



# ACX SERIES UNIVERSAL ACCESS ROUTERS

## Product Overview

Fixed and mobile operators are increasingly challenged to deliver high bandwidth services while growth in average revenue or margin per user fails to justify significant infrastructure investments. While many networks have seen benefits from convergence in the core and on the edge, a similar transformation is clearly required in the access network. Universal Access is an architecture that extends operational intelligence to that network. Juniper Networks ACX Series Universal Access Routers are built to support an adaptive services architecture, enabling rapid deployment of access services, and transforming the network to create a seamless end-to-end service delivery platform.

## Product Description

Juniper Networks® ACX Series Universal Access Routers include the fixed configuration ACX1000, ACX1100, ACX2000, and ACX2100 Universal Access Routers in a compact 1 RU form factor. These are environmentally hardened and support passive cooling for easy deployments in outside street cabinets or environmental enclosures. The ACX4000 Universal Access Router is a modular 2.5 RU form factor with higher performance and configurable options for interface types. Powered by Juniper Networks Junos® operating system, the ACX Series delivers industry-leading performance and simplified end-to-end provisioning with support for full IP/MPLS with traffic engineering, and extensive Layer 2 and Layer 3 functionality.

ACX Series Universal Access Routers cost-effectively address current operator challenges to rapidly deploy new, high bandwidth services. With industry leading performance of up to 60 Gbps for all models and the most comprehensive, traditional, and packet timing features, the ACX Series is well positioned to address the growing bandwidth needs in the access network. These platforms deliver the necessary scale and performance needed to support multi-generation services. With support for extensive hardware and software features, the ACX Series extends the operational intelligence all the way to the access network to deliver seamless end-to-end services. Equipped with interfaces for both time-division multiplexing (TDM) and Ethernet (high density GbE, Power over Ethernet, and 10GbE), as well as support for high precision clocking and synchronization, the ACX Series platforms can support the mobile network's evolution path from 2G/2.5G to 3G/4G/Long Term Evolution (LTE).

Powered by Junos OS, the ACX Series family complements Juniper's Universal Edge<sup>1</sup> and Universal WAN<sup>2</sup> solutions by integrating the mobile network with a flexible and scalable enterprise and branch routing portfolio optimized to support rapidly growing mobile, video, and cloud computing applications. The ACX Series introduces Juniper's proven IP/MPLS leadership from core and edge into the access layers of the network. Still maintaining relative simplicity in the access network, the ACX Series supports a rich suite of L2, L3, and IP/MPLS functionality to allow large-scale seamless MPLS networks with simplified service provisioning and operations.

<sup>1</sup> Juniper's Universal Edge solution at [www.juniper.net/us/en/solutions/service-provider/universal-edge](http://www.juniper.net/us/en/solutions/service-provider/universal-edge).

<sup>2</sup> Juniper's Universal WAN solution at [www.juniper.net/us/en/company/press-center/press-releases/2011/pr\\_2011\\_05\\_02-08\\_02.html](http://www.juniper.net/us/en/company/press-center/press-releases/2011/pr_2011_05_02-08_02.html).

## Architecture and Key Components

The ACX1000, ACX1100, ACX2000, and ACX2100 Universal Access Routers are compact 17.5 x 1.75 x 9.4 in (44.5 x 4.4 x 24 cm) platforms conforming to ETSI 300 specifications. This architecture enables ease of deployment in a cell site cabinet where rack space and cooling are limited. The ACX4000 is a modular 2.5 RU form factor with configurable options for interface types and overall density.

The ACX Series delivers an industry-leading performance with a range of port densities and interface types. Table 1 below provides a snapshot of interfaces supported on each ACX Series model.

