Ascend

OVERVIEW SUMMARY

SA 100 / SA 600

Release 2.0

ASCEND

Product Overview

The Ascend SA 100 Broadband Service Unit and SA 600 Broadband Service Concentrator constitute a line of integrated ATM access concentrators and switches that:

- Adapt and concentrate data, voice and video streams onto an ATM interface, for connection to an ATM or multiservice core switching network.
- Extend the reach of the ATM WAN infrastructure from network service providers locations to head-end offices and remote sites.
- Provide a wide range of service and network interfaces that let service providers develop innovative offerings for their subscribers.

With Release 2.0, the Broadband Access product line offers higher port density, a greater mix of service types, and expanded network interface options that allow service providers increased flexibility in meeting their customers' ATM access requirements.

Target Customers

Target markets for the SA product line include any existing and prospective CBX 500 / GX 550 ATM switch customers, including RBOCs, PTTs, LECs, CLECs and CAPs/ALTs. Additionally, the SA product line may be targeted at those who maintain private ATM switching infrastructures using Ascend or competitive products – this includes state and federal governments, and private enterprises.

Product Positioning

Recent market data confirms what is evident all around us: as ATM core infrastructures are deployed, attention is shifting to the service access and concentration segments of the market. With exploding interest in high bandwidth multimedia applications, quality of service, and end-to-end management and control (the promise of ATM), the time for the ATM access market is NOW.

What drives the ATM access market? Specifically, there are four leading issues:

- First, the TDM-based private data networks of the past are reaching their limits when faced with the networking needs of the future. Contributing factors are a lack of flexibility, scalability issues and operations/administrative costs.
- Second, carriers have committed to ATM as a core technology, as evidenced by their investments in recent years. Now they are faced with making technology and business decisions about their access strategy to leverage their core infrastructure investments.
- Third, ATM access concentrators furnish service providers a standards-based, cost effective way to enhance or expand their service offerings - particularly when both access and core systems are sourced from a single vendor.
- Finally, the trend toward WAN consolidation continues. As subscribers look to lower complexity and operations costs, the ATM access concentrator/switch emerges as the ideal platform for integrated access.

While Ascend Broadband Access products meet the demands of the market, service providers, and users, the design and architecture of the product line creates distinct advantages over the competition:

- A family of products that easily scale from single subscriber remote sites to multisubscriber locations, providing service concentration and access switching
- Support for a diverse array of packet-, circuit-, and cell-based services, with an unmatched range of ATM network interfaces
- Feature-rich control over all aspects of service provisioning: quality of service, circuit shaping and other tuning parameters
- And a state-of-the-art management capability that can be easily integrated into existing management strategies with minimal operations impact and virtually no incremental cos

- Target Applications

While there are numerous applications for the Broadband Access product line, most applications fit into one of several scenarios, which are described below.

High Mix/Low Cost Integrated Access

This is a prime application for the SA 100. In this scenario, a remote customer facility requires a way to integrate multiple disparate services at a single location, with the objective of reducing the access and operations costs incurred when maintaining multiple network feeds to support these services. As these are low density sites, it is imperative that the solution be cost effective, both from an equipment and a resource management perspective.

The SA 100 solves this problem by providing a service platform to which routers, PBXs, Ethernet segments and servers, video codecs, and other CPE can be connected, adapted, and integrated into an ATM network. For the subscriber, the SA 100 consolidates multiple WAN feeds into one; for the service provider, cost effective integrated WAN access services become a reality. The network feed can be relatively low speed to keep costs down (DS1), and migrated to higher rates via an IMA, DS3/E3 or OC-3/STM-1 solution as requirements dictate.

All premise services have a common demarcation point utilizing existing CPE connections for service access to minimize local staff resource requirements. This solution provides a low cost alternative whose functionality can only be matched by more expensive multiservice concentrators.

