internal, Line Interface, External (E1/T1/2048 KHz), Adaptive Clock Recovery for Pseudowires, SyncE
Alarm Relay	Max. Current: 1A for 24VDC, 0.625A for 48VDC Fuse alarm, performance alarm
Management	
Console	Micro USB Connector User Interface: Menu driven VT-100
Ethernet	2 Combo GE port, Connector: RJ45 & SFP SNMPv1/v3, Telnet/SSH, support Radius client function Web GUI Support (optional)
Inband Management	Inband 64 Kbps, support HDLC/PPP
System Configuration Parameters	Active Configuration, Stored Configuration, and Default Configuration (Stored in Non-volatile Memory)
Performance Monitor	
Performance Registers	Last 24 hours performance in 15 minute intervals and last 7 days in 24 hour summaries
Separate Registers	Network, user, and remote site
Performance Reports	Reports include E1 Bursty Errored Second, Severe Errored Second, Degraded Minutes. Also available in Statistics (%)
Alarm Queue	To record the latest alarm type, location, date and time
Threshold	Bursty Seconds, Severely Errored Second, Degraded Minutes
Diagnostics	
Loopback	E1/T1 interface (Line Loopback, Payload Loopback, Local Loopback), DTE Loopback (DTE-to-DTE, DTE to Line)
Test Pattern	For Controller: 2^{20}-1, 2^{15}-1, 2^{11}-1, 2^{9}-1, and 4-byte user define pattern
Front Panel	
Controller LED Indicators	Power, ACTIVE, ALARM

Certification

EMI/EMC	EN55032 Class A, BS EN55032 Class A, EN55035, BS EN55035, FCC Part 15 Class A
Safety	EN62368-1, BS EN 62368-1

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

AM3440-E-CHEB with on-board CCPB-8GEHSWa Controller

Number of GE Ports	8 SFP
Speed	4 ports 1000Mbps and 4 ports 100/1000Mbps
Ethernet Function	
Basic Features	Dual rate SFP with autodetection Ping function contained ARP
Circuit Emulation	
Concurrent PW	Up to 64
SAToP	Unframed E1/T1 packets
CESoPSN	Fractional E1/T1 (N x DS0) packets
Clock Source	Internal, Line Interface, External (E1/T1/2048 KHz from SCLKa/SCLKb*/SCLKc* module, 1PPS/TOD from SCLKc*), Adaptive Clock Recovery for Pseudowires, SyncE
Alarm Relay	Max. Current: 1A for 24VDC, 0.625A for 48VDC Fuse alarm, performance alarm from SCLKa/SCLKb* module
Encapsulation	
TDM	over MPLS, over Carrier Ethernet, over IP (using pseudowire)
IP	over MPLS (using pseudowire)
Ethernet	VPWS, VPLS (using pseudowire)

QoS

Eight priority queues
Scheduling – Strict Priority, Weighted Round Robin with hierarchy
Ingress policing per service
Egress shaping per service
CIR / PIR (EIR) Two-rate, three-color. (committed information rate, peak or expected information rate)
E-LSP: EXP-Inferred PSC (Per Hop Behavior Scheduling Class), LSP (label switching path)
WRED for congestion management. (weighted random early detection)

Management	
Console	Electrical: RS232; Connector: DB9, female; Micro USB User Interface: Menu driven VT-100
Ethernet	GE port, Connector: RJ45 SNMPv1/v3, Telnet/SSH, support Radius client function Web GUI support (optional)
Inband Management	Inband 64 Kbps, support HDLC/PPP
System Configuration Parameters	Active Configuration, Stored Configuration, and Default Configuration (Stored in Non-volatile Memory) Configuration Upload/Download through TFTP/SFTP
Performance Monitor	
Performance Registers	Last 24 hours performance in 15 minute intervals and last 7 days in 24 hour summaries
Separate Registers	Network, user, and remote site
Performance Reports	Reports include E1 Bursty Errored Second, Severe Errored Second, Degraded Minutes. Also available in Statistics (%)
Alarm Queue	To record the latest alarm type, location, date and time
Threshold	Bursty Seconds, Severely Errored Second, Degraded Minutes
Diagnostics	
Loopback	E1/T1 interface (Line Loopback, Payload Loopback, Local Loopback), DTE Loopback (DTE-to-DTE, DTE to Line)
Test Pattern	For Controller: 2^{20}-1, 2^{15}-1, 2^{11}-1, 2^{9}-1, and 4-byte user define pattern
Front Panel	
Controller LED Indicators	Power, ACTIVE, ALARM