**Table 1: Hardware Differences Between the Various ACX Series Models**

Interface	ACX1000	ACX1100	ACX2000	ACX2100	ACX4000 <sup>1</sup>
TDM – T1/E1	8	-	16	16	-
GbE (Copper)	8	8	8 (PoE++ on 2 ports)	4	-
GbE combination Copper or Fiber (SFP)	4	4	-	4	8 (PoE++ on 2 ports)
GbE SFP	-	-	2	2	2
10GbE (SFP+)	-	-	2*	2*	2*

\*SFP+ ports can be configured to be 1GbE ports and accept 1GbE SFP.

The ACX Series common alarm and timing components include:

- Four alarm inputs and four alarm output contacts
- One management port
- External Building Integrated Timing System (BITS) timing port
- 10 MHz timing connectors (one input and one output)
- 1 Pulse Per Second (PPS) connectors (one input and one output)
- Time of Day (TOD) RS232 port
- 1.544 MHz/2.048 MHz T1/E1 (RJ48) ports for timing input or output
- SyncE support on RJ45/SFP ports as timing input or output
- Packet (IEEE 1588-2008)<sup>2</sup> timing includes:
  - Timing input when configured as Ordinary Clock (OC) or Boundary Clock (BC)
  - Timing output when configured as BC

## Features and Benefits

The Universal Access routing solution is optimized to enhance the mobile subscriber experience while significantly improving network monetization for service providers. By delivering new levels of programmability, reliability, and scalability to the mobile network, Juniper's new Universal Access portfolio improves customer satisfaction while lowering the total cost of operating, maintaining, and updating the network infrastructure.

Juniper Networks ACX Series Universal Access Routers are a family of next-generation access routers that addresses the new network imperatives with up to three times the total throughput of competitive solutions. These routers provide a seamless, end-to-end, service delivery platform that can grow and adapt to changing subscriber expectations and traffic demands.

The Universal Access portfolio redefines the service provider access network with support for seamless MPLS, comprehensive management with Junos Space, world-class timing and synchronization and SDK-enabled programmability.

**Table 2: ACX Series Features and Benefits**

Feature	Benefits
Flexible and adaptive service architecture	<ul style="list-style-type: none"> <li>• A service architecture that extends operational intelligence to the access network and can adapt and grow with business needs.</li> <li>• Junos OS-powered comprehensive feature set with support for carrier Ethernet services, L2, L3, MPLS, traffic engineering, and call admission control (CAC). With simplified service provisioning and operations, the ACX Series includes the functionality needed to deploy MPLS in the access network.</li> </ul>
Rapid provisioning with superior management	<ul style="list-style-type: none"> <li>• Easy, cost-effective, remote provisioning with Junos Space Services Activation Director. Support for fault management, extensive Operation, Administration, and Management (OAM), service monitoring, and integrated Sync Manager. Easy integration with third-party services and tools.</li> </ul>
Scale and performance	<ul style="list-style-type: none"> <li>• Industry-leading performance that is 3x the closest competitor. High density GbE and 10GbE support to meet growing bandwidth needs and support for evolution from 2G to 3G/4G/LTE. Wide interface range with T1/E1, GbE, 10GbE, and PoE++ support. With PoE++ support, there is no electrical cabling required for microwave/Wi-Fi access devices and/or surveillance cameras.</li> </ul>
Highest quality of experience (QoE)	<ul style="list-style-type: none"> <li>• The ACX series platforms support proven and widely deployed clocking technologies, SyncE and IEEE 1588-2008 to deliver enhanced subscriber experience.</li> </ul>
Open access system	<ul style="list-style-type: none"> <li>• Through Junos SDK open APIs service provisioning can be easily customized and integrated with third-party applications and tools.</li> </ul>
Environmental hardening	<ul style="list-style-type: none"> <li>• The fixed 1 RU ACX Series models are environmentally hardened and support passive cooling for outdoor deployments in extreme weather conditions.</li> </ul>

<sup>1</sup> ACX4000 supports two Modular Interface Controller (MIC) slots for additional interfaces.

<sup>2</sup> IEEE1588-2008 also referred to as IEEE1588v2 or Precision Time Protocol (PTPv2).



