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Digital Transmission Equipment

D9408 Advanced ATM Adapter

Description

The D9408 Advanced ATM adaptor enables broadcasters and telecom operators to take advantage of the added flexibility and cost savings in video and IP transmission via ATM.

The D9408 is adaptable for a wide range of digital broadcasting applications, such as broadcast services over SDH, PDH, ATM or fiber networks. This includes advanced applications like high-quality video contribution services and distribution services such as DVB/DTV applications.

Its build-in redundancy and protection switching features enable high availability and support for uninterrupted operation.

Providing scalable redundancy, ranging from redundant power supplies, over redundant network interfaces up to redundant service cards, the D9408 provides flexible configurations which are adaptable to varying needs and requirements. It helps you to make use of your existing infrastructure with the highest reliability and availability of services. Supporting multiple levels of protection switching, the D9408 eliminates the need for external components such as ASI or network backup switches. Therefore, it can reduce the cost of the installation and add fast protection switching without intervention of a management system.

Features

- 8 Service slots, can be equipped with up to 32 ASI interfaces or
    - E1/T1, and various network interfaces
    - Ethernet bridging modules
    - Ring controller, for ring configurations or for connecting two different ATM networks
- 2 Aggregation slots provides connections to SDH/SONET, ATM and PDH networks
    - STM-1/OC-3C or STM-4/OC12C optical
    - G.703 E3/DS3 - software configurable between E3 or DS3
- Scalable redundancy
- Doubled AC and/or DC-PSUs (mixed configuration possible)
- 2 Controller slots
- Passive backplane (8 Gbps)
- Redundant data path & redundant control path
- Hot-swap and Hot-plug support
- 3 RU 19" rack-mountable
- External fan unit (forced cooling)
- Web-based GUI and SNMP management interface
- Monitored and controlled with ROSA® Network Management System and ROSA Element Manager

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Specifications

General

Environmental	
Operation temperature range	0 to +40°C / 32 to 104°F
Storage temperature range	-40 to +70°C / -40 to 158°F
Relative humidity	+40°C / 104°F 95% Relative Humidity non-condensing
Altitude	70 to 106 kPa.
Dimensions (W x H x D)	484 x 133 x 332 mm / 19 x 5.2 x 13.1 in. 3 RU, 19" rack mountable
Weight	Max. 12 kg / 26.5 lbs
Cooling	Passive (1 RU free rack space below and above the system required). The use of a fan is recommended in case of fully equipped devices or without air-conditioned and forced cooling in racks (sees specification and ordering info below).

Power Requirements	
AC Power	
Voltage range	100 V – 240 AC V
Line frequency	50 – 60 Hz
Consumption	≤ 320 W fully equipped
DC Power	
Voltage range	36 V – 60 V DC
Consumption	≤ 320 W fully equipped

Fans	
No. of fans	10
Configurations	PSU1/ PSU2: AC/AC, AC/DC, DC/DC
Power consumption	60 VA (max.)
Fan speeds	Low or high
Air intake	At front panel
Air outlet	On the top
Alarm outputs	Fan alarm, PSU1 alarm, PSU2 alarm, each on 2 independent connectors
Alarm closures	Closing, 60 V, 2 A, 60 VA, Can be connected to system controllers for central SNMP trap generation.
Dimension (W x H x D)	445 x 45 x 380 mm / 17.5 x 1.8 x 15 in.

Aggregation Slots – 2 Slots

Network Interface Module	
The NIM card (Network Interface Module) builds the termination point of a network link. The physical line interface is installed on the NIM card as a module which allows easy adaptation to different physical networks. The network clock, recovered by the line interface, is provided as a 2 MHz reference clock on a MCX connector. All line interface modules can be configured to use the recovered network clock, an internal clock or an external PRC (primary rate clock) as their reference clock.	
Line interface modules	STM-4/OC12c S1.1, L1.1 and L1.2 STM-1/OC3c MultiMode, S1.1, L1.1 and L1.2 , Duplex SC, or BiDi G.703 DS3 G.703 E3
Ext. reference clock input	2 MHz, Connector MCX
Network clock output	2 MHz, Connector MCX

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Line Interface Modules

The following line interface modules fit on both the NIM- and the TIM-Card (see later) and are interchangeable.