Standards Compliance

IEEE		**RFC (IETF)***	
802.1d	STP	2131 & 2132	DHCP
802.1w	RSTP	6378	MPLS-TP Linear Protection
802.1s	MSTP	1058	RIPv1
802.1q	VLAN	1389	RIPv2
802.1ad	Tag Stacking (Q-in-Q)	2328	OSPFv2
802.3ag	Ethernet OAM	5340	OSPFv3
802.3ah	Ethernet in the First Mile	3895	Pseudowire End-to-end Emulation (PWE3)
1588 v2*	Precision Time Protocol		
ITU			
G.8113.2*	MPLS-TP OAM		

Y.1731	Ethernet OAM
G.8031	ELPS
G.8032	ERP

*Future Option

Certification

EMI/EMC	EN55032 Class A, BS EN55032 Class A, EN55035, BS EN55035, FCC Part 15 Class A
Safety	EN62368-1, BS EN 62368-1

Physical /Electrical

Model		AM3440-E-CHEA	AM3440-E-CHEB
Dimensions		442 x 44 x 297 mm (W×H×D)	442 x 44 x 320 mm (W×H×D)
Power		Single/ Dual -48 Vdc (-36 to -72 Vdc) Single/ Dual AC plug-in power supply (100 to 240 Vac, 50/60 Hz)	Single/ Dual -48 Vdc (-36 to -72 Vdc) Single/ Dual AC plug-in power supply (100 to 240 Vac, 50/60 Hz)
Temperature	Operating	-20 to 65°C	0 to 55°C
	Storage	-30 to 70°C	-30 to 70°C
Weight	Net Weight	5.5 Kg (12.13lbs)	5.5 Kg (12.13lbs)
	Max. Weight	7.5 Kg (16.53lbs)	7.5 Kg (16.53lbs)
Humidity		0-95%RH (non-condensing)	
Mounting		Desk-top stackable, 19” /23” rack mountable	
Power Consumption (Max.)		30 Watts	65 Watts

Transportation Cards

Network Line Interface - T1

Line Rate	1.544 Mbps ± 50 bps	Output Signal	DSX1
Line Code	AMI or B8ZS	Framing	ESF, ESF&T1.403, G.802, D4
Input Signal	ABAM cable length up to 655 feet	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	ESF, ESF&T1.403, None, D4
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)		

Fiber Optical Interface (FOM)

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/ Interface	Distance (km)	Power (dB)
NHB3S (was SAA)	Dual uni-direction	1310	SC/UPC	30	19
NHB5S (was SBB)	Dual uni-direction	1310	SC/UPC	50	30
NHB3F (was SCC)	Dual uni-direction	1310	FC/UPC	30	20
*NHC2S (was SDD)	Dual uni-direction	1550	SC/UPC	20	12
NHCUS (was SEE)	Dual uni-direction	1550	SC/UPC	100	30
WHD2S (was SSM)	Single bi-direction (master)	1310/1550	SC/UPC	30	20
WHE2S (was SSS)	Single bi-direction (slave)	1310/1550	SC/UPC	30	20

NOTE: Other fiber optical options available on special order

* For the orders of the listed optical module, please contact your Loop sales representative.

Serial and Digital Access

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 (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

1CD G.703 Co-directional

Data Port	1 port
Interface	ITU G.703 64 Kbps co-directional interface
Connector	120ohm, RJ48
Line Distance	Up to 500 meters

Loopback	DTE Payload Loopback, Local Loopback

Voice and Analog Access

Voice Card (QEMA)

Connector	One 44-pin connector, adapter cable included for 4 RJ45 connectors.
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or μ-law, user selectable as a group
Impedance	Balanced 600Ω or 900Ω
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	± 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 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 (QFXOA)

Connector	Four RJ11 connector	
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	
Gain Adjustment	-15 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	
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
Signaling Bit A,B,C,D	Per-port configurable	

- 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.

NOTE: The default setting for signaling bits is ETSI and for trunk condition is ON-HOOK.