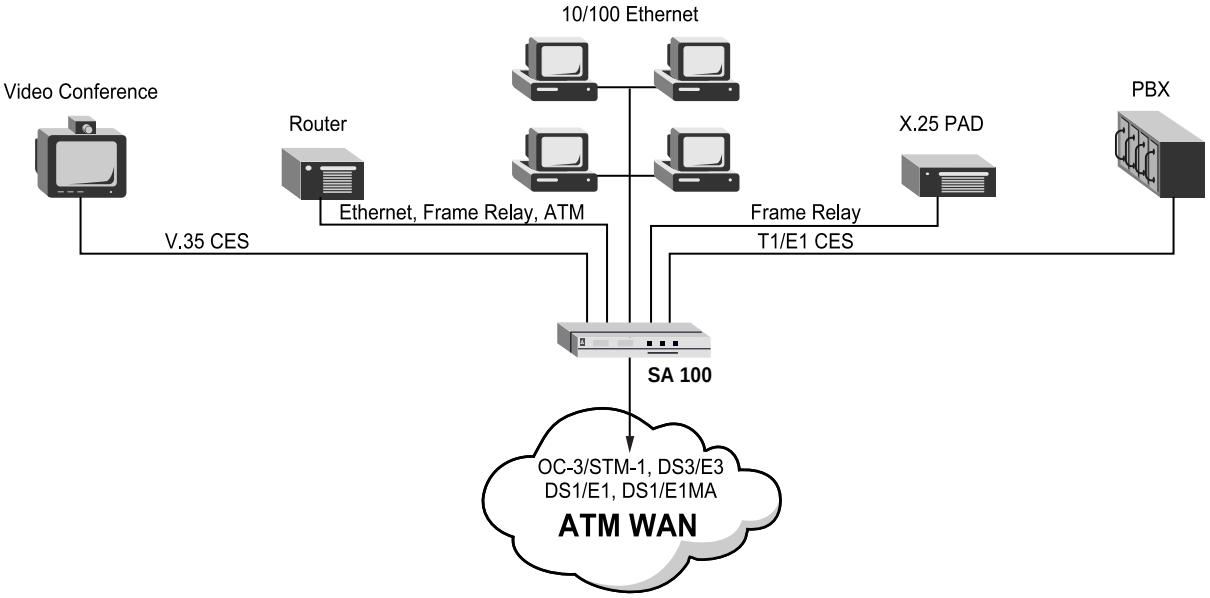

Figure 1 – High Mix/Low Cost Integrated Access

Service Concentration / Switching Concentration

This application is handled with a combination of SA 100s, SA 600s and SA 1200s. There are two fundamental issues to be addressed:

- RBOCs and CLECs are aggressively moving to enter new out of region territories and new service territories that initially do not have the service density requirements to justify installing large-scale multiservice switching concentrators. Therefore, they need a solution that allows them to cost-effectively enter the market and to scale up their network infrastructure as their subscriber base grows.
- As the subscriber base grows sufficiently larger, the service providers need to build service concentration and switching "hub sites". This allows them to efficiently aggregate numerous small service platforms, thereby maximizing the use of expensive core switching ports.

