AAC™ and CellSMART® Multi-service Access Concentrators

High-speed Consolidation of Hybrid Networks

AAC-3

AAC-2

CellSMART

AAC™ Multi-service Access Concentrators cost-effectively connect voice, video and data traffic to private Wide Area Networks (WAN) and public ATM and Frame Relay services worldwide. Supporting multiple protocols, physical interfaces and a wide range of bandwidth requirements, AAC and CellSMART® products allow organizations and service providers to consolidate hybrid facilities for reduced costs and more efficient management of broadband networks.

Features

- **Scalable architecture provides flexibility as network requirements change**
- **Multi-service access in a single device reduces recurring monthly access costs**
- **NxT1/E1 inverse multiplexing for cost-effective network expansion**
- **Large variety of available interfaces supply serial ports, Frame Relay and T1/E1, NxT1/E1 IMA, T3/E3, and OC-3/STM-1 to deliver specific services for customer applications**
- **Standards compliance for inter-operability with multi-vendor network**
- **Comprehensive ATM WAN service management for monitoring ATM services via SNMP and Telnet**

KENTROX Quality Access

Flexible System Architecture

The AAC family offers a flexible, modular architecture, allowing you to choose the most cost-effective service for each application and manage everything from a single platform. Each AAC contains slots for Protocol Modules (PM) that determine the traffic type—ATM or Frame Relay—and Physical Layer Modules (PLM) that determine the physical interface type. The broad array of available Protocol and Physical Layer Modules meets the needs of a variety of customers, including enterprise, service provider, government and military.

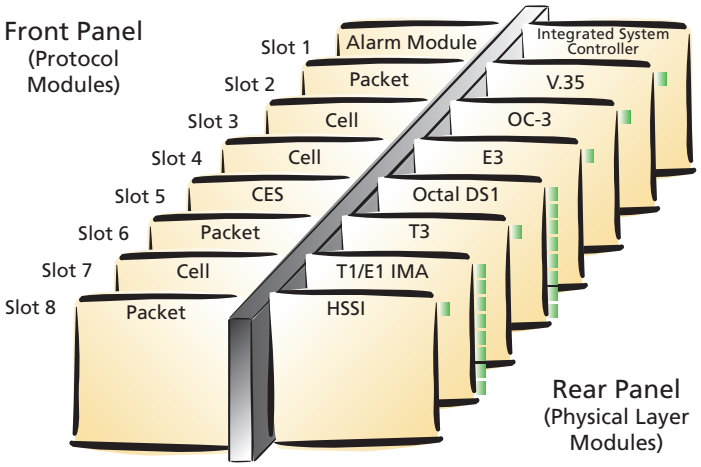

Figure 1: AAC modular architecture

Interface / Protocol	OC-3/STM-1 SM or MM	T3/E3	IMA T1/E1	T1/E1	V.35, X.21 EIA-530	HSSI
ATM UNI	•	•	•	•		
Frame Relay		•		•	•	•
HDLC or PPP		•		•	•	•
CBR (CES)		•		•	•	•

Figure 2: The AAC family supports a variety of protocols and network interfaces.

Protocol Modules / Physical Layer Modules	Cell PM (10200)	Enhanced Shaping Cell PM (10204)	Octal CES PM (10207)	Packet PM (10201)	Quad Packet PM (10205)	Quad Packet/CBR PM (10203)
DS3 PLM (10300)	•	•	•	•		
HSSI PLM (10301)			•	•		
Quad DSX-1 PLM (10302)					•	•
OC-3c/STM-1 MM PLM (10304)	•	•				
OC-3c/STM-1 SM PLM (10305)	•	•				
E3 PLM (10306)	•	•	•	•		
Quad V.35/530 PLM (10309)			•	•	•	•
Octal DSX-1 PLM (10314)			•			
Octal E1 PLM (10315)			•			
Octal DS1 PLM (10317)			•			
Octal DS1 IMA PLM (10318)	•	•				
Octal E1 IMA PLM (10319)	•	•				

Figure 3: AAC PM/PLM compatibility matrix.