ACX1000



ACX1100



ACX2000



ACX2100



ACX4000

## Specifications

This section lists basic specifications for the ACX Series routers. For further details, please refer to the hardware installation manuals on [www.juniper.net/techpubs/hardware](http://www.juniper.net/techpubs/hardware).

Specification	ACX1000 and ACX1100	ACX2000 and ACX2100	ACX4000*
Dimensions (W x H x D)	17.5 x 1.75 x 9.4 in (44.5 x 4.4 x 24 cm)	17.5 x 1.75 x 9.4 in (44.5 x 4.4 x 24 cm)	17.5 x 4.35 x 9.25 in (44.5 x 11 x 23.5 cm)
Weight (lb/kg) fully configured	6.5 lb (2.94 kg) for ACX1000 7.8 lb (3.54 kg) for ACX1100	8.3 lb (3.77 kg)	23.8 lb (10.82 kg) (Fully configured with two power supply units, two Modular Interface Controllers (MICs))
Power (DC)	-48 V, -60 V telco nominal or +24 VDC nominal	-48 V, -60 V telco nominal or +24 VDC nominal	-48 V, -60 V telco nominal or +24 VDC nominal
Power (AC)	90 to 240V AC for ACX1100-AC* only	90 to 240 V AC for ACX2100-AC* only	90 to 240 V AC
Maximum power draw	50W (ACX1000); 35W (ACX1100- AC); 40W (ACX1100-DC)	70W (ACX2000); 60W (ACX2100- AC); 80W (ACX2100-DC)	150W (w/o MICs); 45W for each MIC; 65W for each PoE++ port
Operating temperature	-40° F to 158° F (-40° C to 70° C)	-40° F to 149° F (-40° C to 65° C) full featured	-40° F to 158° F (-40° C to 70° C)
Humidity	95% RH noncondensing	95% RH noncondensing	95% RH noncondensing
Noise level	0 dB (acoustic noise) (negligible— only passive cooling is used)	0 dB (acoustic noise) (negligible— only passive cooling is used)	33 dBA at 27 degrees C ambient temperature

\*ACX100-AC, ACX-2100-AC and ACX4000 models planned to be orderable in 1Q2013.

## Approvals

### Safety Approvals

- CAN/CSA-C22.2 No. 60950-1
- UL 60950-1
- EN 60950-1
- IEC 60950-1 – CB Scheme
- EN 60825-1

### EMC

- AS/NZS CISPR22 Class A
- EN55022 Class A
- VCCI Class B
- FCC Part 15 Class A

### Immunity

- EN-61000-3-2 Power Line Harmonics
- EN-61000-3-3 Voltage Fluctuations and Flicker
- EN-61000-4-2 ESD

- EN-61000-4-3 Radiated Immunity
- EN-61000-4-4 EFT
- EN-61000-4-5 Surge
- EN-61000-4-6 Low Frequency Common Immunity
- EN-61000-4-11 Voltage Dips and Sags

### ETSI

- ETSI EN300386-2 Telecommunication Network Equipment, Electromagnetic Compatibility Requirements
- ETSI EN 300 019-2-1 (2000) – Storage, Class T1.2
- ETSI EN 300 019-2-2 (1999) – Transportation, Class T2.3
- ETSI EN 300 019-2-3 (2003) – Stationary Use at Weather-protected Locations, Class T3.2
- ETSI EN 300 019-2-4 (2003) – Stationary Use at Non-weather Protected Locations, Class 4.2H
- ETS 300753 (1997) – Acoustic Noise Emitted by Telecommunications Equipment

## NEBS

- SR-3580 NEBS Criteria Levels (Level 3 Compliance)
- GR-63-CORE: NEBS, Physical Protection
- GR-1089-CORE: EMC and Electrical Safety for Network Telecommunications Equipment (Issue 6 compliant)
- GR-3108-CORE: Generic Requirements for Network Equipment in the Outside Plant (OSP)