E3/DS3

The E3/DS3 PDH module supports both, G.703 E3 and DS3 on a single module. The operation mode is selected by software.

	G.703 E3		DS3	
Connector	2 BNC, 75 Ohm, unbalanced		2 BNC, 75 Ohm, unbalanced	
Cable	Coax RJ59		Coax RJ59	
Max. reach	100 m		100 m	
Link rate [Mbps]	34.368		44.736	
Max. ATM cell rate [Cells/s]	ADM	PLCP	ADM	PLCP
	80.000	72.000	104.253	96.000
Line coding	HDB3		B3ZS	
Operation modes	G.832 ADM, G.751 ADM, and G.751 PLCP (selectable by software)		CBIT ADM, CBIT PLCP, M23 ADM, and M23 PLCP (selectable by software)	
OAM	F1 – F3			
Cell delineation	According to ITU-T I.432			
HEC processing	According to ITU-T I.432			
Scrambling	According to ITU-T I.432			
Reference clock	Internal, recovered network clock or external PRC (selectable by software)			

Optical STM-1 (OC3)

Optical interfaces are available for distances from 2km up to 80km. You can choose between duplex transceivers for use on a fiber pair, and BiDi-Interfaces interfacing to a single fiber, while still supporting for bi-directional traffic using different wavelength for TX and RX direction.

	Multimode	Single Mode			BiDi	
		S1.1	L1.1	L1.2	S1.1	L1.1
Connector	Duplex SC	Duplex SC			SC	
Fibre core [um]	62.5	9			9	
Max. reach [km]	2	15	40	80	10	40
Link rate [Mbps]	155.52					
Max. ATM cellrate [Cells/s]	353.207					
Line coding	NRZ					
Min. wavelength [nm]	1260	1261	1280	1480	1280/1480	1280/1480
Center wavelength [nm]	1310	1310	1310	1550	1310/1550	1310/1550
Max. wavelength [nm]	1360	1360	1335	1580	1360/1580	1360/1580
Min. output power [dBm]	-20	-15	-5	-5	-5	-3
Max. output Power [dBm]	-14	-8	0	0	0	2
Input sensitivity [dBm]	-31	-30	-31	-34	-34	-34
Saturation level [dBm]	-14	-8	-8	-7	-5	-5
Power budget [dBm]	11	15	26	29	29	31
Operation modes	SDH and SONET (selectable by software)					
OAM	F1 – F3					
Cell delineation	According to ITU-T I.432					
HEC processing	According to ITU-T I.432					
Scrambling	According to ITU-T I.432					
Reference clock	Internal, recovered network clock or external PRC (selectable by software)					

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Optical STM-4 (OC12c)

Optical interfaces are available for distances from 2km up to 80km. You can choose between duplex transceivers for use on a fiber pair, and BiDi-Interfaces interfacing to a single fiber, while still supporting for bi-directional traffic using different wavelength for TX and RX direction.

	STM-4 (OC12c)				
	Multimode	Single Mode		BiDi	
		S4.1	L4.1	S4.1	L4.1
Connector	Duplex SC	Duplex SC		SC	
Fibre core [um]	62.5	9		9	
Max. reach [km]	2	15	40	15	40
Link rate [Mbps]	622.08				
Max. ATM cellrate [Cells/s]	1.412.830				
Line coding	NRZ				
Min. wavelength [nm]	1270	1274	1280	1290/1530	-
Center wavelength [nm]	1330	1313	1310	1310/1550	-
Max. wavelength [nm]	1380	1356	1335	1330/1570	-
Min. output power [dBm]	-20	-15	-3	-15	-
Max. output Power [dBm]	-14	-8	2	-8	-
Input sensitivity [dBm]	-26	-28	-28	-28	-
Saturation level [dBm]	-14	-7	-7	-3	-
Power budget [dBm]	6	13	25	13	-
Operation modes	SDH and SONET (selectable by software)				
OAM	F1 – F3				
Cell delineation	According to ITU-T I.432				
HEC processing	According to ITU-T I.432				
Scrambling	According to ITU-T I.432				
Reference clock	Internal, recovered network clock or external PRC (selectable by software)				
SNMP support	SONET-MIB				

