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Chapter 5
Implementation of PCMCIA Cards

Aim of this Chapter

This chapter provides an overview of the hardware implementation for PCMCIA communication cards on Premium/Atrium PLCs.

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
5.1	At a Glance	104
5.2	Description	106
5.3	Connecting the PCMCIA Card Reception Channel	108
5.4	Connection of the TSX SCP 111 card	117
5.5	Connection of the TSX SCP 112 Card	120
5.6	Connection of the TSX SCP 114 Card	134
5.7	Summary of Connection Devices	143
5.8	Precautions when Connecting PCMCIA Cards	144
5.9	Consumption of PCMCIA Cards	145

Section 5.1
At a Glance

At a Glance

General

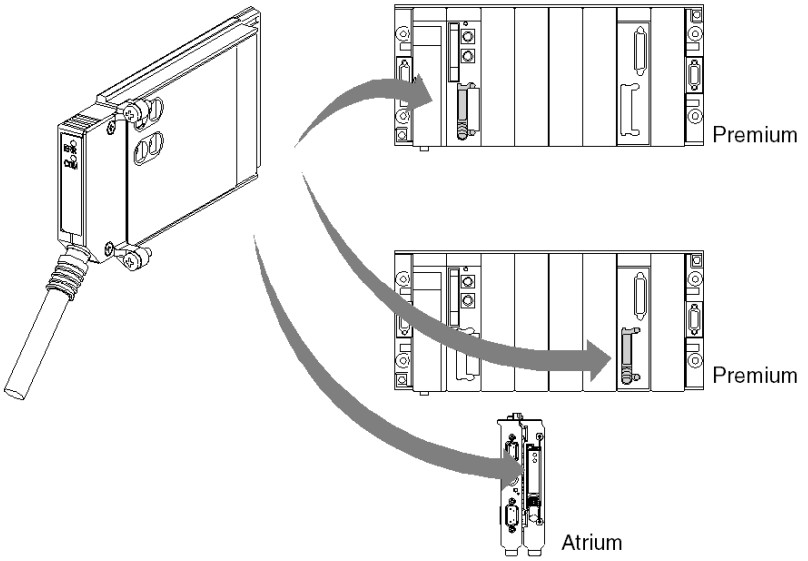
Premium/Atrium PLC stations connect to communication networks, buses and links through PCMCIA communication cards.

The card to be connected is a metal device whose dimensions comply with PCMCIA extended type III.

PCMCIA cards are installed in the host slot of the processor and/or **TSX SCY 21601** module in PLCs from the Premium family.

PCMCIA cards can also be used in devices which have slots for type III cards, such as **FT 2100** terminals or PC-compatible third-party devices, for example.

Illustration:



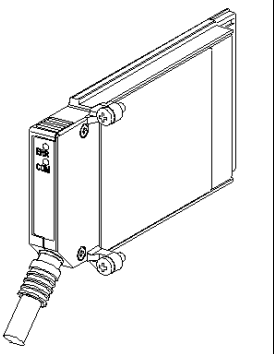
NOTE: It is prohibited to connect PCMCIA cards when the power is switched on.

PCMCIA cards are installed, operated and maintained using Control Expert programming and operation software for all PLCs in the Premium family.

TSX SCP 11XX Cards

Series link PCMCIA cards.

Each **TSX SCP 111**, **112**, **114** PCMCIA card supports a different physical layer. This family comprises three products:

Product Reference	Physical Layer	Illustration
TSX SCP 111	RS 232 link	
TSX SCP 112	Current loop link (20 mA)	
TSX SCP 114	RS 485 link (RS 422 compatible)	

All three cards, **TSX SCP 111**, **112** and **114**, support the following communication protocols:

- Modbus protocol
- Uni-Telway protocol
- Character Mode asynchronous link

Section 5.2
Description

Description

General

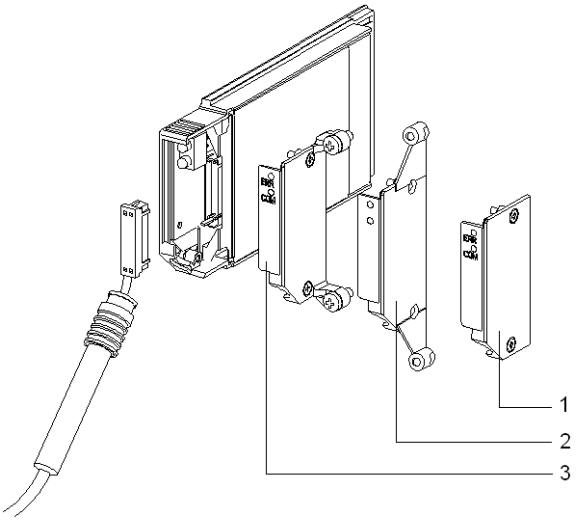
PCMCIA type III (extended) communication cards are built into a metal case with the following dimensions:

- length: 85.5 mm
- width: 51 mm
- height: 10 mm

The front of the card is designed to display communication status and provides the physical connection to the network.

Mechanical Configuration

The mechanical configuration of the card must be adapted by mounting a removable cover, depending on the type of installation desired:

Type of Installation	Configuration	Illustration
Installation on a Premium type processor or on a **TSX SCY 21601** communication module	Removable cover with wings. Screws are provided to fix it to the host module (marked **3** on illustration).	
Installation on an Atrium type processor	Removable cover with wings. Screws are provided to fix it to the Atrium processor (marked **2** on illustration).	
Installation onto a PC compatible device	Removable cover (marked **1** on illustration)	

NOTE: The covers with wings, mounted on PCMCIA cards, prevent any accidental removal when switched on and guarantee that the card remains in good working order.
The two covers **1** and **3** are provided with the PCMCIA card. Cover **2** is provided with the Atrium processor.

Connection to the network is achieved by connecting the link cable to the front of the card. A guidance system is used to prevent anything being mounted incorrectly.

The product reference label informs the user of the type of physical layer supported by the card.

Section 5.3
Connecting the PCMCIA Card Reception Channel

Aim of this Section

This section describes the installation of PCMCIA cards in the reception channel of the **TSX SCY 21601** module.

What Is in This Section?

This section contains the following topics:

Topic	Page
Precautions to be Taken when Connecting PCMCIA Card	109
Connection of PCMCIA Cards	110
Product References for PCMCIA Cards and Installation	111
Mounting Cards and Cables	112
PCMCIA Card Operation Display	115
Visual Diagnostics of PCMCIA Cards	116

Precautions to be Taken when Connecting PCMCIA Card

General

⚠ CAUTION
UNEXPECTED EQUIPMENT OPERATION Power off the device before handling the PCMCIA card. **Failure to follow these instructions can result in injury or equipment damage.**

When removing or inserting the card, the unit is not guaranteed to be operational. There is no procedure for a warm start between the PCMCIA card and the **TSX SCY 21601** host device.

In the event that the operating environment does not allow the application to be stopped by switching off the PLC processor, you are recommended to remove the **TSX SCY 21601** module with the PCMCIA card.

The PCMCIA card must be equipped with a PLC version cover and be screwed into the **TSX SCY 21601** host module before the unit is switched on (mechanical configuration *(see page 106)*).

Connection of PCMCIA Cards

General

Connecting PCMCIA cards requires specific cables and connection devices, depending on the type of models.

