



Cisco Modular Access Router Cable Specifications

This document provides cable specifications for Cisco 1800 series, Cisco 2600 series, Cisco 2800 series, Cisco 3600 series, Cisco 3700 series, and Cisco 3800 series routers.

Use this document in conjunction with the following publications:

- [Cisco 1800 series hardware installation documentation](#)
- [Cisco 2600 Series Hardware Installation Guide](#)
- [Cisco 2800 series hardware installation documentation](#)
- [Cisco 3600 Series Hardware Installation Guide](#)
- [Cisco 3700 Series Hardware Installation Guide](#)
- [Cisco 3800 series hardware installation documentation](#)
- [Cisco Network Modules Hardware Installation Guide](#)
- [Cisco Interface Cards Hardware Installation Guide](#)

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**Note**

All pins not listed in the tables in this document are not connected.

If you prefer to order cables, see your router installation guide.

Safety Warnings

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, may harm you. A warning symbol precedes each warning statement. To see translations of the warnings that appear in this publication, see the *Regulatory Compliance and Safety Information* document that accompanies your router.

**Warning**

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS**Warnung WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.**Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI**Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE**Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES**Varning! VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR**FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!**Предупреждение ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ**警告 重要的安全性说明**

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의 중요 안전 지침

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오.

이 지시 사항을 보관하십시오.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES**Advarsel** VIGTIGE SIKKERHEDSANVISNINGER

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER**تحذير****إرشادات الأمان الهامة**

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في آخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات

Upozorenje VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE**Upozornění DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY**

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY**Προειδοποίηση ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ**

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθειες πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ**אזהרה****הוראות בטיחות חשובות**

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כדי לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה**Opomena VAŽNI BEZBEDNOSNI NAPATSTVIJA**

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА

Ostrzeżenie WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ**Upozornenie DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY**

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Console and Auxiliary Port Signals and Pinouts

Your router comes with a kit that contains the cable and adapters you need to connect a console terminal (an ASCII terminal or PC running terminal emulation software) or modem to your router.

Cisco 1800 series routers, and the Cisco 2801 router, come with an accessory kit that includes the following items:

- RJ-45-to-DB-9 cable
- DB-9-to-DB-25 modem adapter

All other routers in the Cisco 2800 series come with an accessory kit that contains the following:

- RJ-45-to-DB-9 console cable
- RJ-45-to-DB-25 modem cable

For console and modem connections on Cisco 1800 and Cisco 2800 series routers, see the *Cable Connection Procedures* document within the Cisco 1800 series hardware installation documentation or within the Cisco 2800 series hardware installation documentation.

Cisco 2600, Cisco 3600, Cisco 3700 and Cisco 3800 series routers come with a console and auxiliary cable kit that includes the following items:

- RJ-45-to-RJ-45 rollover cable
- RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL)
- RJ-45-to-DB-25 female DTE adapter (labeled TERMINAL)
- RJ-45-to-DB-25 male DCE adapter (labeled MODEM)

For console connections on Cisco 2600, Cisco 3600, Cisco 3700, or Cisco 3800 series routers, proceed to the “[Console Port Signals and Pinouts](#)” section on page 8; for modem connections, proceed to the “[Auxiliary Port Signals and Pinouts](#)” section on page 9.

Console Port Signals and Pinouts

Use the thin, flat, RJ-45-to-RJ-45 rollover cable and RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL) to connect the console port to a PC running terminal emulation software. [Figure 1](#) shows how to connect the console port to a PC. [Table 1](#) lists the pinouts for the asynchronous serial console port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL).

Figure 1 Connecting the Console Port to a PC

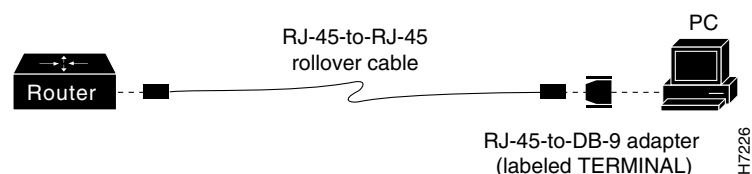


Table 1 Console Port Signaling and Cabling Using a DB-9 Adapter

Console Port (DTE)	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-9 Terminal Adapter (connected to Rollover Cable)	Console Device
Signal	RJ-45 Pin	RJ-45 Pin	DB-9 Pin	Signal
RTS	1 ¹	8	8	CTS
DTR	2	7	6	DSR
TxD	3	6	2	RxD
GND	4	5	5	GND
GND	5	4	5	GND
RxD	6	3	3	TxD
DSR	7	2	4	DTR
CTS	8 ¹	1	7	RTS

1. Pin 1 is connected internally to pin 8.

[Table 2](#) lists the pinouts for the asynchronous serial console port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-25 female DTE adapter (labeled TERMINAL).

Table 2 Console Port Signaling and Cabling Using a DB-25 Adapter

Console Port (DTE) ¹	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-25 Terminal Adapter	Console Device
Signal	RJ-45 Pin	RJ-45 Pin	DB-25 Pin	Signal
RTS	1 ²	8	5	CTS
DTR	2	7	6	DSR
TxD	3	6	3	RxD
GND	4	5	7	GND
GND	5	4	7	GND
RxD	6	3	2	TxD
DSR	7	2	20	DTR
CTS	8 ²	1	4	RTS

1. You can use the same cabling to connect a console to the auxiliary port.
2. Pin 1 is connected internally to pin 8.

Auxiliary Port Signals and Pinouts

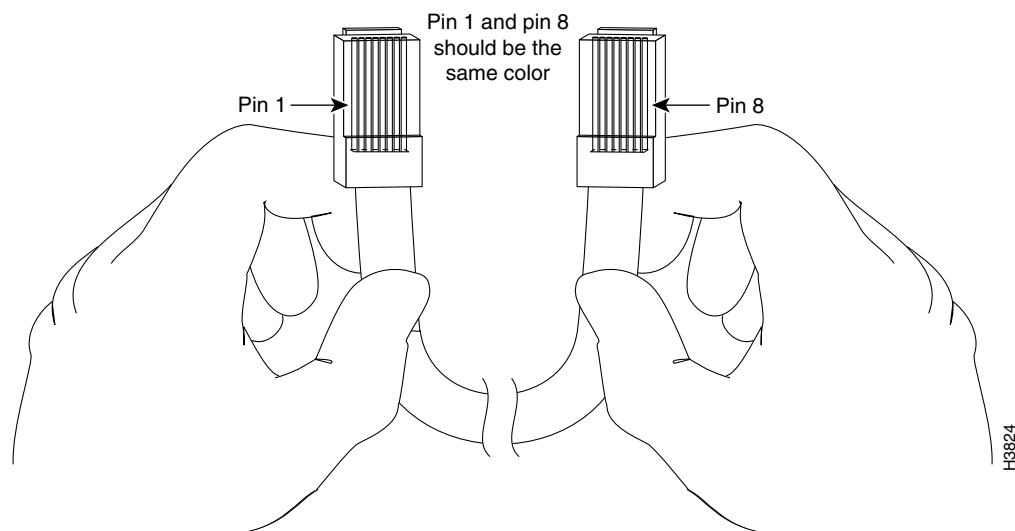
[Table 3](#) lists the pinouts for the asynchronous serial auxiliary port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-25 male DCE adapter (labeled MODEM).

Table 3 Auxiliary Port Signaling and Cabling Using a DB-25 Adapter

Auxiliary Port (DTE)	RJ-45-to-RJ-45 Roll-Over Cable		RJ-45-to-DB-25 Modem Adapter	Modem
Signal	RJ-45 Pin	RJ-45 Pin	DB-25 Pin	Signal
RTS	1 ¹	8	4	RTS
DTR	2	7	20	DTR
TxD	3	6	2	TxD
GND	4	5	7	GND
GND	5	4	7	GND
RxD	6	3	3	RxD
DSR	7	2	8	DCD
CTS	8 ¹	1	5	CTS

1. Pin 1 is connected internally to pin 8.

You can identify a rollover cable by comparing the modular plugs at the two ends of the cable. When you hold the plugs side by side, with the tab at the back, the wire connected to the pin on the outside of the left plug should be the same color as the wire connected to the pin on the outside of the right plug. (See [Figure 2](#).) If you purchased your cable from Cisco Systems, pin 1 is white on one connector, and pin 8 is white on the other (a rollover cable connects pins 1 and 8, 2 and 7, 3 and 6, and 4 and 5).

Figure 2 Identifying a Rollover Cable

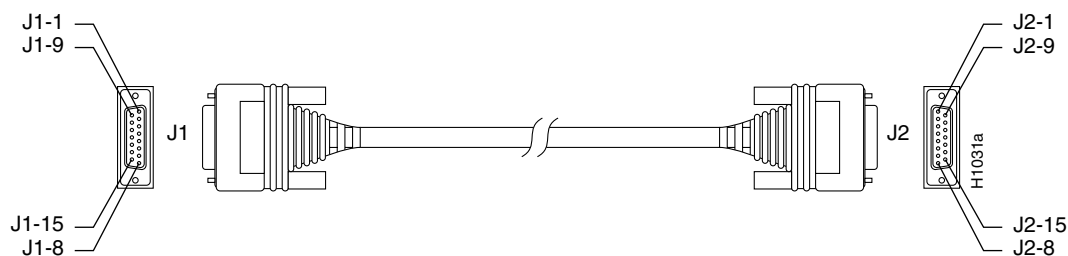
Ethernet Cable Pinouts

This section describes the following:

- [Ethernet AUI Cable Pinouts](#)
- [10BASE-T Connector Pinouts](#)

Ethernet AUI Cable Pinouts

[Figure 3](#) shows the Ethernet (AUI) cable assembly, and [Table 4](#) lists the pinouts.

Figure 3 Ethernet (AUI) Cable Assembly**Table 4** Ethernet (AUI) Pinouts

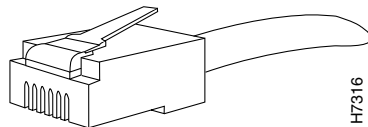
Pin	Ethernet Circuit	Signal Name
3	DO-A	Data Out Circuit A
10	DO-B	Data Out Circuit B
11	DO-S	Data Out Circuit Shield
5	DI-A	Data In Circuit A

Table 4 Ethernet (AUI) Pinouts (continued)

Pin	Ethernet Circuit	Signal Name
12	DI-B	Data In Circuit B
4	DI-S	Data In Circuit Shield
7	CO-A	Control Out Circuit A (not connected)
15	CO-B	Control Out Circuit B (not connected)
8	CO-S	Control Out Circuit Shield (not connected)
2	CI-A	Control In Circuit A
9	CI-B	Control In Circuit B
1	CI-S	Control In Circuit Shield
6	VC	Voltage Common
13	VP	Voltage Plus
14	VS	Voltage Shield (L25 and M25)
Shell	PG	Protective Ground

10BASE-T Connector Pinouts

Figure 4 shows the 10BASE-T connector (RJ-45), and Table 5 lists its pinouts.

Figure 4 10BASE-T Connector (RJ-45)**Table 5 10BASE-T Connector (RJ-45) Pinouts**

Pin ¹	Description
1	TX+
2	TX–
3	RX+
4	—
5	—
6	RX–
7	—
8	—

1. Any pin not described is not connected.

Fast Ethernet Connector Pinouts

This section illustrates the Fast Ethernet 100BASE-TX (RJ-45) connector and lists its pinouts and signal descriptions.

[Figure 5](#) shows the 100BASE-TX RJ-45 connector, and [Table 6](#) lists its pinouts. The 1-port Fast Ethernet network module RJ-45 port actively terminates wire pair 4 and 5 and wire pair 7 and 8. Common-mode termination reduces electromagnetic interference (EMI) and susceptibility to common-mode sources.

Figure 5 100BaseTX RJ-45 Connector

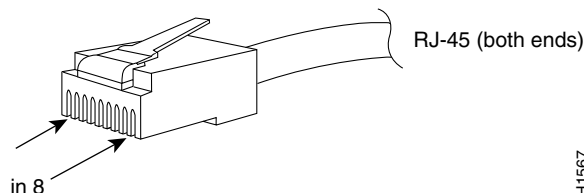


Table 6 RJ-45 Connector Pinout

Pin	Signal
1	TX+
2	TX–
3	RX+
6	RX–

Token Ring Port Pinouts

The 1E1R 2-slot module provides both UTP and STP Token Ring connections described in these sections:

- [Token Ring STP Connector Pinouts](#)
- [Token Ring UTP Connector Pinouts](#)

The IEEE has established Token Ring as standard IEEE 802.5. The distance limitations for the IEEE 802.5 specification indicate a maximum segment distance of 328 feet (100 meters) for UTP cabling. The distance limitation is 1,640 feet (500 meters) for STP cabling.