The AAC family comprises three models to deliver a full range of access options at a variety of price points.

- The **AAC-3** offers the highest levels of connectivity and scalability, supporting speeds ranging from T1/E1 to OC-3c/STM-1. Its modular chassis supports up to seven PM/PLM pairs, making it an ideal hub device for enterprise networks or a port fan-out device for service distribution.
- The **AAC-2** has a smaller chassis which supports up to three PM/PLM pairs, making it suitable for mid-sized locations that need to connect voice, video and data traffic to the WAN.
- The **CellSMART 200** IMA series is the most economical system, ideal for medium-speed to high-speed data applications that require NxT1/E1 access using Inverse Multiplexing for ATM (IMA). A variety of models are available with V.35, HSSI, T3/E3 or OC-3c/STM-1 user ports.

The high port density and modular architecture lets each network grow and upgrade at a minimal cost. As service or application needs change, customers just add or switch modules while maintaining a common chassis and management interface. For instance, with an Octal IMA Physical Layer Module, T1/E1 circuits can be steadily added as bandwidth needs increase.

Network Applications

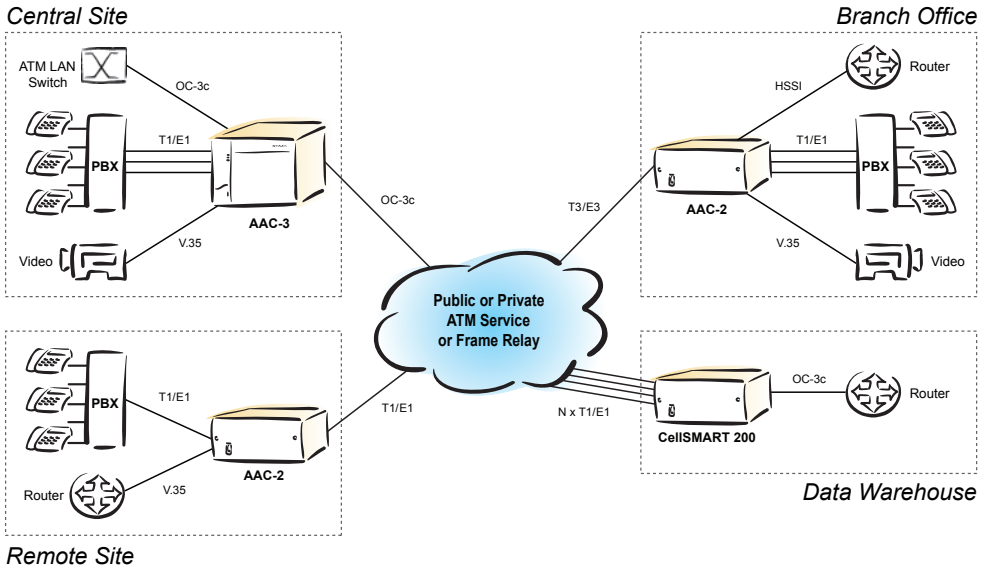

Figure 4: The AAC family of multi-service access concentrators connects central, branch and remote locations via public or private ATM or Frame Relay services.

