Release Notes for Cisco ASR 9000 Routers, Cisco IOS XR Release 6.8.1

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Release Notes for Cisco ASR 9000 Series Routers, IOS XR Release 6.8.1

Cisco ASR 9000 Series Aggregation Services Routers (ASR 9000 Series) deliver unprecedented scale, service flexibility, and high availability for service providers' fixed and mobile networks, data centers, and transport networks. The routers are powered by Cisco IOS XR Software, an innovative, self-healing, distributed operating system designed for always-on operation while scaling system capacity into multiple terabits per second (Tbps).

For more information about ASR 9000 Series routers, see ASR 9000 Data Sheet listing page.

Cisco IOS XR Software is a distributed operating system designed for continuous system operation combined with service flexibility and higher performance.

To migrate from legacy 32 bit and new 64 bit IOS XR OS, refer to the Migration Guide for Cisco ASR 9000 Series Routers.

This release notes describe the features provided in the Cisco IOS XR Software Release 6.8.1. See the *What's New in Cisco IOS XR Release 6.8.1* section in this document for information on new software features.

What's New in Cisco IOS XR Release 6.8.1

Cisco is continuously enhancing the product with every release and this section covers a brief description of key features and enhancements. It also includes links to detailed documentation, where available.

Feature	Description
System Monitoring	
Configuration command enhancements for TWAMP-Light	This release introduces the option, **any** , in the **responder twamp-light** configuration command for the following parameters: **local-ip** , **remote-ip** , **remote-port** , and **vrf** . This enhancement allows you to configure twamp-light test-sessions without explicit configuration for local IP address, remote IP address, remote-port, or vrf. The modified configuration command is: • responder twamp-light
System Security	
Hold-Down Timer for TACACS+	TACACS+ servers provide AAA services to the user. In the event a TACACS+ server becomes unreachable, the router sends the client request to another server, leading to considerable delay in addressing the requests. To prevent this delay, you can set a hold-down timer on the router. The timer gets triggered after the router marks the TACACS+ server as down. During this period, the router does not select the server that is down for processing any client requests. When the timer expires, the router starts using that TACACS+ server for client transactions. This feature improves latency in providing AAA services to the user by limiting the client requests from being sent to unresponsive servers. This feature introduces the **holddown-time** command.
Broadband Network Gateway	

Feature	Description
Dynamic Modification of DAPS Pool	A Distributed Address Pool Service (DAPS) provides dynamic IP address allocation to the BNG subscriber. This feature allows you to modify the DAPS pool configuration in live networks without bringing down the interface or the BNG subscriber session. You can dynamically release the IP address, and thereby release the active subscriber session. This functionality in turn helps you to configure a new IP address pool with the same IP address range or a different one, that can be used for a new client.
	This feature introduces the **pool onfly pppoe** command.

Supported Packages and System Requirements

This section describes the system requirements for Cisco ASR 9000 Series Aggregation Services Router Software Release 6.8.1.

Feature Set (Software Images)

The Cisco ASR 9000 Series Aggregation Services Router Software is packaged in *feature sets* (also called *software images*). Each feature set contains a specific set of features for Cisco ASR 9000 Series Aggregation Services Router IOS XR Release 6.8.1.

This table lists the Cisco IOS XR Software feature set matrix (TAR files) and associated filenames available for the Cisco IOS XR Software Release 6.8.1 supported on the Cisco ASR 9000 Series Aggregation Services Router.

Table 1: Cisco IOS XR Software Release 6.8.1 TAR Files

Feature Set	Filename	Description
Cisco IOS XR IP/MPLS Core Software [for RSP880 and RP systems]	ASR9K-iosxr-px-6.8.1-turboboot.tar	Contains only the mini.vm package.

Feature Set	Filename	Description
Cisco IOS XR IP/MPLS Core Software [for RSP880 and RP systems]	ASR9K-iosxr-px-6.8.1-pies.tar	• Cisco IOS XR IP Unicast Routing Core Bundle • Cisco IOS XR Manageability Package • Cisco IOS XR MPLS Package • Cisco IOS XR Multicast Package • Cisco IOS XR FPD Package • Cisco IOS XR Diagnostic Package • Cisco IOS XR Advanced Video Package • Cisco IOS XR Optics Package • Cisco IOS XR Upgrade Package • Cisco IOS XR BNG Packages • Cisco IOS XR Lawful Intercept Package • Cisco IOS XR Services Package • Cisco IOS XR Satellite Package • Cisco IOS XR Documentation Package

Feature Set	Filename	Description
Cisco IOS XR IP/MPLS Core Software 3DES [for RSP-2, RSP880 and RP systems]	ASR9K-iosxr-px-6.8.1-k9-pies.tar	• Cisco IOS XR IP Unicast Routing Core Bundle • Cisco IOS XR Manageability Package • Cisco IOS XR MPLS Package • Cisco IOS XR Multicast Package • Cisco IOS XR Security Package • Cisco IOS XR FPD Package • Cisco IOS XR Diagnostic Package • Cisco IOS XR Advanced Video Package • Cisco IOS XR Optics Package • Cisco IOS XR Upgrade Package • Cisco IOS XR BNG Packages • Cisco IOS XR Lawful Intercept Package • Cisco IOS XR Services Package • Cisco IOS XR Satellite Package • Cisco IOS XR Documentation Package
Cisco IOS XR Bridge and SMUs	ASR9k-iosxr-px-6.8.1-bridge_smus.tar	Contains all bridge SMUs

This table lists the Cisco ASR 9000 Series Aggregation Services Router Software feature set matrix (PX PIE files) and associated filenames available for the Cisco IOS XR Release 6.8.1 supported on the Cisco ASR 9000 Series Aggregation Services Router.

Table 2: Cisco IOS XR Software Release 6.8.1 PX PIE Files

Composite Package		
Feature Set	**Filename**	**Description**
Cisco IOS XR IP Unicast Routing Core Bundle	asr9k-mini-px.pie-6.8.1	Contains the required core packages, including OS, Admin, Base, Forwarding, Modular Services Card, Routing, SNMP Agent, and Alarm Correlation. The mini pie file is used for upgrading to the new release

Cisco IOS XR IP Unicast Routing Core Bundle	asr9k-mini-px.vm-6.8.1	Contains the required core packages including OS, Admin, Base, Forwarding, Routing, SNMP Agent, Diagnostic Utilities, and Alarm Correlation. The mini VM file is used for turbobooting the device.

Individually-Installable Optional Packages

Feature Set	Filename	Description
Cisco IOS XR Manageability Package	asr9k-mgbl-px.pie-6.8.1	CORBA2 agent, XML3 Parser, and HTTP server packages. This PIE also contains some SNMP MIB infrastructure. Certain MIBs won't work if this PIE is not installed. IPSLA and environment MIBs are part of the mgbl pie.
Cisco IOS XR CGv6 VSM Package	asr9k-services-infra.pie- 6.8.1	Contains iso images and version details of System Admin Virtual Machine (VM) and Kernel-based Virtual Machine (KVM).
Cisco IOS XR MPLS Package	asr9k-mpls-px.pie-6.8.1	MPLS Traffic Engineering (MPLS-TE), Label Distribution Protocol (LDP), MPLS Forwarding, MPLS Operations, Administration, and Maintenance (OAM), Link Manager Protocol (LMP), Optical User Network Interface (OUNI), Resource Reservation Protocol (RSVP), and Layer-3 VPN.
Cisco IOS XR Multicast Package	asr9k-mcast-px.pie-6.8.1	Multicast Routing Protocols (PIM, Multicast Source Discovery Protocol [MSDP], Internet Group Management Protocol [IGMP], Auto-RP), Tools (SAP, MTrace), and Infrastructure [(Multicast Routing Information Base [MRIB], Multicast-Unicast RIB [MURIB], Multicast forwarding [MFWD]), and Bidirectional Protocol Independent Multicast (BIDIR-PIM).
Cisco IOS XR Advanced Video Package	asr9k-video-px.pie-6.8.1	Software providing the vidmon and video quality monitoring feature for Cisco ASR 9000 Series Router chassis.
Cisco IOS XR Optics Package	asr9k-optic-px.pie-6.8.1	Firmware for the optics feature for Cisco ASR 9000 Series Aggregation Services Router Chassis. It enables Transport / OTN feature under interfaces.

Cisco IOS XR FPD Package	asr9k-fpd-px.pie-6.8.1	Firmware pie for all LC and RSP FPGAs and ASICs.
Cisco IOS XR Services Package	asr9k-services.pie-6.8.1	Includes binaries to support CGv6 on VSM.
Cisco IOS XR Documentation Package	asr9k-doc-px.pie-6.8.1	.man pages for Cisco IOS XR Software on the Cisco ASR 9000 Series Aggregation Services Router Chassis.
Cisco IOS XR Satellite Package - ASR9000v	asr9000v-nV-px.pie-6.8.1	Includes binaries to support Cisco ASR9000v Series Router Software and to support Cisco ASR 9000v Series Router as a satellite for Cisco ASR 9000 Series Router.
Cisco IOS XR Satellite Package - NCS 5001 and 5002	asr9k-ncs500x-nV-px.pie-6.8.1	Includes binaries to support Cisco NCS 5001/5002 Series Router Software and to support Cisco NCS 5001/5002 Series Router as a satellite for Cisco ASR 9000 Series Router.
Cisco IOS XR BNG Packages	asr9k-bng-px.pie-6.8.1	Includes binaries to support BNG features.
	asr9k-bng-supp-px.pie-6.8.1	
Cisco IOS XR Lawful Intercept (LI) Package	asr9k-li-px.pie-6.8.1	Includes LI software images.
Cisco IOS XR Security Package	asr9k-k9sec-px.pie-6.8.1	Support for Encryption, Decryption,, Secure Shell (SSH), Secure Socket Layer (SSL), and Public-key infrastructure (PKI).

Memory Requirements

⚠️ **Caution**   If you remove the media in which the software image or configuration is stored, the router may become unstable and fail.

The minimum memory requirements for Cisco ASR 9000 Series Aggregation Services Router running Cisco IOS XR Software Release 6.8.1 consist of the following:

- minimum 6 GB memory on the RSP880, RSP880-LT, and RP2.
- minimum 6 GB memory on the A99-RSP-TR and A99-RSP-SE.
- minimum 2 GB compact flash on route switch processors (RSPs).
- minimum 4 GB memory on the line cards (LCs) running Cisco IOS XR 32 bit image.

Supported Hardware

The following table lists the supported hardware components on the Cisco ASR 9000 Series Router and the minimum required software versions. For more information, see the *Firmware Support* section.

All hardware features are supported on Cisco IOS XR Software, subject to the memory requirements specified in the "Memory Requirements, on page 7" section.

For information on the end-of-sale and end-of-life dates for the Cisco ASR 9000 Series Router hardware, refer to the End-of-Life and End-of-Sale Notices page.

> **Note** The show command output lists supported and EOL hardware PIDs. To know the PIDs that are supported in this release, see the **Supported Hardware** section in this Release Notes.

Table 3: Cisco ASR 9000 Series Aggregation Services Router Supported Hardware and Minimum Software Requirements

Cisco ASR 9000 Series Aggregation Services Router Route Switch Processor Cards		
Component	**Part Number**	**Support Initially Provided in IOS XR Release**
Cisco ASR 9000 Series Aggregation Services Router RSP880-Lite, Packet Transport Optimized	A9K-RSP880-LT-TR	Release 6.2.2
Cisco ASR 9000 Series Aggregation Services Router RSP880-Lite, Service Edge Optimized	A9K-RSP880-LT-SE	Release 6.2.2
Cisco ASR 9000 Series Aggregation Services Router RSP4-S, Service Edge Optimized for ASR 9910.	A99-RSP-SE	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router RSP4-S, Packet Transport Optimized for ASR 9910.	A99-RSP-TR	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router RSP4-S, Packet Transport Optimized for ASR 9906	A99-RSP-TR	Release 6.3.1
Cisco ASR 9000 Series Aggregation Services Router RSP4-S, Service Edge Optimized for ASR 9906	A99-RSP-SE	Release 6.3.1
ASR9K Route Switch Processor with 880G/slot and 32 GB for Service Edge	A9K-RSP880-SE	Release 5.3.0
ASR9K Route Switch Processor with 880G/slot and 16 GB for Packet Transport	A9K-RSP880-TR	Release 5.3.0
ASR Route Processor 32 GB for Service Edge	A99-RP2-SE	Release 5.3.0
ASR Route Processor 16 GB for Packet Transport	A99-RP2-TR	Release 5.3.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot		
Cisco ASR 9000 Series Aggregation Services Router 4-Slot 2 Line Card Slot AC Chassis w/ PEM V2	ASR-9904-AC	Release 5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot 2 Line Card Slot DC Chassis w/ PEM V2	ASR-9904-DC	Release 5.1.0

Cisco ASR 9000 Series Aggregation Services Router 4-Slot Fan Tray	ASR-9904-FAN	Release 5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot Filter	ASR-9904-FILTER	Release 5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot Baffle	ASR-9904-BAFFLE	Release 5.1.0
Cisco ASR 9000 Series Aggregation Services Router 12-Slot		
Cisco ASR 9000 Series Aggregation Services Router 12-Slot 10 Line Card Slot AC Chassis w/ PEM V2	ASR-9912-AC	Release 4.3.2
Cisco ASR 9000 Series Aggregation Services Router 12-Slot 10 Line Card Slot DC Chassis w/ PEM V2	ASR-9912-DC	Release 4.3.2
Cisco ASR 9000 Series Aggregation Services Router 12-Slot Fan Tray	ASR-9912-FAN	Release 4.3.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot		
Component	**Part Number**	**Support Initially Provided in IOS XR Release**
Cisco ASR 9000 Fabric Card	A99-SFC2	Release 5.3.0
Cisco ASR 9000 Series Aggregation Services Router 22-Slot 20 Line Card Slot AC Chassis w/ PEM V2	ASR-9922-AC	Release 4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot 20 Line Card Slot DC Chassis w/ PEM V2	ASR-9922-DC	Release 4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Accessory Kit with grounding locks, guide rails etc	ASR-9922-ACC-KIT	NA
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Accessory - Cover for Power Shelves and Modules	ASR-9922-PWR-COV	NA
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Air Reflector	ASR-9922-AIRREF	NA
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Accessory - Door (with lock) and Fan Tray Covers	ASR-9922-DOOR	NA
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Fan Tray	ASR-9922-FAN	Release 4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Air Filter with Media, Center	ASR-9922-FLTR-CEN	Release 4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Air Filter with Media, Left & Right	ASR-9922-FLTR-LR	Release 4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Route Processor Filler	ASR-9922-RP-FILR	Release 4.2.2

