



## Telos Modular Cable Guide

This document is intended to be a reference tool that covers various modular telephone- style connectors used in Telos products. This document covers the modular cables used with Zephyr, Zephyr Xstream, Zephyr Xport, TWOx12, and Series 2101.



### **IMPORTANT!**

*Be very careful to label wiring using RJ- style connectors. In some cases, they have power on them, and there is a risk of applying this power to something that does not expect it. For this reason we suggest that you use different colored cables (or connector boots) on the ISDN S interface cables versus your Desktop Director & Ethernet cables.*

### ***Pin Numbering on RJ style jacks***

It is recommended practice to install modular wall jacks such that the pins are at the top of the cavity when viewed. This helps to protect the contacts from water when baseboards are mopped, and from dust. When the jack is oriented in this position (i.e. looking into the jack with the contact pins at the top), the pins are sequentially numbered left to right. Note that some jacks may not have all pin positions populated, however the numbering would still begin with the first position. For instance, the "RJ- 11 " style jack is a 6- position 4- pin jack. Therefore, it has pins 2,3,4, & 5. Pins 1 & 6 may be absent.

Note that all but a few of the following cables use 8- position 8- pin miniature modular connectors (RJ- 45 style) on both ends. In today's rapidly changing facilities, it is worth considering using a universal system for most of these cables. This strategy allows the most flexibility since the same wiring configuration could be reused for a different purpose without doing anything but documenting the change!

Therefore, we recommend that you use the TIA/EIA- 568- A T568A cable specification. This specifies a Category 5 (Cat. 5) cable with 4 pairs wired straight through (both ends wired identically) as follows:

<i><b>PIN</b></i>	<i><b>COLOR</b></i>
1	White/Green
2	Green
3	White/Orange
4	Blue
5	White/Blue
6	Orange
7	White/Brown
8	Brown

*TIA/EIA-568-A T568A color codes. Cat 5 cable is used and both ends are identical. The color conductor of each pair may or may not have a white stripe. The other half of the pair may be either white or white with a colored stripe. We will use this color coding in our examples.*

Note that TIA/EIA- 568- A T568B is electrically equivalent, however the Green and Orange pairs are reversed as follows:

<i><b>PIN</b></i>	<i><b>COLOR</b></i>
1	White/Orange
2	Orange
3	White/Green
4	Blue
5	White/Blue
6	Green
7	White/Brown
8	Brown

*TIA/EIA-568-A T568B color codes. Note that this is electrically identical to TIA/EIA-568-A T568A, however the green and orange pairs are switched.*



**Hot Tip!**

*While TIA/EIA- 568- A T568A and TIA/EIA- 568- A T568B are electrically equivalent, care must be taken that both ends of a given cable utilize the same system. For that reason, we strongly recommend choosing one of the two standards and using It throughout your facility.*

**Standard 10Base-T Ethernet Cable Pin-out**

Traditionally Ethernet 10Base- T cables use the Green and Orange pair of the TIA/EIA- 568- A T568A or TIA/EIA- 568- A T568B wiring configuration. The full 4- pair TIA/EIA- 568- A T568A or T568B configurations will work just fine (see above).

**Crossover 10Base-T Ethernet Cable Pin-out**

When connecting a 10Base- T device (such as a computer or Telos gear) to a hub, a “straight through” cable is used (see above). Note that this implies that functionality of the jacks on the hub are different from those on the computer, since the “output” of one must correspond to the “input” of the other.

Therefore, the standard cable will not work if you wish to connect a computer directly to the Telos gear. This can be accomplished with the special cable below.