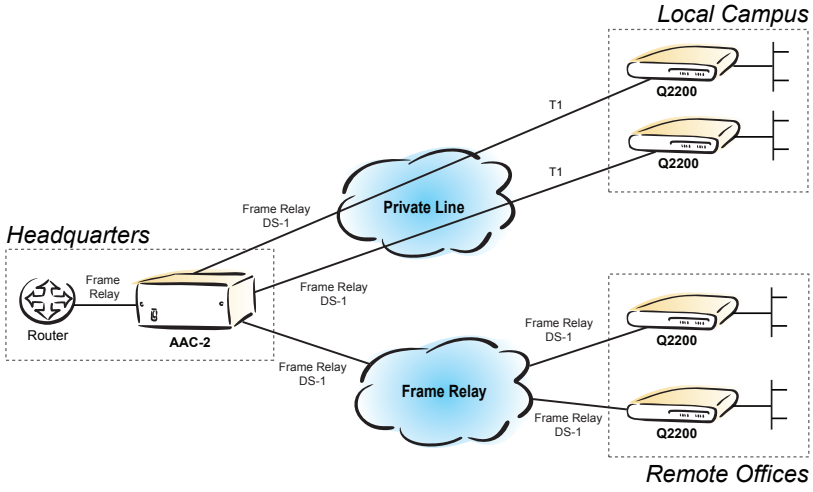

Figure 5: Use the AAC to aggregate traffic from Q-Series routers located at branch offices.

Element Management

The AAC family supports local and remote access via in-band or out-of-band connections. All products include an embedded SNMP agent and standard and enterprise MIBs, compatible with SNMP-based management systems. You can also Telnet to the devices via the Ethernet port on the Integrated System Controller or an in-band ATM/Frame Relay connection. The native user interface is menu-driven, making port and connection configuration quick and easy.

Traffic Management

You can maximize the utilization of expensive wide-area bandwidth with AAC traffic management features. The Enhanced Shaping Cell Protocol Module performs traffic shaping on a per-VC and per-VP basis, ensuring that traffic meets the rates contracted with your carrier. This prevents cell discard and retransmissions, improving the overall use of available bandwidth. Other AAC modules increase bandwidth utilization by reallocating idle CBR bandwidth.

Performance Monitoring

AAC systems collect extensive statistics, including port and cell utilization, cell and packet discard, and physical line errors. You can view the information in table or graphical form to monitor network performance, anticipate growth in bandwidth requirements and troubleshoot problems in both the local and wide area networks.

Standards Compliance

AAC products comply with the following standards to alleviate compatibility issues in multi-vendor networks and reduce the risks associated with proprietary solutions.

- The ATM Forum, including:
  - Inverse Multiplexing for ATM (IMA) 1.1/1.0
  - ATM UNI 3.0 and 3.1
  - Traffic Management 4.0 with support for CBR, rt-VBR, nrt-VBR and UBR QoS categories
  - Circuit Emulation Services 2.0 with support for structured or unstructured CES
- ITU-T
- Bellcore/Telcordia
- The Frame Relay Forum

Protect your network investment with support plans and technical training

To keep your network healthy and productive, Kentrox offers Kentrox Care Support Plans for AAC and CellSMART access concentrators. Kentrox technical training courses are also available on site or at the Kentrox campus to help you get the most out of your access concentrators. For details, visit our website at www.kentrox.com.