Cisco ASR 9000 Series Aggregation Services Router 22-Slot Route Processor 12GB for Service Edge	ASR-9922-RP-SE	Release 4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Route Processor 6GB for Packet Transport	ASR-9922-RP-TR	Release 4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Switch Fabric Card Slot Filler	ASR-9922-SFC-FILR	Release 4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Switch Fabric Card/110G	ASR-9922-SFC110	Release 4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Version 2 Fan Tray	ASR-9922-FAN-V2	Release 5.2.2

Cisco ASR 9000 Series Aggregation Services Router 6-Slot

Component	Part Number	Support Initially Provided in IOS XR Release
Cisco ASR 9000 Series Aggregation Services Router 6-Slot System	ASR-9006-SYS	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 6-Slot Fan Tray	ASR-9006-FAN	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 6-Slot Door Kit	ASR-9006-DOOR	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 6-Slot AC Chassis	ASR-9006-AC	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 6-Slot DC Chassis	ASR-9006-DC	Release 3.7.2

Cisco ASR 9000 Series Aggregation Services Router 6-Slot Air

Component	Part Number	Support Initially Provided in IOS XR Release
Cisco ASR 9000 Series Aggregation Services Router 6-Slot Air Filter	ASR-9006-FILTER	Release 3.7.2

Cisco ASR 9000 Series Aggregation Services Router 6-Slot -ASR 9906

Cisco ASR 9000 Series Aggregation Services Router 6-Slot chassis	ASR-9906	Release 6.3.1
Cisco ASR 9000 Series Aggregation Services Router 6-Slot Fan Tray	ASR-9906-FAN	Release 6.3.1
Cisco ASR 9000 Series Aggregation Services Router 6-Slot Fan Filter	ASR-9906-FILTER	Release 6.3.1

Cisco ASR 9000 Series Aggregation Services Router 10-Slot

Cisco ASR 9000 Series Aggregation Services Router 10-Slot System	ASR-9010-SYS	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 10-Slot Fan Tray	ASR-9010-FAN	Release 3.7.2

Cisco ASR 9000 Series Aggregation Services Router 10-Slot Door Kit	ASR-9010-DOOR	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 10-Slot AC Chassis	ASR-9010-AC	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 10-Slot DC Chassis	ASR-9010-DC	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 2 Post Mounting Kit	ASR-9010-2P-KIT	Release 3.7.2
Cisco ASR 9000 Series Aggregration Services Router 4 Post Mounting Kit	ASR-9010-2P-KIT	Release 3.7.2

Cisco ASR 9000 Series Aggregation Services Router 10-Slot Air

Component	Part Number	Support Initially Provided in IOS XR Release
Cisco ASR 9000 Series Aggregation Services Router 10-Slot Air Filter	ASR-9010-FILTER	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 10-Slot External Exhaust Air Shaper	ASR-9010-AIRSHPR	NA
Cisco ASR 9000 Series Aggregation Services Router 10-Slot Air Inlet Grill	ASR-9010-GRL	NA

Cisco ASR 9000 Series Aggregation Services Router 10-Slot 21 RU

Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) System	ASR-9910	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 10-Slot(9910) Fan Tray	ASR-9910-FAN	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) Accessory Kit	ASR-9910-ACC-KIT	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) 4 Post Rack Mounting Kit	ASR-9910-4P-KIT	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) 2 Post Rack Mounting Kit	ASR-9910-2P-KIT	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) Air Reflector	ASR-9910-AIRREF	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) Air Filter	ASR-9910-FILTER	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) Switch Fabric Card	A99-SFC-S	Release 6.0.1

Cisco ASR 9000 Series Aggregation Services Router Power		
Component	**Part Number**	**Support Initially Provided in IOS XR Release**
Cisco ASR 9000 Series Aggregation Services Router 2KW DC Power Module, version 2	PWR-2KW-DC-V2	Release 4.2.0
Cisco ASR 9000 Series Aggregation Services Router 3KW AC Power Module, version 2	PWR-3KW-AC-V2	Release 4.2.0
Cisco ASR 9000 Series Aggregation Services Router AC Power Entry Module Version 2	A9K-AC-PEM-V2	Release 4.2.0
Cisco ASR 9000 Series Aggregation Services Router DC Power Entry Module Version 2	A9K-DC-PEM-V2	Release 4.2.0
Cisco ASR 9000 Series Aggregation Services Router Power Entry Module Version 2 Filler	A9K-PEM-V2-FILR	Release 4.2.0
Cisco ASR 9000 Series Aggregation Services Router 1.5kW DC Power Module	A9K-1.5KW-DC	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 2kW DC Power Module	A9K-2KW-DC	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router 3kW AC Power Module	A9K-3KW-AC	Release 3.7.2
Cisco ASR 9000 Series Aggregation Services Router AC Power Enclosure Module Version 3	A9K-AC-PEM-V3	Release 5.3.0
Cisco ASR 9000 Series Aggregation Services Router DC Power Enclosure Module Version 3	A9K-DC-PEM-V3	Release 5.3.0
Cisco ASR 9000 Series Aggregation Services Router 6kW AC Power Module Version 3	PWR-6KW-AC-V3	Release 5.3.0
Cisco ASR 9000 Series Aggregation Services Router 4.4kW DC Power Module Version 3	PWR-4.4KW-DC-V3	Release 5.3.0
Cisco ASR 9000 Series Aggregation Services Router Line Cards		
Component	**Part Number**	**Support Initially Provided in IOS XR Release**
ASR 9000 48-port dual-rate 10G/1G Consumption Model line card	A9K-48X10GE-1G-CM	Release 6.3.2
ASR 9000 24-port dual-rate 10G/1G Consumption Model line card	A9K-24X10GE-1G-CM	Release 6.3.2
ASR 9000 4-port 100-Gigabit Ethernet Line Card	A9K-4X100GE	Release 6.2.3
ASR9000 48-port dual-rate 10G/1G service edge–optimized line card	A9K-48X10GE-1G-SE	Release 6.2.1

ASR9000 48-port dual-rate 10G/1G packet transport–optimized line card	A9K-48X10GE-1G-TR	Release 6.2.1
ASR9000 48-port dual-rate 10G/1G service edge line card	A99-48X10GE-1G-SE	Release 6.5.2
ASR9000 48-port dual-rate 10G/1G packet transport line card	A99-48X10GE-1G-TR	Release 6.5.2
ASR9000 24-port dual-rate 10G/1G service edge–optimized line card	A9K-24X10GE-1G-SE	Release 6.2.1
ASR9000 24-port dual-rate 10G/1G packet transport–optimized line card	A9K-24X10GE-1G-TR	Release 6.2.1
ASR 9900 8-port 100GE Service Edge optimized	A99-8X100GE-SE	Release 6.0.1
ASR 9900 8-port 100GE Packet Transport optimized	A99-8X100GE-TR	Release 6.0.1
ASR 9900 8-port 100GE Consumption Model	A99-8X100GE-CM	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 12-Port 100-Gigabit Ethernet Line Card	A99-12X100GE	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 12-port 100GE Ethernet Line card CM	A99-12X100GE-CM	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 8-Port 100-Gigabit Ethernet, Consumption Model Optimized with CPAK	A9K-8X100GE-CM	Release 5.3.2
Cisco ASR 9000 Series Aggregation Services Router 8-Port 100-Gigabit Ethernet, Service Edge Optimized	A9K-8X100GE-SE	Release 5.3.1
Cisco ASR 9000 Series Aggregation Services Router 8-Port 100-Gigabit Ethernet, Packet Transport Optimized	A9K-8X100GE-TR	Release 5.3.1
Cisco ASR 9000 4-port 100GE LAN line card	A9K-4X100GE	Release 6.2.3
Cisco ASR 9000 Series Aggregation Services Router 4--Port 100-Gigabit Ethernet, Service Edge Optimized	A9K-4X100GE-SE	Release 5.3.1
Cisco ASR 9000 Series Aggregation Services Router 4-Port 100-Gigabit Ethernet, Packet Transport Optimized	A9K-4X100GE-TR	Release 5.3.1
Cisco ASR 9000 Series Aggregation Services Router 8-port High Density 100GE Ethernet Line Card, Service Edge Optimized	A9K-8X100GE-L-SE	Release 5.3.0
Cisco ASR 9000 Series Aggregation Services Router 8-port High Density 100GE Ethernet Line Card, Packet Transport Optimized	A9K-8X100GE-L-TR	Release 5.3.0
Cisco ASR 9000 Series Aggregation Services Router Virtualized Services Module (VSM) line card	A9K-VSM-500	Release 5.1.2
Cisco ASR 9000 Series Aggregation Services Router Line Card Filler	A9K-LC-FILR	Release 3.7.2
2-Port 100G + 20-Port 10 GE Combination IPoDWDM Line Card with CFP2 and SFP+, Packet Transport Optimized	A9K-400GE-DWDM-TR	Release 5.3.2

Cisco ASR 9000 Series Aggregation Services Router Modular Line Cards		
Component	**Part Number**	**Support Initially Provided in IOS XR Release**
Cisco ASR 9000 Series Aggregation Services Router 200 Gigabit Modular Line Card, Packet Transport Optimized Cisco ASR 9000 Series Aggregation Services Router 200 Gigabit Modular Line Card, Service Edge Optimized	A9K-MOD200-TR A9K-MOD200-SE	Release 6.0.1
Cisco ASR 9000 Modular 400G Consumption Model Line Card	A9K-MOD400-CM	Release 6.1.2
Cisco ASR 9000 Series Aggregation Services Router 400 Gigabyte Modular Line Card, Service Edge Optimized	A9K-MOD400-SE	Release 5.3.2
Cisco ASR 9000 Series Aggregation Services Router 400 Gigabyte Modular Line Card, Packet Transport Optimized	A9K-MOD400-TR	Release 5.3.2
Cisco ASR 9000 Series Aggregation Services Router Modular Port Adapters (MPAs)		
Component	**Part Number**	**Support Initially Provided in IOS XR Release**
Cisco ASR 9000 1-port 200-Gigabit Ethernet MPA	A9K-MPA-1X200GE	Release 6.6.2
Cisco ASR 9000 32-port 1-Gigabit Ethernet MPA with MACSec	A9K-MPA-32X1GE	Release 6.6.1
Cisco ASR 9000 20x10GE Consumption Model MPA	A9K-MPA20X10GE-CM	Release 6.1.2
Cisco ASR 9000 2x100GE Consumption Model MPA	A9K-MPA2X100GE-CM	Release 6.1.2
Cisco ASR 9000 Series Aggregation Services Router 1-port 100-Gigabit Modular Port Adapter	A9K-MPA-1X100GE	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router 2-port 100-Gigabit Modular Port Adapter	A9K-MPA-2X100GE	Release 6.0.1
20-Port 10-Gigabit Ethernet Modular Port Adapter with SFP+	A9K-MPA-20x10GE	Release 5.3.2
Cisco ASR 9000 Series Aggregation Services Router 8-port 10GE Modular Port Adapter	A9K-MPA-8X10GE	Release 4.3.1
Cisco ASR 9000 Series Aggregation Services Router 1-port 40GE Modular Port Adapter	A9K-MPA-1X40GE	Release 4.2.3
Cisco ASR 9000 Series Aggregation Services Router 4-port 10GE Modular Port Adapter	A9K-MPA-4X10GE	Release 4.2.0
Cisco ASR 9000 Series Aggregation Services Router 20-port 1GE Modular Port Adapter	A9K-MPA-20X1GE	Release 4.2.0

Cisco ASR 9000 Series Aggregation Services Router 2-port 10GE Modular Port Adapter	A9K-MPA-2X10GE	Release 4.2.1
Cisco ASR 9000 Series Aggregation Services Router 2-port 40GE Modular Port Adapter	A9K-MPA-2X40GE	Release 4.2.1
Cisco ASR 9000v Satellite Shelf		
Component	**Part Number**	**Support Initially Provided in IOS XR Release**
Cisco ASR 9000v Satellite Shelf Version 2 DC power ANSI chassis	A9KV-V2-DC-A=	Release 5.2.2
Cisco ASR 9000v Satellite Shelf Version 2 DC power chassis	A9KV-V2-DC-E=	Release 5.2.2
Cisco ASR 9000v Satellite Shelf AC power chassis	A9KV-V2-AC=	Release 5.2.2
Cisco ASR 9000v Satellite Shelf Version 2 Fan Tray	A9KV-V2-FAN=	Release 5.2.2
Cisco NCS 5000 Satellite Shelf		
Cisco NCS 5001 Series Router	NCS-5001	Release 6.0.1
Cisco NCS 5002 Series Router	NCS-5002	Release 6.0.1
Cisco NCS 5001 Router Accessory Kit	NCS-5001-ACSR	Release 6.0.1
Cisco NCS 5002 Router Accessory Kit	NCS-5002-ACSR	Release 6.0.1
Cisco NCS 5001 Router Fan Back to Front AirFlow	NCS-5001-FN-BK	Release 6.0.1
Cisco NCS 5002 Router Fan Back to Front AirFlow	NCS-5002-FN-BK	Release 6.0.1
Cisco NCS 5001 Air Filter Back to Front Airflow	NCS-5001-FLT-BK	Release 6.0.1
Cisco NCS 5002 Air Filter Back to Front Airflow	NCS-5002-FLT-BK	Release 6.0.1
Cisco NCS 5001 Fan Front to Back Airflow	NCS-5001-FN-FR	Release 6.0.1
Cisco NCS 5002 Fan Front to Back Airflow	NCS-5002-FN-FR	Release 6.0.1
Cisco NCS 5001 Air Filter Front to Back Airflow	NCS-5001-FLT-FR	Release 6.0.1
Cisco NCS 5002 Air Filter Front to Back Airflow	NCS-5002-FLT-FR	Release 6.0.1
Cisco ASR 9000 Series Aggregation Services Router SIP and SPA Cards		
Component	**Part Number**	**Support Initially Provided in IOS XR Release**
Cisco ASR 9000 SIP-700 SPA interface processor	A9K-SIP-700	Release 3.9.0
2-Port OC-48/STM16 SPA	SPA-2XOC48POS/RPR	Release 4.0.1

Cisco 4-Port OC-12c/STM-4 POS SPA	SPA-4XOC12-POS	Release 6.4.2
8-Port OC12/STM4 SPA	SPA-8XOC12-POS	Release 4.0.1
1-Port OC-192/STM-64 POS/RPR SPA	SPA-OC192POS-XFP	Release 4.0.1
4-Port Clear Channel T3/E3 SPA	SPA-4XT3E3	Release 4.0.1
2-Port Clear Channel T3/E3 SPA	SPA-2XT3E3	Release 4.0.1
1-Port Channelized OC-3/STM-1 SPA	SPA-1CHSTM1/OC3	Release 4.0.1
4-Port OC-3/STM-1 POS SPA	SPA-4XOC3-POS	Release 4.0.1
8-Port OC-3/STM-1 POS SPA	SPA-8XOC3-POS	Release 4.0.1
4-Port Channelized T3 to DS0 SPA	SPA-4XCT3/DS0	Release 4.1.0
8-Port Channelized T1/E1 SPA	SPA-8XCHT1/E1	Release 4.1.0

Software Compatibility

Cisco IOS XR Software Release is compatible with the following Cisco ASR 9000 Series Aggregation Services Router systems.