Service Slots – 8 slots

ASI Input Module

ASI Input Module	
DVB-ASI input connector	2 BNC 75 Ohm
DVB-ASI format	Burst- (Byte) or Packet Mode (auto-detect)
DVB-ASI A-B switch	Switch over on LOS and MPEG TS sync missing
DVB-ASI output connector	BNC 75 Ohm (active loop-through of active or selected input)
MPEG-TS rate	1.5 to 170 Mbps
MPEG-TS packet size	188 or 204 Byte (auto-detect)
MPEG-RS	According EN50083-9, MPEG TS packet correction in 204 Byte mode
AAL	AAL1, AAL1 FEC (ITU-T I.361.1), and AAL5 (ATMF VoD 2.0)
VPI range	0 to 255
VCI range	32 to 65535
Traffic shaping	Extended Dual-Leaky-Bucket
ATM output	2 high-speed serial links (parallel and redundant operation)

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Quad ASI Input Module	
DVB-ASI input connector	4 MCX 75 Ohm
DVB-ASI format	Burst- (Byte) or Packet Mode (auto-detect)
DVB-ASI A-B switch	Configurable, switch over on LOS and MPEG TS sync missing
DVB-ASI output connector	BNC 75 Ohm (active loop-through of active or selected input, selection 1 of 4)
MPEG-TS rate	1.5 to 170 Mbps
MPEG-TS packet size	188 or 204 Byte (auto-detect)
MPEG-RS	According EN50083-9, MPEG TS packet with error detection based on Reed Solomon
AAL	AAL1, AAL1 FEC (ITU-T I.361.1)
VPI range	0 to 255
VCI range	32 to 65535
Traffic shaping	Extended Dual-Leaky-Bucket
ATM output	2 high-speed serial links (parallel and redundant operation for every TS)

ASI Output Module	
VPI range	0 to 255
VCI range	32 to 65535
AAL	AAL1, AAL1 FEC (ITU-T I.361.1), and AAL5 (ATMF VoD 2.0)
Clock recovery	Adaptive Clock Recovery Method (Acc: 0.2 ppm, Wander: 0.02 ppm/s)
MPEG-TS rate	1.5 to 160 Mbps CBR (SPTS and MPTS)
MPEG-TS packet size	188 or 204 Byte
MPEG-RS	According to EN50083-9
DVB-ASI output connector	2 BNC 75 Ohm
DVB-ASI output format	Burst- (Byte) or Packet mode

Quad ASI Output Module	
VPI range	0 to 255
VCI range	32 to 65535
AAL	AAL1, AAL1 FEC (ITU-T I.361.1), and AAL5 (ATMF VoD 2.0)
Clock recovery	Adaptive Clock Recovery Method (Acc: 0.2ppm, Wander: 0.02ppm/s)
MPEG-TS rate	1.5 to 160 Mbps CBR (SPTS and MPTS)
MPEG-TS packet size	188 or 204 Byte
MPEG-RS	According to EN50083-9
DVB-ASI output connector	4 MCX 75 Ohm, 1x MCX 75 Ohm used as active monitor output
DVB-ASI output format	Burst- (Byte) or Packet mode

Quad E1/T1 Module (Bi-directional)	
The E1/T1 module supports 4 independent E1 or T1 interfaces. Each interface can be configured as E1 or T1 via software.	
VPI range	0 to 255
VCI range	32 to 65535
AAL	AAL1, AAL1 FEC (ITU-T I.361.1)
Connector	2 RJ48C
Framing E1	ADM (ITU-T G.804/G.832), PLCP (ETS 300 213)
Framing T1	ADM (ITU-T G.804/G.832), PLCP (Bellcore TR 772)

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Tributary Interface Module (TIM)

The Tributary Interface Module TIM is used as service slot card in the D9408. Different types of physical interface modules are supported. All optical and electrical STM-1 interface modules can be used as well as STM-4 as tributary interface. DS3/E3 is available as well. The Line Termination (LT) modules can be plugged on the universal carrier board.

VPI range	0 to 255
VCI range	32 to 65535
Shaping	Up to 2048 connections
Policing	Up to 2048 connections
Reference clock	2.048 MHz, ITU-T G.811, MCX connector

Quad E3/DS3 Tributary Interface Module

The Quad E3/DS3 service card (TIM) supports 4 ATM E3 or DS3 interfaces. The interfaces can be configured as E3 or DS3 independently via software. This module is typically ONLY used with the TIM card.

