iSAP2000

E1, Data, Ethernet, Voice Managed Multiplexer (2U)

The iSAP2000 is a 2U 19" 6 slots rack type E1 Time Division Multiplexer for fractional E1 network across, which is designed for nonstop operation. There are 6 slots available for hot-swappable I/O cards and two slots are provided for power supplies. Uplink supports E1 copper connection, maximum up to 96x E1 cross connect for Voice and Data. The iSAP2000 optionally accommodates up to two separate power supplies, which may derive power from AC (110/220) or DC (-36~72V) power sources. When two power supplies are installed, the modules provide complete power redundancy and are hot swappable even during the E1 cards' transmission. The iSAP2000 provides E1 copper uplink, the maximum E1 supports up to 96 E1 channels with cross connection for Voice and Data, the interface included RS232, G64K, V35, FXS, FXO, ET100, FOM01, FOM02 & E&M. CTC Union also provides and maintains our own SmartView EMS (Element Management System) which is a Java based client/server manager for monitoring, configuration, maintenance, or troubleshooting a large number of network elements over a long period of time.

Interface Cards

- E1 card: 5100-8E1, 5100-16E1
- Power modules: 2000-AC240, 2000-DC48

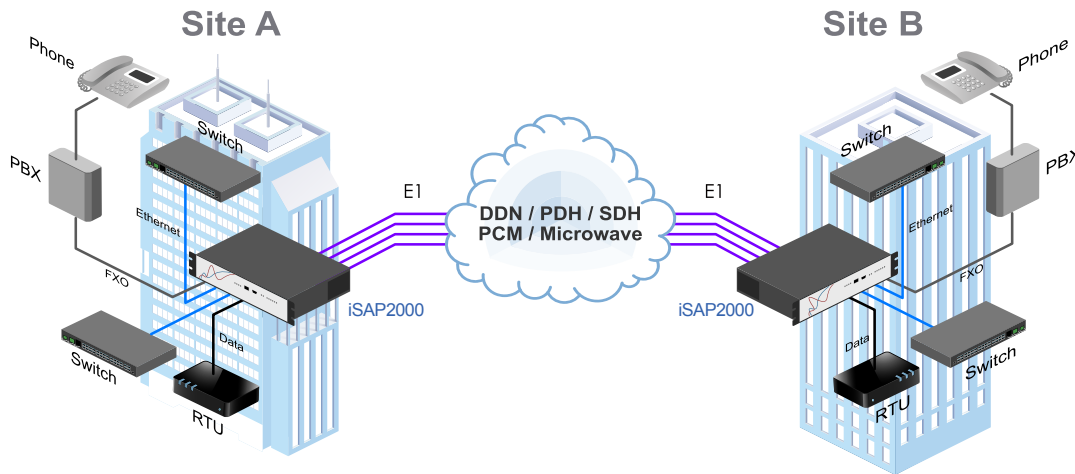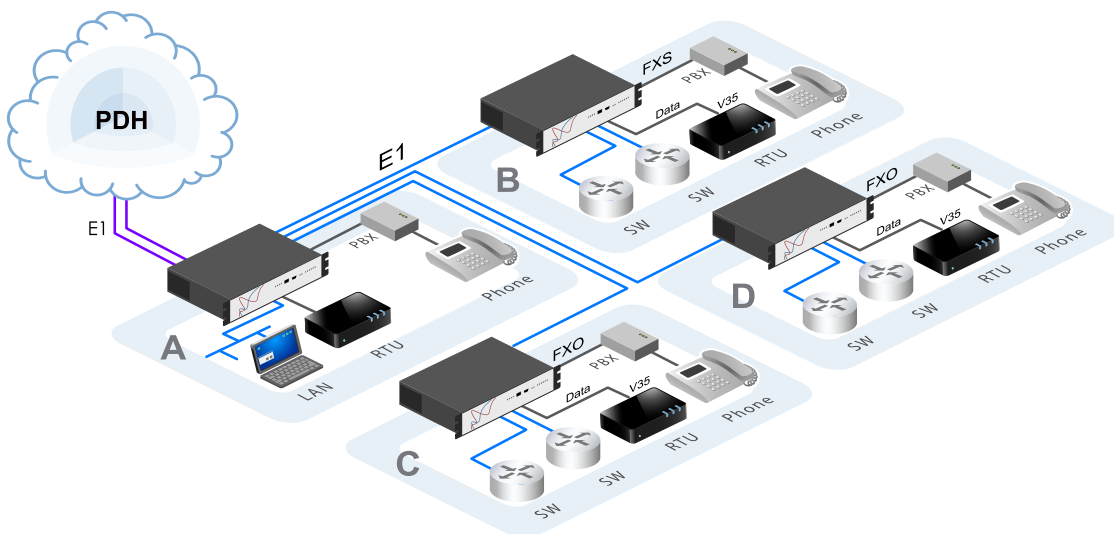- I/O cards: 5100-RS232, 5100-RS232/C, 5100-N*64K/V35, 5100-G64K , 5100-ET100, 5100-E&M , 5100-FXS , 5100-FXO