- Cisco ASR 9900 Series Chassis

  - 22-Slot (ASR-9922) Line Card Chassis

  - 12-Slot (ASR-9912) Line Card Chassis

  - 10-Slot (ASR-9910) Line Card Chassis

  - 6-Slot (ASR-9906) Line Card Chassis

  - 4-slot (ASR-9904) Line Card Chassis

- Cisco ASR 9000 Series Chassis

  - 10-Slot (ASR-9010) Line Card Chassis

  - 6-Slot (ASR-9006) Line Card Chassis

For Cisco license support, please contact your Cisco Sales Representative or Customer Service at 800- 553-NETS (6387) or 408-526-4000. For questions on the program other than ordering, please send e-mail to: cwm-license@cisco.com.

Determining Installed Packages

To determine the version of Cisco IOS XR Software packages installed on your router, log in to the router and enter the **show install active summary** command:

Cisco IOS XR

```
RP/0/RSP0/CPU0:router#show install active summary
Default Profile:
  SDRs:
    Owner
```

```
Active Packages:
  disk0:asr9k-mini-px-6.8.1
  disk0:asr9k-9000v-nV-px-6.8.1
  disk0:asr9k-bng-px-6.8.1
  disk0:asr9k-bng-supp-px-6.8.1
  disk0:asr9k-doc-px-6.8.1
  disk0:asr9k-fpd-px-6.8.1
  disk0:asr9k-k9sec-px-6.8.1
  disk0:asr9k-li-px-6.8.1
  disk0:asr9k-mcast-px-6.8.1
  disk0:asr9k-mgbl-px-6.8.1
  disk0:asr9k-mpls-px-6.8.1
  disk0:asr9k-ncs500x-nV-px-6.8.1
  disk0:asr9k-optic-px-6.8.1
  disk0:asr9k-services-px-6.8.1
  disk0:asr9k-video-px-6.8.1
```

Firmware Support on Cisco IOS XR

To check the firmware code running on the Cisco ASR 9000 Series Router, run the **show fpd package** command in admin mode.

```
RP/0/RSP0/CPU0:router(admin)#show fpd package
```

```
============================== =================================================
                                       Field Programmable Device Package
                               =================================================
                                                  SW       Min Req   Min Req
Card Type                      FPD Description      Type Subtype Version  SW Ver    HW Vers
============================== ========================== ==== ======= =========== ======== =========
ASR-9906-BPID2                 Can Bus Ctrl (CBC) BP2     bp   cbc     7.105        0.00      0.1
-----------------------------------------------------------------------------------------------
ASR-9910-BPID2                 Can Bus Ctrl (CBC) BP2     bp   cbc     7.105        0.00      0.1
                               Can Bus Ctrl (CBC) BP2     lc   cbc     7.105        0.00      0.1
-----------------------------------------------------------------------------------------------
ASR-9904-BPID2                 Can Bus Ctrl (CBC) BP2     bp   cbc     7.105        0.00      0.1
-----------------------------------------------------------------------------------------------
ASR-9912-BPID2                 Can Bus Ctrl (CBC) BP2     bp   cbc     7.105        0.00      0.1
                               Can Bus Ctrl (CBC) BP2     lc   cbc     7.105        0.00      0.1
-----------------------------------------------------------------------------------------------
ASR-9922-BPID2                 Can Bus Ctrl (CBC) BP2     bp   cbc     7.105        0.00      0.1
                               Can Bus Ctrl (CBC) BP2     lc   cbc     7.105        0.00      0.1
-----------------------------------------------------------------------------------------------
A9K-BPID2-E-10-SLOT            Can Bus Ctrl (CBC) BP2     bp   cbc     7.105        0.00      0.1
-----------------------------------------------------------------------------------------------
A9K-BPID2-E-6-SLOT             Can Bus Ctrl (CBC) BP2     bp   cbc     7.105        0.00      0.1
-----------------------------------------------------------------------------------------------
A9K-BPID2-10-SLOT              Can Bus Ctrl (CBC) BP2     bp   cbc     7.105        0.00      0.1
                               Can Bus Ctrl (CBC) BP2     lc   cbc     7.105        0.00      0.1
-----------------------------------------------------------------------------------------------
A9K-BPID2-6-SLOT               Can Bus Ctrl (CBC) BP2     bp   cbc     7.105        0.00      0.1
                               Can Bus Ctrl (CBC) BP2     lc   cbc     7.105        0.00      0.1
-----------------------------------------------------------------------------------------------
ASR-9922-SFC110                Can Bus Ctrl (CBC) MTFC    fc   cbc     28.06        0.00      0.1
                               Fabric Ctrl0 MTFC          fc   fpga7   1.03         0.00      0.1
                               Can Bus Ctrl (CBC) MTFC    lc   cbc     28.06        0.00      0.1
-----------------------------------------------------------------------------------------------
ASR-9912-SFC110                Can Bus Ctrl (CBC) SSFC    fc   cbc     32.05        0.00      0.1
                               Fabric Ctrl0 MTFC          fc   fpga7   1.03         0.00      0.1
-----------------------------------------------------------------------------------------------
A99-SFC2                       Can Bus Ctrl (CBC) MTFC    fc   cbc     37.20        0.00      0.1
                               Fabric Ctrl0 MTFC          fc   fcfsbl  1.100        0.00      0.1
                               Fabric Ctrl0 MTFC          fc   fclnxfw 1.100        0.00      0.1
                               Fabric Ctrl0 MTFC          fc   fpga8   0.37         0.00      0.1
-----------------------------------------------------------------------------------------------
```

ASR-9912-SFC220	Can Bus Ctrl (CBC) MTFC	fc	cbc	37.20	0.00	0.1
	Fabric Ctrl0 MTFC	fc	fcfsbl	1.100	0.00	0.1
	Fabric Ctrl0 MTFC	fc	fclnxfw	1.100	0.00	0.1
	Fabric Ctrl0 MTFC	fc	fpga8	0.37	0.00	0.1
A99-SFC-S	Can Bus Ctrl (CBC) SHFC	fc	cbc	44.02	0.00	0.1
	Fabric Ctrl0 SHFC	fc	fcfsbl	1.100	0.00	0.1
	Fabric Ctrl0 SHFC	fc	fclnxfw	1.100	0.00	0.1
	Fabric Ctrl0 SHFC	fc	fpga8	0.37	0.00	0.1
A99-SFC-T	Can Bus Ctrl (CBC) TWFC	fc	cbc	44.02	0.00	0.1
	Fabric Ctrl0 TWFC	fc	fcfsbl	1.100	0.00	0.1
	Fabric Ctrl0 TWFC	fc	fclnxfw	1.100	0.00	0.1
	Fabric Ctrl0 TWFC	fc	fpga8	0.37	0.00	0.1
ASR-9010-FAN	Can Bus Ctrl (CBC) FAN	ft	cbc	4.04	0.00	0.1
	Can Bus Ctrl (CBC) FAN	lc	cbc	4.03	0.00	0.1
ASR-9006-FAN	Can Bus Ctrl (CBC) FAN	ft	cbc	5.05	0.00	0.1
	Can Bus Ctrl (CBC) FAN	lc	cbc	5.04	0.00	0.1
ASR-9922-FAN	Can Bus Ctrl (CBC) MFAN	ft	cbc	29.12	0.00	0.1
	Can Bus Ctrl (CBC) MFAN	lc	cbc	29.12	0.00	0.1
ASR-9912-FAN	Can Bus Ctrl (CBC) SFAN	ft	cbc	31.06	0.00	0.1
ASR-9010-FAN-V2	Can Bus Ctrl (CBC) FAN	ft	cbc	29.12	0.00	0.1
	Can Bus Ctrl (CBC) FAN	lc	cbc	29.12	0.00	0.1
ASR-9904-FAN	Can Bus Ctrl (CBC) SFAN	ft	cbc	31.06	0.00	0.1
ASR-9922-FAN-V2	Can Bus Ctrl (CBC) MFAN	ft	cbc	40.07	0.00	0.1
	Fan Controller MFAN	ft	fpga9	2.06	0.00	0.1
ASR-9006-FAN-V2	Can Bus Ctrl (CBC) FAN	ft	cbc	5.05	0.00	0.1
	Can Bus Ctrl (CBC) FAN	lc	cbc	5.04	0.00	0.1
ASR-9910-FAN	Can Bus Ctrl (CBC) SHFAN	ft	cbc	45.02	0.00	0.1
	Fan Controller SHFAN	ft	fpga9	2.06	0.00	0.1
ASR-9906-FAN	Can Bus Ctrl (CBC) TWFAN	ft	cbc	56.01	0.00	0.1
	Fan Controller TWFAN	ft	fpga9	2.06	0.00	0.1
ASR-9001-FAN	Can Bus Ctrl (CBC) FAN	ft	cbc	24.115	0.00	0.1
	Can Bus Ctrl (CBC) FAN	lc	cbc	24.115	0.00	0.1
ASR-9001-FAN-V2	Can Bus Ctrl (CBC) FAN	ft	cbc	24.115	0.00	0.1
A9K-SIP-700	Can Bus Ctrl (CBC) LC5	lc	cbc	3.06	0.00	0.1
	CPUCtrl LC5	lc	cpld1	0.15	0.00	0.1
	QFPCPUBridge LC5	lc	fpga2	5.14	0.00	0.1
	NPUXBarBridge LC5	lc	fpga1	0.24	0.00	0.1
	ROMMONB LC5	lc	rommon	1.04	0.00	0.1
A9K-SIP-500	Can Bus Ctrl (CBC) LC5	lc	cbc	3.06	0.00	0.1
	CPUCtrl LC5	lc	cpld1	0.15	0.00	0.1
	QFPCPUBridge LC5	lc	fpga2	5.14	0.00	0.1
	NPUXBarBridge LC5	lc	fpga1	0.24	0.00	0.1
	ROMMONB LC5	lc	rommon	1.04	0.00	0.1
A9K-SIP-700-8G	Can Bus Ctrl (CBC) LC5	lc	cbc	3.06	0.00	0.1
	CPUCtrl LC5	lc	cpld1	0.15	0.00	0.1
	QFPCPUBridge LC5	lc	fpga2	5.14	0.00	0.1
	NPUXBarBridge LC5	lc	fpga1	0.24	0.00	0.1

	ROMMONB LC5	lc	rommon	1.35	0.00	0.1
A9K-RSP440-TR	Can Bus Ctrl (CBC) RSP3	lc	cbc	16.117	0.00	0.1
	ClockCtrl0 RSP3	lc	fpga2	1.10	0.00	0.1
	UTI RSP3	lc	fpga3	4.09	0.00	0.1
	CPUCtrl RSP3	lc	fpga1	0.11	0.00	0.1
	ROMMONB RSP3	lc	rommon	0.76	0.00	0.1
A9K-RSP440-SE	Can Bus Ctrl (CBC) RSP3	lc	cbc	16.117	0.00	0.1
	ClockCtrl0 RSP3	lc	fpga2	1.10	0.00	0.1
	UTI RSP3	lc	fpga3	4.09	0.00	0.1
	CPUCtrl RSP3	lc	fpga1	0.11	0.00	0.1
	ROMMONB RSP3	lc	rommon	0.76	0.00	0.1
ASR-9922-RP-TR	Can Bus Ctrl (CBC) MTRP	lc	cbc	25.03	0.00	0.1
	Fabric Ctrl3 MTFC	lc	fpga10	1.03	0.00	0.1
	Fabric Ctrl4 MTFC	lc	fpga11	1.03	0.00	0.1
	Fabric Ctrl5 MTFC	lc	fpga12	1.03	0.00	0.1
	Fabric Ctrl6 MTFC	lc	fpga13	1.03	0.00	0.1
	CPUCtrl1	lc	fpga2	1.03	0.00	0.1
	ClkCtrl	lc	fpga3	1.05	0.00	0.1
	IntCtrl	lc	fpga4	1.04	0.00	0.1
	UTI	lc	fpga5	4.09	0.00	0.1
	Timex	lc	fpga6	0.02	0.00	0.1
	Fabric Ctrl0 MTFC	lc	fpga7	1.03	0.00	0.1
	Fabric Ctrl1 MTFC	lc	fpga8	1.03	0.00	0.1
	Fabric Ctrl2 MTFC	lc	fpga9	1.03	0.00	0.1
	CPUCtrl0	lc	fpga1	1.05	0.00	0.1
	ROMMONB MTRP	lc	rommon	5.16	0.00	0.1
ASR-9922-RP-SE	Can Bus Ctrl (CBC) MTRP	lc	cbc	25.03	0.00	0.1
	Fabric Ctrl3 MTFC	lc	fpga10	1.03	0.00	0.1
	Fabric Ctrl4 MTFC	lc	fpga11	1.03	0.00	0.1
	Fabric Ctrl5 MTFC	lc	fpga12	1.03	0.00	0.1
	Fabric Ctrl6 MTFC	lc	fpga13	1.03	0.00	0.1
	CPUCtrl1	lc	fpga2	1.03	0.00	0.1
	ClkCtrl	lc	fpga3	1.05	0.00	0.1
	IntCtrl	lc	fpga4	1.04	0.00	0.1
	UTI	lc	fpga5	4.09	0.00	0.1
	Timex	lc	fpga6	0.02	0.00	0.1
	Fabric Ctrl0 MTFC	lc	fpga7	1.03	0.00	0.1
	Fabric Ctrl1 MTFC	lc	fpga8	1.03	0.00	0.1
	Fabric Ctrl2 MTFC	lc	fpga9	1.03	0.00	0.1
	CPUCtrl0	lc	fpga1	1.05	0.00	0.1
	ROMMONB MTRP	lc	rommon	5.16	0.00	0.1
ASR-9900-RP-TR	Can Bus Ctrl (CBC) MTRP	lc	cbc	25.03	0.00	0.1
	Fabric Ctrl3 MTFC	lc	fpga10	1.03	0.00	0.1
	Fabric Ctrl4 MTFC	lc	fpga11	1.03	0.00	0.1
	Fabric Ctrl5 MTFC	lc	fpga12	1.03	0.00	0.1
	Fabric Ctrl6 MTFC	lc	fpga13	1.03	0.00	0.1
	CPUCtrl1	lc	fpga2	1.03	0.00	0.1
	ClkCtrl	lc	fpga3	1.05	0.00	0.1
	IntCtrl	lc	fpga4	1.04	0.00	0.1
	UTI	lc	fpga5	4.09	0.00	0.1
	Timex	lc	fpga6	0.02	0.00	0.1
	Fabric Ctrl0 MTFC	lc	fpga7	1.03	0.00	0.1
	Fabric Ctrl1 MTFC	lc	fpga8	1.03	0.00	0.1
	Fabric Ctrl2 MTFC	lc	fpga9	1.03	0.00	0.1
	CPUCtrl0	lc	fpga1	1.05	0.00	0.1
	ROMMONB MTRP	lc	rommon	5.16	0.00	0.1
ASR-9900-RP-SE	Can Bus Ctrl (CBC) MTRP	lc	cbc	25.03	0.00	0.1
	Fabric Ctrl3 MTFC	lc	fpga10	1.03	0.00	0.1