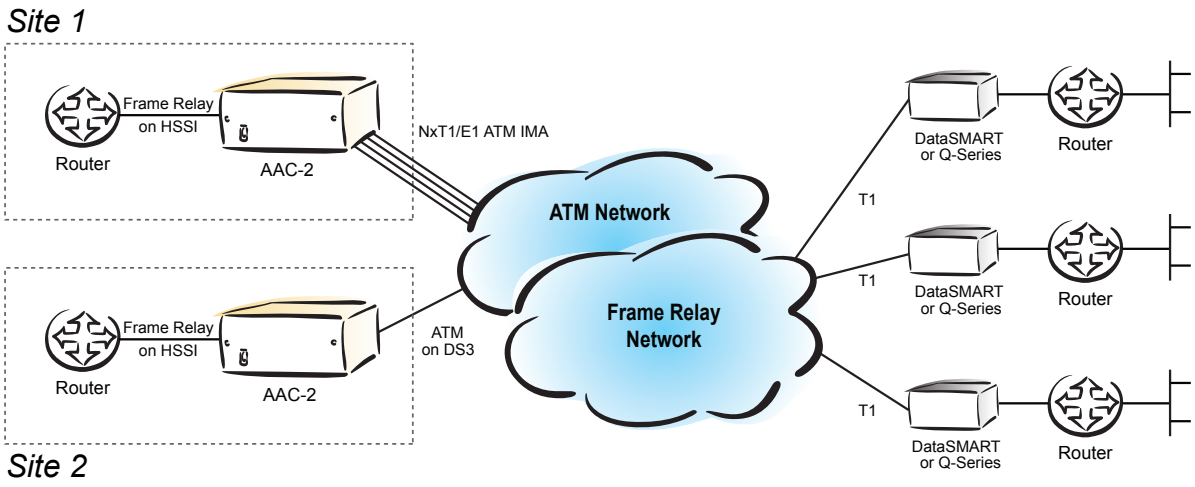

Figure 6: The Kentrox AAC supports Frame Relay to ATM service internetworking.

ORDERING INFORMATION

DESCRIPTION	CATALOG #
Chassis and Power Supplies	
AAC-3 Eight-slot Chassis	10000
AAC-3 DC Power Supply	10101
AAC-3 Universal Input Power Supply 100-240VAC	10103
AAC-2 Four-slot Chassis	10001
AAC-2 DC Power Supply	10111
AAC-2 Universal Input Power Supply 100-240VAC	10113
Common Modules	
AAC Integrated System Controller	10022
AAC System Controller	10010
AAC Alarm Module	10011
AAC Extension Module	10021
Protocol Modules	
AAC Cell Protocol Module	10200
AAC Packet Protocol Module	10201
AAC Quad Packet / CBR Protocol Module	10203
AAC Enhanced Shaping Cell Protocol Module	10204
AAC Quad Packet Protocol Module	10205
AAC Octal CES/CBR Protocol Module	10207
Physical Layer Modules	
AAC DS3 Physical Layer Module	10300
AAC HSSI Physical Layer Module	10301
AAC Quad DSX-1 Physical Layer Module	10302
AAC OC-3c/STM1 MM Fiber Physical Layer Module	10304
AAC OC-3c/STM1 SM Fiber Physical Layer Module	10305
AAC E3 Physical Layer Module	10306
AAC Quad V.35/EIA-530/X.21 Physical Layer Module	10309
AAC Octal (8-port) DSX-1 Physical Layer Module	10314
AAC Octal (8-port) E1 Physical Layer Module	10315
AAC Octal (8-port) DS1 (CSU) Physical Layer Module	10317
AAC Octal (8-port) IMA DS1 Physical Layer Module	10318
AAC Octal (8-port) IMA E1 Physical Layer Module	10319
CellSMART 200 ATM IMA Systems	
CellSMART 201t, T1 Octal IMA to HSSI, 100 to 240VAC	20001-310
CellSMART 201e, E1 Octal IMA to HSSI 100 to 240VAC	20002-310
CellSMART 202t, T1 Octal IMA to V.35,(8 Mbps), 100 to 240VAC	20003-310
CellSMART 202e, E1 Octal IMA to V.35 (8 Mbps), 100 to 240VAC	20004-310
CellSMART 204t, T1 Octal IMA to OC-3c/STM-1, 100 to 240VAC	20007-310
CellSMART 204e, E1 Octal IMA to OC-3c/STM-1, 100 to 240VAC	20008-310
CellSMART 205t, T1 Octal IMA to DS-3, 100 to 240VAC	20009-310
CellSMART 205e, E1 Octal IMA to E3, 100 to 240VAC	20010-310
Accessories	
AAC-3 Fan Tray Assembly (Spare)	10080
AAC Blank Panel, 1 Slot (Spare)	10082
AAC-3 Blank Panel, Power Supply (Spare)	10084
AAC Manual Set, CD (Spare)	10090
AAC Planning Guide, printed	10091
Power Cords	
North America, Korea, Taiwan	90000
European Community	90001
United Kingdom	90002
Italy	90003