Features

- Supports MAX. 96xE1 with full cross-connect, Supports DS0 cross-connect
- Supports 16 channel Main E1 LTU card
- Supports E1 time slot broadcast function
- Modular design for Voice I/O card, the voice I/O card has two sub-module, each sub-module supports 4-port FXO/FXS

- All modules and cards support hot-swapping
- DCE card types included N*64K, RS232(Sync/Async), G703-64K,
- ET100, ET100R, E&M, FXO, FXS, FOM01, FOM02...etc.
- Supports Console, Telnet, SNMP and GUI management
- Available types of power built-in : AC+AC, AC+DC, DC+DC
- Modular design, 2U 19", 6-slot for I/O cards

Specifications

Management	
NMS	10/100Base-TX
Console	RS232
5100-8E1, 5100-16E1	
Interface	Supports 8E1, 16E1 two types interface
E1 Cross connect	96 x E1 transparent cross connect, supports E1, time slot
CAS cross connect	Supports 16 time slot CAS follow voice time cross connect
Line Impedance	120 / 75 ohms
Frame format	CAS(PCM30)/CCS(PCM31)
Connector	RJ45
5100-RS232	
Data rate	≤38.4kbps Async or 64/128kbps Sync
Ports	6-port
Interface	RS232
5100-N*64K/V35	
Data rate	N × 64kbps(N=1~30 or 31)
Ports	4-port
Connector	V.35 Interface
5100-G64K	
Data rate	64Kbps, Co-directional, Contra-directional and Centra-directional
Ports	4-port
Connector	RJ45
5100-ET100	
Standards	IEEE 802.3, 802.3u
MDI/MDIX	Auto
Data rate	10/100Mbp
Ports	4-port
Connector	RJ45
5100-E&M	
Loop current	5~30 mA, maximum 70mA
Ports	8-port
Connector	RJ45
5100-FXS	
ITU-T Standard	G.712/G.713/G.714

Line resistance	600Ω
Off-hook current	25mA
Line distance	2km
Ports	8-port
On-hook current	10mA+/-3mA
Effective Ring	Frequency: 25Hz Voltage: 75V, peak to peak110V MAX line resistance: 1500Ω
Connector	RJ45
5100-FXO	
ITU-T Standard	G.712/G.713/G.714
Line resistance	600Ω
Line distance	2km
Ports	8-port
Caller ID	Supports DTMF, FSK Standard
Connector	RJ45
5100-FOM01/FOM02	
Uplink Fiber port	Ports: 1-port (iSAP5100-FOM01), 2-port (iSAP5100-FOM02)
	Data rate: 155Mbps Connector: FC Distance: 20km
Ethernet Interface	Compliance: IEEE 802.3/802.3u
	Ports: 2- Port Connector: RJ45 Data rate: 10/100Mbps (full duplex, AUTO MDI/MDIX)
E1 Interface	Ports: 4 channels
	Connector: RJ45 or BNC with RJ45 to BNC cable
	Line code: HDB3
	Line resistance: 75Ω(unbalance) or 120Ω(balance)
	Pulse amplitude: Nominal 2.37V(75Ω) or Nominal 3.00V(120Ω)
	Standard : ITU G.703, G.704, G.732, G.823
Electrical & Mechanical	
Dimensions	440 × 300 × 88mm (D x W x H)
Environmental	Operating: 0~60°C Storage:-25~70°C Humidity: 10~90%, non-condensing
Power	AC 220V: 165~265V, 50~60Hz DC -48V:-36~-76VDC
Power Consumption	< 40W

