Serial and Asynchronous Modules for Cisco Integrated Services Routers

Cisco® serial and asynchronous modules provide highly flexible connections for Cisco 1800, 1900, 2800, 2900, 3800, and 3900 Series Integrated Services Routers (ISRs). These modules help customers enable applications such as WAN aggregation, transport of traditional protocols, console servers, and dial access servers. Customers can mix and match modules to tailor cost-effective solutions for common networking problems such as remote network management, external dial modem access, low-density WAN aggregation, transport of traditional protocols, and high-port-density support.

Q. Can you describe these new modules?

A. Cisco offers these serial and asynchronous modules:

- Cisco 2800, 2900, 3800, and 3900 Series 4-Port Serial High-Speed WAN Interface Card (HWIC-4T): Four high-speed serial ports

Cisco 1800, 1900, 2800, 2900, 3800, and 3900 Series 4-Port Asynchronous/Synchronous High-Speed WAN Interface Card (HWIC-4A/S): Four low-speed asynchronous/synchronous ports:

- Cisco 1800, 1900, 2800, 2900, 3800, and 3900 Series 8-Port Asynchronous/Synchronous High-Speed WAN Interface Card (HWIC-8A/S-232): Eight low-speed asynchronous/synchronous ports, EIA-232 only

- Cisco 1800, 1900, 2800, 2900, 3800, and 3900 Series 8-Port Asynchronous High-Speed WAN Interface Card (HWIC-8A): Eight asynchronous EIA-232 ports

- Cisco 2800, 2900, 3800, and 3900 Series 16-Port Asynchronous High-Speed WAN Interface Card (HWIC-16A): Sixteen asynchronous EIA-232 ports

- Cisco 3900 Series 32-Port Asynchronous Service Module (SM-32A): Thirty-two asynchronous EIA-232 ports

Synchronous serial ports are typically used in the following networking solutions:

- WAN links using Cisco High-Level Data Link Control (HDLC), Point-to-Point Protocol (PPP), or Frame Relay encapsulation: With up to eight synchronous serial ports, these HWICs are well suited for low-density WAN aggregation.

- Transport for traditional protocols: Synchronous serial ports can be used to connect to existing equipment using protocols such as IBM Systems Network Architecture (SNA), Synchronous Data Link Control (SDLC) Protocol, Binary Synchronous Communications (Bisync) Protocol, and X.25 Protocol. Cisco IOS® Software provides the capability to transport this traditional-protocol traffic through a TCP/IP network. This capability eliminates the need for expensive leased lines to support this traffic. With up to eight synchronous serial ports, these HWICs are well suited for low- and medium-density applications that provide transport for traditional protocols. For higher densities of synchronous ports, please see the NM-16A/S 16-port synchronous/asynchronous network module.

Asynchronous ports are typically used in the following solutions:

- Console servers and terminal servers: This solution allows Cisco ISRs to connect to the console or craft ports of other networking equipment to provide access to the console or craft ports from anywhere in the network. These modules are well suited for remote management of equipment in network installations. Cisco IOS Software provides a comprehensive set of security features to help ensure that only authorized personnel can access these ports.
- Dial access server: A Cisco ISR with asynchronous ports can connect to external modems to provide a dial access server. This capability provides low-density dial-in access to the network. For a dial access server solution with integrated modems, please see the 8-port and 16-port analog modem network modules.

Q. Can different ports on one module be used for different applications?

A. Yes.

Q. Which connectors and cabling are used with these serial HWICs?

A. The HWIC-4T and HWIC-4A/S use the same Cisco Smart Serial connectors and cabling that are used on the WIC-2T and WIC-2A/S. The HWIC-8A/S-232, HWIC-8A, HWIC-16A, and SM-32A use a new high-density connector and corresponding new cables.

On the HWIC-8A/S-232, each connector supports four asynchronous/synchronous ports. Table 1 lists the available cables.

Table 1.   High-Density Synchronous/Asynchronous Cabling

Product Number	Cable Type	Length	Connector Type
CAB-HD4-232FC	4-port EIA-232 DCE	10 ft (3m)	Socket DB-25
CAB-HD4-232MT	4-port EIA-232 DTE	10 ft (3m)	Plug DB-25

The HWIC-8A/S and HWIC-16A/SM-32A connectors support eight asynchronous ports per connector. The Cisco asynchronous cable has the high-density connector on one end and eight RJ-45 plugs on the other. Connections to other equipment are made using RJ-45 to DB-25 adapters. Table 2 lists the available cables.

