Serial & Asynchronous High-Speed WAN Interface Cards for Cisco 1800, 1900, 2800, 2900, 3800 and 3900

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

Q. Can you describe these new HWICs?

A. Cisco offers these five serial and asynchronous HWICs:

- Cisco 2800, 2900, 3800, 3900 Series 4-Port Serial High-Speed WAN Interface Card (HWIC-4T)-Four high-speed serial ports
- Cisco 1800, 1900, 2800, 2900, 3800, 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, 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, 3900 Series 8-Port Asynchronous High-Speed WAN Interface Card (HWIC-8A)-Eight asynchronous EIA-232 ports
- Cisco 2800, 2900, 3800, 3900 Series 16-Port Asynchronous High-Speed WAN Interface Card (HWIC-16A)-Sixteen 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 as many as eight synchronous serial ports, these HWICs are ideal for low-density WAN aggregation.
- **Legacy protocol transport**—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 Protocol (Bisync), and X.25 Protocol. Cisco IOS® Software provides the capability to transport this legacy traffic through a TCP/IP network. This eliminates the need for expensive leased lines to support this traffic. With up to eight synchronous serial ports, these HWICs are ideal for low- and medium-density legacy protocol transport applications. 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 server and terminal server**—This solution allows the Cisco integrated services router 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. This is ideal for remote management of equipment in network installations. Cisco IOS Software provides a rich set of security features to help ensure that only authorized personnel can access these ports.
- **Dial access server**—An integrated services router with asynchronous ports can connect to external modems to provide a dial access server. This 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 HWIC 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, and HWIC-16A use a new high-density connector and corresponding new cables.

On the HWIC-8A/S-232, each connector supports four asynchronous/synchronous ports. See Table 1 for 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)	Female DB-25
CAB-HD4-232MT	4-port EIA-232 DTE	10 ft (3m)	Male DB-25

The HWIC-8A/S and HWIC-16A 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. See Table 2 for 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 eight CAB-25AS-MMOD	10 ft (3m)	Male DB-25
CAB-25AS-MMOD	RJ-45 to DB-25 adapter	N/A	Male DB-25
CAB-25AS-FDTE	RJ-45 to DB-25 adapter	N/A	Female 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 five HWICs support asynchronous speeds up to 230.4 kbps.

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

A. Yes.

Q. Can the integrated services routers run four HWIC-4Ts 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 HWICs?

A. These HWICs are supported on all Cisco 1800, 2800, 2900, 3800, and 3900 Series Integrated Services Routers in HWIC and EHWIC slots. The HWIC-4T and HWIC-16A are not supported on the 1800 or 1900 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. 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
- The ability to measure the incoming clock rate of synchronous ports in DTE mode (see the Cisco IOS Software show controller command)
- Higher synchronous speeds up to 252 kbps on synchronous/asynchronous ports (HWIC-4A/S, HWIC-8A/S-232)
- Higher asynchronous speeds 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 to 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, DSR	[no] ignore {cts | dcd | dsr}
DCE	RTS, 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, issue the Cisco IOS Software **show interface** command.
- For serial interfaces configured for asynchronous communication, issue 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 may 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 Inc. offers patch panel solutions for the HWIC-8A and HWIC-16A. These patch panels connect to the high-density asynchronous connectors and break out into individual RJ-45 jacks for each asynchronous port. For more information, contact Components Express at:

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