VPI range	0 to 255
VCI range	32 to 65535
Connector	8 MCX
Line coding E3	HDB3
Line coding DS3	B3ZS
Framing E3	G.832ADM, G.751ADM, G.751 PLCP
Framing DS3	CBIT ADM, CBIT PLCP, M23 ADM, M23 PLCP

Ethernet Bridging Module

The Ethernet Bridging Module is used to transmit Ethernet/IP traffic over ATM networks. It supports 10 and 100BaseT connections. Classical IP over ATM (CLIP) and the Spanning Tree algorithm are supported to establish logical subnets on ATM backbones.

VPI range	0 to 255
VCI range	32 to 65535
AAL	AAL5, RFC 2684
Connector	RJ45, patch cable
IP connections	Up to 16 LAN segments, 8k address entries
IP bandwidth	Up to 98 Mbps (depends on MTU size)

Ring Controller

The Ring Control card is used as service card in the D9408 product to support ring configurations or in order to connect two different ATM networks. It supports the traffic forwarding in a ring, the drop function on a destination interface or to activate ring loop backs in case of broken links within a ring.

With the ring controller card the traffic between two network interface modules can be managed. The user can specify to drop or forward all connections or to specify the pass or drop function on dedicated connections. For each connection statistics are available.
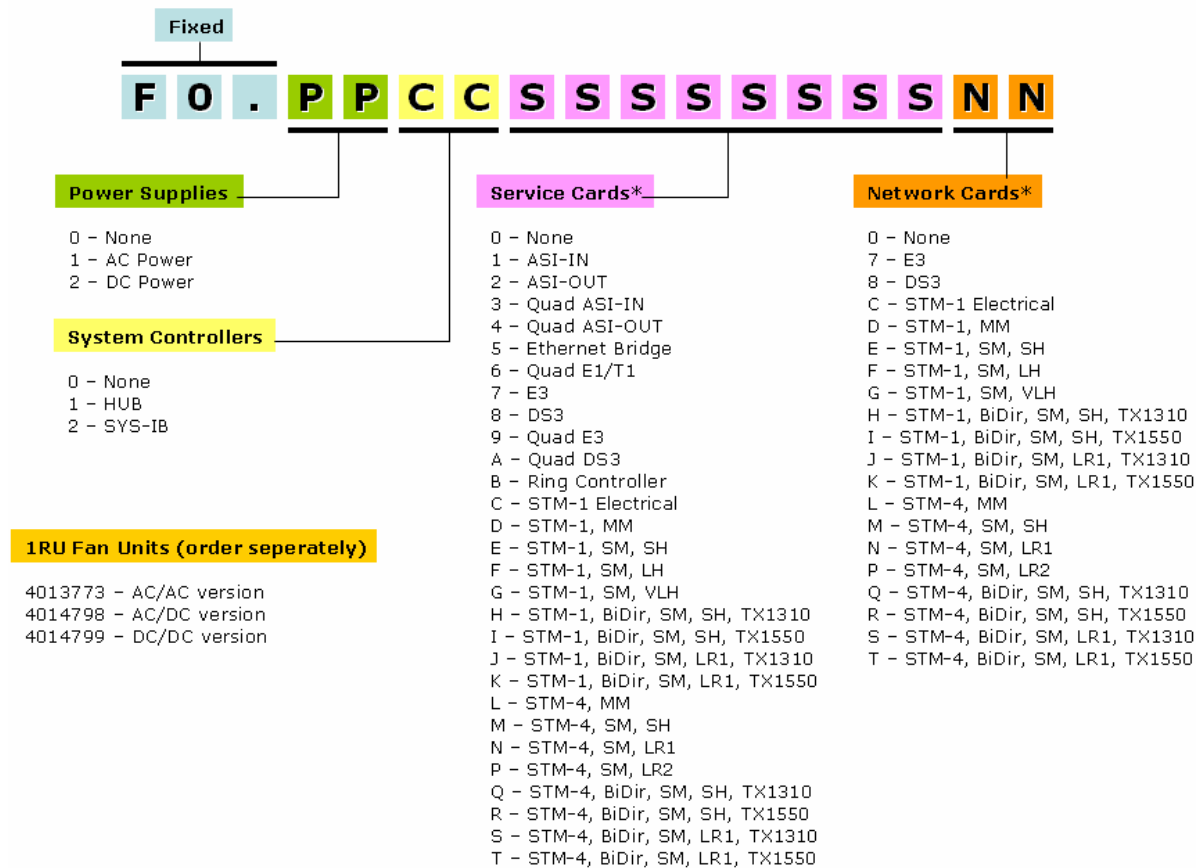
Rings with active backup connections in the opposite directions are supported as well as rings with passive, standby ring paths.