Note

To ensure agency compliance with FCC Class B electromagnetic emissions requirements (EMI), make sure that you use the shielded RJ-45 Token Ring cable when connecting your router to the Token Ring network.

Token Ring can operate at two different ring speeds: 4 and 16 Mbps. All devices on the ring must use the same operating speed.

Only one Token Ring port can be used at a time. The module will automatically detect which port, STP or UTP, is in use. Use the provided Token Ring cable to connect the router to a switch.

Token Ring STP Connector Pinouts

[Table 7](#) shows the Token Ring STP port pinouts used by the 1E1R 2-slot module.

Table 7 *Token Ring STP Port (DB-9) Pinouts*

9-Pin	Signal Name
1	RX–
2	Ground
3	+5 Volt, fused
4	Ground
5	TX–
6	+RX
7	Ground
8	Ground
9	+TX

Token Ring UTP Connector Pinouts

[Table 8](#) shows the Token Ring UTP port pinouts used by the 1E1R 2-slot module.

Table 8 *Token Ring UTP Port (DB-9) Pinouts*

RJ-45 Pins	Signal
1	GND
2	GND
3	TX
4	RX
5	TX
6	RX
7	GND
8	—

ISDN BRI Interface

This section contains the following topics:

- [ISDN BRI Connections](#)
- [ISDN BRI Pinouts](#)

**Warning**

Network hazardous voltages are present in the BRI, fractional T1/T1, and switched 56 cables. If you detach the cable, detach the end away from the router first to avoid possible electric shock. Network hazardous voltages also are present on the system card in the area of the BRI port (RJ-45 connector), fractional T1/T1 port (RJ-48C connector), and switched port (RJ-11 or RJ-48S connector), regardless of when power is turned OFF. Statement 59

ISDN BRI Connections

**Warning**

The ISDN connection is regarded as a source of voltage that should be inaccessible to user contact. Do not attempt to tamper with or open any public telephone operator (PTO)-provided equipment or connection hardware. Any hardwired connection (other than by a nonremovable, connect-one-time-only plug) must be made only by PTO staff or suitably trained engineers. Statement 23

Use a BRI cable (not included) to connect BRI ports on WAN interface cards (WICs) or on high speed WICs (HWICs) directly to an ISDN. [Table 9](#) lists the specifications for ISDN BRI cables.

Table 9 *ISDN BRI Cable Specifications*

Specification	High-Capacitance Cable	Low-Capacitance Cable
Resistance (at 96 kHz)	160 ohms/km	160 ohms/km
Capacitance (at 1 kHz)	120 nF ¹ /km	30 nF/km
Impedance (at 96 kHz)	75 ohms	150 ohms
Wire diameter	0.024 in (0.6 mm)	0.024 in (0.6 mm)
Distance limitation	32.8 ft (10 m)	32.8 ft (10 m)

1. nF = nanoFarad

ISDN BRI Pinouts

[Table 10](#) lists the connector signals and pinouts for an ISDN BRI S/T port. [Table 11](#) lists the connector signals and pinouts for the ISDN BRI U port.

**Caution**

To prevent damage to the system, make certain you connect the BRI cable to the BRI connector *only* and not to any other RJ-45 connector.

Table 10 ISDN BRI S/T Port Signals and Pinouts (RJ-45)

8-Pin ¹	TE ²	NT ³	Polarity
3	TX	RX	+
4	RX	TX	+
5	RX	TX	—
6	TX	RX	—

1. Pins 1, 2, 7, and 8 are not used.
2. TE refers to terminal terminating layer 1 aspects of TE1, TA, and NT functional groups (this applies to the ISDN BRI S/T WIC).
3. NT refers to network terminating layer 1 aspects of NT1 and NT2 functional groups.

Table 11 ISDN BRI U Port Signals and Pinouts (RJ-45)

8-Pin ¹	Function
3	No connection
4	Signal—Tip or Ring
5	Signal—Tip or Ring
6	No connection

1. Pins 1, 2, 7, and 8 are not used.

CT1/PRI Pinouts

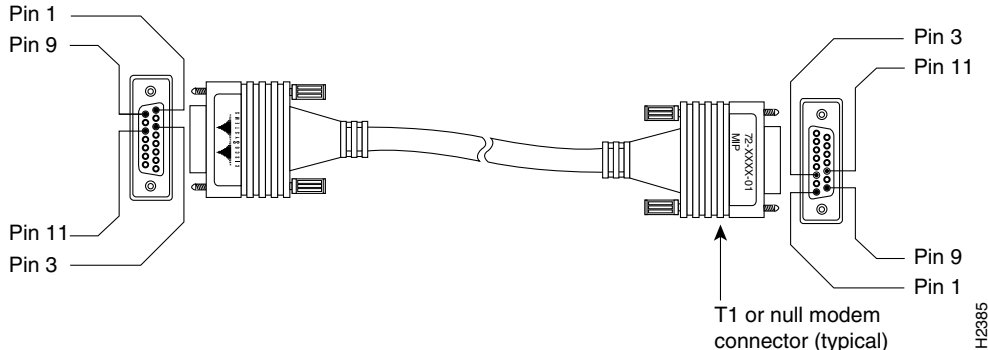
Two standard T1 serial cables are available for the CT1/PRI module: null modem and straight-through. A straight-through cable connects the router to an external CSU. Null modem cables are used for back-to-back operation and testing.

The T1 interface cable has two 15-pin DB connectors at each end to connect the CT1/PRI module with the external T1 CSU. [Figure 6](#) shows the T1 interface cable, connectors, and pinouts. [Table 12](#) lists the pinouts for the null modem T1 cable, and [Table 13](#) lists the pinouts for the straight-through T1 cable.



Warning

Network hazardous voltages are present in the BRI, fractional T1/T1, and switched 56 cables. If you detach the cable, detach the end away from the router first to avoid possible electric shock. Network hazardous voltages also are present on the system card in the area of the BRI port (RJ-45 connector), fractional T1/T1 port (RJ-48C connector), and switched port (RJ-11 or RJ-48S connector), regardless of when power is turned OFF. Statement 59

Figure 6 T1 Interface Cable**Table 12** Null Modem T1 Cable Pinouts

15-Pin DB Connector			15-Pin DB Connector
Signal	Pin	Pin	Signal
Transmit Tip	1	3	Receive Tip
Receive Tip	3	1	Transmit Tip
Transmit Ring	9	11	Receive Ring
Receive Ring	11	9	Transmit Ring

Table 13 Straight-Through T1 Cable Pinouts

15-Pin DB Connector			15-Pin DB Connector
Signal	Pin	Pin	Signal
Transmit Tip	1	1	Transmit Tip
Transmit Ring	9	9	Transmit Ring
Receive Tip	3	3	Receive Tip
Receive Ring	11	11	Receive Ring

CT1/PRI-CSU Pinouts

Table 14 lists the CT1/PRI-CSU module port pinouts. Use a straight-through RJ-48C-to-RJ-48C cable to connect the T1 port to an RJ-48C jack.

Table 14 CT1/PRI-CSU Module Port (RJ-48C) Pinouts

RJ-48C Pin	Description
1	Receive Ring
2	Receive Tip
4	Ring
5	Tip

CE1/PRI Interface

This section contains the following topics:

- [CE1/PRI Cables](#)
- [CE1/PRI Pinouts](#)

CE1/PRI Cables

Cisco Systems makes four cables for the CE1/PRI modules. All four have DB-15 connectors on the CE1/PRI end and either BNC, DB-15, twinaxial, or RJ-45 connectors on the network end. [Figure 7](#) through [Figure 10](#) show the CE1/PRI interface cables.

Figure 7 E1 Interface Cable for 75-Ohm, Unbalanced Connections with BNC Connectors

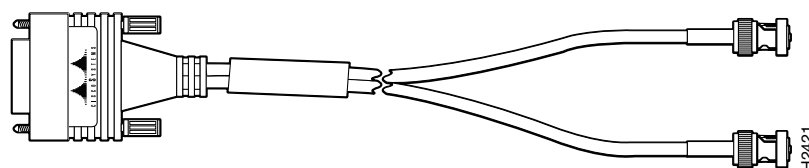


Figure 8 E1 Interface Cable for 120-Ohm, Balanced Connections with DB-15 Connectors

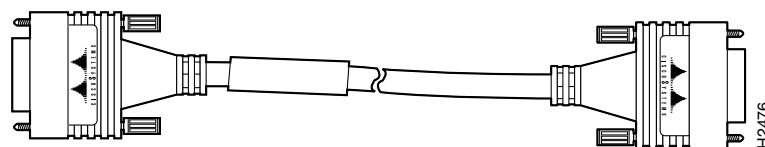


Figure 9 E1 Interface Cable for 120-Ohm, Balanced Connections with Twinaxial Connectors

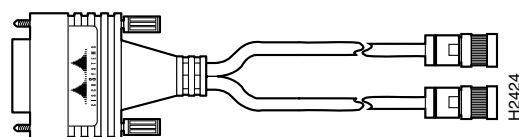
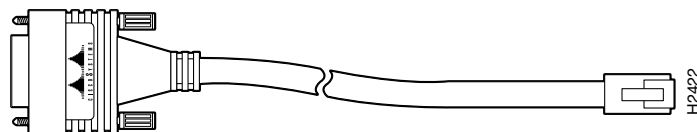


Figure 10 E1 Interface Cable for 120-Ohm, Balanced Connections with an RJ-45 Connector



CE1/PRI Pinouts

[Table 15](#) lists pinouts for the CE1/PRI interface cables.

Table 15 E1 Interface Cable Pinouts

CE1/PRI End		Network End						
DB-15		BNC	DB-15		Twinax		RJ-45	
Pin	Signal	Signal	Pin	Signal	Pin	Signal	Pin	Signal
9	TX Tip	TX Tip	1	TX Tip	TX-1	TX Tip	1	TX Tip
2	TX Ring	TX Shield	9	TX Ring	TX-2	TX Ring	2	TX Ring
10	TX Shield	—	2	TX Shield	Shield	TX Shield	3	TX Shield
8	RX Tip	RX Tip	3	RX Tip	RX-1	RX Tip	4	RX Tip
15	RX Ring	RX Shield	11	RX Ring	RX-2	RX Ring	5	RX Ring
7	RX Shield	—	4	RX Shield	Shield	RX Shield	6	RX Shield

56/64-kbps DSU/CSU Signals and Pinouts

Switched 56-kbps connections are provided by the 56-kbps DSU/CSU WAN interface card (WIC). For more information, see the [Network Modules Hardware Installation Guide](#).



Warning

Network hazardous voltages are present in the BRI, fractional T1/T1, and switched 56 cables. If you detach the cable, detach the end away from the router first to avoid possible electric shock. Network hazardous voltages also are present on the system card in the area of the BRI port (RJ-45 connector), fractional T1/T1 port (RJ-48C connector), and switched port (RJ-11 or RJ-48S connector), regardless of when power is turned OFF. Statement 59

Table 16 lists the 56/64-kbps DSU/CSU connector signals and pinouts.

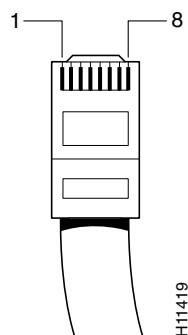
Table 16 56/64-Kbps DSU/CSU (RJ-48S) Signals and Pinouts

8-Pin ¹	Description
1	Transmit Ring
2	Transmit Tip
7	Receive Tip
8	Receive Ring

1. Pins 3, 4, 5, and 6 are not used.

T1/E1 Trunk and Digital Voice Port Pinouts (RJ-48)

Figure 11 shows the RJ-48 connector wiring for the T1/E1 trunk cable and the digital voice port cable; Table 17 lists the pinouts.

Figure 11 RJ-48-to-RJ-48 T1/E1 Cable Wiring**Table 17 Pinouts for T1/E1 Trunk and Digital Voice Port (RJ-48)**

Pin ¹	Signal
1	RX + (input)
2	RX - (input)
3	—
4	TX + (output)
5	TX - (output)
6	—
7	—
8	—

1. Any pin not referenced on a connector is not connected.

Analog Voice RJ-21 Pinouts

Figure 12 shows the RJ-21 connector wiring for the 50-pin Amphenol cable; Table 18 lists the pinouts.