	Fabric Ctrl4 MTFC	lc	fpga11	1.03	0.00	0.1
	Fabric Ctrl5 MTFC	lc	fpga12	1.03	0.00	0.1
	Fabric Ctrl6 MTFC	lc	fpga13	1.03	0.00	0.1
	CPUCtrl1	lc	fpga2	1.03	0.00	0.1
	ClkCtrl	lc	fpga3	1.05	0.00	0.1
	IntCtrl	lc	fpga4	1.04	0.00	0.1
	UTI	lc	fpga5	4.09	0.00	0.1
	Timex	lc	fpga6	0.02	0.00	0.1
	Fabric Ctrl0 MTFC	lc	fpga7	1.03	0.00	0.1
	Fabric Ctrl1 MTFC	lc	fpga8	1.03	0.00	0.1
	Fabric Ctrl2 MTFC	lc	fpga9	1.03	0.00	0.1
	CPUCtrl0	lc	fpga1	1.05	0.00	0.1
	ROMMONB MTRP	lc	rommon	5.16	0.00	0.1
A9K-RSP440-LT	Can Bus Ctrl (CBC) RSP3	lc	cbc	16.117	0.00	0.1
	ClockCtrl0 RSP3	lc	fpga2	1.11	0.00	0.1
	UTI RSP3	lc	fpga3	4.09	0.00	0.1
	CPUCtrl RSP3	lc	fpga1	0.11	0.00	0.1
	ROMMONB RSP3	lc	rommon	0.76	0.00	0.1
A9K-RSP880-TR	Can Bus Ctrl (CBC) RSP4	lc	cbc	34.39	0.00	0.0
	MB CPUCtrl	lc	fpga2	0.71	0.00	0.0
	DBCtrl	lc	fpga3	0.16	0.00	0.0
	DBCtrl	lc	fpga4	0.18	0.00	0.0
	DBCtrl	lc	fpga5	0.12	0.00	0.0
	PUNT FPGA	lc	fpga6	0.08	0.00	0.0
	Fsbl	lc	fsbl	1.110	0.00	0.0
	LinuxFW	lc	lnxfw	1.110	0.00	0.0
	ROMMONB RSP4	lc	rommon	10.68	0.00	0.0
A9K-RSP880-SE	Can Bus Ctrl (CBC) RSP4	lc	cbc	34.39	0.00	0.0
	MB CPUCtrl	lc	fpga2	0.71	0.00	0.0
	DBCtrl	lc	fpga3	0.16	0.00	0.0
	DBCtrl	lc	fpga4	0.18	0.00	0.0
	DBCtrl	lc	fpga5	0.12	0.00	0.0
	PUNT FPGA	lc	fpga6	0.08	0.00	0.0
	Fsbl	lc	fsbl	1.110	0.00	0.0
	LinuxFW	lc	lnxfw	1.110	0.00	0.0
	ROMMONB RSP4	lc	rommon	10.68	0.00	0.0
A9K-RSP880-LT-TR	Can Bus Ctrl (CBC) RSP4L	lc	cbc	50.02	0.00	0.0
	MB CPUCtrl	lc	fpga2	0.19	0.00	0.0
	DBCtrl	lc	fpga3	0.05	0.00	0.0
	DBCtrl	lc	fpga4	0.05	0.00	0.0
	DBCtrl	lc	fpga5	0.05	0.00	0.0
	EOBCSwicthCtrl	lc	fpga6	1.11	0.00	0.0
	Fsbl	lc	fsbl	1.110	0.00	0.0
	LinuxFW	lc	lnxfw	1.110	0.00	0.0
	ROMMONB RSP4L	lc	rommon	17.37	0.00	0.0
A9K-RSP880-LT-SE	Can Bus Ctrl (CBC) RSP4L	lc	cbc	50.02	0.00	0.0
	MB CPUCtrl	lc	fpga2	0.19	0.00	0.0
	DBCtrl	lc	fpga3	0.05	0.00	0.0
	DBCtrl	lc	fpga4	0.05	0.00	0.0
	DBCtrl	lc	fpga5	0.05	0.00	0.0
	EOBCSwicthCtrl	lc	fpga6	1.11	0.00	0.0
	Fsbl	lc	fsbl	1.110	0.00	0.0
	LinuxFW	lc	lnxfw	1.110	0.00	0.0
	ROMMONB RSP4L	lc	rommon	17.37	0.00	0.0
A99-RSP-TR	Can Bus Ctrl (CBC) RSP4S	lc	cbc	43.03	0.00	0.1
	MB CPUCtrl	lc	fpga2	0.71	0.00	0.0
	DBCtrl	lc	fpga3	0.16	0.00	0.0
	DBCtrl	lc	fpga4	0.18	0.00	0.0