2019 v1.0
www.ctcu.com / sales@ctcu.com
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Figure1 : Point to Multi-points 16E1 aggregation

Figure2 : Point to Multi-points 63E1 aggregation over STM-1

Ordering Information

Model Name	Type	Description
iSAP2000-CH	Chassis	2U 19" 6 slots Chassis with bulit-in CPU card, power modules not included
iSAP2000/AC	Power	AC power plug-in module (165 to 265 VAC)
iSAP2000/DC	Power	DC Power plug-in module (±36 to ±76 VDC)
iSAP-EMS	Software	EverLink2000 EMS software for iSAP5100 and iSAP2000
iSAP5100-8E1R	Main E1 card	8 channels Main-E1 LTU card: Fractional E1 RJ45
iSAP5100-16E1R	Main E1 card	16 channels Main-E1 LTU card: Fractional E1 RJ45
iSAP5100-CAB-RJ45/4BNC	Cable	2ch E1 RJ45 to 4BNC cable (1.5 meter)
iSAP5100-FOM01	FOM Card	4E1 + 2x 10/100BaseT Fiber Multiplexer Card
iSAP5100-FOM02	FOM Card	4E1 + 2x 10/100BaseT Fiber Multiplexer with 1 + 1 Protection Card
iSAP5100-FXO	Voice card	8 channels FXO interface card
iSAP5100-FXS	Voice card	8 channels FXS interface card
iSAP5100-E&M	Voice card	8 channels 2/4 wires E&M voice interface card
iSAP5100-RS232	RS-232 card	6 channels RS-232 interface card (V4.0), Low speed: 128kbps 19.2kbps Async
CAB-DB62DB25F6-232-LS	Cable	RS-232 adapter cable for low speed: DB62 Male to 6x DB25 Female, 1M
ISAP5100-ET100	FE card	4 channels 10/100Base-TX Ethernet Bridge card
iSAP5100-DATA	Data card	4 channels V.35/X.21/RS530/RS449 cards
CAB-HP68MB34F4-V35	Cable	V35 adapter cable for High speed: HP68 Male to 4x MB34 Female, 1M
CAB-HP68DB25F4-530	Cable	RS530 adapter cable for High Speed: HP68 Male to 4x DB25 Female, 1M
CAB-HP68DB15F4-X.21	Cable	X21 adapter cable for High speed: HP68 Male to 4x DB15 Female, 1M
CAB-HP68DB37F4-449	Cable	RS449 adapter cable for High Speed: HP68 Male to 4x DB37 Female, 1M
iSAP5100-G64K	64K co-directional card	4 channels G.703 64kbps co-directional card

Chassis
iSAP2000 – ☐☐
Example: iSAP2000 – CH

Card Type
iSAP2000 – ☐☐☐☐
Example: iSAP2000 – 8E1R

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

iSAP5100-MS-DM-96
iSAP5100-MS-DM-155

CPU Control SNMP Management Card

The iSAP5100 has two dedicated slots for installing two CPU control cards that automatically work in redundant operation mode. Both iSAP5100-MS-DM-96 and iSAP5100-MS-DM-155 CPU control cards have an RS-232 serial port on a DB9 female connector for connection of any standard dumb terminal and RJ45 jack with 10/100BaseTX Ethernet connector for IP based management. The iSAP5100-MS-DM-155 CPU card also has one STM-1 155Mbps SFP slot for fiber uplink. The SNMP management supports remote telnet management with the same user friendly menu interface as local console. SNMP can be use by compiling the enterprise MIB into your favorite network management software.

Features

- RS-232 port for dumb terminal at 9.6k, 8bit, no parity
- SNMP V1 and V2C support
- MIB file compliant to MIB-II ASN.1
- Firmware upgrade by TFTP
- Hot swappable

Specifications

Electrical Interface	Console RS-232 port
	LAN 10/100Base-TX
Fiber Interface	STM-1 155Mbps
Network Management	Telnet, SNMP, EMS, local console port

Dimensions	340 x 145x 32mm (WxDxH)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

iSAP5100-8E1R
iSAP5100-16E1R

Main E1 Aggregate Card

The main E1 aggregate card can be slid randomly in any slot of iSAP5100/iSAP2000 chassis for installing E1 aggregate cards. Currently E1 cards are available with 8 or 16E1 ports. In the backplane design of the iSAP5000/iSAP2000, a maximum of 144 E1s can carry data to and from tributary (I/O) cards. One typical application could be to install main E1 cards in the chassis and have the cards act as one master and one hot-standby card for E1 redundancy. For other applications, the main E1 cards could be used to cross connect E1 timelots prior to assignment to the 144 available backplane channels. Another application can use the 'extra' E1 aggregate channels for drop & insert (Sub-E1) rather than performing cross connection. It can quickly be seen that a large number of applications are possible with the iSAP5000/iSAP2000's flexible design.