KENTROX CARE SUPPORT PLANS	CATALOG #
Onsite 7x24x4: AAC components	13203
Onsite 7x24x4: CellSMART	13603
Onsite 5x8x4: AAC components	13213
Onsite 5x8x4: CellSMART	13613
Onsite 7x24xNBD: AAC components	13202
Onsite 7x24xNBD: CellSMART	13602
Onsite 5x8xNBD: AAC components	13212
Onsite 5x8xNBD: CellSMART	13612
Basic 7x24xNBD: AAC components	13204
Basic 7x24xNBD: CellSMART	13604
Exchange NBD: AAC components	13209
Exchange NBD: CellSMART	13609
Onsite Installation: AAC components	13100
Onsite Installation: CellSMART	14105

For details on Kentrox Care Support Plans and AAC/CellSMART training, visit www.kentrox.com or call 800-733-5511.

SPECIFICATIONS

AAC-3 CHASSIS	
Dimensions (H x W x D)	13.95" x 17.32" x 19" (354.3 x 440 x 482.6 mm)
Weight	60 lbs. (27 kg)
Mounting	Available for 19-inch or 23-inch standard equipment racks
Operating Temperature	32° F to 104° F, ambient (0° C to 40° C)
Operating Humidity	5% to 95%, non-condensing

AAC-2 AND CELLSMART 200 CHASSIS	
Dimensions (H x W x D)	6.95" x 17.32" x 19" (176.5 x 440 x 482.6 mm)
Weight	29 lbs. (13.2 kg)
Mounting	Available for 19-inch or 23-inch standard equipment racks
Operating Temperature	32° F to 104° F, ambient (0° C to 40° C)
Operating Humidity	5% to 95%, non-condensing

SWITCHING BACKPLANE	
Cell bus	Dynamic time-allocated, output buffered per port or connection
Maximum system throughput	524 Mbps (1,168,000 cells/second)
Connections	8192 VCCs, 512 VPCs, 512 Multicast

MANAGEMENT ACCESS	
Control port	VT100 via RS232 port on front panel (Additional RS232 port on the Integrated System Controller)
Ethernet port	SNMP or Telnet
In-band	SNMP or Telnet
Telnet sessions	Up to 4 concurrently with the Integrated System Controller

POWER SYSTEM	
AAC-3	Dual redundant power system. Modular power supplies, field replaceable with unit powered. Monitored with alarms/traps on failure. Forced-air cooled. Supports mixed use of AC/DC power modules.
AAC-2 and CellSMART 200	Single power system. Modular power supply. Monitored with alarms/traps on failure. Forced-air cooled. Supports use of AC/DC power modules.
AC power supply	120/240 VAC (85 to 264 volts), 50/60Hz +/- 3Hz
DC power supply	-48 VDC (42 to 60 VDC)

EMC, SAFETY, AND NEBS	
Terminal	47 CFR 68, CS.03
Emissions	47 CFR 15, EN55022, Class A
Immunity	EN55024
Safety	CSA 60950-1-03/UL 60950-1
NEBS	Level 3 certified

SYSTEM MODULES

One ISC module is required in every AAC/CellSMART chassis.

INTEGRATED SYSTEM CONTROLLER (ISC)	
Clock sources	Internal reference oscillator or recovered from user-specified physical port
Clock fallback	User-selectable primary and secondary clock source with automatic fallback and recovery
Internal reference	Oscillator Stratum 4 or better
Power loss protection	Loss of all input line power will not affect the configuration settings; performance data will be maintained for 12 hours upon loss of power
Alarm	Critical, Major, and Minor alarm indicators are viewable from the rear Contact closure for audible and visual alarms ACO (Automatic Cut Off) button disables audible alarms
Configuration backup	Pluggable Type II compact flash
Management access	Ethernet port and DTE asynchronous port for dial-up modem (in addition to front panel port)

ALARM MODULE (optional)	
Indicators	Critical, Major and Minor alarm indicators are viewable from the front
Alarm	ACO (Automatic Cut Off) button disables audible alarms
Configuration backup	Flash

SPECIFICATIONS *(continued)*

PROTOCOL MODULES

See the PM/PLM compatibility matrix, Figure 3, for available Protocol and Physical Layer Module combinations. Not all modules are listed.

