# One- and 2-Port Serial and Asynchronous High-Speed WAN Interface Cards for Cisco 1800, 1900, 2800, 2900, 3800, and 3900 Series Integrated Services Routers

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 access, legacy protocol transport, console server, and dial access server. You 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.

Cisco offers four new serial and asynchronous HWICs:

- Cisco 1-Port T1/Fractional T1 DSU/CSU WAN Interface Card (HWIC-1DSU-T1)
- Cisco 1-Port Serial WAN Interface Card (HWIC-1T)
- Cisco 2-Port Serial WAN Interface Card (HWIC-2T)
- Cisco 2-Port Asynchronous/Synchronous Serial WAN Interface Card (HWIC-2A/S)

**Figure 1.** Cisco 1- and 2-Port Serial and Asynchronous HWICs

HWIC-1DSU-T1

HWIC-2T

## Common Applications

These highly flexible interface cards facilitate several important applications:

- WAN access and aggregation
- Legacy protocol transport
- Dial access server

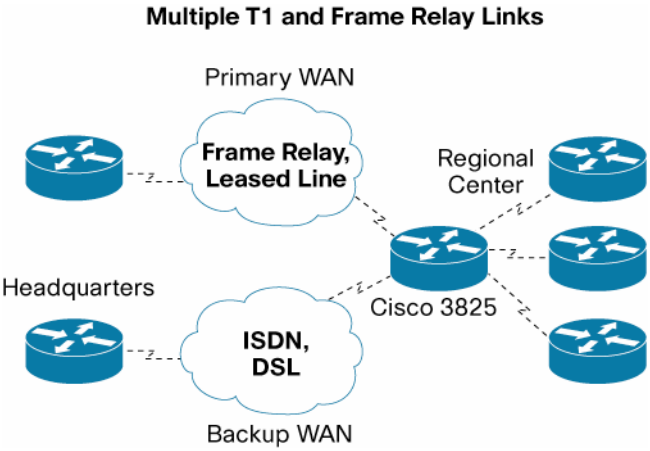
### WAN Access and Aggregation

Serial interfaces can be used to provide WAN access for remote sites. With support for serial speeds up to 8 Mbps per port, the 2-port serial HWIC is ideal for low- and medium-density WAN aggregation (Figure 2).

The HWIC-1DSU-T1 also offers an integrated CSU/DSU, simplifying configuration and management. Integration allows management of the router and CSU/DSU as a single SNMP entity

while also providing detailed troubleshooting capabilities. Troubleshooting features include self-test, loopbacks, CSU/DSU reset, alarm counters, and T1 statistics.

**Figure 2.** WAN Concentration




### Legacy Protocol Transport

Serial and synchronous/asynchronous ports are ideally suited to transport legacy traffic across a TCP/IP network, facilitating network convergence (Figure 3) and eliminating costly separate leased lines for this traffic. Legacy protocols supported by Cisco IOS® Software include:

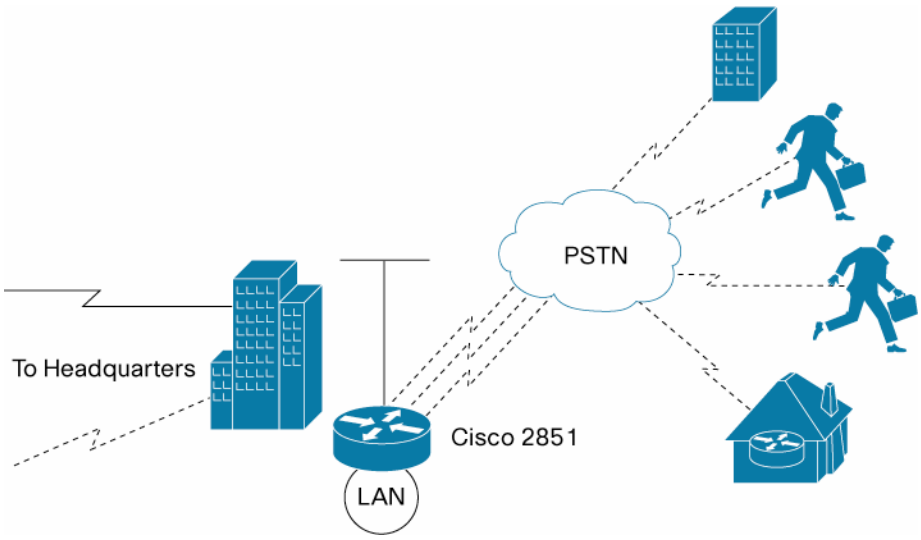
- Systems Network Architecture (SNA) and Synchronous Data Link Control (SDLC) Protocol
- Binary Synchronous Communications Protocol (Bisync)
- X.25 Protocol