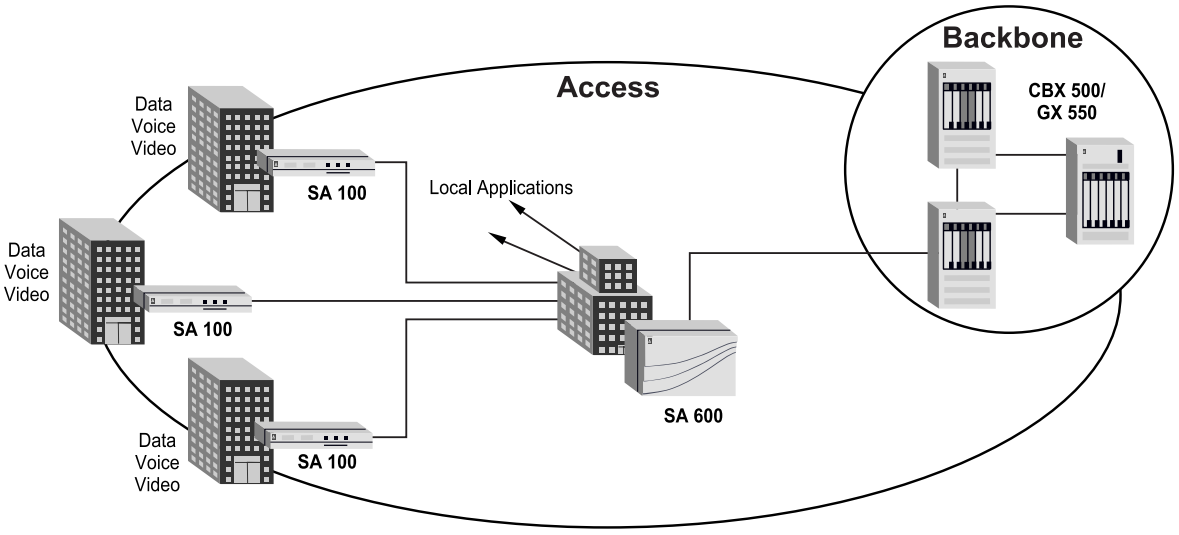

Figure 2 – Service Concentration/Switching Concentration

Solutions

- As service providers enter new service areas, they can begin deployment of SA 100s to meet the needs of their emerging subscriber base. As the subscriber base grows, they can easily and cost effectively upgrade to SA 600s.

- When the service area becomes saturated, service providers can deploy high density service concentration and switching "hub sites" using SA 600s.

The advantage of the Broadband Access product solution is the inherent scalability, thus allowing you to maximize initial capital investment, minimize sparing and management operations overhead.

ATM Service Concentration

This application is targeted for the SA 600 and SA 1200.

The steady growth of T1 ATM UNI services is being fueled by such applications as integrated access (described previously) and is expected to be further accelerated by the availability of inverse multiplexing over ATM. This is creating a significant physical concentration problem at central offices and concentration sites.

Service providers can deploy SA 600s and SA 1200s to act as T1 CES, IMA and ATM UNI service concentrators. This provides a much more cost efficient solution than terminating the connections on core switch ports.

The Broadband Access products provide a superior port density solution with the added value of switching capabilities.