Features

- Available in 8,16 E1 channels
- Supports PCM31 or PCM30 framed/unframed
- Path / Card Redundancy / Hot Swappable
- E1 timeslots can support cross-connect function
- E1 channel can act as Sub-E1 for drop & insert

Specifications

Frame format	CAS(PCM30) / CCS(PCM31) ; CRC on/off , framed/unframed
Bit rate	2.048Mbps
Line codes	HDB3/AMI
Rx sensitivity	0 ~ -43dB
Tx driver	1.5km over 0.5mm E1 cable
Line impedance	75 ohms (unbalanced) 120 ohms (balanced)

Pulse amplitude	nominal 2.37V (75ohm) nominal 3.00V (120ohm)
Pulse shape	According to ITU-T G.703
Dimensions	23 x 181 x 197mm (WxDxH)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

9-5

2019 v1.0
www.ctcu.com / sales@ctcu.com
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

iSAP5100-RS232

RS232 Sync/Asyn Card

The iSAP5100-RS232 Sync/Async RS232 Serial Card provides six independent RS-232 data channel capability. Incorporating six separate channels, each channel can independently assign any Nx64 timeslots from the aggregate E1. The single DB62 connector mates to a 1 to 6 cable that terminates to DB25 female connectors. These serial data channels may be linked to leased line modems for further extension or connected to other data terminal or data acquisition devices. When configured for synchronous use, the data connectors carry both clock and data. For asynchronous use, the clock signals can be ignored.

Features

- Six independent channels
- N x 64 setting from any E1 channel
- Transparent asynchronous rates up to 115.2kbps
- Synchronous 64 or 128Kbps, DCE mode
- Diagnostic loop backs
- Hot swappable

Specifications

Datacom interfaces	ITU-T V.24 compliant
	Multiplexing Nx64K data onto E1 time-slot
Data speed	N x 64K (N=1 to 2)
Data access	RS-232, supplied with corresponding interface cable
Access mode	DCE
Diagnostics	Local /Remote /Bi-directional Loop

Dimensions	23 x 181 x 197mm (WxDxH)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

iSAP5100-G64K

G.703 64K Co-directional Card

The iSAP5100-G64K Card provides 4 independent G.703 64Kbps Co-directional data channel capability. Each channel can independently assign any 64Kbps timeslot from the aggregate E1. Individual Shielded RJ-45 connectors that conform to USOC RJ-48C standard wiring provide the G.703 connections. Standard UTP or alternately shielded UTP are both acceptable cabling media. These data channels may be linked to multiplexers, terminal equipment or satellite/micro-wave transmission equipment. In Co-directional signaling, the clock signals are recovered from the received G.703 data stream. Only Tx and Rx pairs or a total of 4 wires are required in 64Kbps co-directional transmission.

Features

- 4 independent channels
- 1x 64 setting from any E1 channel
- Transparent synchronous rate of 64kbps
- Co-directional clock recovered from Rx G.703
- Diagnostic loop backsHot swappable
- LED indicators for Power, Alarm, Tx/Rx activity
- Hot swappable

Specifications

Data interface	ITU-T G.703, G.823 64kbps compliant
	Multiplexing 1x 64K data onto E1 time-slot
Data speed	64Kbps +/-100ppm
Data access	RJ-45 per USOC RJ-48C standard
Line code	Co-directional
Pulse shape	according to G.703
Transmit distance	600M or less (0.5~0.7mm TP)

Diagnostics	Local /Remote /Bi-directional Loop
Dimensions	23 x 181 x 197mm (WxDxH)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

2019 v1.0
www.ctcu.com / sales@ctcu.com
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

9-6

iSAP5100-Data

N x 64 Synchronous Serial Card

The iSAP5100-Data Nx64 Serial Card provides V.35/ X.21/ RS-530/ RS-449 Synchronous data capability. Incorporating four separate channels, each channel can independently assign any Nx64 timeslots from the aggregate E1. The single HD68 connector mates to a 1 to 4 cable that terminates to the required connector type. Four different cables provide connection to V.35's MB34, X.21's DB15, RS-530's DB25 or RS-449's DB37 female connectors. Please be sure to select the right cable for your application when ordering this card.