## Telecomm Compliance

- RTTE Directive 1995/5/EC
- T1 and XDSL Interfaces
  - FCC Part 68
  - Industry Canada CS-03
  - JATE Green Book
  - TBR 21 (XDSL only)
- E1 Interface
  - TBR 12/13
  - ACA TS016
  - G.703

## Management

- Device management: NETCONF, CLI, SNMP v1/v2/v3
- Comprehensive fault-management, configuration, accounting, performance, and security (FCAPS) management through Junos Space network management system (NMS):
  - Device level configuration, software upgrade, alarms, script management
  - End-to-end provisioning of ELINE, emulated LAN (ELAN), L3VPN, SyncE, IEEE1588-2008 (PTP), OAM, class of service (CoS)
  - Device and service level fault management
  - Device and service level performance management

## Metro Ethernet Forum (MEF)

- Designed to be MEF compliant – MEF 9, MEF 14 and MEF 21

## Juniper Networks Services and Support

Juniper Networks is the leader in performance-enabling services that are designed to accelerate, extend, and optimize your high-performance network. Our services allow you to maximize operational efficiency while reducing costs and minimizing risk, achieving a faster time to value for your network. Juniper Networks ensures operational excellence by optimizing the network to maintain required levels of performance, reliability, and availability. For more details, please visit [www.juniper.net/us/en/products-services/](http://www.juniper.net/us/en/products-services/).

## Ordering Information

Model Number	Description
ACX1000-DC	ACX1000 unit, 8xT1/E1, 8xGbE copper, 4xGbE combination (copper or SFP), 1 RU, ETSI 300, dual feed DC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX1100-DC	ACX1100 unit, 8xGbE copper and 4xGbE combination (copper or SFP), 1 RU, ETSI 300, redundant DC power supplies, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX1100-AC*	ACX1100 unit, 8xGbE copper and 4xGbE combination (copper or SFP), 1 RU, ETSI 300, redundant AC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX2000-DC	ACX2000 unit, 16xT1/E1, 8xGbE copper with PoE++ on two ports, 2xGbE SFP, 2x10GbE SFP+, 1 RU, ETSI 300, dual feed DC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX2100-DC	ACX2100 unit, 16xT1/E1, 4xGbE copper, 4xGbE combination (copper or fiber), 2xGbE SFP, 2x10GbE SFP+, 1 RU, ETSI 300, redundant DC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX2100-AC*	ACX2100 unit, 16xT1/E1, 4xGbE copper, 4xGbE combination (copper or fiber), 2xGbE SFP, 2x10GbE SFP+, 1 RU, ETSI 300, redundant AC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX4000-DC*	ACX4000 modular unit, 8xGbE combo (copper/fiber) with PoE++ on two ports, 2xGbE SFP, 2x10GbE SFP+, 2.5 RU, ETSI 300, redundant DC power, temperature hardened, Junos OS, two configurable MIC slots (optics sold separately)
ACX4000-AC*	ACX4000 modular unit, 2x10GbE SFP+, 8xGbE combo (copper/fiber) with PoE++ on two ports, 2xGbE SFP, 2.5 RU, ETSI 300, redundant AC power, temperature hardened, Junos OS, two configurable MIC slots (optics sold separately)
MIC-6GE-CU-SFP-ACX	6xGbE copper/SFP MIC for ACX4000
MIC-4CHOC3-1OC12-ACX	4xCHOC3/STM-1/1xCHOC12/STM-4 MIC for ACX4000
ACX-MIC-16CHE1-T1-CE	16x T1/E1 MIC for ACX4000**

\* ACX1100-AC, ACX2100-AC and ACX-4000 models planned to be orderable in 1Q2013.

\*\* 16xT1/E1 MIC for ACX4000 is orderable in 3Q2013.

## About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at [www.juniper.net](http://www.juniper.net).

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