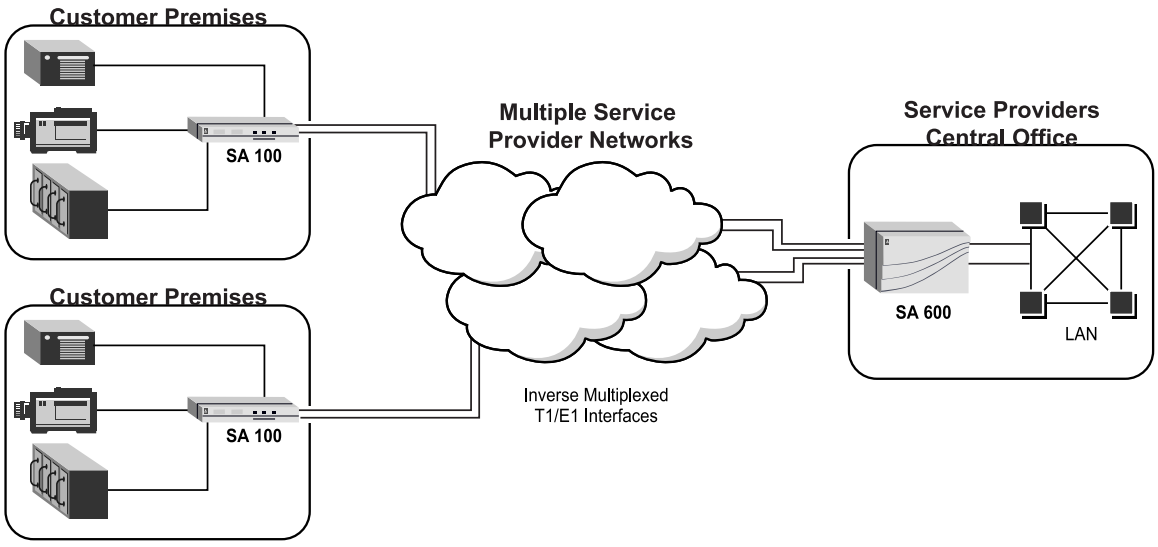

Figure 3 – Service providers can deploy SA 600 units to act as T1 CES, IMA and ATM UNI services.

Public Video Distribution Services

Recently, government funding for distance learning has increased significantly, creating new opportunities for video distribution services in the public network. For example, a Universal Service Fund was recently established that, as of January 1, 1998, makes $2.25 billion per year available to schools and libraries for technology initiatives. The initiative concentrated on bringing Internet access, email and distance learning into the classroom.

Typically, schools and libraries utilize a low cost DS1 or N x DS1 connection to a public service provider, or a state network provider. This raises two issues. First, it creates a requirement for high capacity physical concentration of DS1 and N x DS1 links in the service provider network. This problem and its solution was previously described. Second, the efficient utilization of access bandwidth becomes paramount. Since video services are only active a fraction of the time, it is extremely inefficient to reserve this bandwidth at all times. By implementing the Dynamic Bandwidth Allocation™ feature, Broadband Access Products allow the idle bandwidth to be absorbed by Internet access and e-mail services.