<i><b>10Base- T Crossover Cable</b></i>		
<i><b>PIN</b></i>	<i><b>COLOR</b></i>	
1	White/Green	3
2	Green	6
3	White/Orange	1
4	Blue	Not Used
5	White/Blue	Not Used
6	Orange	2
7	White/Brown	Not Used
8	Brown	Not Used


*This special Ethernet "crossover" cable is used when two computers (or a computer and another device such as a Zephyr Xstream) need to be connected without using an Ethernet hub.*

**ISDN U and POTS (analog) telephone interface Cable Pin-out**

The U interface, specified in the USA & Canada, is specified between the Telco and the user-provided NT1. The U interface is a robust interface meant for use on existing Telco copper

plant. It is a single copper pair. It is provided on the center pair of either a 6- position 4- pin miniature modular jacks (RJ- 11 style) or a 8- position 8- pin miniature jack (RJ- 45 style). The standards specify the compatibility between the 6- position plug and 8- position jack so either can be used. For this reason, we prefer the 6- position connectors on cables, as they will work with either type of receptacle.

The same cable is used for plain old telephone service connections (POTS) as used with the Xport or many other Telos equipment.

	<p><b>HOT TIP</b></p> <p><i>We've seen some places in the world that uses the 6- position/4- pin miniature modular connector for POTS, but use a different pin out. Telos uses the <b>center pins</b> for both POTS and ISDN U interface connections.</i></p>
---	---

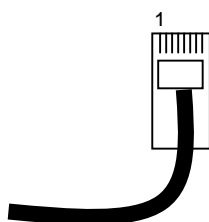
### ISDN U or POTS interface cable (typical)

<i>PIN</i>	<i>FUNCTION</i>	<i>PIN</i>
1	Not Present	6
2	None	5
3	Line (R)	4
4	Line (T)	3
5	None	2
6	Not Present	1

*Typical ISDN U interface cable. This is identical to a POTS telephone cord. Polarity should not matter, so a straight through cable is also acceptable.*

### ISDN S Interface Cable Pin-out

The S interface is standardized around the world and in most countries is the only designated ISDN termination for end users. It specifies an 8- conductor 8- position miniature modular (RJ- 45 style) plug with 4 pairs as shown below (Identical to TIA/EIA- 568- A T568A). Unshielded twisted pair category 3 (or higher) cable should be used. We recommend category 5 cable. The cable details are shown below:



*BRI S Interface cable.*

*Note: Pin 1 is to the left when viewed as above (with pins facing you and at the top).*

## ISDN S interface cable (Worldwide)

<i>PIN</i>	<i>COLOR</i>	<i>DESCRIPTION</i>	<i>PIN</i>
1*	White/Green	PS 3 Power +/ground (Optional)	1
2*	Green	PS 3 Power – (Optional)	2
3	White/Orange	Xmt (TE to NT1) to Network +	3
4	Blue	Rcv (NT1 to TE) from Network +	4
5	White/Blue	Rcv (NT1 to TE) from Network -	5
6	Orange	Xmt (TE to NT1) to Network -	6
7@	White/Brown	PS 2 Power 48 VDC – (Optional)	7
8 @	Brown	PS 2 Power +/ground (Optional)	8
*	Not used in Telos Products		
@	Optional, not required if remote PS2 power is not needed		

*ISDN S interface cable wiring diagram. Both ends are wired identically.*



### **HOT TIP**

*This cable has 4 twisted pairs wired “straight through” just like many cables normally used for Ethernet 10Base-T. The wiring configuration is the same as TIA/EIA- 568-A T568A (T568B is electrically equivalent).*

## Desktop Director™ to 2101 Studio Interface or TWOx12 Cable Pin-out

The Desktop Director interface is electrically very similar to the ISDN S interface “extended” configuration. Wiring practices and termination resistor rules for the S interface apply. In this case, we are using the optional PS2 power convention, so the pair on pins 7 & 8 is needed. This cable uses 8- position 8- pin miniature modular (RJ- 45 style) plugs. The wiring uses 3 of the 4 pairs described in TIA- 568A/B.