VPI range	0 to 255
VCI range	32 to 65535
Throughput	620 Mbps
Pass function	Up to 1024 connections
Drop function	Up to 1024 connections

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System Controllers	
User can select either the very simple HUB card or the more advanced SYS-IB that can also do IP over ATM and Ethernet bridging. In addition it also support 100BT on the management interface	
HUB	
Management interface	Console (RS232) and 10BaseT Ethernet
Alarm inputs	4 digital inputs with reference voltage to create alarms from fan
Alarm outputs	5 alarm outputs (dry contact)
SYS-IB	
Management interface	Console (RS232) and 10/100BaseT Ethernet
Alarm inputs	4 digital inputs with reference voltage to create alarms from FAN
Alarm outputs	5 alarm outputs (dry contact)
IP over ATM	IPoA according RFC 2225
Ethernet bridging	Multiprotocol Encapsulation over ATM according RFC 2684

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Ordering Information

A D9408 configuration is created with the part number structure shown below:

Fixed

F 0 . P P C C S S S S S S S S N N

Power Supplies

0 – None
1 – AC Power
2 – DC Power

System Controllers

0 – None
1 – HUB
2 – SYS-IB

1RU Fan Units (order seperately)

4013773 – AC/AC version
4014798 – AC/DC version
4014799 – DC/DC version

Service Cards*

0 – None
1 – ASI-IN
2 – ASI-OUT
3 – Quad ASI-IN
4 – Quad ASI-OUT
5 – Ethernet Bridge
6 – Quad E1/T1
7 – E3
8 – DS3
9 – Quad E3
A – Quad DS3
B – Ring Controller
C – STM-1 Electrical
D – STM-1, MM
E – STM-1, SM, SH
F – STM-1, SM, LH
G – STM-1, SM, VLH
H – STM-1, BiDir, SM, SH, TX1310
I – STM-1, BiDir, SM, SH, TX1550
J – STM-1, BiDir, SM, LR1, TX1310
K – STM-1, BiDir, SM, LR1, TX1550
L – STM-4, MM
M – STM-4, SM, SH
N – STM-4, SM, LR1
P – STM-4, SM, LR2
Q – STM-4, BiDir, SM, SH, TX1310
R – STM-4, BiDir, SM, SH, TX1550
S – STM-4, BiDir, SM, LR1, TX1310
T – STM-4, BiDir, SM, LR1, TX1550

Network Cards*

0 – None
7 – E3
8 – DS3
C – STM-1 Electrical
D – STM-1, MM
E – STM-1, SM, SH
F – STM-1, SM, LH
G – STM-1, SM, VLH
H – STM-1, BiDir, SM, SH, TX1310
I – STM-1, BiDir, SM, SH, TX1550
J – STM-1, BiDir, SM, LR1, TX1310
K – STM-1, BiDir, SM, LR1, TX1550
L – STM-4, MM
M – STM-4, SM, SH
N – STM-4, SM, LR1
P – STM-4, SM, LR2
Q – STM-4, BiDir, SM, SH, TX1310
R – STM-4, BiDir, SM, SH, TX1550
S – STM-4, BiDir, SM, LR1, TX1310
T – STM-4, BiDir, SM, LR1, TX1550

Example: F0.11021112222008 - 2 AC PSU's, 1 SYS-IB System controller, 3 ASI input, 4 ASI outputs, D3 network interface

Optionally you may also order AC-power cords from the following list:

AC Power Cords	Part Number
Argentina	207340
Australia	1000897
China	745415
Europe	3989835
Italy	3993130
Japan	3993133
UK	3989836
US	3989838

Note: DC power-cords are always included with the device.