	DBCtrl	lc	fpga5	0.12	0.00	0.0
	PUNT FPGA	lc	fpga6	0.08	0.00	0.0
	Fsbl	lc	fsbl	1.110	0.00	0.0
	LinuxFW	lc	lnxfw	1.110	0.00	0.0
	ROMMONB RSP4SHW	lc	rommon	16.17	0.00	0.0
A99-RSP-SE	Can Bus Ctrl (CBC) RSP4S	lc	cbc	43.03	0.00	0.1
	MB CPUCtrl	lc	fpga2	0.71	0.00	0.0
	DBCtrl	lc	fpga3	0.16	0.00	0.0
	DBCtrl	lc	fpga4	0.18	0.00	0.0
	DBCtrl	lc	fpga5	0.12	0.00	0.0
	PUNT FPGA	lc	fpga6	0.08	0.00	0.0
	Fsbl	lc	fsbl	1.110	0.00	0.0
	LinuxFW	lc	lnxfw	1.110	0.00	0.0
	ROMMONB RSP4SHW	lc	rommon	16.17	0.00	0.0
A99-RP2-TR	Can Bus Ctrl (CBC) MTRP	lc	cbc	35.14	0.00	0.1
	MB CPUCtrl	lc	fpga2	0.71	0.00	0.0
	DBCtrl	lc	fpga3	0.16	0.00	0.0
	DBCtrl	lc	fpga4	0.18	0.00	0.0
	DBCtrl	lc	fpga5	0.12	0.00	0.0
	PUNT FPGA	lc	fpga6	0.08	0.00	0.0
	Fsbl	lc	fsbl	1.110	0.00	0.0
	LinuxFW	lc	lnxfw	1.110	0.00	0.0
	ROMMONB RP2	lc	rommon	14.38	0.00	0.0
A99-RP2-SE	Can Bus Ctrl (CBC) MTRP	lc	cbc	35.14	0.00	0.1
	MB CPUCtrl	lc	fpga2	0.71	0.00	0.0
	DBCtrl	lc	fpga3	0.16	0.00	0.0
	DBCtrl	lc	fpga4	0.18	0.00	0.0
	DBCtrl	lc	fpga5	0.12	0.00	0.0
	PUNT FPGA	lc	fpga6	0.08	0.00	0.0
	Fsbl	lc	fsbl	1.110	0.00	0.0
	LinuxFW	lc	lnxfw	1.110	0.00	0.0
	ROMMONB RP2	lc	rommon	14.38	0.00	0.0
ASR9001-RP	Can Bus Ctrl (CBC) IMRP	lc	cbc	22.114	0.00	0.1
	MB CPUCtrl	lc	fpga2	1.15	0.00	0.0
	ROMMONB IM RP	lc	rommon	3.04	0.00	0.1
A9K-24x10GE-SE	Can Bus Ctrl (CBC) LC6	lc	cbc	19.112	0.00	0.0
	DBCtrl LC6	lc	fpga2	1.03	0.00	0.0
	LinkCtrl LC6	lc	fpga3	1.01	0.00	0.0
	LCCPUCtrl LC6	lc	fpga4	1.07	0.00	0.0
	ROMMONB LC6	lc	rommon	3.04	0.00	0.0
A9K-2x100GE-SE	Can Bus Ctrl (CBC) LC4	lc	cbc	21.111	0.00	0.1
	DB IO FPGA1	lc	cpld1	1.03	0.00	0.0
	MB CPUCtrl	lc	fpga2	1.08	0.00	0.0
	PortCtrl	lc	fpga3	1.05	0.00	0.0
	Imux	lc	fpga4	1.04	0.00	0.0
	Emux	lc	fpga5	1.04	0.00	0.0
	100GIGMAC	lc	fpga6	41.00	0.00	0.0
	ROMMONB LC4	lc	rommon	3.04	0.00	0.0
A9K-24x10GE-TR	Can Bus Ctrl (CBC) LC6	lc	cbc	19.112	0.00	0.0
	DBCtrl LC6	lc	fpga2	1.03	0.00	0.0
	LinkCtrl LC6	lc	fpga3	1.01	0.00	0.0
	LCCPUCtrl LC6	lc	fpga4	1.07	0.00	0.0
	ROMMONB LC6	lc	rommon	3.04	0.00	0.0
A9K-2x100GE-TR	Can Bus Ctrl (CBC) LC4	lc	cbc	21.111	0.00	0.1
	DB IO FPGA1	lc	cpld1	1.03	0.00	0.0
	MB CPUCtrl	lc	fpga2	1.08	0.00	0.0

```
                               PortCtrl                       lc    fpga3    1.05     0.00    0.0
                               Imux                           lc    fpga4    1.04     0.00    0.0
                               Emux                           lc    fpga5    1.04     0.00    0.0
                               100GIGMAC                      lc    fpga6    41.00    0.00    0.0
                               ROMMONB LC4                    lc    rommon   3.04     0.00    0.0
-------------------------------------------------------------------------------------------------
A9K-36x10GE-SE                 Can Bus Ctrl (CBC) LC6         lc    cbc      15.104   0.00    0.0
                               DBCtrl LC6                     lc    fpga2    1.01     0.00    0.0
                               LinkCtrl LC6                   lc    fpga3    1.00     0.00    0.0
                               LCCPUCtrl LC6                  lc    fpga4    1.03     0.00    0.0
                               ROMMONB LC6                    lc    rommon   3.03     0.00    0.0
-------------------------------------------------------------------------------------------------
A9K-36x10GE_SC7-SE             Can Bus Ctrl (CBC) LC6         lc    cbc      15.104   0.00    0.0
                               DBCtrl LC6                     lc    fpga2    1.01     0.00    0.0
                               LinkCtrl LC6                   lc    fpga3    1.00     0.00    0.0
                               LCCPUCtrl LC6                  lc    fpga4    1.03     0.00    0.0
                               ROMMONB LC6                    lc    rommon   3.03     0.00    0.0
-------------------------------------------------------------------------------------------------
A9K-36x10GE-TR                 Can Bus Ctrl (CBC) LC6         lc    cbc      15.104   0.00    0.0
                               DBCtrl LC6                     lc    fpga2    1.01     0.00    0.0
                               LinkCtrl LC6                   lc    fpga3    1.00     0.00    0.0
                               LCCPUCtrl LC6                  lc    fpga4    1.03     0.00    0.0
                               ROMMONB LC6                    lc    rommon   3.03     0.00    0.0
-------------------------------------------------------------------------------------------------
A9K-36x10GE_SC7-TR             Can Bus Ctrl (CBC) LC6         lc    cbc      15.104   0.00    0.0
                               DBCtrl LC6                     lc    fpga2    1.01     0.00    0.0
                               LinkCtrl LC6                   lc    fpga3    1.00     0.00    0.0
                               LCCPUCtrl LC6                  lc    fpga4    1.03     0.00    0.0
                               ROMMONB LC6                    lc    rommon   3.03     0.00    0.0
-------------------------------------------------------------------------------------------------
A9K-1x100GE-SE                 Can Bus Ctrl (CBC) LC4         lc    cbc      21.111   0.00    0.1
                               DB IO FPGA1                    lc    cpld1    1.03     0.00    0.0
                               MB CPUCtrl                     lc    fpga2    1.08     0.00    0.0
                               PortCtrl                       lc    fpga3    1.05     0.00    0.0
                               Imux                           lc    fpga4    1.04     0.00    0.0
                               Emux                           lc    fpga5    1.04     0.00    0.0
                               100GIGMAC                      lc    fpga6    41.00    0.00    0.0
                               ROMMONB LC4                    lc    rommon   3.04     0.00    0.0
-------------------------------------------------------------------------------------------------
A9K-1x100GE-TR                 Can Bus Ctrl (CBC) LC4         lc    cbc      21.111   0.00    0.1
                               DB IO FPGA1                    lc    cpld1    1.03     0.00    0.0
                               MB CPUCtrl                     lc    fpga2    1.08     0.00    0.0
                               PortCtrl                       lc    fpga3    1.05     0.00    0.0
                               Imux                           lc    fpga4    1.04     0.00    0.0
                               Emux                           lc    fpga5    1.04     0.00    0.0
                               100GIGMAC                      lc    fpga6    41.00    0.00    0.0
                               ROMMONB LC4                    lc    rommon   3.04     0.00    0.0
-------------------------------------------------------------------------------------------------
A9K-VSM-500                    CPUCtrl Forge                  lc    cbc      33.05    0.00    0.1
                               CPUCtrl Forge                  lc    fpga1    1.26     0.00    0.1
                               CPUCtrl Forge                  lc    ibmc     5.08     0.00    0.1
                               CPUCtrl Forge                  lc    rommon   3.07     0.00    0.1
-------------------------------------------------------------------------------------------------
A99-8X100GE-SE                 Can Bus Ctrl (CBC) LC4         lc    cbc      38.23    0.00    0.0
                               MB CPUCtrl                     lc    fpga2    1.99     0.00    0.0
                               DBCtrl                         lc    fpga3    1.07     0.00    0.0
                               PortCtrl                       lc    fpga4    1.09     0.00    0.0
                               CPAK LR4                       lc    fpga5    1.16     0.00    0.0
                               CPAK SR10                      lc    fpga6    2.02     0.00    0.0
                               Fsbl                           lc    fsbl     1.113    0.00    0.0
                               LinuxFW                        lc    lnxfw    1.113    0.00    0.0
                               ROMMONB LC1                    lc    rommon   8.51     0.00    0.0
-------------------------------------------------------------------------------------------------
A99-8X100GE-TR                 Can Bus Ctrl (CBC) LC4         lc    cbc      38.23    0.00    0.0
```

```
                        MB CPUCtrl              lc   fpga2    1.99      0.00      0.0
                        DBCtrl                  lc   fpga3    1.07      0.00      0.0
                        PortCtrl                lc   fpga4    1.09      0.00      0.0
                        CPAK LR4                lc   fpga5    1.16      0.00      0.0
                        CPAK SR10               lc   fpga6    2.02      0.00      0.0
                        Fsbl                    lc   fsbl     1.113     0.00      0.0
                        LinuxFW                 lc   lnxfw    1.113     0.00      0.0
                        ROMMONB LC1             lc   rommon   8.51      0.00      0.0
------------------------------------------------------------------------------------------
A99-4X100GE-SE          Can Bus Ctrl (CBC) LC4  lc   cbc      38.23     0.00      0.0
                        MB CPUCtrl              lc   fpga2    1.99      0.00      0.0
                        DBCtrl                  lc   fpga3    1.07      0.00      0.0
                        PortCtrl                lc   fpga4    1.09      0.00      0.0
                        CPAK LR4                lc   fpga5    1.16      0.00      0.0
                        CPAK SR10               lc   fpga6    2.02      0.00      0.0
                        Fsbl                    lc   fsbl     1.113     0.00      0.0
                        LinuxFW                 lc   lnxfw    1.113     0.00      0.0
                        ROMMONB LC1             lc   rommon   8.51      0.00      0.0
------------------------------------------------------------------------------------------
A99-4X100GE-SE-TAA      Can Bus Ctrl (CBC) LC4  lc   cbc      38.23     0.00      0.0
                        MB CPUCtrl              lc   fpga2    1.99      0.00      0.0
                        DBCtrl                  lc   fpga3    1.07      0.00      0.0
                        PortCtrl                lc   fpga4    1.09      0.00      0.0
                        CPAK LR4                lc   fpga5    1.16      0.00      0.0
                        CPAK SR10               lc   fpga6    2.02      0.00      0.0
                        Fsbl                    lc   fsbl     1.113     0.00      0.0
                        LinuxFW                 lc   lnxfw    1.113     0.00      0.0
                        ROMMONB LC1             lc   rommon   8.51      0.00      0.0
------------------------------------------------------------------------------------------
A99-4X100GE-TR          Can Bus Ctrl (CBC) LC4  lc   cbc      38.23     0.00      0.0
                        MB CPUCtrl              lc   fpga2    1.99      0.00      0.0
                        DBCtrl                  lc   fpga3    1.07      0.00      0.0
                        PortCtrl                lc   fpga4    1.09      0.00      0.0
                        CPAK LR4                lc   fpga5    1.16      0.00      0.0
                        CPAK SR10               lc   fpga6    2.02      0.00      0.0
                        Fsbl                    lc   fsbl     1.113     0.00      0.0
                        LinuxFW                 lc   lnxfw    1.113     0.00      0.0
                        ROMMONB LC1             lc   rommon   8.51      0.00      0.0
------------------------------------------------------------------------------------------
A99-4X100GE-TR-TAA      Can Bus Ctrl (CBC) LC4  lc   cbc      38.23     0.00      0.0
                        MB CPUCtrl              lc   fpga2    1.99      0.00      0.0
                        DBCtrl                  lc   fpga3    1.07      0.00      0.0
                        PortCtrl                lc   fpga4    1.09      0.00      0.0
                        CPAK LR4                lc   fpga5    1.16      0.00      0.0
                        CPAK SR10               lc   fpga6    2.02      0.00      0.0
                        Fsbl                    lc   fsbl     1.113     0.00      0.0
                        LinuxFW                 lc   lnxfw    1.113     0.00      0.0
                        ROMMONB LC1             lc   rommon   8.51      0.00      0.0
------------------------------------------------------------------------------------------
A99-4X100GE-TAA         Can Bus Ctrl (CBC) LC4  lc   cbc      38.23     0.00      0.0
                        MB CPUCtrl              lc   fpga2    1.99      0.00      0.0
                        DBCtrl                  lc   fpga3    1.07      0.00      0.0
                        PortCtrl                lc   fpga4    1.09      0.00      0.0
                        CPAK LR4                lc   fpga5    1.16      0.00      0.0
                        CPAK SR10               lc   fpga6    2.02      0.00      0.0
                        Fsbl                    lc   fsbl     1.113     0.00      0.0
                        LinuxFW                 lc   lnxfw    1.113     0.00      0.0
                        ROMMONB LC1             lc   rommon   8.51      0.00      0.0
------------------------------------------------------------------------------------------
A9K-4X100GE-SE          Can Bus Ctrl (CBC) LC4  lc   cbc      38.23     0.00      0.0
                        MB CPUCtrl              lc   fpga2    1.99      0.00      0.0
                        DBCtrl                  lc   fpga3    1.07      0.00      0.0
                        PortCtrl                lc   fpga4    1.09      0.00      0.0
                        CPAK LR4                lc   fpga5    1.16      0.00      0.0
```

```
                       CPAK SR10                   lc   fpga6    2.02      0.00       0.0
                       Fsbl                        lc   fsbl     1.113     0.00       0.0
                       LinuxFW                     lc   lnxfw    1.113     0.00       0.0
                       ROMMONB LC1                 lc   rommon   8.51      0.00       0.0
-----------------------------------------------------------------------------------------------
A9K-4X100GE-SE-TAA     Can Bus Ctrl (CBC) LC4      lc   cbc      38.23     0.00       0.0
                       MB CPUCtrl                  lc   fpga2    1.99      0.00       0.0
                       DBCtrl                      lc   fpga3    1.07      0.00       0.0
                       PortCtrl                    lc   fpga4    1.09      0.00       0.0
                       CPAK LR4                    lc   fpga5    1.16      0.00       0.0
                       CPAK SR10                   lc   fpga6    2.02      0.00       0.0
                       Fsbl                        lc   fsbl     1.113     0.00       0.0
                       LinuxFW                     lc   lnxfw    1.113     0.00       0.0
                       ROMMONB LC1                 lc   rommon   8.51      0.00       0.0
-----------------------------------------------------------------------------------------------
A9K-4X100GE-TR         Can Bus Ctrl (CBC) LC4      lc   cbc      38.23     0.00       0.0
                       MB CPUCtrl                  lc   fpga2    1.99      0.00       0.0
                       DBCtrl                      lc   fpga3    1.07      0.00       0.0
                       PortCtrl                    lc   fpga4    1.09      0.00       0.0
                       CPAK LR4                    lc   fpga5    1.16      0.00       0.0
                       CPAK SR10                   lc   fpga6    2.02      0.00       0.0
                       Fsbl                        lc   fsbl     1.113     0.00       0.0
                       LinuxFW                     lc   lnxfw    1.113     0.00       0.0
                       ROMMONB LC1                 lc   rommon   8.51      0.00       0.0
-----------------------------------------------------------------------------------------------
A9K-4X100GE-TR-TAA     Can Bus Ctrl (CBC) LC4      lc   cbc      38.23     0.00       0.0
                       MB CPUCtrl                  lc   fpga2    1.99      0.00       0.0
                       DBCtrl                      lc   fpga3    1.07      0.00       0.0
                       PortCtrl                    lc   fpga4    1.09      0.00       0.0
                       CPAK LR4                    lc   fpga5    1.16      0.00       0.0
                       CPAK SR10                   lc   fpga6    2.02      0.00       0.0
                       Fsbl                        lc   fsbl     1.113     0.00       0.0
                       LinuxFW                     lc   lnxfw    1.113     0.00       0.0
                       ROMMONB LC1                 lc   rommon   8.51      0.00       0.0
-----------------------------------------------------------------------------------------------
A9K-4X100GE-TAA        Can Bus Ctrl (CBC) LC4      lc   cbc      38.23     0.00       0.0
                       MB CPUCtrl                  lc   fpga2    1.99      0.00       0.0
                       DBCtrl                      lc   fpga3    1.07      0.00       0.0
                       PortCtrl                    lc   fpga4    1.09      0.00       0.0
                       CPAK LR4                    lc   fpga5    1.16      0.00       0.0
                       CPAK SR10                   lc   fpga6    2.02      0.00       0.0
                       Fsbl                        lc   fsbl     1.113     0.00       0.0
                       LinuxFW                     lc   lnxfw    1.113     0.00       0.0
                       ROMMONB LC1                 lc   rommon   8.51      0.00       0.0
-----------------------------------------------------------------------------------------------
A99K-MOD200-SE         Can Bus Ctrl (CBC) LC4      lc   cbc      39.09     0.00       0.0
                       DBCtrl                      lc   fpga10   1.27      0.00       0.0
                       MB CPUCtrl                  lc   fpga2    1.97      0.00       0.0
                       Fsbl                        lc   fsbl     1.103     0.00       0.0
                       LinuxFW                     lc   lnxfw    1.103     0.00       0.0
                       ROMMONB LC1                 lc   rommon   8.51      0.00       0.0
-----------------------------------------------------------------------------------------------
A99K-200MOD-SE-TAA     Can Bus Ctrl (CBC) LC4      lc   cbc      39.09     0.00       0.0
                       DBCtrl                      lc   fpga10   1.27      0.00       0.0
                       MB CPUCtrl                  lc   fpga2    1.97      0.00       0.0
                       Fsbl                        lc   fsbl     1.103     0.00       0.0
                       LinuxFW                     lc   lnxfw    1.103     0.00       0.0
                       ROMMONB LC1                 lc   rommon   8.51      0.00       0.0
-----------------------------------------------------------------------------------------------
A99K-MOD200-TR         Can Bus Ctrl (CBC) LC4      lc   cbc      39.09     0.00       0.0
                       DBCtrl                      lc   fpga10   1.27      0.00       0.0
                       MB CPUCtrl                  lc   fpga2    1.97      0.00       0.0
                       Fsbl                        lc   fsbl     1.103     0.00       0.0
                       LinuxFW                     lc   lnxfw    1.103     0.00       0.0
```

```
                              ROMMONB LC1             lc   rommon   8.51       0.00      0.0
-------------------------------------------------------------------------------------------
A99K-MOD200-TR-TAA            Can Bus Ctrl (CBC) LC4  lc   cbc      39.09      0.00      0.0
                              DBCtrl                  lc   fpga10   1.27       0.00      0.0
                              MB CPUCtrl              lc   fpga2    1.97       0.00      0.0
                              Fsbl                    lc   fsbl     1.103      0.00      0.0
                              LinuxFW                 lc   lnxfw    1.103      0.00      0.0
                              ROMMONB LC1             lc   rommon   8.51       0.00      0.0
-------------------------------------------------------------------------------------------
A9K-MOD200-SE                 Can Bus Ctrl (CBC) LC4  lc   cbc      39.09      0.00      0.0
                              DBCtrl                  lc   fpga10   1.27       0.00      0.0
                              MB CPUCtrl              lc   fpga2    1.97       0.00      0.0
                              Fsbl                    lc   fsbl     1.103      0.00      0.0
                              LinuxFW                 lc   lnxfw    1.103      0.00      0.0
                              ROMMONB LC1             lc   rommon   8.51       0.00      0.0
-------------------------------------------------------------------------------------------
A9K-MOD200-SE-TAA             Can Bus Ctrl (CBC) LC4  lc   cbc      39.09      0.00      0.0
                              DBCtrl                  lc   fpga10   1.27       0.00      0.0
                              MB CPUCtrl              lc   fpga2    1.97       0.00      0.0
                              Fsbl                    lc   fsbl     1.103      0.00      0.0
                              LinuxFW                 lc   lnxfw    1.103      0.00      0.0
                              ROMMONB LC1             lc   rommon   8.51       0.00      0.0
-------------------------------------------------------------------------------------------
A9K-MOD200-TR                 Can Bus Ctrl (CBC) LC4  lc   cbc      39.09      0.00      0.0
                              DBCtrl                  lc   fpga10   1.27       0.00      0.0
                              MB CPUCtrl              lc   fpga2    1.97       0.00      0.0
                              Fsbl                    lc   fsbl     1.103      0.00      0.0
                              LinuxFW                 lc   lnxfw    1.103      0.00      0.0
                              ROMMONB LC1             lc   rommon   8.51       0.00      0.0
-------------------------------------------------------------------------------------------
A9K-MOD200-TR-TAA             Can Bus Ctrl (CBC) LC4  lc   cbc      39.09      0.00      0.0
                              DBCtrl                  lc   fpga10   1.27       0.00      0.0
                              MB CPUCtrl              lc   fpga2    1.97       0.00      0.0
                              Fsbl                    lc   fsbl     1.103      0.00      0.0
                              LinuxFW                 lc   lnxfw    1.103      0.00      0.0
                              ROMMONB LC1             lc   rommon   8.51       0.00      0.0
-------------------------------------------------------------------------------------------
A9K-MOD200-TAA                Can Bus Ctrl (CBC) LC4  lc   cbc      39.09      0.00      0.0
                              DBCtrl                  lc   fpga10   1.27       0.00      0.0
                              MB CPUCtrl              lc   fpga2    1.97       0.00      0.0
                              Fsbl                    lc   fsbl     1.103      0.00      0.0
                              LinuxFW                 lc   lnxfw    1.103      0.00      0.0
                              ROMMONB LC1             lc   rommon   8.51       0.00      0.0
-------------------------------------------------------------------------------------------
A99K-MOD400-SE                Can Bus Ctrl (CBC) LC4  lc   cbc      39.09      0.00      0.0
                              DBCtrl                  lc   fpga10   1.27       0.00      0.0
                              MB CPUCtrl              lc   fpga2    1.97       0.00      0.0
                              Fsbl                    lc   fsbl     1.103      0.00      0.0
                              LinuxFW                 lc   lnxfw    1.103      0.00      0.0
                              ROMMONB LC1             lc   rommon   8.51       0.00      0.0
-------------------------------------------------------------------------------------------
A99K-MOD400-SE-TAA            Can Bus Ctrl (CBC) LC4  lc   cbc      39.09      0.00      0.0
                              DBCtrl                  lc   fpga10   1.27       0.00      0.0
                              MB CPUCtrl              lc   fpga2    1.97       0.00      0.0
                              Fsbl                    lc   fsbl     1.103      0.00      0.0
                              LinuxFW                 lc   lnxfw    1.103      0.00      0.0
                              ROMMONB LC1             lc   rommon   8.51       0.00      0.0
-------------------------------------------------------------------------------------------
A99K-MOD400-TR                Can Bus Ctrl (CBC) LC4  lc   cbc      39.09      0.00      0.0
                              DBCtrl                  lc   fpga10   1.27       0.00      0.0
                              MB CPUCtrl              lc   fpga2    1.97       0.00      0.0
                              Fsbl                    lc   fsbl     1.103      0.00      0.0
                              LinuxFW                 lc   lnxfw    1.103      0.00      0.0
                              ROMMONB LC1             lc   rommon   8.51       0.00      0.0
```