Features

- Four independent Synchronous channels
- N x 64 setting from any E1 channel
- Each channel operates in native DCE mode
- Diagnostic loop backs

- LED indicators for Power, Alarm, RD/TD activity
- Hot swappable

Specifications

Datacom interfaces	ITU-T and ANSI compliant
	Multiplexing Nx64K data onto E1 time-slot
Data speed	N x 64K (N=1 to 30, or 31)
Data access	RS-530, RS-449, V.35, X.21, supplied with corresponding interface cable
Access mode	DCE
Diagnostics	Local /Remote /Bi-directional Loop

Dimensions	23 x 181 x 197mm (WxDxH)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

iSAP5100-ET100

Fast Ethernet Bridge Card

The iSAP5100-ET100 Ethernet Bridge Card provides Ethernet over E1 capability. Incorporating four separate channels, this transparent bridge supports industry standard HDLC encapsulation. The WAN data rate depends on the number of E1 timeslots assigned (Nx64). The front panel has four RJ-45 shielded connectors for connection of 10/100Base-TX Ethernet and status LEDs for each channel to display link state, speed, duplex and activity

Features

- Four independent Ethernet over E1 channels
- Utilizes HDLC WAN encapsulation
- MAC Address learning table with 5 minute aging
- Auto-MDIX and Auto-Negotiation
- Hot swappable

Specifications

Standards	IEEE 802.3, IEEE 802.3u
Ports	4-port RJ45
Throughput latency	1 frame
MDI/MDIX	Auto
Buffer	4K bits
Encapsulation	HDLC
Data rate	10/100Base-TX

Packet side	64 ~ 1522 bytes
Dimensions	23 x 181 x 197mm (WxDxH)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

9-7

2019 v1.0
www.ctcu.com / sales@ctcu.com
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

iSAP5100-E&M

E&M Voice Card

The iSAP5100-E&M Voice Card provides eight independent Ear & Mouth Voice channel capability. Each channel can independently assign any 64Kbps timeslot from the aggregate E1. Individual Shielded RJ-45 connectors provide the voice connections. Standard UTP or alternately shielded UTP are both acceptable cabling media. These voice channels may be linked to PBX (Private Branch Exchange) to facilitate voice to voice connections. The channels support selection of Type 1~5, support 2 or 4 wire operation and have 0.5dB steps for signal attenuation.

Features

- Eight independent channels
- 2/4 wire independent setting
- 1x 64 setting from any E1 channel
- E&M Signaling PBX trunks
- Provides E line, M line, SB (battery) and SG (ground) lines

- Supports types I, II, III, IV or V
- G.711 Codec
- LED indicators for Power, Alarm, activity
- Hot swappable

Specifications

Loop current	5~30 mA, maximum 70 mA
Return loss	300-600Hz >12dB (2W), 600-3400Hz >15dB (2W), 300-3400Hz >20dB (4W)
Group delay	@-10dBm0 <750uSec(2W) <600uSec(4W)
Total Distortion	according to ITU-T G.223
Channel crosstalk	< -65dB, 1020Hz@0dBm

Noise	< -65dBm0p weighted
Dimensions	23 x 181 x 197mm (WxDxH)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

iSAP5100-FXS

FXS Voice Card

The iSAP5100-FXS Voice Card provides eight independent Foreign Exchange Station Voice channel capability. These 8 channel tributary cards are designed for voice applications over E1. Typically, an FXS connects to a standard telephone set. The FXS needs to sense on-hook, off-hook or disconnected status. It also must be able to provide ring function to a telephone set and it must pass caller-ID information. In point-to-point application, the FXS can connect to a remote FXO (Foreign Exchange Office) when deployed as an extension from PBX (Private Branch Exchange) or PSTN (Public Switched Telephone Network). It may also connect to a remote FXS, also for extension from PBX or as a direct 'hotline' voice connection. Individual Shielded RJ-45 connectors provide the voice connections.