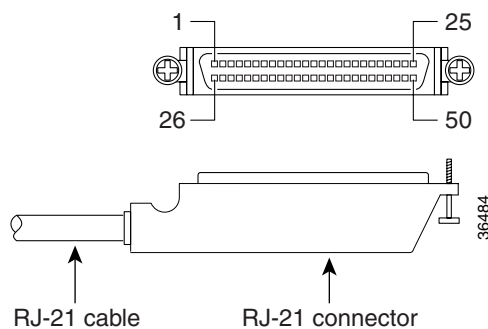
Figure 12 RJ-21 Connector Wiring

Table 18 *Pinouts for FXS and FXO Voice Ports*

Pair	Ring Conductor	Tip Conductor
1	1	26
2	2	27
3	3	28
4	4	29
5	5	30
6	6	31
7	7	32
8	8	33
9	9	34
10	10	35
11	11	36
12	12	37
13	13	38
14	14	39
15	15	40
16	16	41
17	17	42
18	18	43
19	19	44
20	20	45
21	21	46
22	22	47
23	23	48
24	24	49

Serial Connection Signals and Pinouts

This section provides information about the 1-port serial WAN interface card (WIC). With the appropriate serial transition cable, this WIC can provide an EIA/TIA-232, EIA/TIA-449, V.35, X.21, DTE/DCE, EIA-530 DTE, or NRZ/NRZI serial interface.

Types of Serial Cables

Five types of serial cables (also called serial adapter cables or serial transition cables) are available from Cisco Systems:

- [EIA/TIA-232 Interface](#)
- [EIA/TIA-449 Interface](#)
- [V.35 Interface](#)
- [X.21 Serial Cable Assembly](#)
- [EIA-530 Interface](#)

All serial cables provide a universal plug at the WIC end. The network end of each cable provides the physical connectors most commonly used for the interface. For example, the network end of the EIA/TIA-232 serial cable is a DB-25 connector, the most widely used EIA/TIA-232 connector.

All serial interface types except EIA-530 are available in DTE or DCE format: DTE with a plug connector (male) at the network end and DCE with a receptacle (female) at the network end. V.35 is available in either mode with either gender at the network end. EIA-530 is available in DTE only.

Connecting the WIC to the Network



Note

The serial WIC uses a universal high-density, 60-pin receptacle. Each universal port requires a serial port adapter cable that determines the port's electrical interface type and mode: DTE or DCE. Although all port adapter cables use a universal plug at the serial module end, the network end of each cable type uses the physical connectors commonly used for the interface. (For example, the network end of the EIA/TIA-232 port adapter cable is a DB-25 connector, the most widely used EIA/TIA-232 connector.)

After you install the serial WIC, use the appropriate serial cable to connect the WIC DB-60 serial port to one of the following types of equipment:

- An asynchronous modem, if connecting to an analog telephone line
- A synchronous modem, data service unit/channel service unit (DSU/CSU), or other data circuit-terminating equipment (DCE), if connecting to a digital WAN line

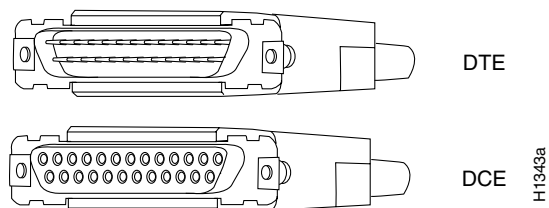
EIA/TIA-232 Interface

This section contains the following topics:

- [EIA/TIA-232 Connections](#)
- [EIA/TIA-232 Serial Cable Assembly](#)

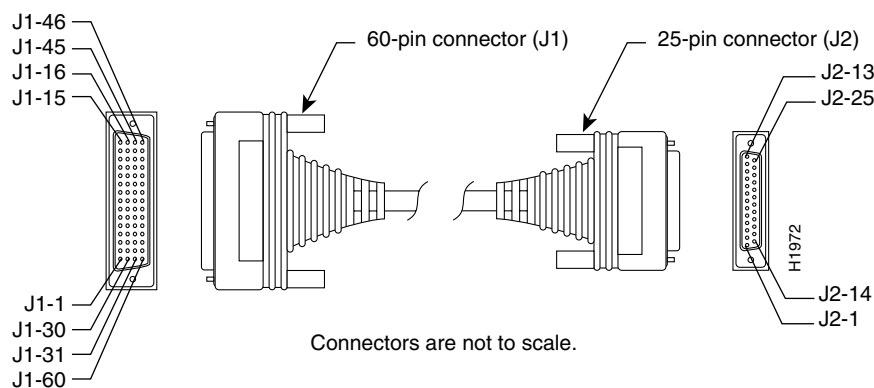
EIA/TIA-232 Connections

EIA/TIA-232 supports unbalanced circuits at signal speeds up to 64 kbps. The network end of the adapter cable is a standard 25-pin D-shell connector known as a DB-25. (See [Figure 13](#).) The router console and auxiliary ports also use EIA/TIA-232 connections; however, the serial module ports support synchronous connections, and the console and auxiliary ports support asynchronous connections.

Figure 13 EIA/TIA-232 Adapter Cable Connectors, Network End

EIA/TIA-232 Serial Cable Assembly

Figure 14 shows the EIA/TIA-232 serial cable assembly. Table 19 lists the DTE pinout and Table 20 lists the DCE pinout. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Figure 14 EIA/TIA-232 Cable Assembly**Table 19 EIA/TIA-232 DTE Cable Pinout (DB-60 to DB-25)**

60-Pin	Signal	Note	Direction	25-Pin	Signal
J1-50 J1-51 J1-52	MODE_0 GND MODE_DCE	Shorting group	—	—	—
J1-46	Shield GND	Single	—	J2-1	Shield GND
J1-46	Shield GND	Single	—	J2-1	Shield GND
J1-41 Shield	TXD/RXD —	Twisted pair no. 5	—> —	J2-2 Shield	TXD —
J1-36 Shield	RXD/TXD —	Twisted pair no. 9	<— —	J2-3 Shield	RXD —
J1-42 Shield	RTS/CTS —	Twisted pair no. 4	—> —	J2-4 Shield	RTS —
J1-35 Shield	CTS/RTS —	Twisted pair no. 10	<— —	J2-5 Shield	CTS —
J1-34 Shield	DSR/DTR —	Twisted pair no. 11	<— —	J2-6 Shield	DSR —

Table 19 EIA/TIA-232 DTE Cable Pinout (DB-60 to DB-25) (continued)

60-Pin	Signal	Note	Direction	25-Pin	Signal
J1-45 Shield	Circuit GND —	Twisted pair no. 1	— —	J2-7 Shield	Circuit GND —
J1-33 Shield	DCD/LL —	Twisted pair no. 12	<— —	J2-8 Shield	DCD —
J1-37 Shield	TXC/NIL —	Twisted pair no. 8	<— —	J2-15 Shield	TXC —
J1-38 Shield	RXC/TXCE —	Twisted pair no. 7	<— —	J2-17 Shield	RXC —
J1-44 Shield	LL/DCD —	Twisted pair no. 2	—> —	J2-18 Shield	LTST —
J1-43 Shield	DTR/DSR —	Twisted pair no. 3	—> —	J2-20 Shield	DTR —
J1-39 Shield	TXCE/TXC —	Twisted pair no. 6	—> —	J2-24 Shield	TXCE —

Table 20 EIA/TIA-232 DCE Cable Pinout (DB-60 to DB-25)

60-Pin	Signal	Note	Direction	25-Pin	Signal
J1-50 J1-51	MODE_0 GND	Shorting group	— —	— —	— —
J1-36 Shield	RXD/TXD —	Twisted pair no. 9	<— —	J2-2 Shield	TXD —
J1-41 Shield	TXD/RXD —	Twisted pair no. 5	—> —	J2-3 Shield	RXD —
J1-35 Shield	CTS/RTS —	Twisted pair no. 10	<— —	J2-4 Shield	RTS —
J1-42 Shield	RTS/CTS —	Twisted pair no. 4	—> —	J2-5 Shield	CTS —
J1-43 Shield	DTR/DSR —	Twisted pair no. 3	—> —	J2-6 Shield	DSR —
J1-45 Shield	Circuit GND —	Twisted pair no. 1	— —	J2-7 Shield	Circuit GND
J1-44 Shield	LL/DCD —	Twisted pair no. 2	—> —	J2-8 Shield	DCD —
J1-39 Shield	TXCE/TXC —	Twisted pair no. 7	—> —	J2-15 Shield	TXC —
J1-40 Shield	NIL/RXC —	Twisted pair no. 6	—> —	J2-17 Shield	RXC —
J1-33 Shield	DCD/LL —	Twisted pair no. 12	<— —	J2-18 Shield	LTST —

Table 20 EIA/TIA-232 DCE Cable Pinout (DB-60 to DB-25) (continued)

60-Pin	Signal	Note	Direction	25-Pin	Signal
J1-34 Shield	DSR/DTR —	Twisted pair no. 11	<— —	J2-20 Shield	DTR —
J1-38 Shield	RXC/TXCE —	Twisted pair no. 8	<— —	J2-24 Shield	TXCE —

EIA/TIA-449 Interface

This section contains the following topics:

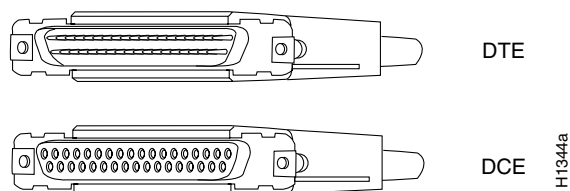
- [EIA/TIA-449 Connections](#)
- [EIA/TIA-449 Serial Cable Assembly](#)

EIA/TIA-449 Connections

EIA/TIA-449, which supports balanced (EIA/TIA-422) and unbalanced (EIA/TIA-423) transmissions, is a faster (up to 2 Mbps) version of EIA/TIA-232 that provides more functions and supports transmissions over greater distances.

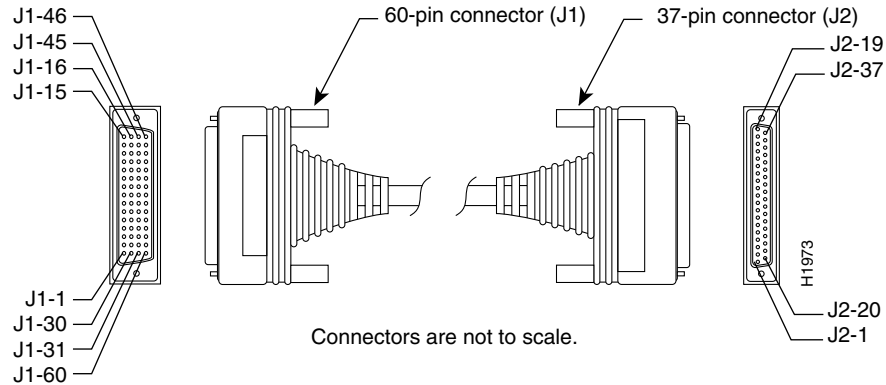
The EIA/TIA-449 standard was intended to replace the EIA/TIA-232 standard, but it was not widely adopted primarily because of the large installed base of DB-25 hardware and because of the larger size of the 37-pin EIA/TIA-449 connectors, which limited the number of connections possible (fewer than possible with the smaller, 25-pin EIA/TIA-232 connector).

The network end of the EIA/TIA-449 adapter cable provides a standard 37-pin D-shell connector. (See [Figure 15](#).) EIA/TIA-449 cables are available as either DTE (DB-37 plug) or DCE (DB-37 receptacle).