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------------------------------------------------------------------------------------
A99K-MOD400-TR-TAA       Can Bus Ctrl (CBC) LC4    lc   cbc      39.09    0.00    0.0
                         DBCtrl                    lc   fpga10    1.27     0.00    0.0
                         MB CPUCtrl                lc   fpga2     1.97     0.00    0.0
                         Fsbl                      lc   fsbl      1.103    0.00    0.0
                         LinuxFW                   lc   lnxfw     1.103    0.00    0.0
                         ROMMONB LC1               lc   rommon    8.51     0.00    0.0
------------------------------------------------------------------------------------
A9K-MOD400-SE            Can Bus Ctrl (CBC) LC4    lc   cbc      39.09    0.00    0.0
                         DBCtrl                    lc   fpga10    1.27     0.00    0.0
                         MB CPUCtrl                lc   fpga2     1.97     0.00    0.0
                         Fsbl                      lc   fsbl      1.103    0.00    0.0
                         LinuxFW                   lc   lnxfw     1.103    0.00    0.0
                         ROMMONB LC1               lc   rommon    8.51     0.00    0.0
------------------------------------------------------------------------------------
A9K-MOD400-SE-TAA        Can Bus Ctrl (CBC) LC4    lc   cbc      39.09    0.00    0.0
                         DBCtrl                    lc   fpga10    1.27     0.00    0.0
                         MB CPUCtrl                lc   fpga2     1.97     0.00    0.0
                         Fsbl                      lc   fsbl      1.103    0.00    0.0
                         LinuxFW                   lc   lnxfw     1.103    0.00    0.0
                         ROMMONB LC1               lc   rommon    8.51     0.00    0.0
------------------------------------------------------------------------------------
A9K-MOD400-TR            Can Bus Ctrl (CBC) LC4    lc   cbc      39.09    0.00    0.0
                         DBCtrl                    lc   fpga10    1.27     0.00    0.0
                         MB CPUCtrl                lc   fpga2     1.97     0.00    0.0
                         Fsbl                      lc   fsbl      1.103    0.00    0.0
                         LinuxFW                   lc   lnxfw     1.103    0.00    0.0
                         ROMMONB LC1               lc   rommon    8.51     0.00    0.0
------------------------------------------------------------------------------------
A9K-MOD400-TR-TAA        Can Bus Ctrl (CBC) LC4    lc   cbc      39.09    0.00    0.0
                         DBCtrl                    lc   fpga10    1.27     0.00    0.0
                         MB CPUCtrl                lc   fpga2     1.97     0.00    0.0
                         Fsbl                      lc   fsbl      1.103    0.00    0.0
                         LinuxFW                   lc   lnxfw     1.103    0.00    0.0
                         ROMMONB LC1               lc   rommon    8.51     0.00    0.0
------------------------------------------------------------------------------------
A9K-MOD400-TAA           Can Bus Ctrl (CBC) LC4    lc   cbc      39.09    0.00    0.0
                         DBCtrl                    lc   fpga10    1.27     0.00    0.0
                         MB CPUCtrl                lc   fpga2     1.97     0.00    0.0
                         Fsbl                      lc   fsbl      1.103    0.00    0.0
                         LinuxFW                   lc   lnxfw     1.103    0.00    0.0
                         ROMMONB LC1               lc   rommon    8.51     0.00    0.0
------------------------------------------------------------------------------------
A9K-8X100GE-L-SE         Can Bus Ctrl (CBC) LC4    lc   cbc      38.23    0.00    0.0
                         MB CPUCtrl                lc   fpga2     1.99     0.00    0.0
                         DBCtrl                    lc   fpga3     1.07     0.00    0.0
                         PortCtrl                  lc   fpga4     1.09     0.00    0.0
                         CPAK LR4                  lc   fpga5     1.16     0.00    0.0
                         CPAK SR10                 lc   fpga6     2.02     0.00    0.0
                         Fsbl                      lc   fsbl      1.113    0.00    0.0
                         LinuxFW                   lc   lnxfw     1.113    0.00    0.0
                         ROMMONB LC1               lc   rommon    8.51     0.00    0.0
------------------------------------------------------------------------------------
A9K-8X100GE-L-TR         Can Bus Ctrl (CBC) LC4    lc   cbc      38.23    0.00    0.0
                         MB CPUCtrl                lc   fpga2     1.99     0.00    0.0
                         DBCtrl                    lc   fpga3     1.07     0.00    0.0
                         PortCtrl                  lc   fpga4     1.09     0.00    0.0
                         CPAK LR4                  lc   fpga5     1.16     0.00    0.0
                         CPAK SR10                 lc   fpga6     2.02     0.00    0.0
                         Fsbl                      lc   fsbl      1.113    0.00    0.0
                         LinuxFW                   lc   lnxfw     1.113    0.00    0.0
                         ROMMONB LC1               lc   rommon    8.51     0.00    0.0
------------------------------------------------------------------------------------
A9K-8X100GE-SE           Can Bus Ctrl (CBC) LC4    lc   cbc      38.23    0.00    0.0
```

```
                        MB CPUCtrl                  lc   fpga2    1.99    0.00    0.0
                        DBCtrl                      lc   fpga3    1.07    0.00    0.0
                        PortCtrl                    lc   fpga4    1.09    0.00    0.0
                        CPAK LR4                    lc   fpga5    1.16    0.00    0.0
                        CPAK SR10                   lc   fpga6    2.02    0.00    0.0
                        Fsbl                        lc   fsbl     1.113   0.00    0.0
                        LinuxFW                     lc   lnxfw    1.113   0.00    0.0
                        ROMMONB LC1                 lc   rommon   8.51    0.00    0.0
-------------------------------------------------------------------------------------------------
A9K-8X100GE-TR          Can Bus Ctrl (CBC) LC4      lc   cbc     38.23    0.00    0.0
                        MB CPUCtrl                  lc   fpga2    1.99    0.00    0.0
                        DBCtrl                      lc   fpga3    1.07    0.00    0.0
                        PortCtrl                    lc   fpga4    1.09    0.00    0.0
                        CPAK LR4                    lc   fpga5    1.16    0.00    0.0
                        CPAK SR10                   lc   fpga6    2.02    0.00    0.0
                        Fsbl                        lc   fsbl     1.113   0.00    0.0
                        LinuxFW                     lc   lnxfw    1.113   0.00    0.0
                        ROMMONB LC1                 lc   rommon   8.51    0.00    0.0
-------------------------------------------------------------------------------------------------
A99L-4X100GE-SE         Can Bus Ctrl (CBC) LC4      lc   cbc     38.23    0.00    0.0
                        MB CPUCtrl                  lc   fpga2    1.99    0.00    0.0
                        DBCtrl                      lc   fpga3    1.07    0.00    0.0
                        PortCtrl                    lc   fpga4    1.09    0.00    0.0
                        CPAK LR4                    lc   fpga5    1.16    0.00    0.0
                        CPAK SR10                   lc   fpga6    2.02    0.00    0.0
                        Fsbl                        lc   fsbl     1.113   0.00    0.0
                        LinuxFW                     lc   lnxfw    1.113   0.00    0.0
                        ROMMONB LC1                 lc   rommon   8.51    0.00    0.0
-------------------------------------------------------------------------------------------------
A99L-4X100GE-TR         Can Bus Ctrl (CBC) LC4      lc   cbc     38.23    0.00    0.0
                        MB CPUCtrl                  lc   fpga2    1.99    0.00    0.0
                        DBCtrl                      lc   fpga3    1.07    0.00    0.0
                        PortCtrl                    lc   fpga4    1.09    0.00    0.0
                        CPAK LR4                    lc   fpga5    1.16    0.00    0.0
                        CPAK SR10                   lc   fpga6    2.02    0.00    0.0
                        Fsbl                        lc   fsbl     1.113   0.00    0.0
                        LinuxFW                     lc   lnxfw    1.113   0.00    0.0
                        ROMMONB LC1                 lc   rommon   8.51    0.00    0.0
-------------------------------------------------------------------------------------------------
A9KL-4X100GE-SE         Can Bus Ctrl (CBC) LC4      lc   cbc     38.23    0.00    0.0
                        MB CPUCtrl                  lc   fpga2    1.99    0.00    0.0
                        DBCtrl                      lc   fpga3    1.07    0.00    0.0
                        PortCtrl                    lc   fpga4    1.09    0.00    0.0
                        CPAK LR4                    lc   fpga5    1.16    0.00    0.0
                        CPAK SR10                   lc   fpga6    2.02    0.00    0.0
                        Fsbl                        lc   fsbl     1.113   0.00    0.0
                        LinuxFW                     lc   lnxfw    1.113   0.00    0.0
                        ROMMONB LC1                 lc   rommon   8.51    0.00    0.0
-------------------------------------------------------------------------------------------------
A9KL-4X100GE-TR         Can Bus Ctrl (CBC) LC4      lc   cbc     38.23    0.00    0.0
                        MB CPUCtrl                  lc   fpga2    1.99    0.00    0.0
                        DBCtrl                      lc   fpga3    1.07    0.00    0.0
                        PortCtrl                    lc   fpga4    1.09    0.00    0.0
                        CPAK LR4                    lc   fpga5    1.16    0.00    0.0
                        CPAK SR10                   lc   fpga6    2.02    0.00    0.0
                        Fsbl                        lc   fsbl     1.13    0.00    0.0
                        LinuxFW                     lc   lnxfw    1.113   0.00    0.0
                        ROMMONB LC1                 lc   rommon   8.51    0.00    0.0
-------------------------------------------------------------------------------------------------
A9K-400G-DWDM-TR        Can Bus Ctrl (CBC) LC4      lc   cbc     42.04    0.00    0.0
                        MB CPUCtrl                  lc   fpga2    1.97    0.00    0.0
                        DBCtrl                      lc   fpga3    1.07    0.00    0.0
                        DBCtrl                      lc   fpga4    1.03    0.00    0.0
                        DBCtrl                      lc   fpga5    1.05    0.00    0.0
```

```
                    DBCtrl                        lc    fpga6      3.78      0.00      1.0
                    DBCtrl                        lc    fpga7     49.00      0.00      0.0
                    CFP2 V2                       lc    fpga8      5.52      0.00      2.0
                    CFP2 V1                       lc    fpga8      4.40      0.00      1.0
                    Fsbl                          lc    fsbl       1.103     0.00      0.0
                    LinuxFW                       lc    lnxfw      1.103     0.00      0.0
                    ROMMONB LC1                   lc    rommon     8.51      0.00      0.0
-------------------------------------------------------------------------------------------
A9K-4X100GE         Can Bus Ctrl (CBC) LC4        lc    cbc       46.06      0.00      0.0
                    MB CPUCtrl                    lc    fpga2      1.90      0.00      0.0
                    DBCtrl                        lc    fpga3      1.05      0.00      0.0
                    PortCtrl                      lc    fpga4      1.02      0.00      0.0
                    Fsbl                          lc    fsbl       1.113     0.00      0.0
                    LinuxFW                       lc    lnxfw      1.113     0.00      0.0
                    ROMMONB LC1                   lc    rommon     9.30      0.00      0.0
-------------------------------------------------------------------------------------------
A99-12X100GE        Can Bus Ctrl (CBC) LC4        lc    cbc       46.06      0.00      0.0
                    MB CPUCtrl                    lc    fpga2      1.90      0.00      0.0
                    DBCtrl                        lc    fpga3      1.05      0.00      0.0
                    PortCtrl                      lc    fpga4      1.02      0.00      0.0
                    Fsbl                          lc    fsbl       1.113     0.00      0.0
                    LinuxFW                       lc    lnxfw      1.113     0.00      0.0
                    ROMMONB LC1                   lc    rommon     9.30      0.00      0.0
-------------------------------------------------------------------------------------------
A99-8X100GE-CM      Can Bus Ctrl (CBC) LC4        lc    cbc       38.23      0.00      0.0
                    MB CPUCtrl                    lc    fpga2      1.99      0.00      0.0
                    DBCtrl                        lc    fpga3      1.07      0.00      0.0
                    PortCtrl                      lc    fpga4      1.09      0.00      0.0
                    CPAK LR4                      lc    fpga5      1.16      0.00      0.0
                    CPAK SR10                     lc    fpga6      2.02      0.00      0.0
                    Fsbl                          lc    fsbl       1.113     0.00      0.0
                    LinuxFW                       lc    lnxfw      1.113     0.00      0.0
                    ROMMONB LC1                   lc    rommon     8.51      0.00      0.0
-------------------------------------------------------------------------------------------
A9K-8X100GE-CM      Can Bus Ctrl (CBC) LC4        lc    cbc       38.23      0.00      0.0
                    MB CPUCtrl                    lc    fpga2      1.99      0.00      0.0
                    DBCtrl                        lc    fpga3      1.07      0.00      0.0
                    PortCtrl                      lc    fpga4      1.09      0.00      0.0
                    CPAK LR4                      lc    fpga5      1.16      0.00      0.0
                    CPAK SR10                     lc    fpga6      2.02      0.00      0.0
                    Fsbl                          lc    fsbl       1.113     0.00      0.0
                    LinuxFW                       lc    lnxfw      1.113     0.00      0.0
                    ROMMONB LC1                   lc    rommon     8.51      0.00      0.0
-------------------------------------------------------------------------------------------
A99-12X100GE-CM     Can Bus Ctrl (CBC) LC4        lc    cbc       46.06      0.00      0.0
                    MB CPUCtrl                    lc    fpga2      1.90      0.00      0.0
                    DBCtrl                        lc    fpga3      1.05      0.00      0.0
                    PortCtrl                      lc    fpga4      1.02      0.00      0.0
                    Fsbl                          lc    fsbl       1.113     0.00      0.0
                    LinuxFW                       lc    lnxfw      1.113     0.00      0.0
                    ROMMONB LC1                   lc    rommon     9.30      0.00      0.0
-------------------------------------------------------------------------------------------
A99-48X10GE-1G-SE   Can Bus Ctrl (CBC) LC4        lc    cbc       47.03      0.00      0.0
                    MB CPUCtrl                    lc    fpga2      1.90      0.00      0.0
                    PortCtrl                      lc    fpga3      1.00      0.00      0.0
                    EOBCSwicthCtrl                lc    fpga4      1.11      0.00      0.0
                    Fsbl                          lc    fsbl       1.112     0.00      0.0
                    LinuxFW                       lc    lnxfw      1.112     0.00      0.0
                    ROMMONB LC1                   lc    rommon    18.30      0.00      0.0
-------------------------------------------------------------------------------------------
A99-48X10GE-1G-TR   Can Bus Ctrl (CBC) LC4        lc    cbc       47.03      0.00      0.0
                    MB CPUCtrl                    lc    fpga2      1.90      0.00      0.0
                    PortCtrl                      lc    fpga3      1.00      0.00      0.0
                    EOBCSwicthCtrl                lc    fpga4      1.11      0.00      0.0
```