**Figure 3.** Network Convergence


### Dial Access Server

Asynchronous HWICs can connect to external dial modems to provide low-density dial access servers (Figure 4).

**Figure 4.** Dial Access Server




## Ordering Information

**Table 1.** Cisco 1- and 2-Port Serial and Asynchronous HWICs

| Part Number | Description |
|---|---|
| **HWIC-1DSU-T1** | 1-Port T1/Fractional T1 DSU/CSU WAN Interface Card |
| **HWIC-1T** | 1-Port Serial WAN Interface Card |
| **HWIC-2T** | 2-Port Serial WAN Interface Card |
| **HWIC-2A/S** | 2-Port Async/Sync Serial WAN Interface Card |

## IOS Release, Feature Sets, Licenses and Platform Support

**Table 2.** Minimum IOS Releases, Feature Sets and Licenses

| Platforms | Minimum Cisco IOS Sotware Release | Minimum Cisco IOS Sotware Feature Set or License |
|---|---|---|
| **Cisco 1800, 2800, and 3800 Series Integrated Services Routers** | • 12.4(20T<br>• 12.4(23)<br>• 12.4(15)T | IP Base |
| **Cisco 1900, 2900, and 3900 Series Integrated Services Routers** | • 15.0(1)M | IP Base |

**Table 3.** Supported Platforms and Quantities

| Platforms | HWIC-1T | HWIC-1DSU-T1 | HWIC-2T | HWIC-2A/S |
|---|---|---|---|---|
| **Cisco 1841** | 2 | 2 | 2 | 2 |
| **Cisco 1861** | No | No | No | No |
| **Cisco 1941** | 2 | 2 | 2 | 2 |
| **Cisco 2801** | 2 | 2 | 2 | 2 |
| **Cisco 2811, 2821, 2851** | 4 | 4 | 4 | 4 |
| **Cisco 2901, 2911, 2921, 2951** | 4 | 4 | 4 | 4 |
| **Cisco 3825 and 3845** | 4 | 4 | 4 | 4 |
| **Cisco 3925 and 3945** | 4 | 4 | 4 | 4 |

## Connectors and Cabling

### Smart Serial Cabling

The HWIC-1T, HWIC-2T, and HWIC-2A/S use Cisco Smart Serial connectors. The supported cables are noted in Table 3. The HWIC-1DSU-T1 uses a RJ-48 connector.

**Table 4.** Smart Serial Cabling for HWIC-1T, HWIC-2T, and HWIC-2A/S

| Product Number | Cable Type | Length | Connector Type |
|---|---|---|---|
| **CAB-SS-V35MT** | V.35 DTE | 10 ft (3m) | Male |
| **CAB-SS-V35FC** | V.35 DCE | 10 ft (3m) | Female |
| **CAB-SS-232MT** | EIA/TIA-232 DTE | 10 ft (3m) | Male |
| **CAB-SS-232FC** | EIA/TIA-232 DCE | 10 ft (3m) | Female |
| **CAB-SS-449MT** | EIA/TIA-449 DTE | 10 ft (3m) | Male |
| **CAB-SS-449FC** | EIA/TIA-449 DCE | 10 ft (3m) | Female |
| **CAB-SS-X21MT** | X.21 DTE | 10 ft (3m) | Male |
| **CAB-SS-X21FC** | X.21 DCE | 10 ft (3m) | Female |
| **CAB-SS-530MT** | EIA/TIA-530 DTE | 10 ft (3m) | Male |
| **CAB-SS-530AMT** | EIA/TIA-530A DTE | 10 ft (3m) | Male |

## Specifications

The specifications of the HWICs are listed in Tables 4, 5, and 6.