Figure 15 EIA/TIA-449 Adapter Cable Connectors, Network End

EIA/TIA-449 Serial Cable Assembly

[Figure 16](#) shows the EIA/TIA-449 serial cable assembly. [Table 21](#) lists the DTE pinout, and [Table 22](#) lists the DCE pinout. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Figure 16 EIA/TIA-449 Serial Cable Assembly**Table 21 EIA/TIA-449 DTE Cable Pinout (DB-60 to DB-37)**

60-Pin	Signal Name	Note	Direction	37-Pin	Signal Name
J1-49 J1-48	MODE_1 GND	Shorting group	—	—	—
J1-51 J1-52	GND MODE_DCE	Shorting group	—	—	—
J1-46	Shield_GND	Single	—	J2-1	Shield GND
J1-11 J1-12	TXD/RXD+ TXD/RXD–	Twisted pair no. 6	—> —>	J2-4 J2-22	SD+ SD–
J1-24 J1-23	TXC/RXC+ TXC/RXC–	Twisted pair no. 9	<— <—	J2-5 J2-23	ST+ ST–
J1-28 J1-27	RXD/TXD+ RXD/TXD–	Twisted pair no. 11	<— <—	J2-6 J2-24	RD+ RD–
J1-9 J1-10	RTS/CTS+ RTS/CTS–	Twisted pair no. 5	—> —>	J2-7 J2-25	RS+ RS–
J1-26 J1-25	RXC/TXCE+ RXC/TXCE–	Twisted pair no. 10	<— <—	J2-8 J2-26	RT+ RT–
J1-1 J1-2	CTS/RTS+ CTS/RTS–	Twisted pair no. 1	<— <—	J2-9 J2-27	CS+ CS–
J1-44 J1-45	LL/DCD Circuit_GND	Twisted pair no. 12	—> —	J2-10 J2-37	LL SC
J1-3 J1-4	DSR/DTR+ DSR/DTR–	Twisted pair no. 2	<— <—	J2-11 J2-29	DM+ DM–
J1-7 J1-8	DTR/DSR+ DTR/DSR–	Twisted pair no. 4	—> —>	J2-12 J2-30	TR+ TR–
J1-5 J1-6	DCD/DCD+ DCD/DCD–	Twisted pair no. 3	<— <—	J2-13 J2-31	RR+ RR–
J1-13 J1-14	TXCE/TXC+ TXCE/TXC–	Twisted pair no. 7	—> —>	J2-17 J2-35	TT+ TT–
J1-15 J1-16	Circuit_GND Circuit_GND	Twisted pair no. 9	— —	J2-19 J2-20	SG RC

Table 22 EIA/TIA-449 DCE Cable Pinout (DB-60 to DB-37)

60-Pin	Signal Name	Note	Direction	37-Pin	Signal Name
J1-49 J1-48	MODE_1 GND	Shorting group	—	—	—
J1-46	Shield_GND	Single	—	J2-1	Shield GND
J1-28 J1-27	RXD/TXD+ RXD/TXD–	Twisted pair no. 11	<— <—	J2-4 J2-22	SD+ SD–
J1-13 J1-14	TXCE/TXC+ TXCE/TXC–	Twisted pair no. 7	—> —>	J2-5 J2-23	ST+ ST–
J1-11 J1-12	TXD/RXD+ TXD/RXD–	Twisted pair no. 6	—> —>	J2-6 J2-24	RD+ RD–
J1-1 J1-2	CTS/RTS+ CTS/RTS–	Twisted pair no. 1	<— <—	J2-7 J2-25	RS+ RS–
J1-24 J1-23	TXC/RXC+ TXC/RXC–	Twisted pair no. 9	—> —>	J2-8 J2-26	RT+ RT–
J1-9 J1-10	RTS/CTS+ RTS/CTS–	Twisted pair no. 5	—> —>	J2-9 J2-27	CS+ CS–
J1-29 J1-30	NIL/LL Circuit_GND	Twisted pair no. 12	—> —	J2-10 J2-37	LL SC
J1-7 J1-8	DTR/DSR+ DTR/DSR–	Twisted pair no. 4	—> —>	J2-11 J2-29	DM+ DM–
J1-3 J1-4	DSR/DTR+ DSR/DTR–	Twisted pair no. 2	<— <—	J2-12 J2-30	TR+ TR–
J1-5 J1-6	DCD/DCD+ DCD/DCD–	Twisted pair no. 3	—> —>	J2-13 J2-31	RR+ RR–
J1-26 J1-25	RXC/TXCE+ RXC/TXCE–	Twisted pair no. 10	<— <—	J2-17 J2-35	TT+ TT–
J1-15 J1-16	Circuit_GND Circuit_GND	Twisted pair no. 8	— —	J2-19 J2-20	SG RC

V.35 Interface

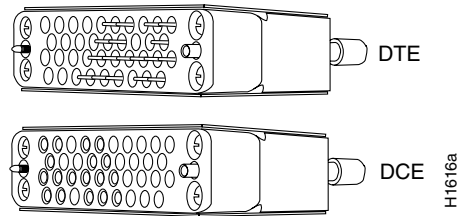
This section contains the following topics:

- [V.35 Connections](#)
- [V.35 Serial Cable Assembly](#)

V.35 Connections

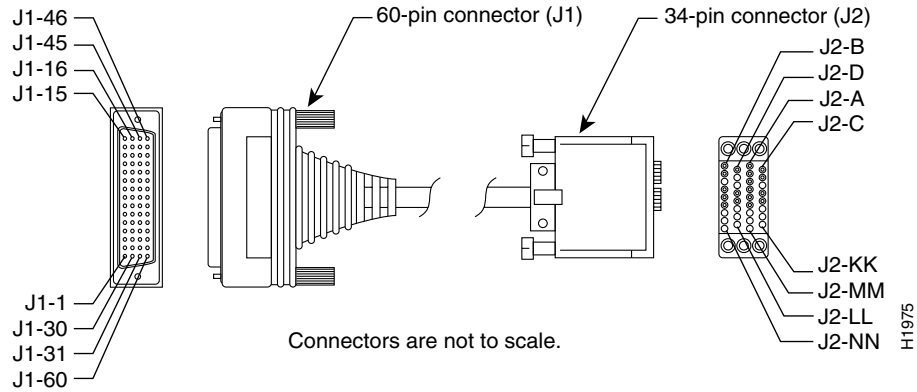
The V.35 interface is recommended for speeds up to 48 kbps, although in practice it is used successfully at 4 Mbps.

The network end of the V.35 adapter cable provides a standard 34-pin Winchester-type connector. (See [Figure 17](#).) V.35 cables are available with a standard V.35 plug or receptacle in either DTE or DCE mode.

Figure 17 V.35 Adapter Cable Connectors, Network End

V.35 Serial Cable Assembly

Figure 18 shows the V.35 serial cable assembly. Table 23 lists the DTE pinout and Table 24 lists the DCE pinout. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Figure 18 V.35 Serial Cable Assembly**Table 23 V.35 DTE Cable Pinout (DB-60 to Winchester-Type 34-Pin)**

60-Pin	Signal Name	Type	Direction	34-Pin	Signal Name
J1-49 J1-48	MODE_1 GND	Shorting group	—	—	—
J1-50 J1-51 J1-52	MODE_0 GND MODE_DCE	Shorting group	—	—	—
J1-53 J1-54 J1-55 J1-56	TxC/NIL RxC_TxCE RxD/TxD GND	Shorting group	—	—	—
J1-46	Shield_GND	Single	—	J2-A	Frame GND
J1-45 Shield	Circuit_GND —	Twisted pair no. 12	— —	J2-B Shield	Circuit GND —
J1-42 Shield	RTS/CTS —	Twisted pair no. 9	—> —	J2-C Shield	RTS —
J1-35 Shield	CTS/RTS —	Twisted pair no. 8	<— —	J2-D Shield	CTS —

Table 23 V.35 DTE Cable Pinout (DB-60 to Winchester-Type 34-Pin) (continued)

60-Pin	Signal Name	Type	Direction	34-Pin	Signal Name
J1-34 Shield	DSR/DTR —	Twisted pair no. 7	<— —	J2-E Shield	DSR —
J1-33 Shield	DCD/LL —	Twisted pair no. 6	<— —	J2-F Shield	RLSD —
J1-43 Shield	DTR/DSR —	Twisted pair no. 10	—> —	J2-H Shield	DTR —
J1-44 Shield	LL/DCD —	Twisted pair no. 11	—> —	J2-K Shield	LT —
J1-18 J1-17	TxD/RxD+ TxD/RxD–	Twisted pair no. 1	—> —>	J2-P J2-S	SD+ SD–
J1-28 J1-27	RxD/TxD+ RxD/TxD–	Twisted pair no. 5	<— <—	J2-R J2-T	RD+ RD–
J1-20 J1-19	TxCE/TxC+ TxCE/TxC–	Twisted pair no. 2	—> —>	J2-U J2-W	SCTE+ SCTE–
J1-26 J1-25	RxC/TxCE+ RxC/TxCE–	Twisted pair no. 4	<— <—	J2-V J2-X	SCR+ SCR–
J1-24 J1-23	TxC/RxC+ TxC/RxC–	Twisted pair no. 3	<— <—	J2-Y J2-AA	SCT+ SCT–

Table 24 V.35 DCE Cable Pinout (DB-60 to Winchester-Type 34-Pin)

60-Pin	Signal Name	Type	Direction	34-Pin	Signal Name
J1-49 J1-48	MODE_1 GND	Shorting group	—	—	—
J1-50 J1-51	MODE_0 GND	Shorting group	—	—	—
J1-53 J1-54 J1-55 J1-56	TxC/NIL RxC_TxCE RxD/TxD GND	Shorting group	—	—	—
J1-46	Shield_GND	Single	—	J2-A	Frame GND
J1-45 Shield	Circuit_GND —	Twisted pair no. 12	— —	J2-B Shield	Circuit GND —
J1-35 Shield	CTS/RTS —	Twisted pair no. 8	<— —	J2-C Shield	RTS —
J1-42 Shield	RTS/CTS —	Twisted pair no. 9	—> —	J2-D Shield	CTS —
J1-43 Shield	DTR/DSR —	Twisted pair no. 10	—> —	J2-E Shield	DSR —
J1-44 Shield	LL/DCD —	Twisted pair no. 11	—> —	J2-F Shield	RLSD —

Table 24 V.35 DCE Cable Pinout (DB-60 to Winchester-Type 34-Pin) (continued)

60-Pin	Signal Name	Type	Direction	34-Pin	Signal Name
J1-34 Shield	DSR/DTR —	Twisted pair no. 7	<— —	J2-H Shield	DTR —
J1-33 Shield	DCD/LL —	Twisted pair no. 6	<— —	J2-K Shield	LT —
J1-28 J1-27	RxD/TxD+ RxD/TxD–	Twisted pair no. 5	<— <—	J2-P J2-S	SD+ SD–
J1-18 J1-17	TxD/RxD+ TxD/RxD–	Twisted pair no. 1	—> —>	J2-R J2-T	RD+ RD–
J1-26 J1-25	RxC/TxC+ RxC/TxC–	Twisted pair no. 4	<— <—	J2-U J2-W	SCTE+ SCTE–
J1-22 J1-21	NIL/RxC+ NIL/RxC–	Twisted pair no. 3	—> —>	J2-V J2-X	SCR+ SCR–
J1-20 J1-19	TxCE/TxC+ TxCE/TxC–	Twisted pair no. 2	—> —>	J2-Y J2-AA	SCT+ SCT–

X.21 Interface

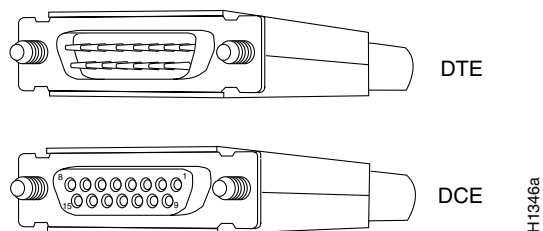
This section contains the following topics:

- [X.21 Connections](#)
- [X.21 Serial Cable Assembly](#)

X.21 Connections

The X.21 interface uses a 15-pin connection for balanced circuits and is commonly used in the United Kingdom to connect public data networks. X.21 relocates some of the logic functions to the DTE and DCE interfaces and, as a result, requires fewer circuits and a smaller connector than EIA/TIA-232.

The network end of the X.21 adapter cable is a standard DB-15 connector. (See [Figure 19](#).) X.21 cables are available as either DTE (DB-15 plug) or DCE (DB-15 receptacle).