```
                            Fsbl                        lc   fsbl     1.112    0.00     0.0
                            LinuxFW                     lc   lnxfw    1.112    0.00     0.0
                            ROMMONB LC1                 lc   rommon   18.30    0.00     0.0
--------------------------------------------------------------------------------------------
A99-48X10GE-1G-CM           Can Bus Ctrl (CBC) LC4      lc   cbc      47.03    0.00     0.0
                            MB CPUCtrl                  lc   fpga2    1.90     0.00     0.0
                            PortCtrl                    lc   fpga3    1.00     0.00     0.0
                            fpd_lc_fpga4_0x003d02ca     lc   fpga4    1.11     0.00     0.0
                            Fsbl                        lc   fsbl     1.112    0.00     0.0
                            LinuxFW                     lc   lnxfw    1.112    0.00     0.0
                            ROMMONB LC1                 lc   rommon   18.30    0.00     0.0
--------------------------------------------------------------------------------------------
A9K-24X10GE-1G-SE           Can Bus Ctrl (CBC) LC4      lc   cbc      47.03    0.00     0.0
                            MB CPUCtrl                  lc   fpga2    1.90     0.00     0.0
                            PortCtrl                    lc   fpga3    1.00     0.00     0.0
                            EOBCSwicthCtrl              lc   fpga4    1.11     0.00     0.0
                            Fsbl                        lc   fsbl     1.112    0.00     0.0
                            LinuxFW                     lc   lnxfw    1.112    0.00     0.0
                            ROMMONB LC1                 lc   rommon   18.30    0.00     0.0
--------------------------------------------------------------------------------------------
A9K-24X10GE-1G-TR           Can Bus Ctrl (CBC) LC4      lc   cbc      47.03    0.00     0.0
                            MB CPUCtrl                  lc   fpga2    1.90     0.00     0.0
                            PortCtrl                    lc   fpga3    1.00     0.00     0.0
                            EOBCSwicthCtrl              lc   fpga4    1.11     0.00     0.0
                            Fsbl                        lc   fsbl     1.112    0.00     0.0
                            LinuxFW                     lc   lnxfw    1.112    0.00     0.0
                            ROMMONB LC1                 lc   rommon   18.30    0.00     0.0
--------------------------------------------------------------------------------------------
A9K-24X10GE-1G-CM           Can Bus Ctrl (CBC) LC4      lc   cbc      47.03    0.00     0.0
                            MB CPUCtrl                  lc   fpga2    1.90     0.00     0.0
                            PortCtrl                    lc   fpga3    1.00     0.00     0.0
                            EOBCSwicthCtrl              lc   fpga4    1.11     0.00     0.0
                            Fsbl                        lc   fsbl     1.112    0.00     0.0
                            LinuxFW                     lc   lnxfw    1.112    0.00     0.0
                            ROMMONB LC1                 lc   rommon   18.30    0.00     0.0
--------------------------------------------------------------------------------------------
A9K-48X10GE-1G-SE           Can Bus Ctrl (CBC) LC4      lc   cbc      47.03    0.00     0.0
                            MB CPUCtrl                  lc   fpga2    1.90     0.00     0.0
                            PortCtrl                    lc   fpga3    1.00     0.00     0.0
                            EOBCSwicthCtrl              lc   fpga4    1.11     0.00     0.0
                            Fsbl                        lc   fsbl     1.112    0.00     0.0
                            LinuxFW                     lc   lnxfw    1.112    0.00     0.0
                            ROMMONB LC1                 lc   rommon   18.30    0.00     0.0
--------------------------------------------------------------------------------------------
A9K-48X10GE-1G-TR           Can Bus Ctrl (CBC) LC4      lc   cbc      47.03    0.00     0.0
                            MB CPUCtrl                  lc   fpga2    1.90     0.00     0.0
                            PortCtrl                    lc   fpga3    1.00     0.00     0.0
                            EOBCSwicthCtrl              lc   fpga4    1.11     0.00     0.0
                            Fsbl                        lc   fsbl     1.112    0.00     0.0
                            LinuxFW                     lc   lnxfw    1.112    0.00     0.0
                            ROMMONB LC1                 lc   rommon   18.30    0.00     0.0
--------------------------------------------------------------------------------------------
A9K-48X10GE-1G-CM           Can Bus Ctrl (CBC) LC4      lc   cbc      47.03    0.00     0.0
                            MB CPUCtrl                  lc   fpga2    1.90     0.00     0.0
                            PortCtrl                    lc   fpga3    1.00     0.00     0.0
                            EOBCSwicthCtrl              lc   fpga4    1.11     0.00     0.0
                            Fsbl                        lc   fsbl     1.112    0.00     0.0
                            LinuxFW                     lc   lnxfw    1.112    0.00     0.0
                            ROMMONB LC1                 lc   rommon   18.30    0.00     0.0
--------------------------------------------------------------------------------------------
A99-24X10GE-1G-SE           Can Bus Ctrl (CBC) LC4      lc   cbc      47.03    0.00     0.0
                            MB CPUCtrl                  lc   fpga2    1.90     0.00     0.0
                            PortCtrl                    lc   fpga3    1.00     0.00     0.0
                            EOBCSwicthCtrl              lc   fpga4    1.11     0.00     0.0
```

```
                              Fsbl                       lc   fsbl      1.112     0.00      0.0
                              LinuxFW                    lc   lnxfw     1.112     0.00      0.0
                              ROMMONB LC1                lc   rommon    18.30     0.00      0.0
--------------------------------------------------------------------------------------------------
A99-24X10GE-1G-TR             Can Bus Ctrl (CBC) LC4     lc   cbc       47.03     0.00      0.0
                              MB CPUCtrl                 lc   fpga2     1.90      0.00      0.0
                              PortCtrl                   lc   fpga3     1.00      0.00      0.0
                              EOBCSwicthCtrl             lc   fpga4     1.11      0.00      0.0
                              Fsbl                       lc   fsbl      1.112     0.00      0.0
                              LinuxFW                    lc   lnxfw     1.112     0.00      0.0
                              ROMMONB LC1                lc   rommon    18.30     0.00      0.0
--------------------------------------------------------------------------------------------------
A99-24X10GE-1G-CM             Can Bus Ctrl (CBC) LC4     lc   cbc       47.03     0.00      0.0
                              MB CPUCtrl                 lc   fpga2     1.90      0.00      0.0
                              PortCtrl                   lc   fpga3     1.00      0.00      0.0
                              EOBCSwicthCtrl             lc   fpga4     1.11      0.00      0.0
                              Fsbl                       lc   fsbl      1.112     0.00      0.0
                              LinuxFW                    lc   lnxfw     1.112     0.00      0.0
                              ROMMONB LC1                lc   rommon    18.30     0.00      0.0
--------------------------------------------------------------------------------------------------
A9K-MOD400-CM                 Can Bus Ctrl (CBC) LC4     lc   cbc       39.09     0.00      0.0
                              DBCtrl                     lc   fpga10    1.27      0.00      0.0
                              MB CPUCtrl                 lc   fpga2     1.97      0.00      0.0
                              Fsbl                       lc   fsbl      1.103     0.00      0.0
                              LinuxFW                    lc   lnxfw     1.103     0.00      0.0
                              ROMMONB LC1                lc   rommon    8.51      0.00      0.0
--------------------------------------------------------------------------------------------------
A9K-MOD200-CM                 Can Bus Ctrl (CBC) LC4     lc   cbc       39.09     0.00      0.0
                              DBCtrl                     lc   fpga10    1.27      0.00      0.0
                              MB CPUCtrl                 lc   fpga2     1.97      0.00      0.0
                              Fsbl                       lc   fsbl      1.103     0.00      0.0
                              LinuxFW                    lc   lnxfw     1.103     0.00      0.0
                              ROMMONB LC1                lc   rommon    8.51      0.00      0.0
--------------------------------------------------------------------------------------------------
A9K-40GE-SE                   Can Bus Ctrl (CBC) LC4     lc   cbc       41.104    0.00      0.1
                              PortCtrl                   lc   fpga2     0.08      0.00      0.0
                              PortCtrl                   lc   fpga3     0.08      0.00      0.0
                              MB CPUCtrl                 lc   fpga4     0.06      0.00      0.0
                              ROMMONB LC4                lc   rommon    3.04      0.00      0.1
--------------------------------------------------------------------------------------------------
A9K-4T16GE-SE                 Can Bus Ctrl (CBC) LC4     lc   cbc       41.104    0.00      0.1
                              PortCtrl                   lc   fpga2     0.08      0.00      0.0
                              PortCtrl                   lc   fpga3     1.00      0.00      0.0
                              MB CPUCtrl                 lc   fpga4     0.06      0.00      0.0
                              ROMMONB LC4                lc   rommon    3.04      0.00      0.1
--------------------------------------------------------------------------------------------------
A9K-40GE-TR                   Can Bus Ctrl (CBC) LC4     lc   cbc       41.104    0.00      0.1
                              PortCtrl                   lc   fpga2     0.08      0.00      0.0
                              PortCtrl                   lc   fpga3     0.08      0.00      0.0
                              MB CPUCtrl                 lc   fpga4     0.06      0.00      0.0
                              ROMMONB LC4                lc   rommon    3.04      0.00      0.1
--------------------------------------------------------------------------------------------------
A9K-4T16GE-TR                 Can Bus Ctrl (CBC) LC4     lc   cbc       41.104    0.00      0.1
                              PortCtrl                   lc   fpga2     0.08      0.00      0.0
                              PortCtrl                   lc   fpga3     1.00      0.00      0.0
                              MB CPUCtrl                 lc   fpga4     0.06      0.00      0.0
                              ROMMONB LC4                lc   rommon    3.04      0.00      0.1
--------------------------------------------------------------------------------------------------
ASR9001-LC                    Can Bus Ctrl (CBC) IMLC    lc   cbc       23.114    0.00      0.1
                              DB CPUCtrl                 lc   fpga2     1.18      0.00      0.0
                              EP Gambit                  lc   fpga3     1.01      0.00      0.0
                              MB CPUCtrl                 lc   fpga4     2.10      0.00      0.0
                              EP Rogue                   lc   fpga6     1.06      0.00      0.0
                              EP I/O FPGA                lc   fpga7     1.02      0.00      0.0
```

```
                      ROMMONB IM LC              lc   rommon    3.04    0.00    0.1
-----------------------------------------------------------------------------------
ASR9001-LC-S          Can Bus Ctrl (CBC) IMLC    lc   cbc      23.114   0.00    0.1
                      DB CPUCtrl                 lc   fpga2     1.18    0.00    0.0
                      EP Gambit                  lc   fpga3     1.01    0.00    0.0
                      MB CPUCtrl                 lc   fpga4     2.10    0.00    0.0
                      EP Rogue                   lc   fpga6     1.06    0.00    0.0
                      EP I/O FPGA                lc   fpga7     1.02    0.00    0.0
                      ROMMONB IM LC              lc   rommon    3.04    0.00    0.1
-----------------------------------------------------------------------------------
A9K-ISM-100           Can Bus Ctrl (CBC) LC6     lc   cbc      18.08    0.00    0.1
                      CPUCtrl LC6                lc   cpld1     0.01    0.00    0.1
                      Maintenance LC6            lc   fpga2     2.13    0.00    0.1
                      Amistad LC6                lc   fpga1     0.33    0.00    0.20
                      ROMMONB LC6                lc   rommon    1.02    0.00    0.1
-----------------------------------------------------------------------------------
PWR-3KW-AC-V2         Delta AC logic PM          pm   fpga11    6.04    0.00    0.1
                      Delta AC primary PM        pm   fpga12    6.02    0.00    0.1
                      Delta AC secondary PM      pm   fpga13    6.02    0.00    0.1
                      Emerson AC logic PM        pm   fpga14    3.18    0.00    0.1
                      Emerson AC primary PM      pm   fpga15    3.06    0.00    0.1
                      Emerson AC secondary PM    pm   fpga16    3.12    0.00    0.1
-----------------------------------------------------------------------------------
PWR-2KW-DC-V2         Delta DC logic PM          pm   fpga11    6.03    0.00    0.1
                      Delta DC primary PM        pm   fpga12    6.03    0.00    0.1
                      Delta DC secondary PM      pm   fpga13    6.02    0.00    0.1
                      Emerson DC logic PM        pm   fpga14    3.20    0.00    0.1
                      Emerson DC primary PM      pm   fpga15    3.12    0.00    0.1
                      Emerson DC secondary PM    pm   fpga16    3.21    0.00    0.1
-----------------------------------------------------------------------------------
PWR-6KW-AC-V3         Delta V3 AC logic PM       pm   fpga11    4.04    0.00    0.1
                      Delta V3 AC primary PM     pm   fpga12    4.02    0.00    0.1
                      Delta V3 AC secondary PM   pm   fpga13    4.03    0.00    0.1
                      Acbel V3 AC logic PM MCU   pm   fpga14    3.05    0.00    0.1
                      Acbel V3 AC primary PM     pm   fpga15    3.02    0.00    0.1
                      Acbel V3 AC secondary PM   pm   fpga16    3.02    0.00    0.1
-----------------------------------------------------------------------------------
PWR-4.4KW-DC-V3       Delta V3 DC logic PM       pm   fpga11    3.02    0.00    0.1
                      Delta V3 DC primary PM     pm   fpga12    3.01    0.00    0.1
                      Delta V3 DC secondary PM   pm   fpga13    3.01    0.00    0.1
                      Acbel V3 DC logic PM MCU   pm   fpga14    1.11    0.00    0.1
                      Acbel V3 DC primary PM     pm   fpga15    1.03    0.00    0.1
                      Acbel V3 DC secondary PM   pm   fpga16    2.13    0.00    0.1
-----------------------------------------------------------------------------------
PWR-3KW-HVDC          Delta HVDC logic PM        pm   fpga11    2.03    0.00    0.1
                      Delta HVDC primary PM      pm   fpga12    2.02    0.00    0.1
                      Delta HVDC secondary PM    pm   fpga13    2.02    0.00    0.1
-----------------------------------------------------------------------------------
A9K-MPA-32X1GE        EP I/O FPGA                spa  fpga11    1.09    0.00    0.0
-----------------------------------------------------------------------------------
SPA-4XT3/E3           SPA E3 Subrate FPGA        spa  fpga2     1.04    0.00    0.0
                      SPA T3 Subrate FPGA        spa  fpga3     1.04    0.00    0.0
                      SPA I/O FPGA               spa  fpga1     1.01    0.00    0.0
                      SPA ROMMON                 spa  rommon    2.12    0.00    0.0
-----------------------------------------------------------------------------------
SPA-2XT3/E3           SPA E3 Subrate FPGA        spa  fpga2     1.04    0.00    0.0
                      SPA T3 Subrate FPGA        spa  fpga3     1.04    0.00    0.0
                      SPA I/O FPGA               spa  fpga1     1.01    0.00    0.0
                      SPA ROMMON                 spa  rommon    2.12    0.00    0.0
-----------------------------------------------------------------------------------
SPA-4XCT3/DS0         SPA T3 Subrate FPGA        spa  fpga2     0.11    0.00    0.100
                      SPA T3 Subrate FPGA        spa  fpga2     1.04    0.00    0.200
                      SPA I/O FPGA               spa  fpga1     2.08    0.00    0.100
                      SPA ROMMON                 spa  rommon    2.12    0.00    0.100
```