<b>PIN</b>	<b>COLOUR</b>	<b>DESCRIPTION</b>
1	White/Green	Not used
2	Green	Not used
3	White/Orange	Xmt (TE to NT1) to Network +
4	Blue	Rcv (NT1 to TE) from Network +
5	White/Blue	Rcv (NT1 to TE) from Network -
6	Orange	Xmt (TE to NT1) to Network -
7	White/Brown	PS 2 Power - 48 VDC
8	Brown	PS 2 Power ground (+)

*Desktop Director™ cable wiring diagram. TIA/EIA-568-A T 568A or T568B standard Category 5 cables may be used. Both ends are wired identically.*

## Series 2101 T-Link Cable Pin-out

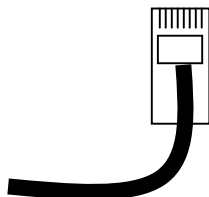
This connection, used in the Series 2101 system, requires 2 pairs. Unshielded twisted pair category 3 (or higher) cable should be used. We recommend category 5 cable. See the next section to determine if this cable, or the T- Link crossover cable, should be used.

This cable uses 8- conductor 8- position miniature modular (RJ- 45 style) plugs with 4 pairs as shown below (Identical to TIA/EIA- 568- A T568A). The cable details are shown below:

<i><b>PIN</b></i>	<i><b>COLOR</b></i>
1	White/Green
2	Green
3*	White/Orange
4	Blue
5	White/Blue
6*	Orange
7*	White/Brown
8*	Brown
* = Not required	

The T-Link connection can be made using a standard EIA/TIA-568-A T568A category 5 cable. Optionally, the cable can be wired with only two pairs as indicated above.

## T-Link interface cable



T-Link Interface cable.

Note: Pin 1 is to the left when viewed as above (with pins facing you and at the top).

## Crossover T-Link Cable

This cable is *only used* with the T-Link cards provided with the earliest Telos Series 2101 Hubs. If your Hub has T-Link cards that look like the illustration to the right, you will need to use this cable between the 2101 Hub and the Studio Interface.

This special cable wired as shown below. You should use unshielded twisted pair cable rated Category 3 (Cat. 3) or higher. We suggest you use Category 5 (Cat. 5) cable.



<i>PIN</i>	<i>COLOR</i>	<i>DIRECTION</i>	<i>PIN</i>
1	White/Green	←	4
2	Green	←	5
3*	White/Orange		3*
4	Blue	→	1
5	White/Blue	→	2
6*	Orange		6*
7*	White/Brown		7*
8*	Brown		8*
* Not used on the T- Link Interface; may be omitted			

*T-Link cable wiring diagram for use with 2101 T-Link card version A. Pins 1/2 are swapped with 4/5 as shown. Note that this is a special cable and both ends are not wired identically. Note that the T-Link interface does not require all 8 conductors.*

**HOT TIP!**

*This cable must be fabricated on site and is not included with the Series 2101. Note that this is **not** the same as an “Ethernet Crossover cable”.*



**Series 2101 T1 / E1 Telco trunk cable Pin-out**

The Telco Trunk Connection requires two pairs of Category 3 (Cat. 3) or greater cable wired straight through. We recommend Category 5 cable. An 8- position/8- pin miniature modular (RJ- 45 style) jack is required at the Hub end.

If, as is usually the case, the NCTE (Network Channel Terminating Equipment or CSU) also uses this jack, all that is needed is a 2 pair twisted pair cable wired to the TIA/EIA- 568- A T568A or T568B standard.

<b><i>PIN</i></b>	<b><i>COLOR</i></b>	<b><i>DESCRIPTION</i></b>
1	White/Green	Receive from Network (Ring 1)
2	Green	Receive from Network (Tip 1)
3	White/Orange	Not Used
4	Blue	Transmit to Network (Ring)
5	White/Blue	Transmit to Network (Tip)
6	Orange	Not Used
7	White/Brown	Not Used
8	Brown	Not Used

*Telco Interface pin functions and wiring diagram. Pin 1 is the top pin of the jack.*

Talos:D:/Manuals/apnotes&... Mod cable TSB.doc