Figure 19 X.21 Adapter Cable Connectors, Network End

X.21 Serial Cable Assembly

Figure 20 shows the X.21 serial cable assembly. Table 25 lists the DTE pinout, and Table 26 lists the DCE pinout. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Figure 20 X.21 Serial Cable Assembly

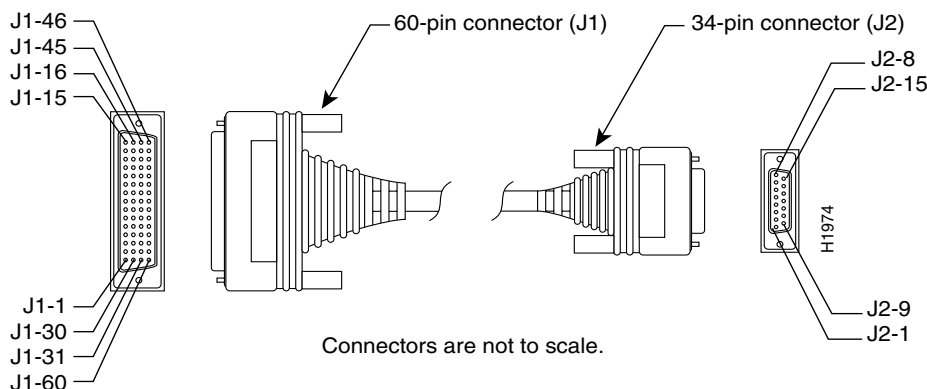


Table 25 X.21 DTE Cable Pinout (DB-60 to DB-15)

60-Pin	Signal Name	Type	Direction	15-Pin	Signal Name
J1-48 J1-47	GND MODE_2	Shorting group	—	—	—
J1-51 J1-52	GND MODE_DCE	Shorting group	—	—	—
J1-46	Shield_GND	Single	—	J2-1	Shield GND
J1-11 J1-12	TXD/RXD+ TXD/RXD–	Twisted pair no. 3	—> —>	J2-2 J2-9	Transmit+ Transmit–
J1-9 J1-10	RTS/CTS+ RTS/CTS–	Twisted pair no. 2	—> —>	J2-3 J2-10	Control+ Control–
J1-28 J1-27	RXD/TXD+ RXD/TXD–	Twisted pair no. 6	<— <—	J2-4 J2-11	Receive+ Receive–
J1-1 J1-2	CTS/RTS+ CTS/RTS–	Twisted pair no. 1	<— <—	J2-5 J2-12	Indication+ Indication–
J1-26 J1-25	RXC/TXCE+ RXC/TXCE–	Twisted pair no. 5	<— <—	J2-6 J2-13	Timing+ Timing–
J1-15 Shield	Control_GND —	Twisted pair no. 4	— —	J2-8 Shield	Control GND —

Table 26 X.21 Serial DCE Cable Pinout (DB-60 to DB-15)

60-Pin	Signal Name	Type	Direction	15-Pin	Signal Name
J1-48 J1-47	GND MODE_2	Shorting group	—	—	—
J1-46	Shield_GND	Single	—	J2-1	Shield GND

Table 26 X.21 Serial DCE Cable Pinout (DB-60 to DB-15) (continued)

60-Pin	Signal Name	Type	Direction	15-Pin	Signal Name
J1-28 J1-27	RXD/TXD+ RXD/TXD–	Twisted pair no. 6	<— <—	J2-2 J2-9	Transmit+ Transmit–
J1-1 J1-2	CTS/RTS+ CTS/RTS–	Twisted pair no. 1	<— <—	J2-3 J2-10	Control+ Control–
J1-11 J1-12	TXD/RXD+ TXD/RXD–	Twisted pair no. 3	—> —>	J2-4 J2-11	Receive+ Receive–
J1-9 J1-10	RTS/CTS+ RTS/CTS–	Twisted pair no. 2	—> —>	J2-5 J2-12	Indication+ Indication–
J1-24 J1-23	TXC/RXC+ TXC/RXC–	Twisted pair no. 4	—> —>	J2-6 J2-13	Timing+ Timing–
J1-15 Shield	Control_GND —	Twisted pair no. 5	— —	J2-8 Shield	Control GND —

EIA-530 Interface

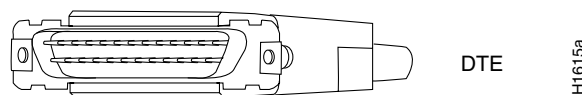
This section contains the following topics:

- [EIA-530 Connections](#)
- [EIA-530 Serial Cable Assembly](#)

EIA-530 Connections

EIA-530, which supports balanced transmission, provides the increased functionality, speed, and distance of EIA/TIA-449 on the smaller DB-25 connector used for EIA/TIA-232, instead of the 37-pin connectors used for EIA/TIA-449. Like EIA/TIA-449, EIA-530 refers to the electrical specifications of EIA/TIA-422 and EIA/TIA-423. Although the specification recommends a maximum speed of 2 Mbps, EIA-530 is used successfully at 4 Mbps or faster speeds over short distances.

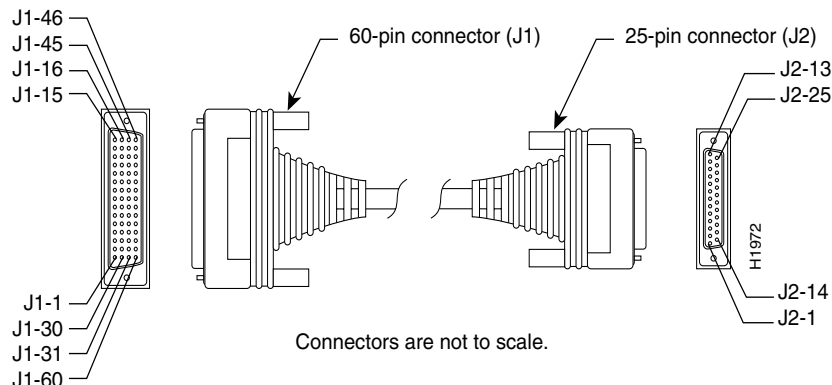
The EIA-530 adapter cable is available in DTE mode only. The network end of the EIA-530 adapter cable is a standard DB-25 plug commonly used for EIA/TIA-232 connections. [Figure 21](#) shows the DB-25 connector at the network end of the adapter cable.

Figure 21 EIA-530 Adapter Cable Connector, Network End

EIA-530 Serial Cable Assembly

[Figure 22](#) shows the EIA-530 serial cable assembly, and [Table 27](#) lists the pinout. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

The EIA-530 interface cannot be operated in DCE mode, and no DCE cable is available for it.

Figure 22 EIA-530 Serial Cable Assembly**Table 27 EIA-530 DTE Cable Pinout (DB-60 to DB-25)**

60-Pin	Signal Name	25-Pin	Signal Name	Direction
J1-11	TXD/RXD+	J2-2	BA(A), TXD+	—>
J1-12	TXD/RXD–	J2-14	BA(B), TXD–	—>
J1-28	RXD/TXD+	J2-3	BB(A), RXD+	<—
J1-27	RXD/TXD–	J2-16	BB(B), RXD–	<—
J1-9	RTS/CTS+	J2-4	CA(A), RTS+	—>
J1-10	RTS/CTS–	J2-19	CA(B), RTS–	—>
J1-1	CTS/RTS+	J2-5	CB(A), CTS+	<—
J1-2	CTS/RTS–	J2-13	CB(B), CTS–	<—
J1-3	DSR/DTR+	J2-6	CC(A), DSR+	<—
J1-4	DSR/DTR–	J2-22	CC(B), DSR–	<—
J1-46	Shield_GND	J2-1	Shield	Shorted
J1-47	MODE_2	—	—	
J1-48	GND	—	—	Shorted
J1-49	MODE_1	—	—	
J1-5	DCD/DCD+	J2-8	CF(A), DCD+	<—
J1-6	DCD/DCD–	J2-10	CF(B), DCD–	<—
J1-24	TXC/RXC+	J2-15	DB(A), TXC+	<—
J1-23	TXC/RXC–	J2-12	DB(B), TXC–	<—
J1-26	RXC/TXCE+	J2-17	DD(A), RXC+	<—
J1-25	RXC/TXCE–	J2-9	DD(B), RXC–	<—
J1-44	LL/DCD	J2-18	LL	—>
J1-45	Circuit_GND	J2-7	Circuit_GND	—
J1-7	DTR/DSR+	J2-20	CD(A), DTR+	—>
J1-8	DTR/DSR–	J2-23	CD(B), DTR–	—>
J1-13	TXCE/TXC+	J2-24	DA(A), TXCE+	—>
J1-14	TXCE/TXC–	J2-11	DA(B), TXCE–	—>
J1-51	GND	—	—	Shorted
J1-52	MODE_DCE	—	—	

Smart Serial Connection Signals and Pinouts

The Smart Serial cable interface supports multiple independent serial interface ports. Each port supports five types of serial interfaces:

- [EIA/TIA-232 Smart Serial Cable Assembly](#)
- [EIA/TIA-449 Smart Serial Cable Assembly](#)
- [X.21 Smart Serial Cable Assembly](#)
- [V.35 Smart Serial Cable Assembly](#)
- [EIA-530 Smart Serial Cable Assembly](#)

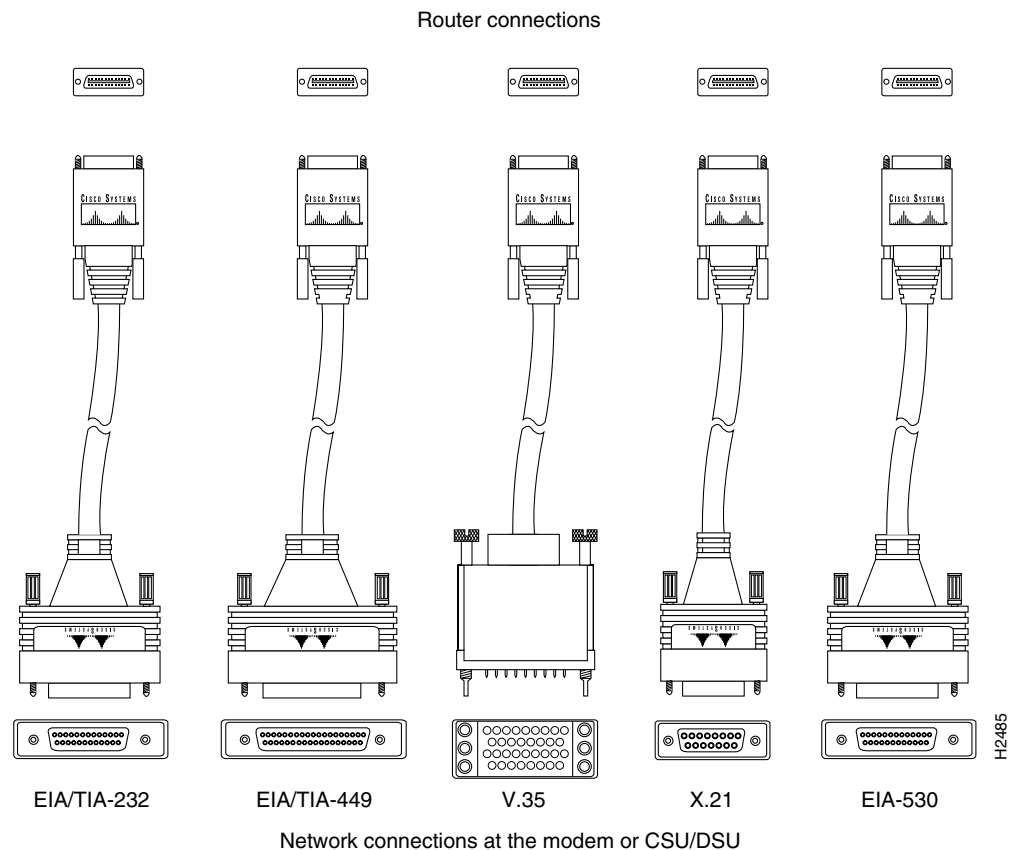
The serial end (router end) of the Smart Serial cable is a 26-pin connector.

These cables are used with the following interface cards:

- 2-port serial and 2-port asynchronous or synchronous WICs
- 4-port serial and 4-port asynchronous or synchronous high-speed WICs (HWICs)

Figure 23 shows the serial cables you can connect to the port on the asynchronous or synchronous serial modules and the serial WICs and HWICs.