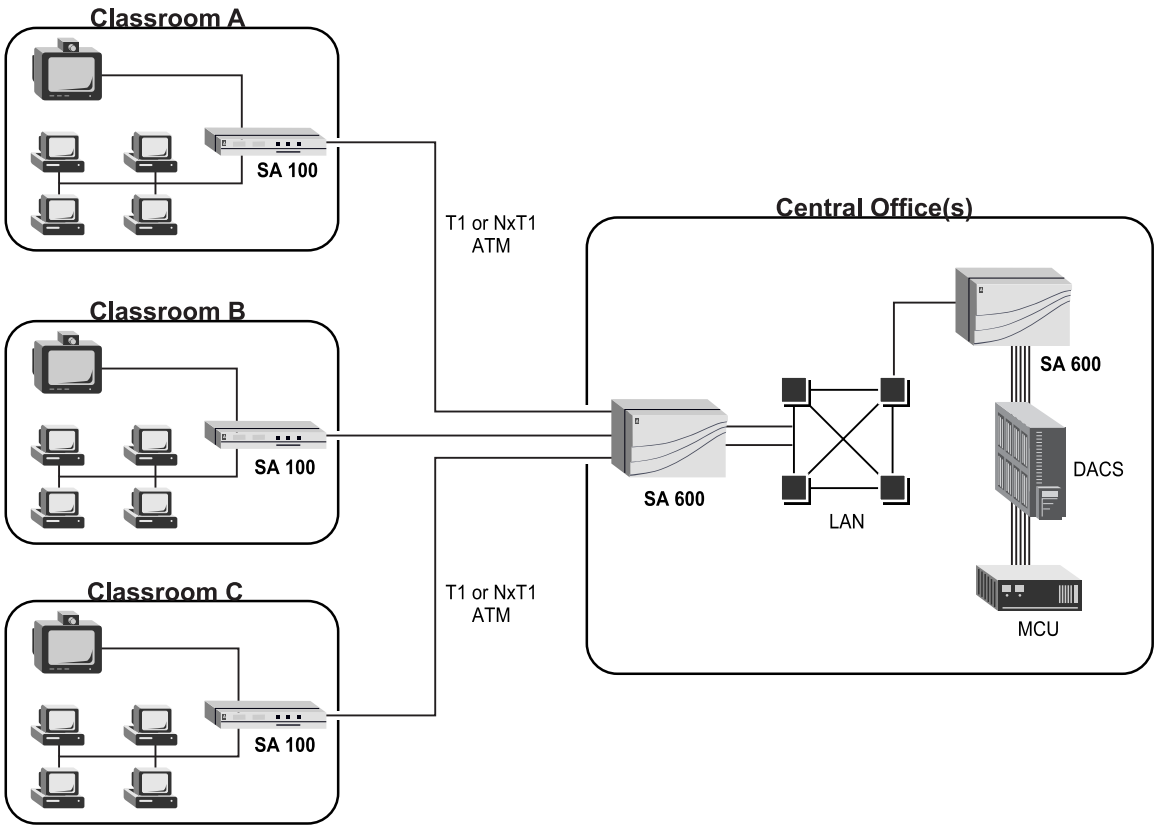

Figure 4 – Public Video Distribution Services

Software Features

The following software features are available through Release 2.0:

- **Service Interfaces:** Circuit emulation with A+B bit interpretation, dynamic bandwidth over AAL1; Frame transport over AAL5; LAN switching over AAL5; Native ATM cell switching
- **System Management:** WebXtend HTTP/Java via Web browser; Local craft; VT-100 ANSI terminal and/or modem; Ethernet port; Inband ATM; Telnet/FTP; NavisCore; SNMP
- **MIB Support:** SNMP MIB II AToM, MIB, ILMI MIB, Interface MIBs, Bridging MIB and Broadband Access Enterprise MIB
- **VBR Shaping:** adds rtVBR, nrtVBR support to native LAN services and the packet subsystem
- **ILMI:** supports ILMI 3.1 on service-side ATM interfaces, provides link connectivity verification and address registration for service-side ATM NICs
- **Dynamic Bandwidth Allocation:** provides 3 control "triggers" to enable/disable circuit emulation transmission – A/B bit signaling, Loss of Signal (LOS), Loss of cell status, makes idle bandwidth available to other services

Queue Servicing Fairness Algorithm: weighted Round Robin queue servicing, ensures that lower priority services classes receive a minimum level of fairness in queue servicing

Hardware Features

The following hardware features are available through Release 2.0:

- **SA 100 Broadband Service Unit:** consists of one ICM, supports up to 17 interfaces, AC or DC power.
- **SA 600 Broadband Service Concentrator:** consists of up to three ICMs, supports up to 57 interfaces, redundant AC/DC power.
- **XPODs:** OC-3/STM-1 single/multimode, SR, IR, LR (1 port); T3/E3 PLCP and G.804; ATM (1 port); T1/E1G.804 ATM (1 port); T1/E1 Inverse Mux ATM (4 ports); T1G.804 ATM with integral CSU/DSU (1 port); T1/E1 Structured/Unstructured circuit emulation (2 ports)
- **IPODs:** OC-3/STM-1 single/multimode, SR, IR, LR (1 or 2 ports); T3/E3 PLCP and G.804 ATM (1 or 2 ports); T1/E1 G.804 ATM (4 ports); T1/E1 Structured/Unstructured circuit emulation (4 ports); 10/100BaseT Ethernet (4 ports); Universal Frame Forwarding V.11, V.35, X.21, RS-232, RS-449 (2 ports); Serial circuit emulation V.35/X.21 (2 ports)
- CPODs: Cell switching fabric; CPOD 150 (for use with SA 100); CPOD 200 (for use with SA 600 – one CPOD per installed ICM)

Competitive Analysis

Features	Ascend SA 100	Cisco3810	NetEdge Edge65	Onstream 9300	Xylan Omni-3WX
Network Interface Support					
ATM	OC-3 (SM, MM), DS1, DS1 IMA, T/E1, T1/E1 IMA, DS3/E3	No	OC-3 (MM SM), T3/E3	OC-3 (SM MM), T1/E1, T1/E1 IMA	No
User Interface Support					
Packet					
Ethernet	Yes	Yes	Yes	Yes	Yes
Frame	Yes	No	No	Yes	Yes
Circuit					
Circuit Emulation	Yes	Yes	Yes	Yes	Yes
Compressed digital Voice	Future	Yes	No	Future	Unknown
Compressed Analog Voice	Future	Yes	No	Future	Unknown
Cell					
ATM UNI	Yes	No	Yes	Yes	Yes
IMA	Yes	No	No	Yes	No
Service Delivery Support					
ATM Service Classes					
CBR	Yes	Yes	Yes	Yes	Yes
rt-VBR	Yes	No	No	Yes	Yes
nrt-VBR	Yes	No	No	Yes	No
VBR	Yes	Yes	No	Yes	No
Traffic Shaping	Yes	No	No	Yes	No
Dynamic Bandwidth Allocation	Yes	No	No	Yes	Unknown
Per VC Queuing	Yes	No	No	Yes	Unknown
Network Management Support					
Web Based	Yes	No	No	No	No

Ordering Information

Features	Ascend SA 100	Cisco3810	NetEdge Edge65	Onstream 9300	Xylan Omni-3WX
Local Craft	Yes	Yes	No	Yes	Yes
Ethernet Port	Yes	Yes	No	Yes	Yes
Inband ATM	Yes	No	Yes	Yes	Unknown
Telnet FTP	Yes	Yes	Yes	Yes	Yes
SNMP	Yes	Yes	Yes	Yes	Yes
Scalability	DS1 up toOC-3	T1/E1 only	T1 up to OC-3	T1 up to OC-3	DS3 up to OC-3
Capacity	1 Gb/s	2 Mbps	800 Mbps	480 Mbps	640/960 Mbps
Expandability and Interoperability for Investment Protection	Interfaces may be upgraded to SA 600	None	Yes	No	Base cards may be upgraded to Omni-5WX in the future
Network Interface Support					
ATM	OC-3 (SM, MM) DS1, DS1 IMA, T1/E1, T1/E1 IMA, DS3/E3, J2	OC-3 (MM, SM), T1/E1, T1/E1 IMA T3/E3, J2	OC-3 (SM MM), T3/E3	OC-3 (MM,SM) T1/E1 IMA T3/E3	OC-3, OC-12
User Interface Support					
Packet					
Ethernet	Yes	Yes	Yes	Yes	Yes
Frame	Yes	Yes	No	Yes	Yes
Circuit					
Circuit Emulation	Yes	Yes	Yes	Yes	Yes
Compressed Digital Voice	Future	No	No	Future	No
Compressed Analog Voice	Future	No	No	Future	No
Cell					
ATM UNI	Yes	Yes	Yes	Yes	Yes
IMA	Yes	Yes	No	Yes	No

Features	Ascend SA 600	ADC Kentrox , ACC-3FS	NetEdge Edge85	Onstream 9600	Xylan Omni-5WX
Service Delivery Support					
ATM service Classes					
CBR	Yes	Yes	Yes	Yes	Yes
rt-VBR	Yes	No	No	Yes	Yes (X-Cell CSM modules only)
nrt-VBR	Yes	No	No	Yes	Yes (X-Cell CSM modules only)
VBR	Yes	Yes	No	Yes	Yes (X-Cell CSM modules only)
Traffic Shaping	Yes	Yes	No	Yes	Yes
Dynamic Bandwidth Allocation	Yes	No	No	Yes	Unknown
Per VC Queuing	Yes	No	No	Yes	Unknown
Network Management Support					
Web Based	Yes	Yes	No	No	No
Local Craft	Yes	Yes	No	Yes	Yes
Ethernet Port	Yes	Yes	No	Yes	Yes
Inband ATM	Yes	Yes	Yes	Yes	Unknown
Telnet FTP	Yes	Yes	Yes	Yes	Yes
SNMP	Yes	Yes	Yes	Yes	Yes
Scalability	DS1 up to OC-3	T1 up to OC-3	T1 up to OC-3	T1 up to OC-3	DS3 up to OC-12
Capacity	1 Gb/s per ICM	524 Mbps	800 Mbps	1.2 Gb/s	640/960 Mbps Frame 6.8 Gb/s usable Cell
Expandability & Interoperability for Investment Protection	Base card plus interfaces may be upgraded to SA 1200 in the future.	Base cards may be upgrade to the ACC-3ES	Yes	No	Base cards may be upgraded to Omni-9WX in the future.

Ordering Guidelines

The chart below lists all components for the SA 100 and SA 600 products by product code, description and U.S. list price. Additionally, all components are further categorized as follows:

Chassis – this section contains the available chassis assemblies.

For the SA 100, AC- and DC- powered bundled configurations are available, that include the chassis with the appropriate power supply, an Interface Control Module (ICM), all accessories and documentation. All PODs (CPODs, IPODs, XPODs) are ordered separately.

For the SA 600, only the chassis, fan tray, accessories and documentation are included. All ICMs, PODs and SUMs are ordered separately.

Power Supplies – this section contains the power supply units required for the SA 600. The SA 100 power supply units are contained in the chassis bundle (see above).

For the SA 600, order one or two PSUs, in either AC or DC configurations, as required. In a two PSU configuration, the supplies are redundant, not load sharing.

ICM – this section contains the ICM used in the SA 600 only. The SA 100 ICM is contained in the chassis bundle (see above).

For the SA 600, order one, two or three ICMs, as required (or more if spare units are required).

System Utility Modules (SUMs) – this section contains the SUMs used in the SA 600 only. The SA 100 has the equivalent functions built into its chassis and ICM, and does not require SUMs.

The SA 600 provides slots for two SUMs. SUMs must be installed in the slots to provide local craft ports, system level alarm LEDs, and to complete the primary and secondary system timing circuitry for the unit. Order a SUM 100 for the first slot and a SUM 50 for the second slot.

eXpansion PODs (XPODs) – this section contains the XPODs used in the SA 100 and SA 600. All XPODs can be used in either product (one XPOD per ICM). When ordering, be sure that the XPOD has been released (see Product Availability table above). Also, be sure that you are ordering the exact type of XPOD required for the application. Many XPODs, particularly those with optics, appear very similar. Review the descriptions carefully to be sure you are ordering the one(s) you need.

Interface PODs (IPODs) - this section contains the IPODs used in the SA 100 and SA 600. All IPODs can be used in either product (up to two IPODs per ICM). When ordering, be sure that the IPOD has been released (see Product Availability table above). Also, be sure that you are ordering the exact type of IPODs required for the application. Many IPODs, particularly those with optics, appear very similar. Review the descriptions carefully to be sure you are ordering the one(s) you need.

Cables and Accessories – this section contains the cables and accessories list for the SA 100 and SA 600. Accessory Kits are included with the chassis bundles; only order from this section if additional kits are required. Serial cables are used with the Universal Serial Frame IPOD – order the cable(s) required to match your interface requirements. Bezels / Visual Face assemblies are also part of the chassis bundles, so only order them if additional ones are required. Order blank panels for empty power supply and ICM slots, as they assist in the proper cooling / ventilation of the products.

Spares – this section contains the spare components available for the SA 100 and SA 600, excluding PODs. For POD spares, simply order the quantity and type of PODs required. Spares in this section include SA 100 AC and DC chassis with power supplies (no ICMs), and the fan tray assemblies for the larger systems.

Documentation – this section lists the all manuals for the SA products. Manuals are part of the chassis bundles and Accessory Kits, so order from this section only if additional manuals are required.

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