**Table 5.** HWIC Signaling and Telecom Specifications

| Specification | HWIC-1DSU-T1 | HWIC-1T | HWIC-2T | HWIC-2A/S |
|---|---|---|---|---|
| **Synchronous Support** | Yes | Yes | Yes | Yes |
| **Synchronous Maximum Speed (Per Port)** | 1.544 Mbps | 8 Mbps | 8 Mbps | 128 kbps |
| **Asynchronous Support** | No | Yes | Yes | Yes |
| **Asynchronous Maximum Speed (Per Port)** | – | 115.2 kbps | 115.2 kbps | 115.2 kbps |
| **Bisync Support** | No | Yes | Yes | Yes |
| **Serial Protocols** | – | EIA-232, EIA-449, EIA-530, EIA-530A, V.35, and X.21 | EIA-232, EIA-449, EIA-530, EIA-530A, V.35, and X.21 | EIA-232, EIA-449, EIA-530, EIA-530A, V.35, and X.21 |
| **Network Clock Synchronization** | Yes | Yes | Yes | Yes |
| **NEBS** | Type 1/3 | Type 2/4 | Type 2/4 | Type 2/4 |
| **TelecommPTT** | • TIA-968-A<br>• Industry Canada CS-03 Part II<br>• JATE Digital<br>• ID0002<br>• HK2017<br>• NEBS | • TBR1 and 2<br>• JATE Digital<br>• NEBS | • TBR1 and 2<br>• JATE Digital<br>• NEBS | • TBR1 and 2<br>• JATE Digital<br>• NEBS |

**Table 6.** Specifications unique to Cisco 1-Port T1/Fractional T1 DSU/CSU WAN Interface Card (HWIC-1DSU-T1)

| Specification | Data |
|---|---|

| | |
|---|---|
| **Network Interface Specifications** | • Transmit bit rate: 1.544 Mbps +/– 50 bps<br>• Receive bit rate: 1.544 Mbps +/– 100 bps<br>• Line code: AMI, B8ZS<br>• AMI ones density<br>• Forced/bit robbing (N X56)<br>• High-Level Data Link Control (HDLC) data inversion (N X64)<br>• Framing format: D4 (SF) and DSF<br>• Output level (LBO) 0, –7.5, or –15 dB, DSU 0-655 feet<br>• Input level: +1 dB0 to –24 dB0 |
| **Recognized BERT Test Patterns** | 1:2, 1:5, 1:8, 3:24, QRW, all 0s, all 1s, and user-programmable 24-bit patterns |

**Table 7.** Homologation Specifications for the HWIC-1DSU-T1, HWIC-T1, HWIC-2T, and HWIC-2A/S

| Specification | Data |
|---|---|
| **Safety Approvals** | • UL 60950 (United States)<br>• CAN/CSA 22.2, CSA60950 (Canada)<br>• GB 4943 (China)<br>• AS/NZS 60950 (Australia/New Zealand)<br>• EN60950 (Europe)<br>• IEC 60950 (International) |
| **Immunity** | • EN300386<br>• CISPR24<br>• EN55024<br>• EN50082-1<br>• 61000-4-2/3/4/5/6/8/11 |
| **Emissions** | • FCC Part 15 Class A<br>• ICES-003 Class A<br>• EN55022 Class A<br>• CISPR22 Class A<br>• AS/NZSCISPR22 Class A<br>• VCCI Class A<br>• EN 300386<br>• EN61000-3-2/3<br>• CNS13438 |
| **Physical Specifications** | • Singlewide HWIC, no slot restrictions<br>• Dimensions (H x W x D) 0.8 x 3.1 x 5.6 in. (2.1 x 7.9 x 14.2 cm) |
| **Environmental Specifications** | • Operating temperature: 32 to 104°F (0 to 40°C)<br>• NEBS short-term operating temperature: 32 to 131°F ( 0 to 50°C)<br>• Storage temperature: –4 to 149°F (–20 to 65°C)<br>• Relative humidity: 10 to 90%, noncondensing |

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