CELL PROTOCOL MODULE

Protocols supported	ATM UNI
Connections	256 VPCs, 4096 VCCs or combinations thereof up to 4096 total connections
QoS categories	CBR, nrt-VBR and rt-VBR
Output queuing	Separate CBR and VBR output queues with traffic and congestion management capability. Total queue depth: 4700 cells
Maximum burst size	32, 105, 210 or maximum cells
Cell emission scheduling	Per port for VBR traffic only or aggregate (CBR and VBR) traffic
Congestion management	Early packet discard (EPD) and 4 VBR priorities, CBR not subject to congestion, Partial Packet Discard (PPD)Packet PROTOCOL MODULE/Quad Packet

PROTOCOL MODULE

Protocols supported	Frame Relay, ATM DXI, HDLC, PPP
Frame Relay connections	Packet PM: 2048 VCCs (AAL5) or DLCIs Quad Packet PM: 512 VCCs (AAL5) or DLCIs per port
Services supported	FRF.5, FRF.8 (1490 to 1483 translation) and FRLM
Congestion management	Partial and early packet discard (EPD) and 4 VBR priorities

OCTAL CES PROTOCOL MODULE

Protocols supported	Structured or unstructured circuit emulation over AAL1 Dynamic bandwidth allocation based on CAS signaling, idle code detection, or V.35 control signals
Connections	32 unicast or multicast per port, 256 per module
Output queuing	User-selectable depth of CDV absorption queue to 1 ms
Clocking	Synchronous or asynchronous (Adaptive)
Logical bundles	1 DS0 to 24 DS0s (T1) or 31 DS0s (E1)

PHYSICAL LAYER MODULES

See the PM/PLM compatibility matrix, Figure 3, for available Protocol and Physical Layer Module combinations. Not all modules are listed.

OCTAL IMA DS1 AND E1 PHYSICAL LAYER MODULES

Interface connector	RJ48C
Line rate	T1 - 1.544 Mbps per port E1 - 2.048 Mbps per port
IMA rate	T1 - 1.536 to 12.288 Mbps E1 - 1.984 to 15.872 Mbps
Differential delay	Up to 200 ms
ACP sync cells	User selectable at 32, 64, 128 or 256 cells
Link adjustment	Automatic adjustment on link failure or recovery

OCTAL DS1, DSX-1 AND E1 PHYSICAL LAYER MODULES

Interface connector	RJ48C
Line rate	DS1 (includes CSU) - 1.544 Mbps per port DSX-1 - 1.544 Mbps per port E1 - 2.048 Mbps per port
Channelization	NxDS0 up to full line rate

QUAD DSX-1 PHYSICAL LAYER MODULE

Interface connector	DA15
Line rate	DSX-1 - 1.544 Mbps per port
Fractionalization	NxDS0 up to full line rate

QUAD V.35/EIA-530 PHYSICAL LAYER MODULE

Interface connector	DB25
Electrical	V.35, RS449, EIA-530, X.21
Line speed	64 Kbps to 2.048 Mbps on each of four ports or up to 8.192 Mbps on one port

HSSI PHYSICAL LAYER MODULE

Interface connector	TIA/EIA-613 standard 50 position
Line speed	1 Mbps to 52 Mbps

DS3 AND E3 PHYSICAL LAYER MODULES

Interface connector	75 ohm coaxial BNC
Line rate	DS3 - 44.736 Mbps E3 - 34.368 Mbps

OC-3C/STM1 SINGLE AND MULTI-MODE PHYSICAL LAYER MODULES

Interface connector	Duplex SC
Line speed	155.52 Mbps
Wavelength	1310 nm (single-mode or multi-mode)

For more information, call our pre-sales Applications Support Team at 800-733-5511 or visit www.kentrox.com.

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