Features

- Eight independent channels
- 2 wire independent setting
- G.711 Codec
- 1x 64 setting from any E1 channel

- Provides ring function
- Supports caller-ID forwarding
- PSTN extension or direct "Hot-line"

- Links telephone to telephone or extends POTS
- LED indicators for Power, Alarm, RD/TD activity
- Hot swappable

Specifications

Effective ring voltage	AC 75VRMS +/-15V@25Hz +/-3Hz, <10% THD
Ring voltage at 300mA load	>50VACRMS
Loop resistance	<1.8K Ohms, including 300 Ohms for telephone
On-hook current	10mA +/-3mA
Off-hook loop current	18-50mA
Channel crosstalk	< -65dB, 1020Hz@0dBm

Noise	< -65dBm0p weighted
Surge protection	1000V, 10uSec transient response, decay to 50% in 700uSec 300VRMS for less than 200mSec; no component damage 220VRMS for 15 minutes; damage only local loop
Dimensions	23 x 181 x 197mm (WxDxH)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

2019 v1.0
www.ctcu.com / sales@ctcu.com
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

9-8

iSAP5100-FXO
FXO Voice Card

The iSAP5100-FXO Voice Card provides eight independent Foreign Exchange Office Voice channel capability. Each channel can independently assign any 64Kbps timeslot from the aggregate E1. Individual Shielded RJ-45 connectors provide the voice connections. Standard UTP or alternately shielded UTP are both acceptable cabling media. These voice channels may be linked to PBX (Private Branch Exchange) or PSTN (Public Switched Telephone Network) to facilitate voice to voice connections.

Features

- Eight independent channels
- 2 wire independent setting
- G.711 Codec
- 1x 64 setting from any E1 channel

- PCM30 R2 Signaling PSTN trunks
- Links PBX to PBX or extends POTS
- LED indicators for Power, Alarm, activity
- Hot swappable

Specifications

On-hook DC resistance	> 100K Ohms
Ring AC resistance	> 7.5K Ohms
Ring power sensitivity	< 50mW
Off-hook DC resistance	< 300 Ohms
Max. Input Voltage	70VDC
Max. Input Current	150mA
Channel crosstalk	< -65dB, 1020Hz@0dBm

Noise	< -65dBm0p weighted
Return loss	300-600Hz >12dB (2W) 600-3400Hz >15dB (2W) 300-3400Hz >20dB (4W)
Dimensions	23 x 181 x 197mm (WxDxH)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

---

iSAP5100-FOM01
iSAP5100-FOM02
Fiber Optical Multiplexer Card

iSAP5100-FOM card provides customers with two option types. The iSAP5100-FOM01 provides one single uplink fiber port while the ISAP5100-FOM02 provides dual 1+1 redundant uplink fiber ports. Both cards use 1x9 PDH155M standard optical interfaces, with FC connectors and 20km reach (which can be customized according to user needs). The 4xE1 multiplexer also provides 2 bi-directional wire-speed Fast Ethernet ports which support VLAN transparent transmission. The 4xE1 are fullytransparent to framing and clock. Through the main Control Card, you can flexibly set the 4xE1 and I / O modules and E1 crossconnect.

Features

- Single or dual uplink fiber ports
- Supports E1 and Ethernet Isolation
- Supports Ethernet transparent VLAN pass-thru

- Supports E1 frame and non-frame
- Hot swappable

Specifications

Uplink Fiber Port	1x port (iSAP2000-FOM01) or 2x port (iSAP2000-FOM02)
	Date Rate: 155M
	Connector : FC
Ethernet interface	Ports: 2x ports
	Connector : RJ45
	Rate: 10 / 100Mbps full duplex, auto-negotiation
E1 interface	Ports: 4x ports
	Connector : RJ45 or BNC (via RJ45 to BNC cable)

E1 interface	Line code: HDB3
	Line resistance: 75Ω (unbalanced) or 120Ω (balanced)
	Pulse amplitude: Nominal 2.37V (75Ω) or Nominal 3.00V (120Ω)
	ITU-T Standard: G.703, G.704, G.732, G.823
Dimensions	23 x 181 x 197mm (WxDxH)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs