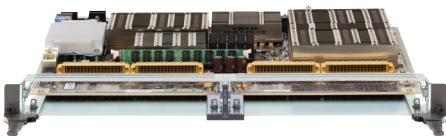
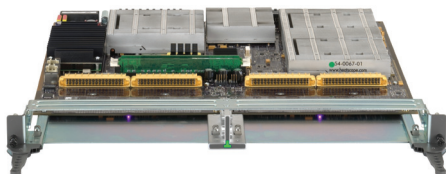


ALCATEL-LUCENT 7750 SERVICE ROUTER AND 7450 ETHERNET SERVICE SWITCH INPUT/OUTPUT MODULES

The Alcatel-Lucent 7750 Service Router (SR) and 7450 Ethernet Service Switch (ESS) Input/Output Modules (IOMs) deliver up to 50 Gb/s (full duplex) per-slot performance, with highly scalable multiservice capabilities combined with the flexibility of a wide range of modular, physical interface options. The 7750 SR and 7450 ESS IOMs provide outstanding IP/MPLS routing performance to enable the convergence of voice, video and data services for a wide range of business, consumer, Carrier Ethernet and mobile network applications.



Input/Output Module 3-XP



Input/Output Module 2

Alcatel-Lucent 7750 SR and 7450 ESS IOMs provide high-performance distributed routing and packet processing capabilities and configuration flexibility. An Alcatel-Lucent 7750 SR IOM is a full-slot module that inserts into a 7750 SR-12e, SR-12 or SR-7 Service Router chassis slot. Alcatel-Lucent 7450 ESS IOMs are full-slot modules that insert into 7450 ESS-6, ESS-6V, ESS-7 or ESS-12 chassis. Each IOM supports up to two hot-swappable Media Dependent Adapters (MDAs), two Integrated Service Adapters (ISAs), or one each MDA and ISA. The IOM is the distributed forwarding and packet services engine, while the MDA provides the physical network interfaces, and the ISA provides processing resources for integrated advanced services.

The Alcatel-Lucent 7750 SR IOM delivers the full complement of Alcatel-Lucent Service Router Operating System (SR OS) capabilities and provides comprehensive support for Layer 2 and Layer 3 IPv4 and IPv6 routing services, IP/MPLS, Ethernet over MPLS (EoMPLS), IP VPN and Virtual Private LAN Services (VPLS). Alcatel-Lucent 7450 ESS IOMs deliver SR OS capabilities targeted to the 7450 ESS supporting MPLS-enabled Carrier Ethernet services like Ethernet Line (E-Line)/VLL services, Ethernet LAN (ELAN)/VPLS

and Provider Backbone Bridge/VPLS (PBB-VPLS) services to meet the rigorous demands of metro and aggregation networks.

FP-based distributed processing

At the heart of every IOM is the FP packet processing complex. Innovative Alcatel-Lucent FP technology delivers performance and multiservice flexibility, enabling hardware-based IP/MPLS, routing, granular traffic management, and scalable multicast and high-touch packet services. The FP packet processor complex delivers the multi-dimensional scaling required for large networks with performance predictability.

Designed for multiservice networks, FP technology supports all interface types, so common silicon is used across platform interface modules, ensuring service consistency with complete interoperability. Purpose-built and optimized for high-demand environments, FP technology enables the Alcatel-Lucent 7750 SR and 7450 ESS to deliver a variety of complex consumer, business and mobile services with granular per-service and per-subscriber controls. Each IOM contains the powerful packet processing and traffic management capabilities of

the FP processor complex, so the overall performance of the 7750 SR and 7450 ESS scales linearly with the addition of each IOM to the chassis.

Extensible, programmable and predictable

Highly extensible, FP technology delivers the speed, depth and predictability of a hard-wired, fixed-function Application Specific Integrated Circuit (ASIC), with the flexibility of complete programmability and headroom to enable rapid service adaptation. This allows the Alcatel-Lucent 7750 SR and 7450 ESS to easily evolve to support emerging technologies, protocols and services through simple in-service microcode updates. This flexibility minimizes the need for premature hardware replacements, significantly reducing the TCO and greatly enhancing agility and speed-to-service capabilities.

Flexible Alcatel-Lucent 7750 SR IOM options – IOM-2 and IOM3-XP

Two 7750 SR IOM options are available – with each version providing increasing levels of per-slot throughput and incrementally higher scale for high-touch packet services. The Alcatel-Lucent 7750 SR Input/Output Module 2 (IOM-2) leverages FP technology and delivers up to 20 Gb/s (full duplex) with a full range of scalable deep-touch services. The Alcatel-Lucent 7750 SR IOM3-XP leverages the FP2 network processor to deliver per-slot throughput of up to 50 Gb/s (full duplex) with an average of 8x increase in service scale over the IOM-2, while maintaining complete service and platform consistency. The IOM3-XP scales further to meet the needs of the most demanding converged environments, with the headroom for years of feature expansion, bandwidth growth and service scaling.

Flexible Alcatel-Lucent 7450 ESS IOM options – IOM3-XP and IOM-1

Two 7450 ESS IOM options are available: The 7450 ESS IOM-1 leverages first-generation FP technology and delivers up to 20 Gb/s (full duplex), and the 7450 ESS IOM3-XP leverages FP2 network processors to deliver per-slot throughput of up to 50 Gb/s (full duplex) with an average of 16x increase in service scale over the IOM-1, while maintaining complete service and platform consistency.

Modular interface flexibility

Each IOM supports two MDAs per module, providing the physical network interfaces for a simple and flexible approach to router configuration. Alcatel-Lucent 7450 ESS IOMs support MDAs providing Fast Ethernet, Gigabit Ethernet, 10 Gigabit Ethernet and Packet over SONET/SDH (PoS). Alcatel-Lucent 7750 SR IOMs support MDAs providing Fast Ethernet, Gigabit Ethernet, 10 Gigabit Ethernet, PoS, ATM, channelized Any Service Any Port (ASAP) and Circuit Emulation Services (CES). With the flexibility to mix and match MDAs on an IOM, service providers have the increased freedom to construct routers to meet a broad range of customer requirements. (For more information on the supported MDA types and densities, see Table 1.)

Field upgradability is further simplified, as hot-swappable MDAs can be exchanged in-service to change media type and physical interfaces as required. Because the IOM contains all the processing technology, most reconfigurations only require the exchange of an MDA containing the physical interfaces, preserving a significant portion of a service provider's technology investment. This flexibility enables a high degree of investment preservation and leverage to further reduce the TCO.

Virtualized service integration

Alcatel-Lucent ISAs enable more intelligent services by virtualizing advanced services into the Service Router or Ethernet Service Switch chassis. ISAs become fully integrated into the network and share processing capabilities, while reducing network complexity, operating expenses, rack space and power consumption. ISAs are deployed in the same manner as MDAs, and are inserted into an IOM slot. Both ISAs and MDAs may be implemented simultaneously in an IOM. (For more information, consult the MS-ISA datasheet for details and application support on a given platform and IOM.)

Uncompromising interoperability

Newer IOMs based on FP2 technology can be intermixed in the same chassis with older IOMs based on FP technology, with no adverse performance or service impact. In addition, IOMs support any generation of MDA and automatically detect which MDA has been inserted to deliver the expected performance levels. As a result of FP technology design consistency, each IOM and paired MDA will operate at their intended performance and service levels with complete predictability. Provisioning features and services are consistently implemented across IOMs to ensure operational continuity.

Advanced traffic management with per-subscriber, per-service granularity

Each Alcatel-Lucent 7750 SR IOM provides granular and scalable traffic management services on a fully distributed basis. There are no predefined parameters, queue blocks or hard-coding of H-QoS capabilities in the IOM FP packet processing architecture. As a result, queues and policers for granular traffic management are shared across ports and subscribers serviced by an IOM.

The Alcatel-Lucent 7750 SR and 7450 ESS IOMs provide granular traffic shaping at the individual queue level, overcoming the limitations and inflexibility associated with per-subscriber aggregated shaping. By shaping subscriber traffic on a per-service basis, the total allocated per-subscriber bandwidth can be dynamically shared across all applications or services, while strict control of aggregate per-subscriber bandwidth allotments is maintained. The IOM3-XP enables even deeper and more granular control over distinct flow types, allowing each queue to be shaped to four different user-definable states, with up to eight distinct priority levels. Traffic is then forwarded based on the combination of queue shaping, state and priority. IOM3-XPs also add up to one million two-tier policers to provide even deeper levels of granular per-subscriber and per-service traffic control.

MDA AND ISA SUPPORT

Tables 1 and 2 summarize the MDAs and ISAs supported on the Alcatel-Lucent 7750 SR and 7450 ESS IOMs.

Table 1. Alcatel-Lucent 7750 SR and 7450 ESS MDA support

	7750 SR		7450 ESS		
	7750 SR IOM3-XP	7750 IOM-2	7450 ESS IOM3-XP	7450 IOM-1	7750 IOM3-XP*
ETHERNET MDA-XP					
48-port 10/100/1000BASE-TX MDA-XP	Yes	No	Yes	No	Yes
20-port 1000BASE MDA-XP (SFP)	Yes	Yes	Yes	Yes	Yes
20-port 10/100/1000BASE-TX MDA-XP	Yes	Yes	Yes	Yes	Yes
12-port 1000BASE MDA-XP (XFP)	Yes	Yes	Yes	Yes	Yes
10-port 1000BASE MDA-XP (SFP)	Yes	Yes	Yes	Yes	Yes
4-port 10GBASE MDA-XP (XFP)	Yes	Yes	Yes	Yes	Yes
2-port 10GBASE MDA-XP (XFP)	Yes	Yes	Yes	Yes	Yes
1-port 10GBASE MDA-XP (XFP)	Yes	Yes	Yes	Yes	Yes
2-port 10GBASE + 12-port 1000BASE MDA-XP (XFP/SFP) (combination)	Yes	No	Yes	No	Yes
ETHERNET MDA					
60-port 10/100BASE-TX MDA	Yes	Yes	Yes	Yes	Yes
20-port 100BASE-FX MDA (SFP)	Yes	Yes	Yes	Yes	Yes
1-port 10GBASE + 10-port 1000BASE MDA (XFP/SFP) (combination)	Yes	Yes	Yes	Yes	Yes
ETHERNET MDA WITH TUNABLE DWDM OPTICS					
1-port 10GBASE MDA with tunable optics (DWDM Tunable)	Yes	Yes	Yes	Yes	Yes
HIGH SCALE MDA					
10-port 1000BASE HS-MDA (SFP) (Rev B)	Yes	No	Yes	No	No
1-port 10GBASE HS-MDA (XFP) (Rev B)	Yes	Yes	Yes	No	Yes
SONET/SDH MDA-XP					
2-port OC-192c/STM-64c MDA-XP	Yes	Yes	N/A	N/A	Yes
SONET/SDH MDA					
1-port OC-192c/STM-64c MDA	Yes	No	N/A	N/A	Yes
4-port OC-48c/STM-16c MDA (Rev B)	Yes	Yes	Yes	Yes	Yes
16-port OC-3c/STM-1c /OC-12c/STM-4c (Multirate) MDA (Rev B)	Yes	Yes	Yes	Yes	Yes
ANY SERVICE ANY PORT (ASAP) MDA					
1-port Channelized OC-12/STM-4 ASAP MDA	Yes	Yes	N/A	N/A	Yes
4-port Channelized OC-3/STM-1 ASAP MDA	Yes	Yes	N/A	N/A	Yes
12-port Channelized DS3/E3 ASAP MDA	Yes	Yes	N/A	N/A	Yes
4-port Channelized DS3/E3 ASAP MDA	Yes	Yes	N/A	N/A	Yes
ATM MDA					
4-port ATM OC-3c/STM-1c/OC-12c/STM-4c (Multirate) (Rev B)	Yes	Yes	N/A	N/A	Yes
16-port ATM OC-3c/STM-1c (Rev B)	Yes	Yes	N/A	N/A	Yes
CIRCUIT EMULATION SERVICE (CES) MDA					
1-port Channelized OC-12/STM-4 CES MDA	Yes	Yes	N/A	N/A	Yes
4-port Channelized OC-3/STM-1 CES MDA	Yes	Yes	N/A	N/A	Yes
1-port Channelized OC-3/STM-1 CES MDA	Yes	Yes	N/A	N/A	Yes

* Note: Alcatel-Lucent 7750 SR MDAs in a 7450 ESS chassis requires advanced IP Services mode.

Table 2. Alcatel-Lucent 7750 SR and 7450 ESS MS-ISA support

ISA TYPE	NOTE
Multiservice Integrated Service Adapter (MS-ISA)	Consult the MS-ISA Datasheet for details and application support on a given platform and IOM.

ORDERING INFORMATION

Table 3 provides ordering information for the Alcatel-Lucent 7750 SR and 7450 ESS IOM hardware.

Table 3. Ordering information for Alcatel-Lucent Input/Output Modules

PART NUMBER	PART NAME	DESCRIPTION
3HE06318AA	IOM - 7750 SR IOM3-XP-B	7750 SR 50G Input/Output Module 3-XP (IOM3-XP) Baseboard Rev B - accepts up to two Media Dependent Adapters (MDAs)
3HE03619AA	IOM - 7750 SR IOM3-XP	7750 SR 50G Input/Output Module 3-XP (IOM3-XP) Baseboard - accepts up to two Media Dependent Adapters (MDAs)
3HE01473AA	IOM - 7750 SR-7/12 IOM2-20G	7750 SR 20G Input/Output Module 2 (IOM-2) Baseboard - accepts up to two Media Dependent Adapters (MDAs)
3HE06324AA	IOM - 7450 ESS IOM3-XP-B	7450 ESS 50G Input/Output Module 3-XP (IOM3-XP) Baseboard Rev B - accepts up to two Media Dependent Adapters (MDAs)
3HE03620AA	IOM - 7450 ESS IOM3-XP	7450 ESS 50G Input/Output Module 3-XP (IOM3-XP) Baseboard - accepts up to two Media Dependent Adapters (MDAs)
3HE00229AB	IOM - 7450 ESS IOM-1 20G	7450 ESS 20G Input/Output Module 1 (IOM-1) Baseboard - accepts up to two Media Dependent Adapters (MDAs)

TECHNICAL SPECIFICATIONS

	7750 SR IOM3-XP	7750 SR IOM-2	7450 ESS IOM3-XP	7450 ESS IOM-1
Network processor technology	FP2 technology	FP technology	FP2 technology	FP technology
Control processor	Single core Six core (Rev B)	Single core	Single core	Six core (Rev B)
Slot requirements	Single-slot module		Single-slot module	
MDA/ISA supported per IOM	Two MDAs, two ISAs, or one each MDA and ISA		Two MDAs, two ISAs, or one each MDA and ISA	
MDA type supported	7750 SR MDA and MDA-XP		7450 ESS MDA and MDA-XP	
IOM full-slot throughput	50 Gb/s	20 Gb/s	50 Gb/s	20 Gb/s
MDA per half-slot throughput	Up to 25 Gb/s per MDA for a total of 50 Gb/s per IOM	Up to 10 Gb/s per MDA for a total of 20 Gb/s per IOM	Up to 25 Gb/s per MDA for a total of 50 Gb/s per IOM	Up to 10 Gb/s per MDA for a total of 20 Gb/s per IOM
Hardware policers	1 million	16,000	1 million	16,000
Indicators	Operational: Solid green; Fault: Amber	Not applicable	Operational: Solid green; Fault: Amber	Not applicable
Supported chassis	7750 SR-12e 7750 SR-12 7750 SR-7 7450 ESS-12 7450 ESS-7	7750 SR-12 7750 SR-7	7450 ESS-12 7450 ESS-7 7450 ESS-6 7450 ESS-6V	
Minimum operating system software	SR OS Release 6.1 SR OS Release 9.0.R6 (Rev B)	SR OS Release 2.0 or higher MDA support varies by SR OS release	SR OS Release 6.1 SR OS Release 9.0.R6 (Rev B)	SR OS Release 4.0 or higher MDA support varies by SR OS release
Dimensions*	Standard full slot form factors are common to all variants			
	<ul style="list-style-type: none"> • Height: 3.6 cm (1.4 in.) • Width: 42.5 cm (16.8 in.) • Depth: 43.2 cm (17.0 in.) 			
Weight*	IOM3-XP weight empty: 5.3 kg (12 lb)	IOM-2 weight empty: 4.1 kg (9 lb)	IOM3-XP weight empty: 5.3 kg (12 lb)	IOM-1 weight empty: 4.1 kg (9 lb)

	7750 SR IOM3-XP	7750 SR IOM-2	7450 ESS IOM3-XP	7450 ESS IOM-1
Environmental specifications	Operating temperature: 5°C to 40°C (41°F to 104°F) Operating relative humidity: 5% to 85% Operating altitude: Up to 4000 m (13,000 ft) at 30°C (86°F)			
Network/element management	Fully supported by Alcatel-Lucent 5620 Service Aware Manager (SAM) Command line interface			
Queue grouping	Dynamically assignable across IOM	Dynamically assignable per MDA	Dynamically assignable across IOM	Dynamically assignable per MDA
Hardware queues	Hierarchical service queues: 64,000 – available to all IOM-attached ports Shapers: 64,000 (1 per queue)	Hierarchical service queues: 32,000 – assignable in 16,000 blocks to each MDA Shapers: 32,000 (1 per queue)	Hierarchical service queues: 64,000 – available to all IOM-attached ports Shapers: 64,000 (1-per queue)	Hierarchical service queues: 32,000 – assignable in 16,000 blocks to each MDA Shapers: 32,000 (1 per queue)
Queues available to all ports	Yes – all 64,000 assignable to any port on IOM	Yes – 16,000 assignable to any port per MDA	Yes – all 64,000 assignable to any port on IOM	Yes – 16,000 assignable to any port per MDA
Hardware policers†	1 million 2-tier policers	16,000	1 million 2-tier policers	N/A
Media Access Control (MAC) address capacity*	Up to 2 million 2-tier MAC FIBs	Up to 192,000 MAC FIBs (hardware/software)	Up to 2 million 2-tier MAC FIBs	Up to 128,000 MAC FIBs (hardware/software)
Access Control List*	Up to 200,000 entries per IOM System scaling up to 2 million entries	Up to 96,000 entries per IOM System scaling up to 960,000 entries	Up to 174,000 entries per IOM System scaling up to 1.7 million entries	Up to 96,000 entries per IOM System scaling up to 960,000 entries
Network protocols	IPv4 unicast and multicast IPv6 unicast and multicast MPLS Ethernet bridging Provider Backbone Bridging		IPv4 unicast and multicast MPLS Ethernet bridging Provider Backbone Bridging	
Safety	EN 60950-1 2nd Ed CE-Mark IEC 60950-1 2nd Ed CB Scheme CSA/UL 60950-1 2nd Ed NRTL FDA CDRH 21-CFR 1040 IEC/EN 60825-1 IEC/EN 60825-2			
EMC emission	ICES-003 Class A FCC Part 15 Class A EN 55022 Class A CISPR 22 Class A AS/NZS CISPR 22 VCCI Class A BSMI Class A			

	7750 SR IOM3-XP	7750 SR IOM-2	7450 ESS IOM3-XP	7450 ESS IOM-1
EMC immunity	EN 300 386 EN 55024 IEC/EN 61000-4-2 ESD IEC/EN 61000-4-3 Radiated Immunity IEC/EN 61000-4-4 EFT IEC/EN 61000-4-5 Surge IEC/EN 61000-4-6 Conducted Immunity IEC/EN 61000-4-8 Magnetic Immunity IEC/EN 61000-4-11 Voltage Interruptions			
Telecom	Telcordia GR-253-CORE IEEE 802.3 (GigE, Ethernet) ANSI T1.105 ANSI T1.105.03 ANSI T1.105.06 ANSI T1.105.09 ANSI T1.403 (DS1) ANSI T1.404 (DS3) ITU-T G.957 ITU-T G.825 ITU-T G.824 ITU-T G.823 ITU-T G.813 ITU-T G.707 ITU-T G.703 ITU-T G.8261 - g.pactiming ITU-T G.8262 - g.paclock ITU-T G.8263 - g.paclock.bis ITU-T G.8264 - g.pacmod			
Environmental	ETS 300 019-1-1 Storage Tests, Class 1.2 ETS 300 019-1-2 Transportation Tests, Class 2.3 ETS 300 019-1-3 Operational Tests, Class 3.2 ETS 300 019-2-4, pr A 1 Seismic WEEE RoHS China CRoHS			
Network Equipment Building System (NEBS)	<ul style="list-style-type: none"> • NEBS Level 3 Compliant <ul style="list-style-type: none"> – Telcordia GR-1089-CORE – Telcordia GR-63-CORE • Telcordia GR-295-CORE • RBOC requirements <ul style="list-style-type: none"> – ATT-TP-76200 – ATT-TP-76200 section 13, TEER per ATIS-0600015.02 – VZ.TPR.9205 TEEER per ATIS-0600015.02 – VZ.TPR.9305 			

* Weights and dimensions are approximate and subject to change. Refer to the appropriate installation guide for the current weight and dimensions.

† Hardware capacity - actual capacity depends on capacity supported in specific SR OS releases.