Voice Card (QFXSA)

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

Connector	1, 2, 3, or 4 FXS per RJ11 connector
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, 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 signalling compatibility between a telephone and a switch, or between a PBX and a switch.

Voice Card(QMAGA)*

Connector	RJ11 x 4
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	-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) 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	Programmable

- 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

*Future Option

Data Processing

Analog Bridge Card (ABRA)

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 (MJU 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
1:1 Card Protection[NOTE]	Dual-card redundancy

NOTE: Supported by AM3440-E-CHEA SW V12.05.01 and AM3440-E-CHEB SW V33.01.01 and up.

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

Packet Access

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

Teleprotection Access

Mini C37.94 Card

ZRATT

Multi-Mode, 2Mbps, 820nm, 2KM, ST/UPC connector

Tx						Rx						Note
Power (dBm)			Wavelength (nm)			Power (dBm)			Wavelength (nm)			
Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
-19.8	--	-12.8	792	820	865	-25.4	--	-9.2	792	820	865	50/125μm Fiber Cable
-16	--	-9				-25.4	--	-9.2				62.5/125μm Fiber Cable

QRATT

Multi-Mode, 2Mbps, 850nm, 2KM, ST/UPC connector

Tx						Rx						Note
Power (dBm)			Wavelength (nm)			Power (dBm)			Wavelength (nm)			
Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
-23	--	-11	790	--	870	-32	--	-11	790	--	870	50/125μm Fiber Cable
-19	--	-11				-32	--	-11				62.5/125μm Fiber Cable

NRB2T

Single-Mode, 2Mbps, 1310nm, 20KM, ST/UPC connector

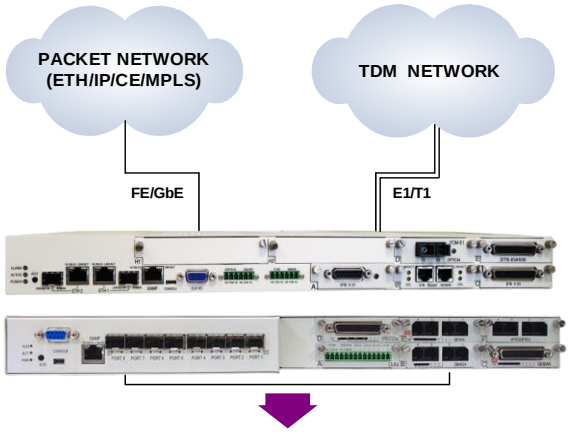
Tx						Rx						Note
Power (dBm)			Wavelength (nm)			Power (dBm)			Wavelength (nm)			
Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
-20	--	0	1261	1310	1360	-32	--	0	1260	--	1610	

Clock and Alarm

CLKa Card Specifications

Clock Input (CLK1_In, CLK2_In)	2.048Mbps, 1.544Mbps, 2048KHz
Clock Output (CLK1_Out)	2.048Mbps, 1.544Mbps, 2048KHz
Alarm Output (Fuse, SYS_ALM)	Max. Current: 1A for 24VDC, 0.625A for 48VDC
	Fuse alarm, System alarm
LED Indicator	Multi-color LED indication

Application Illustration



Mini Slot Plug-in Cards

- 1-channel T1 interface card
- 1-channel E1 plug-in card with 75ohm
- 1-channel E1 plug-in card with 120ohm
- Mini Quad E1 plug-in card with 75ohm
- Mini Quad E1 plug-in card with 120ohm
- Mini Quad T1 plug-in card
- Fiber Optical Module
- 1-channel X.21 plug-in card
- 1-channel V.35 plug-in card
- 1-channel RS232 plug-in card
- 3-channel RS232 plug-in card
- 1-channel OCU-DP Interface card
- 1-channel G.703 Co-Directional plug-in card
- 1-channel C37.94 mini plug-in card
- 4-channel E&M voice plug-in card
- 4-channel FXS voice plug-in card
- 4-channel FXO voice plug-in card
- 4-channel magneto voice plug-in card*
- Echo Cancellation plug-in card
- Analog Bridging plug-in card
- 2-LAN ports/64 WAN port router/bridge plug-in card
- CLKa Mini Slot plug-in card

* Future Option

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LOOP TELECOMMUNICATION INTERNATIONAL, INC.
ISO 9001 / ISO 14001 / ISO 27001

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