Table 2.   High-Density Asynchronous Cabling

Product Number	Cable Type	Length	Connector Type
CAB-HD8-ASYNC	8-port EIA-232	10 ft (3m)	RJ-45
CAB-HD8-KIT	8-port EIA-232 plus 8 CAB-25AS-MMOD	10 ft (3m)	Plug DB-25
CAB-25AS-MMOD	RJ-45 to DB-25 adapter	-	Plug DB-25
CAB-25AS-FDTE	RJ-45 to DB-25 adapter	-	Socket DB-25

Q. What are the maximum speeds supported on the HWIC interfaces?

A. The HWIC-4T supports up to 8 Mbps on each port. The HWIC-4A/S and HWIC-8A/S-232 support up to 252 kbps on each port. All modules support asynchronous speeds of up to 230.4 kbps.

Q. Can the HWIC-4T run at 8 Mbps on all four ports?

A. Yes.

Q. Can the Cisco ISRs run four HWIC-4T modules all at 8 Mbps on every port?

A. Yes. The configuration is limited only by the total system throughput and number of available HWIC slots.

Q. Which routers support these modules?

A. These HWICs are supported on all Cisco 1800, 2800, 2900, 3800, and 3900 Series ISRs in HWIC and enhanced HWIC (EHWIC) slots. The HWIC-4T and HWIC-16A are not supported on the Cisco 1800 or 1900 Series. The SM-32A is supported on the Cisco 3900 Series and Cisco 2900 Series.

Q. Are these HWICs supported on the Cisco 1600, 1700, 2600, 3600, or 3700 Series?

A. No.

Q. Why is "-232" in the product number for HWIC-8A/S-232?

A. The HWIC-8A/S-232 supports EIA-232 only in the data terminal equipment (DTE) or data communications equipment (DCE) mode. It does not support EIA-449, EIA-530, EIA-530A, V.35, or X.21.

Q. Which protocols are supported by the HWIC-4T and HWIC-4A/S?

A. These HWICs support EIA-232, EIA-449, V.35, and X.21 in DTE or DCE mode and EIA-530 and EIA-530A in DTE mode.

Q. Are any features missing from these HWICs?

A. No support is available for the Airline Product Set (ALPS). For ALPS support, please use the NM-4A/S, NM-8A/S, or NM-16A/S.

Q. Do these HWICs offer any new features?

A. Yes. The following are new features:

- More ports in the HWIC form factor
- Capability to measure the incoming clock rate of synchronous ports in DTE mode (see the Cisco IOS Software **show controller** command)
- Higher synchronous speeds of up to 252 kbps on synchronous/asynchronous ports (HWIC-4A/S and HWIC-8A/S-232)
- Higher asynchronous speeds of up to 230.4 kbps
- Support for the lead manipulation feature

Q. What is the lead manipulation feature?

A. Lead manipulation is a Cisco IOS Software feature that allows a user to ignore input signals on the physical interface, view the state of the input signals, and monitor the transitions of the input signals.

Ignoring Input Signals

By default, Cisco IOS Software requires some of the input leads on the physical interface to be asserted. With lead manipulation, the user can configure the serial interface to ignore input signals. The syntax is shown in Table 3.

Table 3.   Lead Manipulation

Mode	Required Input Leads	Syntax to Ignore Input Leads
DTE	CTS, DCD, and DSR	[no] ignore {cts	dcd	dsr}
DCE	RTS and DTR	[no] ignore {dtr	local-loopback	rts}

Viewing the State of Input Signals

Cisco IOS Software will display the state of input signals on the physical interface using **show** commands:

- For serial interfaces configured for synchronous communication, enter the Cisco IOS Software **show interface** command.
- For serial interfaces configured for asynchronous communication, enter the Cisco IOS Software **show line** command.

Monitoring Input Signal Transition

Cisco IOS Software introduces new debugging commands to monitor lead transitions on the physical interface. A user can enable debugging of lead transitions with the **[no] debug serial lead-transitions [serial slot/port]** command.

Q.   Are cable management solutions available for asynchronous ports?

A.   Components Express offers patch panel solutions for the HWIC-8A and HWIC-16A. These patch panels connect to the high-density asynchronous connectors and divide into individual RJ-45 jacks for each asynchronous port. For more information, contact Components Express at:

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Printed in USA

C67-466096-04   05/13