```
--------------------------------------------------------------------------------------
SPA-OC192POS-XFP        SPA FPGA swv1.101 hwv3    spa   fpga2    1.101        0.00    3.0
                        SPA FPGA swv1.2 hwv2      spa   fpga1    1.02         0.00    2.0
--------------------------------------------------------------------------------------
SPA-1XCHSTM1/OC3        SPA T3 Subrate FPGA       spa   fpga2    1.04         0.00    0.0
                        SPA I/O FPGA              spa   fpga1    1.08         0.00    0.0
                        SPA ROMMON                spa   rommon   2.12         0.00    0.0
--------------------------------------------------------------------------------------
SPA-1XOC48POS/RPR       SPA FPGA swv1.101 hwv3    spa   fpga2    1.101        0.00    3.0
                        SPA FPGA swv1.2           spa   fpga1    1.02         0.00    0.0
--------------------------------------------------------------------------------------
SPA-24CHT1-CE-ATM       SPA T3 Subrate FPGA       spa   fpga2    1.10         0.00    1.0
                        SPA I/O FPGA              spa   fpga1    2.32         0.00    1.0
                        SPA ROMMON                spa   rommon   1.03         0.00    1.0
--------------------------------------------------------------------------------------
SPA-2CHT3-CE-ATM        SPA T3 Subrate FPGA       spa   fpga2    1.11         0.00    1.0
                        SPA I/O FPGA              spa   fpga1    2.22         0.00    1.0
                        SPA ROMMON                spa   rommon   1.04         0.00    1.0
--------------------------------------------------------------------------------------
SPA-1CHOC3-CE-ATM       SPA OC3 Subrate FPGA      spa   fpga2    2.23         0.00    0.0
                        SPA I/O FPGA              spa   fpga1    2.23         0.00    2.0
                        SPA ROMMON                spa   rommon   1.04         0.00    0.0
--------------------------------------------------------------------------------------
SPA-1XCHOC48/DS3        SPA I/O FPGA              spa   fpga2    1.00         0.00    0.49
                        SPA I/O FPGA              spa   fpga3    1.00         0.00    0.52
                        SPA I/O FPGA              spa   fpga1    1.36         0.00    0.49
                        SPA ROMMON                spa   rommon   2.02         0.00    0.49
--------------------------------------------------------------------------------------
SPA-4XT-SERIAL          SPA I/O FPGA              spa   fpga2    1.04         0.00    2.0
                        SPA I/O FPGA              spa   fpga1    1.02         0.00    0.0
--------------------------------------------------------------------------------------
SPA-1XOC3-ATM-V2        SPA FPGA swv2.104 hwv2    spa   fpga2    2.104        0.00    2.8
                        SPA FPGA swv1.2           spa   fpga1    2.02         0.00    0.0
--------------------------------------------------------------------------------------
SPA-3XOC3-ATM-V2        SPA FPGA swv2.104 hwv2    spa   fpga2    2.104        0.00    2.8
                        SPA FPGA swv1.2           spa   fpga1    2.02         0.00    0.0
--------------------------------------------------------------------------------------
SPA-1XOC12-ATM-V2       SPA FPGA swv2.104 hwv2    spa   fpga2    2.104        0.00    2.8
                        SPA FPGA swv1.2           spa   fpga1    2.02         0.00    0.0
--------------------------------------------------------------------------------------
SPA-2XCHOC12/DS0        SPA FPGA2 swv1.00         spa   fpga2    1.00         0.00    0.0
                        SPA FPGA swv1.36          spa   fpga1    1.36         0.00    0.49
                        SPA ROMMON swv2.2         spa   rommon   2.02         0.00    0.49
--------------------------------------------------------------------------------------
A9K-MPA-20X1GE          EP I/O FPGA               spa   fpga3    1.01         0.00    0.0
--------------------------------------------------------------------------------------
A9K-MPA-20X10GE         EP I/O FPGA               spa   fpga5    1.16         0.00    0.0
--------------------------------------------------------------------------------------
A9K-MPA20X10GE-CM       EP I/O FPGA               spa   fpga5    1.16         0.00    0.0
--------------------------------------------------------------------------------------
A9K-MPA-2X10GE          EP I/O FPGA               spa   fpga6    1.06         0.00    0.0
--------------------------------------------------------------------------------------
A9K-MPA-4X10GE          EP I/O FPGA               spa   fpga6    1.06         0.00    0.0
--------------------------------------------------------------------------------------
A9K-MPA-2X40GE          EP I/O FPGA               spa   fpga7    1.03         0.00    0.0
--------------------------------------------------------------------------------------
A9K-MPA-1X40GE          EP I/O FPGA               spa   fpga7    1.03         0.00    0.0
--------------------------------------------------------------------------------------
A9K-MPA-8X10GE          EP I/O FPGA               spa   fpga8    1.09         0.00    0.0
--------------------------------------------------------------------------------------
A9K-MPA-2X100GE         EP I/O FPGA               spa   fpga9    1.04         0.00    0.0
                        CFP2 DCO B0               spap  fpga7    38.26887     0.00    0.0
                        CFP2 DCO                  spap  fpga8    38.26887     0.00    0.0
--------------------------------------------------------------------------------------
```

```
A9K-MPA-1X100GE           EP I/O FPGA             spa   fpga9     1.04      0.00      0.0
                          CFP2 DCO B0            spap   fpga7    38.26887   0.00      0.0
                          CFP2 DCO              spap   fpga8    38.26887   0.00      0.0
-------------------------------------------------------------------------------------
A9K-MPA2X100GE-CM         EP I/O FPGA             spa   fpga9     1.04      0.00      0.0
                          CFP2 DCO B0            spap   fpga7    38.26887   0.00      0.0
                          CFP2 DCO              spap   fpga8    38.26887   0.00      0.0
-------------------------------------------------------------------------------------
A9K-MPA-1X200GE           EP I/O FPGA             spa   fpga9     1.04      0.00      0.0
                          CFP2 DCO B0            spap   fpga7    38.26887   0.00      0.0
                          CFP2 DCO              spap   fpga8    38.26887   0.00      0.0
-------------------------------------------------------------------------------------
SPA-8XOC12-POS            SPA FPGA swv1.0         spa   fpga1     1.00      0.00      0.5
-------------------------------------------------------------------------------------
SPA-8XCHT1/E1             SPA I/O FPGA            spa   fpga1     2.08      0.00      0.0
                          SPA ROMMON             spa   rommon    2.12      0.00      0.140
-------------------------------------------------------------------------------------
SPA-2XOC48POS/RPR         SPA FPGA swv1.0         spa   fpga1     1.00      0.00      0.0
-------------------------------------------------------------------------------------
SPA-4XOC48POS/RPR         SPA FPGA swv1.0         spa   fpga1     1.00      0.00      0.0
-------------------------------------------------------------------------------------
SPA-8XOC3-POS             SPA FPGA swv1.0         spa   fpga1     1.00      0.00      0.5
-------------------------------------------------------------------------------------
SPA-2XOC12-POS            SPA FPGA swv1.0         spa   fpga1     1.00      0.00      0.5
-------------------------------------------------------------------------------------
SPA-4XOC12-POS            SPA FPGA swv1.0         spa   fpga1     1.00      0.00      0.5
-------------------------------------------------------------------------------------
SPA-10X1GE-V2             SPA FPGA swv1.10        spa   fpga1     1.10      0.00      0.0
-------------------------------------------------------------------------------------
SPA-4XOC3-POS-V2          SPA FPGA swv1.0         spa   fpga1     1.00      0.00      0.5
-------------------------------------------------------------------------------------
SPA-2XOC3-ATM-V2          SPA FPGA swv1.2         spa   fpga1     2.02      0.00      0.0
-------------------------------------------------------------------------------------
SPA-8XCHT1/E1-V2          SPA I/O FPGA            spa   fpga1     1.02      0.00      1.0
                          SPA ROMMON             spa   rommon    1.00      0.00      1.0
-------------------------------------------------------------------------------------
SPA-1CHSTM1/OC3V2         SPA I/O FPGA            spa   fpga1     1.00      0.00      0.1
                          SPA ROMMON             spa   rommon    1.00      0.00      0.1
-------------------------------------------------------------------------------------
SPA-2XCT3/DS0-V2          SPA I/O FPGA            spa   fpga1     1.01      0.00      1.0
                          SPA ROMMON             spa   rommon    1.00      0.00      1.0
-------------------------------------------------------------------------------------
SPA-4XCT3/DS0-V2          SPA I/O FPGA            spa   fpga1     1.01      0.00      1.0
                          SPA ROMMON             spa   rommon    1.00      0.00      1.0
-------------------------------------------------------------------------------------
SPA-2XT3/E3-V2            SPA FPGA swv1.1 hwv3    spa   fpga1     1.01      0.00      1.0
                          SPA ROMMON             spa   rommon    1.00      0.00      1.0
-------------------------------------------------------------------------------------
SPA-4XT3/E3-V2            SPA FPGA swv1.1 hwv3    spa   fpga1     1.01      0.00      1.0
                          SPA ROMMON             spa   rommon    1.00      0.00      1.0
-------------------------------------------------------------------------------------
```

Caveats

Caveats describe unexpected behavior in Cisco IOS XR Software releases. Severity-1 caveats are the most critical caveats; severity-2 caveats are less critical.

This section contains the caveats for Cisco ASR 9000 Series Aggregation Services Router Software Release and the Cisco ASR 9000 Series Aggregation Services Router platform.

Caveats Specific to the Cisco ASR 9000 Series Router

There are no caveats in this release.

Other Important Information

- IOS XR Release 6.8.1 does not support the Cisco ASR 9001 router. We recommend that you choose IOS XR Release 6.8.2 for this router.

- Repetitive Smart Licensing evaluation expired warning messages are displayed on the console every hour, but there is no functionality impact observed on the device. To stop these repetitive messages, you should register the device again with a new registration token.

- Cisco IOS XR Release 5.3.0 and later does not support the first and third generation Cisco ASR 9000 Line Cards to coexist in a single chassis.

  For the list of ASR 9000 Series line card types, see: http://www.cisco.com/c/en/us/support/docs/routers/asr-9000-series-aggregation-services-routers/116726-qanda-product-00.html#anc2

- From IOS XR Release 6.0, A9K-RSP-4G, A9K-RSP-8G and the first generation ASR 9000 LCs are not supported. For a detailed listing, see End-of-Life and End-of-Sale Notices

- In IOS XR Releases 6.8.x, 2nd generation of ASR 9000 line cards is not supported.

- From Release 6.0, the onePK toolkit is not supported.

- Country-specific laws, regulations, and licenses—In certain countries, use of these products may be prohibited and subject to laws, regulations, or licenses, including requirements applicable to the use of the products under telecommunications and other laws and regulations; customers must comply with all such applicable laws in the countries in which they intend to use the products.

- Exceeding Cisco testing—If you intend to test beyond the combined maximum configuration tested and published by Cisco, contact your Cisco Technical Support representative to discuss how to engineer a large-scale configuration for your purpose.

- Installing a Line Card—For a fully populated 40-port high density Line Card with cable optics, maintenance time required for card replacement is higher. For more information about Line Card installation and removal, refer to the *Cisco ASR 9000 Aggregation Services Router Ethernet Line Card Installation Guide*.

Supported Transceiver Modules

To determine the transceivers that Cisco hardware device supports, refer to the Transceiver Module Group (TMG) Compatibility Matrix tool.

Supported Modular Port Adapters

For the compatibility details of Modular Port Adapters (MPAs) on the line cards, see the datasheet of that specific line card.

Upgrading Cisco IOS XR Software

Cisco IOS XR Software is installed and activated from modular packages, allowing specific features or software patches to be installed, upgraded, or downgraded without affecting unrelated processes. Software packages can be upgraded or downgraded on all supported card types, or on a single card (node).

Software packages are installed from package installation envelope (PIE) files that contain one or more software components.

The upgrade document is available along with the software images.

Cisco Software Manager (CSM) application provides an intuitive user interface to manage Cisco IOS XR installations, with pre-installation and post-installation checks and reports. CSM helps manage the process of software maintenance upgrades (SMUs) and service packs (SPs) on devices that run the Cisco IOS XR Software.

For information on how to use CSM, see Cisco Software Manager User Guide.

Production Software Maintenance Updates (SMUs)

A production SMU is a SMU that is formally requested, developed, tested, and released. Production SMUs are intended for use in a live network environment and are formally supported by the Cisco TAC and the relevant development teams. Software bugs identified through software recommendations or Bug Search Tools are not a basis for production SMU requests.

For information on production SMU types, refer the Production SMU Types section of the *IOS XR Software Maintenance Updates (SMUs)* guide.

Related Documentation

The most current Cisco ASR 9000 router documentation is located at the following URL:

https://www.cisco.com/c/en/us/td/docs/iosxr/asr-9000-series-routers.html

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Americas Headquarters
Cisco Systems, Inc.
San Jose, CA 95134-1706
USA

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