Figure 23 Smart Serial Interface Cables



EIA/TIA-232 Smart Serial Cable Assembly

Table 28 lists the DTE pinout, and Table 29 lists the DCE pinout for the EIA/TIA-232 Smart Serial cable. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Table 28 EIA/TIA-232 DTE Smart Serial Cable Pinout

26-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-23 J1-24	MODE_0 MODE_DCE	Local connections			
Drain wire		Shield	—	J2-01	Shield_GND
J1-05 J1-18	I_RXD/TXD+ GND+	Twisted pair no. 9	<— —	J2-03	RXD GND
J1-01 J1-14	O_TXD/RXD+ GND+	Twisted pair no. 5	—> —	J2-02	TXD GND
J1-11 J1-12	I_CTS/RTS+ I_DSR/DTR+	Twisted pair no. 2	<— <—	J2-05 J2-06	CTS DSR
J1-08 J1-07	O_RTS/CTS O_DTR/DSR+	Twisted pair no. 4	—> —>	J2-04 J2-20	RTS DTR
J1-06 J1-19	B_DCD/DCD+ GND+	Twisted pair no. 1	<— —	J2-08 J2-07	DCD GND
J1-03 J1-16	B_TXC/TXC+ GND+	Twisted pair no. 7	<— —	J2-15	TXC GND
J1-02 J1-15	O_TXCE/RXC+ GND+	Twisted pair no. 6	—> —	J2-24	TXCE GND
J1-13 J1-26	B_LL/LL+ GND+	Twisted pair no. 3	—> —	J2-18	LTST GND
J1-04 J1-17	I_RXC/TXCE+ GND+	Twisted pair no. 8	<— —	J2-17	RXC GND

Table 29 EIA/TIA-232 DCE Smart Serial Cable Pinout

26-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-23	MODE_0	Local connections			
Drain wire		Shield	—	J2-01	Shield_GND
J1-05 J1-18	I_RXD/TXD+ GND+	Twisted pair no. 5	<— —	J2-02	TXD GND
J1-01 J1-14	O_TXD/RXD+ GND+	Twisted pair no. 9	—> —	J2-03	RXD GND
J1-11 J1-12	I_CTS/RTS+ I_DSR/DTR+	Twisted pair no. 2	<— <—	J2-04 J2-20	RTS DTR
J1-08 J1-07	O_RTS/CTS O_DTR/DSR+	Twisted pair no. 4	—> —>	J2-05 J2-06	CTS DSR

Table 29 EIA/TIA-232 DCE Smart Serial Cable Pinout (continued)

26-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-06 J1-19	B_DCD/DCD+ GND+	Twisted pair no. 1	—> —	J2-08 J2-07	DCD GND
J1-03 J1-16	B_TXC/TXC+ GND+	Twisted pair no. 7	—> —	J2-15	TXC GND
J1-02 J1-15	O_TXCE/RXC+ GND+	Twisted pair no. 8	—> —	J2-17	RXC GND
J1-13 J1-26	B_LL/LL+ GND+	Twisted pair no. 3	<— —	J2-18	LTST GND
J1-04 J1-17	I_RXC/TXCE+ GND+	Twisted pair no. 6	<— —	J2-24	TXCE GND

EIA/TIA-449 Smart Serial Cable Assembly

Table 30 lists the DTE pinout, and Table 31 lists the DCE pinout for the EIA/TIA-449 Smart Serial cable. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Table 30 EIA/TIA-449 DTE Smart Serial Cable Pinout

26-Pin	Signal Name	Note	Direction	DB-37 Pin	Signal Name
Drain wire		Shield	—	J2-01	Shield_GND
J1-22 J1-24	MODE_I MODE_DCE	Twisted pair no. 2	— —	J2-19 J2-20	SG RC
J1-01 J1-14	O_TXD/RXD+ O_TXD/RXD–	Twisted pair no. 5	—> —>	J2-04 J2-22	SD+ SD–
J1-03 J1-16	B_TXC/TXC+ B_TXC/TXC–	Twisted pair no. 7	<— <—	J2-05 J2-23	ST+ ST–
J1-05 J1-18	I_RXD/TXD+ I_RXD/TXD–	Twisted pair no. 9	<— <—	J2-06 J2-24	RD+ RD–
J1-08 J1-09	O_RTS/CTS O_RTS/CTS–	Twisted pair no. 1	—> —>	J2-07 J2-25	RS+ RS–
J1-04 J1-17	I_RXC/TXCE+ I_RXC/TXCE–	Twisted pair no. 8	<— <—	J2-08 J2-26	RT+ RT–
J1-11 J1-10	I_CTS/RTS+ I_CTS/RTS–	Twisted pair no. 4	<— <—	J2-09 J2-27	CS+ CS–
J1-13 J1-26	B_LL/LL+ GND+	Twisted pair no. 12	—> —	J2-10 J2-37	LL SC
J1-12 J1-25	I_DTR/DSR+ I_DTR/DSR–	Twisted pair no. 10	<— <—	J2-11 J2-29	DM+ DM–
J1-07 J1-20	O_DTR/DSR+ O_DTR/DSR–	Twisted pair no. 3	—> —>	J2-12 J2-30	TR+ TR–

Table 30 EIA/TIA-449 DTE Smart Serial Cable Pinout (continued)

26-Pin	Signal Name	Note	Direction	DB-37 Pin	Signal Name
J1-02 J1-15	O_TXCE/RXC+ O_TXCE/RXC-	Twisted pair no. 6	—> —>	J2-17 J2-35	TT+ TT-
J1-06 J1-19	B_DCD/DCD+ B_DCD/DCD-	Twisted pair no. 11	<— <—	J2-13 J2-31	RR+ RR-

Table 31 EIA/TIA-449 DCE Smart Serial Cable Pinout

26-Pin	Signal Name	Note	Direction	DB-37 Pin	Signal Name
Drain wire		Shield	—	J2-01	Shield_GN D
J1-22	MODE_I Not used	Twisted pair no. 2	—	J2-19 J2-20	SG RC
J1-05 J1-18	I_RXD/TXD+ I_RXD/TXD-	Twisted pair no. 5	<— <—	J2-04 J2-22	SD+ SD-
J1-03 J1-16	B_TXC/TXC+ B_TXC/TXC-	Twisted pair no. 7	—> —>	J2-05 J2-23	ST+ ST-
J1-01 J1-14	O_TXD/RXD+ O_TXD/RXD-	Twisted pair no. 9	—> —>	J2-06 J2-24	RD+ RD-
J1-11 J1-10	I_CTS/RTS+ I_CTS/RTS-	Twisted pair no. 1	<— <—	J2-07 J2-25	RS+ RS-
J1-02 J1-15	O_TXCE/RXC+ O_TXCE/RXC-	Twisted pair no. 8	—> —>	J2-08 J2-26	RT+ RT-
J1-08 J1-09	O_RTS/CTS O_RTS/CTS-	Twisted pair no. 4	—> —>	J2-09 J2-27	CS+ CS-
J1-06 J1-19	B_DCD/DCD+ B_DCD/DCD-	Twisted pair no. 11	—> —>	J2-13 J2-31	RR+ RR-
J1-07 J1-20	O_DTR/DSR+ O_DTR/DSR-	Twisted pair no. 10	—> —>	J2-11 J2-29	DM+ DM-
J1-12 J1-25	I_DTR/DSR+ I_DTR/DSR-	Twisted pair no. 3	<— <—	J2-12 J2-30	TR+ TR-
J1-13 J1-26	B_LL/LL+ GND+	Twisted pair no. 12	—> —	J2-10 J2-37	LL SC
J1-04 J1-17	I_RXC/TXCE+ I_RXC/TXCE-	Twisted pair no. 6	<— <—	J2-17 J2-35	TT+ TT-

X.21 Smart Serial Cable Assembly

Table 32 lists the DTE pinout, and Table 33 lists the DCE pinout for the X.21 Smart Serial cable. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Table 32 X.21 DTE Smart Serial Cable Pinout

26-Pin	Signal Name	Note	Direction	DB-15 Pin	Signal Name
J1-21 J1-24	MODE_2 MODE_DCE	Local connections			
Drain wire		Shield	—	J2-01	Shield_GND
J1-05 J1-18	I_RXD/TXD+ I_RXD/TXD–	Twisted pair no. 8	<— <—	J2-04 J2-11	RECEIVE+ RECEIVE–
J1-01 J1-14	O_TXD/RXD+ O_TXD/RXD–	Twisted pair no. 5	—> —>	J2-02 J2-09	TRANSMIT+ TRANSMIT–
J1-11 J1-10	I_CTS/RTS+ I_DSR/DTR+	Twisted pair no. 2	<— <—	J2-05 J2-12	INDICATION+ INDICATION–
J1-08 J1-09	O_RTS/CTS O_DTR/DSR+	Twisted pair no. 3	—> —>	J2-03 J2-10	CONTROL+ CONTROL–
J1-26	GND+ Not used	Twisted pair no. 1	—	J2-08	CCT GND Not used
J1-04 J1-17	I_RXC/TXCE+ I_RXC/TXCE–	Twisted pair no. 7	<— <—	J2-06 J2-13	TIMING+ TIMING–
	Not used	Twisted pair no. 4			Not used
	Not used	Twisted pair no. 6			Not used
	Not used	Twisted pair no. 9			Not used

Table 33 X.21 DCE Smart Serial Cable Pinout

26-Pin	Signal Name	Note	Direction	DB-15 Pin	Signal Name
J1-21	MODE_2	Local connections			
Drain wire		Shield	—	J2-01	Shield_GND
J1-05 J1-18	I_RXD/TXD+ I_RXD/TXD–	Twisted pair no. 5	<— <—	J2-02 J2-09	TRANSMIT+ TRANSMIT–
J1-01 J1-14	O_TXD/RXD+ O_TXD/RXD–	Twisted pair no. 8	—> —>	J2-04 J2-11	RECEIVE+ RECEIVE–
J1-11 J1-10	I_CTS/RTS+ I_DSR/DTR+	Twisted pair no. 3	<— <—	J2-03 J2-10	CONTROL+ CONTROL–
J1-08 J1-09	O_RTS/CTS O_DTR/DSR+	Twisted pair no. 2	—> —>	J2-05 J2-12	INDICATION+ INDICATION–
J1-02 J1-15	O_TXCE/RXC+ O_TXCE/RXC+	Twisted pair no. 7	—> —>	J2-06 J2-13	TIMING+ TIMING–
J1-26	GND Not used	Twisted pair no. 1	—	J2-08	CCT GND Not used
	Not used	Twisted pair no. 4			Not used

Table 33 X.21 DCE Smart Serial Cable Pinout (continued)

26-Pin	Signal Name	Note	Direction	DB-15 Pin	Signal Name
	Not used	Twisted pair no. 6			Not used
	Not used	Twisted pair no. 9			Not used

V.35 Smart Serial Cable Assembly

Table 34 lists the DTE pinout, and Table 35 lists the DCE pinout for the V.35 Smart Serial cable. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Table 34 V.35 DTE Smart Serial Cable Pinout

26-Pin	Signal Name	Note	Direction	V.35 Pin	Signal Name
J1-22 J1-23 J1-24	MODE_1 MODE_0 MODE_DCE	Local connections			
Drain wire		Shield	—	J2-A	Shield_GND
J1-06 J1-19	B_DCD/DCD+ GND+	Twisted pair no. 1	<— —	J2-F	RLSD GND
J1-13 J1-26	B_LL/LL+ GND	Twisted pair no. 3	—> —	J2-K J2-B	LT GND
J1-05 J1-18	I_RXD/TXD+ I_RXD/TXD–	Twisted pair no. 9	<— <—	J2-R J2-T	RD+ RD–
J1-01 J1-14	O_TXD/RXD+ O_TXD/RXD–	Twisted pair no. 5	—> —>	J2-P J2-S	SD+ SD–
J1-11 J1-12	I_CTS/RTS+ I_DSR/DTR+	Twisted pair no. 2	<— <—	J2-D J2-E	CTS DSR
J1-08 J1-07	O_RTS/CTS O_DTR/DSR+	Twisted pair no. 4	—> —>	J2-C J2-H	RTS DTR
J1-04 J1-17	I_RXC/TXCE+ I_RXC/TXCE–	Twisted pair no. 8	<— <—	J2-V J2-X	SCR+ SCR–
J1-02 J1-15	O_TCXE/RXC+ O_TXCE/RXC–	Twisted pair no. 6	—> —>	J2-U J2-W	SCTE+ SCTE–
J1-03 J1-16	B_TXC/TXC+ B_TXC/TXC–	Twisted pair no. 7	<— <—	J2-Y J2-AA	SCT+ SCT–

Table 35 V.35 DCE Smart Serial Cable Pinout

26-Pin	Signal Name	Note	Direction	V.35 Pin	Signal Name
J1-22 J1-23	MODE_1 MODE_0	Local connections			
Drain wire		Shield	—	J2-A	Shield_GND

Table 35 V.35 DCE Smart Serial Cable Pinout (continued)

26-Pin	Signal Name	Note	Direction	V.35 Pin	Signal Name
J1-06 J1-19	B_DCD/DCD+ GND+	Twisted pair no. 1	—> —	J2-F	RLSD GND
J1-13 J1-26	B_LL/LL+ GND	Twisted pair no. 3	—> —	J2-K J2-B	LT GND
J1-05 J1-18	I_RXD/TXD+ I_RXD/TXD–	Twisted pair no. 5	<— <—	J2-P J2-S	SD+ SD–
J1-01 J1-14	O_TXD/RXD+ O_TXD/RXD–	Twisted pair no. 9	—> —>	J2-R J2-T	RD+ RD–
J1-11 J1-12	I_CTS/RTS+ I_DSR/DTR+	Twisted pair no. 4	<— <—	J2-C J2-H	RTS DSR
J1-08 J1-07	O_RTS/CTS O_DTR/DSR+	Twisted pair no. 2	—> —>	J2-D J2-E	CTS DSR
J1-04 J1-17	I_RXC/TXCE+ I_RXC/TXCE–	Twisted pair no. 6	<— <—	J2-U J2-W	SCTE+ SCTE–
J1-02 J1-15	O_TCXE/RXC+ O_TXCE/RXC–	Twisted pair no. 8	—> —>	J2-V J2-X	SCR+ SCR–
J1-03 J1-16	B_TXC/TXC+ B_TXC/TXC–	Twisted pair no. 7	—> —>	J2-Y J2-AA	SCT+ SCT–

EIA-530 Smart Serial Cable Assembly

Table 36 lists the DTE pinout, and Table 37 lists the DCE pinout for the EIA-530 Smart Serial cable. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Table 36 EIA-530 DTE Smart Serial Cable Pinout

26-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-21 J1-23 J1-24	MODE_2 MODE_0 MODE_DCE	Local connections			
Drain wire		Shield	—	J2-01	Shield_GND
J1-06 J1-19	B_DCD/DCD+ B_DCD/DCD–	Twisted pair no. 11	<— <—	J2-08 J2-10	CF(A); DCD+ CF(B); DCD–
J1-13 J1-26	B_LL/LL+ GND	Twisted pair no. 12	—> —	J2-18 J2-07	LL GND
J1-05 J1-18	I_RXD/TXD+ I_RXD/TXD–	Twisted pair no. 9	<— <—	J2-03 J2-16	BB(A); RXD+ BB(B); RXD–
J1-01 J1-14	O_TXD/RXD+ O_TXD/RXD–	Twisted pair no. 5	—> —>	J2-02 J2-14	BA(A); TXD+ BA(B); TXD–
J1-11 J1-10	I_CTS/RTS+ I_DSR/RTS–	Twisted pair no. 4	<— <—	J2-05 J2-13	CB(A); CTS+ CB(B); CTS–

Table 36 EIA-530 DTE Smart Serial Cable Pinout (continued)

26-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-03 J1-16	B_TXC/TXC+ B_TXC/TXC-	Twisted pair no. 7	<— <—	J2-15 J2-12	DB(A); TXC+ DB(B); TXC-
J1-12 J1-25	I_DSR/DTR+ I_DSR/DTR-	Twisted pair no. 10	<— <—	J2-06 J2-22	CC(A); DSR+ CC(B); DSR-
J1-08 J1-09	O_RTS/CTS O_RTS/CTS-	Twisted pair no. 1	—> —>	J2-04 J2-19	CA(A); RTS+ CA(B); RTS-
J1-04 J1-17	I_RXC/TXCE+ I_RXC/TXCE-	Twisted pair no. 8	<— <—	J2-17 J2-09	DD(A); RXC+ DD(B); RXC-
J1-02 J1-15	O_TCXE/RXC+ O_TXCE/RXC-	Twisted pair no. 6	—> —>	J2-24 J2-11	DB(A); TXCE+ DB(B); TXCE-
J1-03 J1-16	B_TXC/TXC+ B_TXC/TXC-	Twisted pair no. 7	<— <—	J2-15 J2-12	DB(A); TXC+ DB(B); TXC-
J1-07 J1-20	O_DTR/DSR+ O_DTR/DSR-	Twisted pair no. 3	—> —>	J2-20 J2-23	CD(A); DTR+ CD(B); DTR-
	Not used	Twisted pair no. 2			Not used

Table 37 RS-530A DCE Smart Serial Cable Pinout

26-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-21 J1-22 J1-24	MODE_2 MODE_1 MODE_DCE	Local connections			
Drain wire		Shield	—	J2-01	Shield_GND
J1-06 J1-19	B_DCD/DCD+ B_DCD/DCD-	Twisted pair no. 11	<— <—	J2-08 J2-10	CF(A); DCD+ CF(B); DCD-
J1-13 J1-26	B_LL/LL+ GND	Twisted pair no. 12	—> —	J2-18 J2-07	LL AB; GND
J1-05 J1-18	I_RXD/TXD+ I_RXD/TXD-	Twisted pair no. 9	<— <—	J2-03 J2-16	BB(A); RXD+ BB(B); RXD-
J1-01 J1-14	O_TXD/RXD+ O_TXD/RXD-	Twisted pair no. 5	—> —>	J2-02 J2-14	BA(A); TXD+ BA(B); TXD-
J1-11 J1-10	I_CTS/RTS+ I_DSR/RTS-	Twisted pair no. 4	<— <—	J2-05 J2-13	CB(A); CTS+ CB(B); CTS-
J1-12 J1-25	I_DSR/DTR+ GND	Twisted pair no. 10	<— —	J2-06	CC(A); DSR+ AC; GND
J1-03 J1-16	B_TXC/TXC+ B_TXC/TXC-	Twisted pair no. 7	<— <—	J2-15 J2-12	DB(A); TXC+ DB(B); TXCS-
J1-08 J1-09	O_RTS/CTS O_RTS/CTS-	Twisted pair no. 1	—> —>	J2-04 J2-19	CA(A); RTS+ CA(B); RTS-
J1-04 J1-17	I_RXC/TXCE+ I_RXC/TXCE-	Twisted pair no. 8	<— <—	J2-17 J2-09	DD(A); RXC+ DD(B); RXC-

Table 37 RS-530A DCE Smart Serial Cable Pinout (continued)

26-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-02 J1-15	O_TCXE/RXC+ O_TXCE/RXC-	Twisted pair no. 6	—> —>	J2-24 J2-11	DB(A); TXCE+ DB(B); TXCE-
J1-03 J1-16	B_TXC/TXC+ B_TXC/TXC-	Twisted pair no. 7	<— <—	J2-15 J2-12	DB(A); TXC+ DB(B); TXC-
J1-07 J1-20	O_DTR/DSR+ GND+	Twisted pair no. 3	—> —	J2-20 J2-23	CD(A); DTR+ AC; GND
	Not used	Twisted pair no. 2			Not used

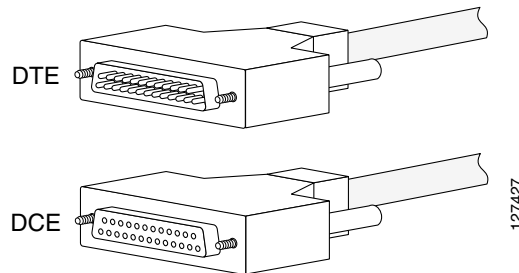
Octopus Cable Connection Signals and Pinouts

This section contains the following topics:

- [4-Port RS-232 Cable Assembly](#)
- [8-Port RS-232 Cable Assembly](#)

4-Port RS-232 Cable Assembly

The 4-port RS-232 cable was designed for use with the Cisco 8-port RS-232 asynchronous or synchronous high-speed WAN interface card (HWIC) (the Cisco HWIC-8A-RS232). The router end of the cable consists of a 68-pin 2-row D-shell connector. The network end of the cable consists of 4 standard 25-pin D-shell connectors (DB-25 connectors). These cables are available in either DTE or DCE format. See [Figure 24](#).

Figure 24 4-Port RS-232 Cable Connectors, Network End

[Figure 25](#) shows the 4-port RS-232 cable assembly. [Table 38](#) lists the cable's DTE pinout, and [Table 39](#) lists the cable's DCE pinout. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Figure 25 4-Port RS-232 Cable Assembly

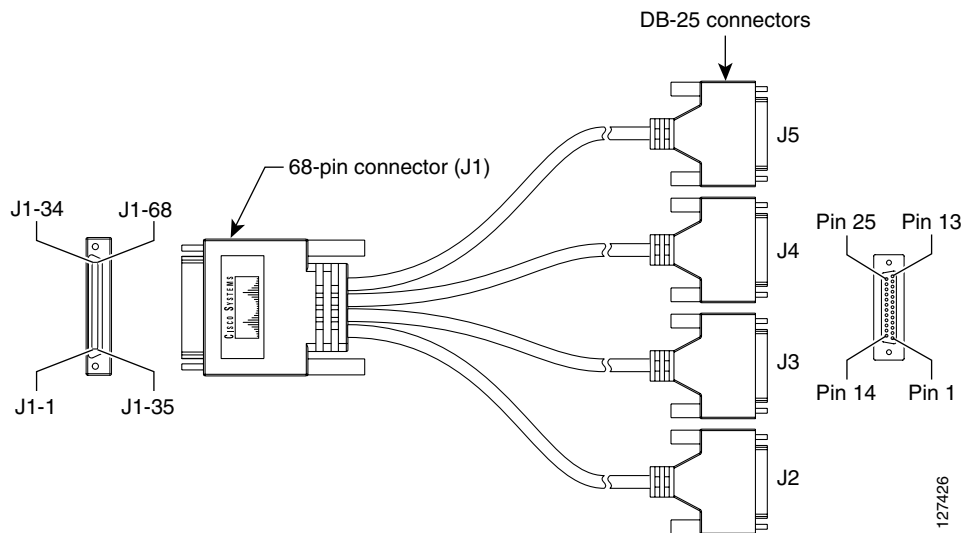


Table 38 4-Port RS-232 DTE Cable Pinout

68-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-32 J1-31	GND	Local mode connection	—	—	—
J1-67 J1-65	GND	Local mode connection	—	—	—
J1-34 J1-68	GND	Local mode connection	—	—	—
J1-1 J1-2 J1-9 J1-16 J1-23 J1-30 J1-31 J1-35 J1-36 J1-43 J1-50 J1-57 J1-64 J1-65 J1-68	GND	Shorting block	—	—	—
J1-1	Shield_GND	Shield	—	J2-01	Shield_GND
J1-7	TXD/RXD Not used	Twisted pair	—> —	J2-02	TXD GND
J1-38	RXD/TXD Not used	Twisted pair	<— —	J2-03	RXD GND

Table 38 4-Port RS-232 DTE Cable Pinout (continued)

68-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-41 J1-8	RTS/CTS DTR/DSR	Twisted pair	—> —>	J2-04 J2-20	RTS DTR
J1-4 J1-37	CTS/RTS DSR/DTR	Twisted pair	<— <—	J2-05 J2-06	CTS DSR
J1-3 J1-36	DCD/LL GND	Twisted pair	<— —	J2-08 J2-07	DCD GND
J1-5	TXC/NIL Not used	Twisted pair	<— —	J2-15	TXC GND
J1-39	RXC/TXCE Not used	Twisted pair	<— —	J2-17	RXC GND
J1-42 J1-2	LL/DCD GND	Twisted pair	—> —	J2-18 J2-07	LTST GND
J1-6	TXCE/RXC Not used	Twisted pair	—> —	J2-24	TXCE GND
J1-35	Shield		—	J3-01	Shield_GND
J1-14	TXD/RXD Not used	Twisted pair	—> —	J3-02	TXD GND
J1-45	RXD/TXD Not used	Twisted pair	<— —	J3-03	RXD GND
J1-48 J1-15	RTS/CTS DTR/DSR	Twisted pair	—> —>	J3-04 J3-20	RTS DTR
J1-11 J1-44	CTS/RTS DSR/DTR	Twisted pair	<— <—	J3-05 J3-06	CTS DSR
J1-10 J1-43	DCD/LL GND	Twisted pair	<— —	J3-08 J3-07	DCD GND
J1-12	TXC/NIL Not used	Twisted pair	<— —	J3-15	TXC GND
J1-46	RXC/TXCE Not used	Twisted pair	<— —	J3-17	RXC GND
J1-49 J1-36	LL/DCD GND	Twisted pair	—> —	J3-18 J3-07	LTST GND
J1-13	TXCE/RXC Not used	Twisted pair	—> —	J3-24	TXCE GND
J1-30	Shield		—	J4-01	Shield_GND
J1-21	TXD/RXD Not used	Twisted pair	—> —	J4-02	TXD GND
J1-52	RXD/TXD Not used	Twisted pair	<— —	J4-03	RXD GND

Table 38 4-Port RS-232 DTE Cable Pinout (continued)

68-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-55 J1-22	RTS/CTS DTR/DSR	Twisted pair	—> —>	J4-04 J4-20	RTS DTR
J1-18 J1-51	CTS/RTS DSR/DTR	Twisted pair	<— <—	J4-05 J4-06	CTS DSR
J1-17 J1-50	DCD/LL GND	Twisted pair	<— —	J4-08 J4-07	DCD GND
J1-19	TXC/NIL Not used	Twisted pair	<— —	J4-15	TXC GND
J1-53	RXC/TXCE Not used	Twisted pair	<— —	J4-17	RXC GND
J1-56 J1-31	LL/DCD GND	Twisted pair	—> —	J4-18 J4-07	LTST GND
J1-20	TXCE/RXC Not used	Twisted pair	—> —	J4-24	TXCE GND
J1-64	Shield		—	J5-01	Shield_GND
J1-28	TXD/RXD Not used	Twisted pair	—> —	J5-02	TXD GND
J1-59	RXD/TXD Not used	Twisted pair	<— —	J5-03	RXD GND
J1-62 J1-29	RTS/CTS DTR/DSR	Twisted pair	—> —>	J5-04 J5-20	RTS DTR
J1-25 J1-58	CTS/RTS DSR/DTR	Twisted pair	<— <—	J5-05 J5-06	CTS DSR
J1-24 J1-57	DCD/LL GND	Twisted pair	<— —	J5-08 J5-07	DCD GND
J1-26	TXC/NIL Not used	Twisted pair	<— —	J5-15	TXC GND
J1-60	RXC/TXCE Not used	Twisted pair	<— —	J5-17	RXC GND
J1-63 J1-65	LL/DCD GND	Twisted pair	—> —	J5-18 J5-07	LTST GND
J1-27	TXCE/RXC Not used	Twisted pair	—> —	J5-24	TXCE GND

Table 39 4-Port RS-232 DCE Cable Pinout

68-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-32 J1-31	GND	Local mode connection	—	—	—
J1-67 J1-65	GND	Local mode connection	—	—	—
J1-1 J1-2 J1-9 J1-16 J1-23 J1-30 J1-31 J1-35 J1-36 J1-43 J1-50 J1-57 J1-64 J1-65 J1-68	GND	Shorting block	—	—	—
J1-1	Shield_GND	Shield	—	J2-01	Shield_GND
J1-38 Not used	RXD/TXD	Twisted pair	<— —	J2-02	TXD GND
J1-7 Not used	TXD/RXD	Twisted pair	—> —	J2-03	RXD GND
J1-4 J1-37	CTS/RTS DSR/DTR	Twisted pair	<— <—	J2-04 J2-20	RTS DTR
J1-41 J1-8	RTS/CTS DTR/DSR	Twisted pair	—> —>	J2-05 J2-06	CTS DSR
J1-42 J1-36	LL/DCD GND	Twisted pair	—> —	J2-08 J2-07	DCD GND
J1-40 Not used	NIL/TXC	Twisted pair	—> —	J2-15	TXC GND
J1-6 Not used	TXCE/RXC	Twisted pair	—> —	J2-17	RXC GND
J1-3 J1-2	DCD/LL/ GND	Twisted pair	<— —	J2-18 J2-07	LTST GND
J1-39 Not used	RXC/TXCE	Twisted pair	<— —	J2-24	TXCE GND
J1-35	Shield		—	J3-01	Shield_GND
J1-45 Not used	RXD/TXD	Twisted pair	<— —	J3-02	TXD GND

Table 39 4-Port RS-232 DCE Cable Pinout (continued)

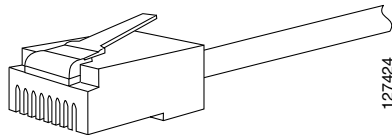
68-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-14	TXD/RXD Not used	Twisted pair	—> —	J3-03	RXD GND
J1-11 J1-44	CTS/RTS DSR/DTR	Twisted pair	<— <—	J3-04 J3-20	RTS DTR
J1-48 J1-15	RTS/CTS DTR/DSR	Twisted pair	—> —>	J3-05 J3-06	CTS DSR
J1-49 J1-43	LL/DCD GND	Twisted pair	—> —	J3-08 J3-07	DCD GND
J1-47	NIL/TXC Not used	Twisted pair	—> —	J3-15	TXC GND
J1-13	TXCE/RXC Not used	Twisted pair	—> —	J3-17	RXC GND
J1-10 J1-36	DCD/LL/ GND	Twisted pair	<— —	J3-18 J3-07	LTST GND
J1-46	RXC/TXCE Not used	Twisted pair	<— —	J3-24	TXCE GND
J1-30	Shield		—	J4-01	Shield_GND
J1-52	RXD/TXD Not used	Twisted pair	<— —	J4-02	TXD GND
J1-21	TXD/RXD Not used	Twisted pair	—> —	J4-03	RXD GND
J1-18 J1-51	CTS/RTS DSR/DTR	Twisted pair	<— <—	J4-04 J4-20	RTS DTR
J1-55 J1-22	RTS/CTS DTR/DSR	Twisted pair	—> —>	J4-05 J4-06	CTS DSR
J1-56 J1-50	LL/DCD GND	Twisted pair	—> —	J4-08 J4-07	DCD GND
J1-54	NIL/TXC Not used	Twisted pair	—> —	J4-15	TXC GND
J1-20	TXCE/RXC Not used	Twisted pair	—> —	J4-17	RXC GND
J1-17 J1-31	DCD/LL/ GND	Twisted pair	<— —	J4-18 J4-07	LTST GND
J1-53	RXC/TXCE Not used	Twisted pair	<— —	J4-24	TXCE GND
J1-64	Shield		—	J5-01	Shield_GND
J1-59	RXD/TXD Not used	Twisted pair	<— —	J5-02	TXD GND

Table 39 4-Port RS-232 DCE Cable Pinout (continued)

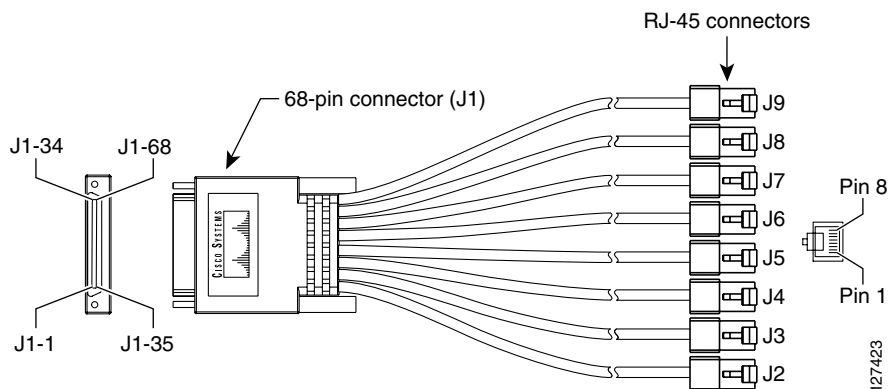
68-Pin	Signal Name	Note	Direction	DB-25 Pin	Signal Name
J1-28	TXD/RXD Not used	Twisted pair	—> —	J5-03	RXD GND
J1-25 J1-58	CTS/RTS DSR/DTR	Twisted pair	<— <—	J5-04 J5-20	RTS DTR
J1-62 J1-29	RTS/CTS DTR/DSR	Twisted pair	—> —>	J5-05 J5-06	CTS DSR
J1-63 J1-57	LL/DCD GND	Twisted pair	—> —	J5-08 J5-07	DCD GND
J1-61	NIL/TXC Not used	Twisted pair	—> —	J5-15	TXC GND
J1-27	TXCE/RXC Not used	Twisted pair	—> —	J5-17	RXC GND
J1-24 J1-65	DCD/LL/ GND	Twisted pair	<— —	J5-18 J5-07	LTST GND
J1-60	RXC/TXCE Not used	Twisted pair	<— —	J5-24	TXCE GND

8-Port RS-232 Cable Assembly

The 8-port RS-232 cable was designed for use with the Cisco 8-port and 16-port RS-232 asynchronous HWICs (the Cisco HWIC-8A and Cisco HWIC-16A). The router end of the cable consists of a standard 68-pin 2-row D-shell connector. The network end of the cable provides eight standard 8-pin RJ-45 connectors. These cables are available in DTE format only. See [Figure 26](#).

Figure 26 8-Port RS-232 Cable Connector, Network End

[Figure 27](#) shows the 8-port RS-232 cable assembly. [Table 40](#) lists the DTE pinout for the 8-port RS-232 cable. Arrows indicate signal direction: —> means DTE to DCE and <— means DCE to DTE.

Figure 27 8-Port RS-232 Cable Assembly

Table 40 8-Port RS-232 DTE Cable Pinout

68-Pin	Signal Name	Note	RJ-45 Pin
J1-34 J1-68	GND	Local mode connection	—
J1-67 J1-65	GND	Local mode connection	—
J1-4 J1-3	CTS/RTS DSR/DTR	Twisted pair	J2-01 J2-02
J1-38 J1-36	RXD/TXD RXD GND	Twisted pair	J2-03 J2-04
J1-36 J1-7	TXD GND TXD/RXD	Twisted pair	J2-05 J2-06
J1-8 J1-41	DTR/DSR RTS/CTS	Twisted pair	J2-07 J2-08
J1-37 J1-5	CTS/RTS DSR/DTR	Twisted pair	J3-01 J3-02
J1-39 J1-2	RXD/TXD RXD GND	Twisted pair	J3-03 J3-04
J1-2 J1-6	TXD GND TXD/RXD	Twisted pair	J3-05 J3-06
J1-40 J1-42	DTR/DSR RTS/CTS	Twisted pair	J3-07 J3-08
J1-11 J1-10	CTS/RTS DSR/DTR	Twisted pair	J4-01 J4-02
J1-45 J1-43	RXD/TXD RXD GND	Twisted pair	J4-03 J4-04
J1-43 J1-14	TXD GND TXD/RXD	Twisted pair	J4-05 J4-06

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Table 40 8-Port RS-232 DTE Cable Pinout (continued)

68-Pin	Signal Name	Note	RJ-45 Pin
J1-15 J1-48	DTR/DSR RTS/CTS	Twisted pair	J4-07 J4-08
J1-44 J1-12	CTS/RTS DSR/DTR	Twisted pair	J5-01 J5-02
J1-46 J1-9	RXD/TXD RXD GND	Twisted pair	J5-03 J5-04
J1-9 J1-13	TXD GND TXD/RXD	Twisted pair	J5-05 J5-06
J1-47 J1-49	DTR/DSR RTS/CTS	Twisted pair	J5-07 J5-08
J1-18 J1-17	CTS/RTS DSR/DTR	Twisted pair	J6-01 J6-02
J1-52 J1-50	RXD/TXD RXD GND	Twisted pair	J6-03 J6-04
J1-50 J1-21	TXD GND TXD/RXD	Twisted pair	J6-05 J6-06
J1-22 J1-55	DTR/DSR RTS/CTS	Twisted pair	J6-07 J6-08
J1-51 J1-19	CTS/RTS DSR/DTR	Twisted pair	J7-01 J7-02
J1-53 J1-16	RXD/TXD RXD GND	Twisted pair	J7-03 J7-04
J1-16 J1-20	TXD GND TXD/RXD	Twisted pair	J7-05 J7-06
J1-54 J1-56	DTR/DSR RTS/CTS	Twisted pair	J7-07 J7-08
J1-25 J1-24	CTS/RTS DSR/DTR	Twisted pair	J8-01 J8-02
J1-59 J1-57	RXD/TXD RXD GND	Twisted pair	J8-03 J8-04
J1-57 J1-28	TXD GND TXD/RXD	Twisted pair	J8-05 J8-06
J1-29 J1-62	DTR/DSR RTS/CTS	Twisted pair	J8-07 J8-08
J1-58 J1-26	CTS/RTS DSR/DTR	Twisted pair	J9-01 J9-02

Table 40 8-Port RS-232 DTE Cable Pinout (continued)

68-Pin	Signal Name	Note	RJ-45 Pin
J1-60 J1-23	RXD/TXD RXD GND	Twisted pair	J9-03 J9-04
J1-23 J1-27	TXD GND TXD/RXD	Twisted pair	J9-05 J9-06
J1-61 J1-63	DTR/DSR RTS/CTS	Twisted pair	J9-07 J9-08

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