Series Link Cards

Product references of cables and branch devices to be used with series link PCMCIA cards according to the different protocols:

PCMCIA Card	Uni-Telway	Modbus	Character Mode
TSX SCP 111 (RS 232)	**TSX SCP CD 1030/1100** in point to point mode	**TSX SCP CD 1030/1100** in point to point mode	**TSX SCP CD 1030/1100**
	TSX SCP CC 1030 in multidrop mode via a modem	**TSX SCP CC 1030** in multidrop mode via a modem	
TSX SCP 112 (Current Loop)	**TSX SCP CX 2030**	**TSX SCP CX 2030**	**TSX SCP CX 2030**
TSX SCP 114 (RS 422/RS 485	**TSX SCP CU 4030,** **TSX SCA 64** and **TSX SCA 50**	**TSX SCP CM 4030,** **TSX SCA 64** and **TSX SCA 50**	**TSX SCP CU 4030**, **TSX SCP CM 4030** and **TSX SCP CM 4530**

Product References for PCMCIA Cards and Installation

Installation

Table showing options for installing PCMCIA cards in processor host channels and in the **TSX SCY 21601** module:

Product References	Processor Host Channel	TSX SCY 21601 Host Channel
TSX SCP 111	Yes	Yes
TSX SCP 112	Yes	Yes
TSX SCP 114	Yes	Yes

Application-specific Channels and Network Connections

Table showing the number of application-specific channels or network connections used by PCMCIA cards:

Product References	Number of Application-specific Channels	
	Card in the Processor	Card in the TSX SCY 21601 Module
TSX SCP 111	0	1
TSX SCP 112	0	1
TSX SCP 114	0	1

Maximum Number of Application-specific Channels per Processor Type

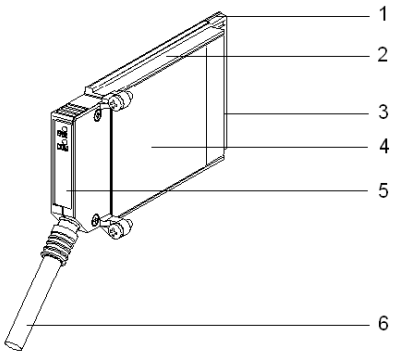
Number of "application-specific" channels supported:

- Premium *(see Premium and Atrium using EcoStruxure™ Control Expert, Processors, racks and power supply modules, Implementation Manual)*
- Atrium *(see Premium and Atrium using EcoStruxure™ Control Expert, Processors, racks and power supply modules, Implementation Manual)*

Mounting Cards and Cables

PCMCIA Card Details

Illustration:

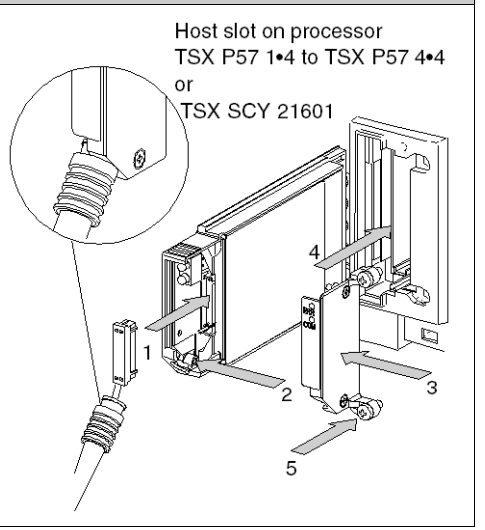


PCMCIA cards are made up of the following elements:

Number	Designation	Comments
1	Equipped card	Receives electronic components
2	Body made of zamac	-
3	PCMCIA connector	Connector with 20 connection points
4	Upper cover	Houses the product reference label that shows the type of PCMCIA card
5	Removable cover	Ensures the card is displayed in its slot. The names of the two LEDs are printed on the front of the removable cover. This cover is also used to fix the PCMCIA card on the processor or on the **TSX SCY 21601** module.
6	Linking cable with ferule	The ferule placed on the end of the PCMCIA card cable side prevents the cable being pinched by the removable cover. This ferule also eliminates the risk of causing a bending radius which can damage the quality of the link.

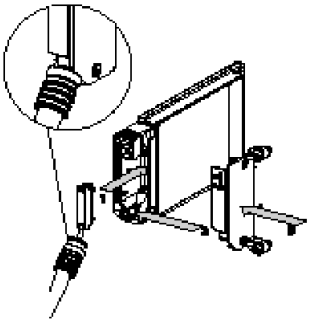
Assembly for TSX P57 1•4 to TSX P57 5•4 Processors

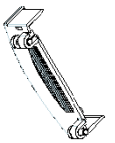
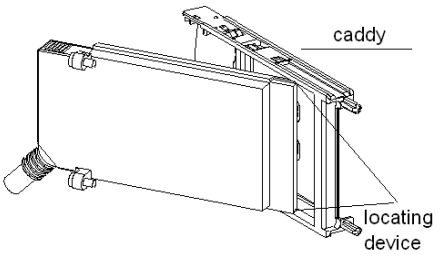
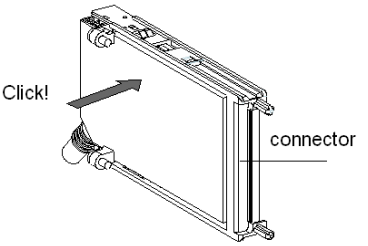
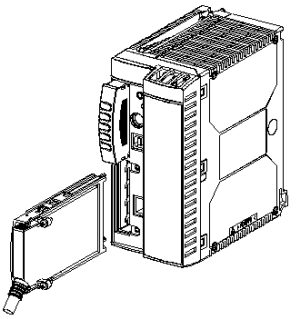
To assemble the transmission card for the processor or the TSX SCY 21601, first remove the cover which is screwed on the device and then follow the instructions below:

Step	Action	Illustration
1	Connect the cable.	
2	Place the appropriate cover on the device, taking care to insert the ferrule in the slot provided in order to fix the cable to the card.	
3	Screw on the cover.	
4	Insert the card in the slot provided in the host device.	
5	Screw in the card to stop it being moved when switched on, and to ensure it functions effectively.	

Assembly for TSX P57 5•4 Processors

To assemble the card in TSX P57 5•4 type processors, follow the instructions below:

Step	Action	Illustration
1	Connect the cable.	
2	Place the appropriate cover on the device, taking care to insert the ferrule in the slot provided in order to fix the cable to the card.	
3	Screw on the cover.	

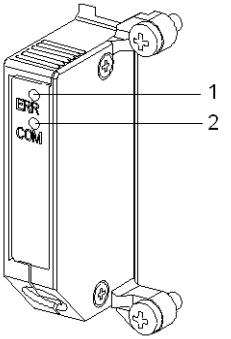
Step	Action	Illustration
4	Remove the plastic cover from the caddy.	
5	Guide the card into the caddy from an oblique angle using the 2 locating devices.	
6	Slide the card into the caddy until it stops. The card is now firmly attached to the caddy.	
7	Insert the assembly (caddy and card) in the slot provided in the host device.	
8	Screw in the card to stop it being moved when switched on, and to ensure it functions effectively.	

PCMCIA Card Operation Display

General

Two diagnostics LEDs are located on the front of the card. They inform the user on how exchanges between the device supporting the PCMCIA card and the related device are functioning.

Illustration

Number	Description	Diagram
1	Error "ERR" LED (normally off) displays errors. This is red.	
2	The "COM" communication LED displays the line activity. This LED is yellow on **TSX SCP 111/112/114** cards.	

Visual Diagnostics of PCMCIA Cards

General

Depending on their state, LEDs of the PCMCIA card indicate the operating mode for communication, as well as the card diagnostics.

TSX SCP 111/112/114 Cards

State of LEDs:

ERR	COM	Meaning	Corrective actions
○	○	Device switched off, no dialog	Check the power supply. Card not operational.
○	▒	Operating normally	-
●	(1)	Serious error	Change the card.
▒	○	Functional fault	Check the configuration and the connection to the communication bus.
▒	▒	Functional fault	Check the configuration.
Key:			
○	Off		
●	On		
▒	Flashing		
(1)	Neutral status		

Section 5.4
Connection of the TSX SCP 111 card

Subject of this Section

This section deals with the hardware installation of **TSX SCP 111** PCMCIA cards.

What Is in This Section?

This section contains the following topics:

Topic	Page
Point to Point Connection in Character Mode (DTE ´ DTE)	118
Uni-Telway, Modbus or Character Mode via Modem	119

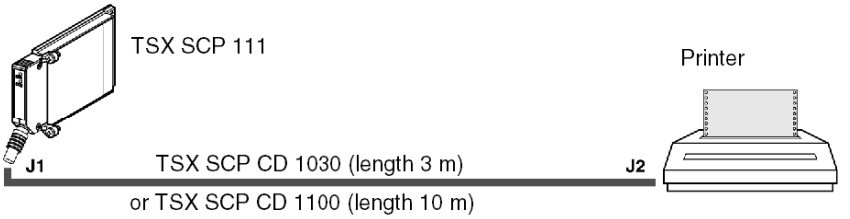
Point to Point Connection in Character Mode (DTE ´ DTE)

General

The **TSX SCP 111** RS 232 physical support card is inserted either in the processor or in the **TSX SCY 21601** module. It is connected to the related device with the **TSX SCP CD 1030/1100** cable.

The devices to be connected are DTE to DTE (Data Terminal Equipment). For example: terminal, printer, etc.

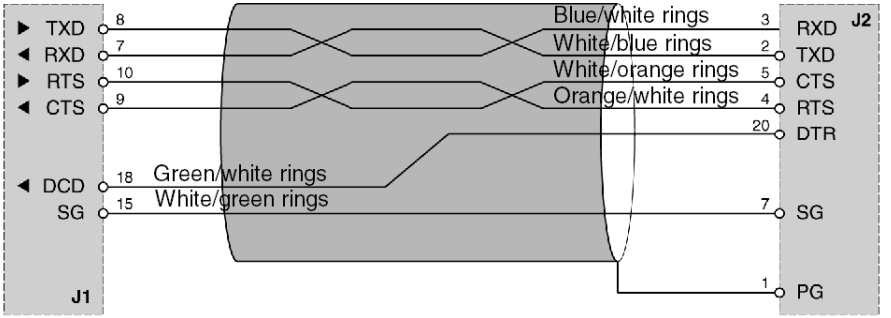
Illustration:



Description of TSX SCP CD 1030 Cable

Illustration:

The PCMCIA 20-pin mini-connector supports the signals:



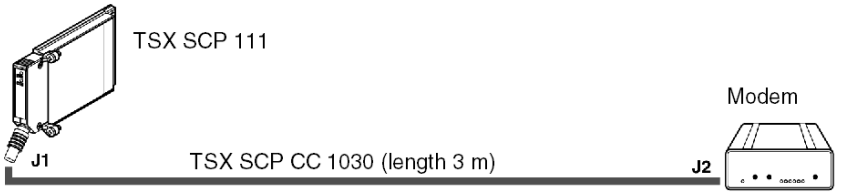
Uni-Telway, Modbus or Character Mode via Modem

General

The PCMCIA card is connected to a Uni-Telway, Modbus or Character Mode bus, via a modem and a telephone link (DTE/DCE type), using a **TSX SCP CC 1030** cable.

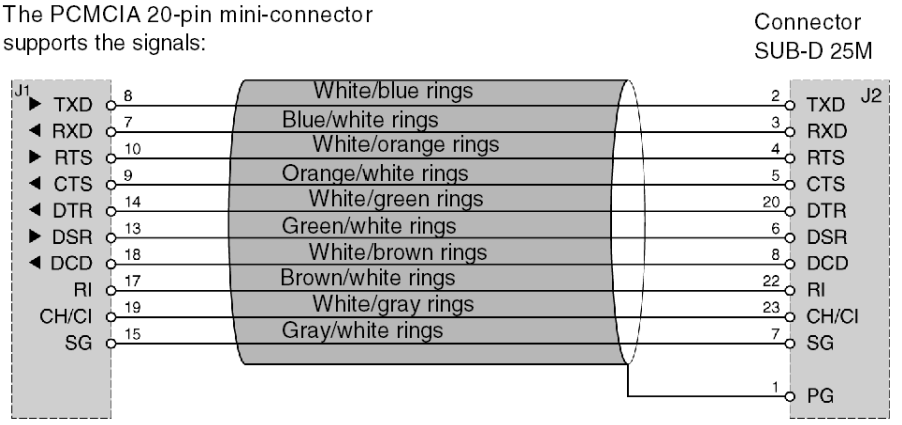
The connected devices are DCE type, for example a modem or a converter.

Illustration:



Description of the TSX SCP CC 1030 cable

Illustration:



Section 5.5
Connection of the TSX SCP 112 Card

Subject of this Section

This section deals with the hardware installation of **TSX SCP 112** PCMCIA cards.

What Is in This Section?

This section contains the following topics:

Topic	Page
Connection of the TSX SCP 112 card	121
Connecting in point to point mode	122
Multidrop Connection	123
Dynamic Performance	124
TSX SCP 112 Connection with April 5000/7000 PLCs	127

Connection of the TSX SCP 112 card

General

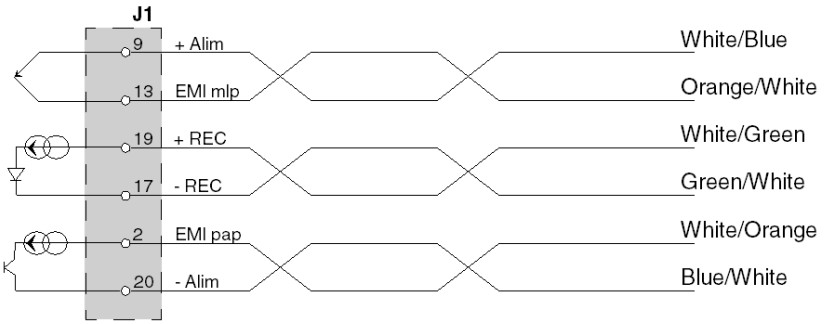
The **PCMCIA TSX SCP 112** card is used to connect a Premium/Atrium PLC station to a loop link with a current of 20 mA in point to point or multidrop.

NOTE: In all cases the power supply is: 24 V ± 20%, external to the TSX SCP 112 card, and must provide the current required for the current loop supply .

The **TSX SCP CX 2030** cable is used for this type of connection (length 3 m).

Description of the TSX SCP CX 2030 cable:

The PCMCIA 20-pin mini-connector supports the signals:



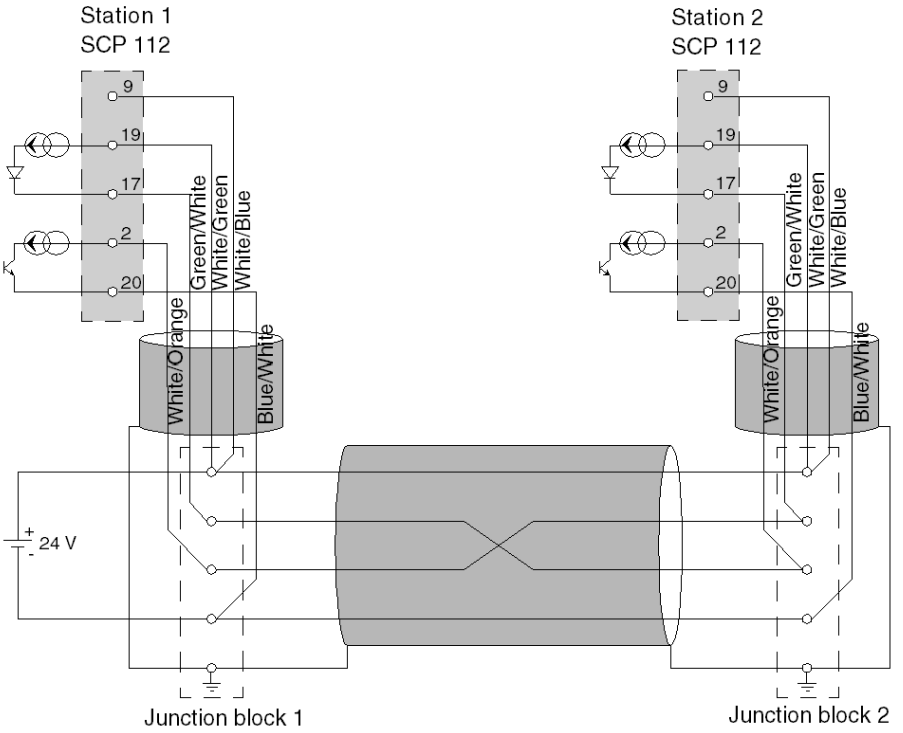
NOTE: A screw terminal block needs to be installed to connect the **TSX SCP 112** card.

Connecting in point to point mode

General

The diagram below describes the wiring principles for **TSX SCP 112** loop current PCMCIA cards in point to point. Point to point is only carried out according to 20 mA mode when idle.

Illustration:



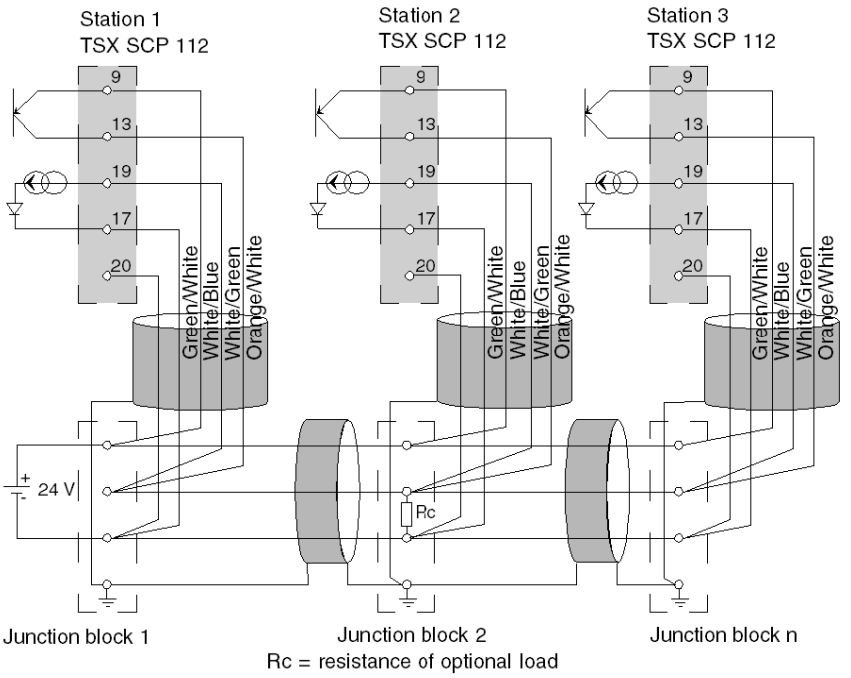
NOTE: Important: the cable shielding must be connected at the shortest point in the junction blocks.

Multidrop Connection

General

Multidrop is only carried out in 0 mA idle mode. The send cable and receive cable are set in parallel. The master is set by the software.

Example of connection of n TSX SCP 112 cards:



NOTE: The cable shielding must be connected at the shortest point in the junction blocks.

Dynamic Performance

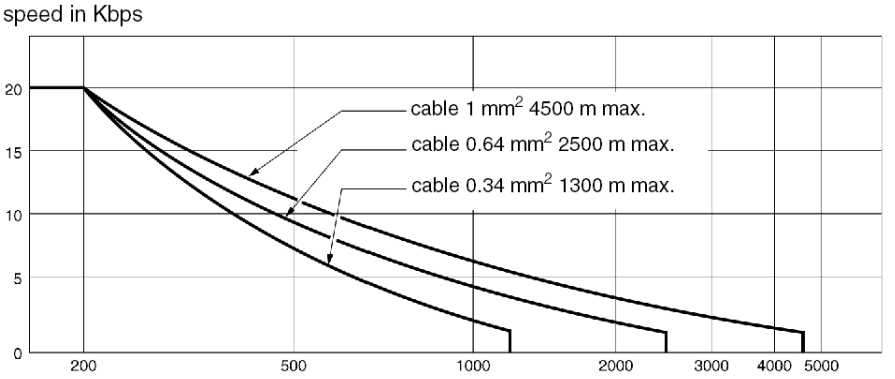
General

The flow of a current loop link is limited by the cross-section and the length or the cable used.

The user should refer to the two charts below to evaluate the performance which can be obtained using this application.

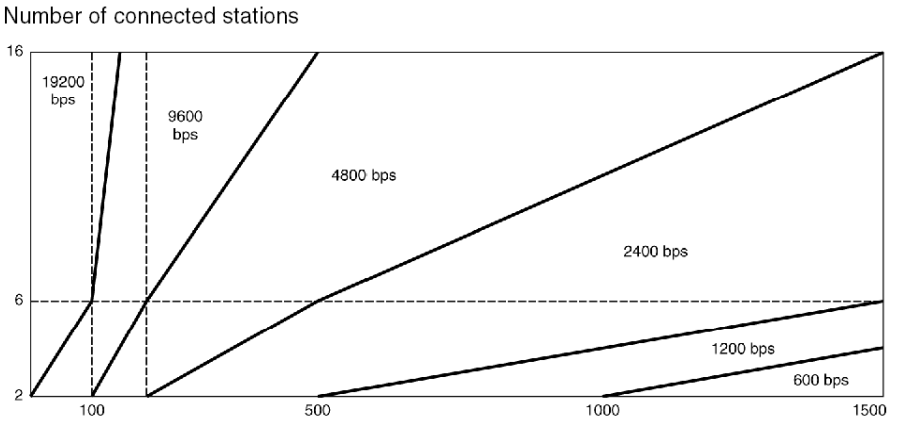
Point to Point

These curves are given for a shielded two pair cable (send through one pair, reception through the other) while observing all the precautions of use.



Multidrop

The chart below is given for a shielded cable with a conductor cross-section of 0.34 mm^2. The connection is made according to the parallel multidrop diagram below. Using conductors with a larger cross-section improves the quality of the signals transmitted:



Multidrop link performance is optimized when there are more connected stations. The line is busier, which improves the quality of the transmitted signal.

When the connection is made according to the diagram above *(see page 123)*, the number of stations can be increased artificially (to a maximum of 16 stations) by loading the line at one of its ends.

This can be carried out by incorporating a load resistance.

This load resistance can be connected to any junction block providing it is between pins 17 and 19 of cards **TSX SCP 112**.

The value of Lr resistance simulating the load of "N" stations is determined by the formula:

$$Rc = \frac{U}{N \times 20}$$

R in KΩ
U = external supply voltage
N = station number to be simulated

Example:

An installation is physically made up of 6 stations connected in multidrop with an external 24 V supply.

The performance of the line is that of 10 stations, simulating the load of 4 additional stations by a resistance:

$$Rc = \frac{24}{4 \times 20} = 0,3K\Omega$$

NOTE: The load resistance must not have an inductive effect or there is a risk that it will not operate.
Use a thick layer of resistance.

TSX SCP 112 Connection with April 5000/7000 PLCs

General

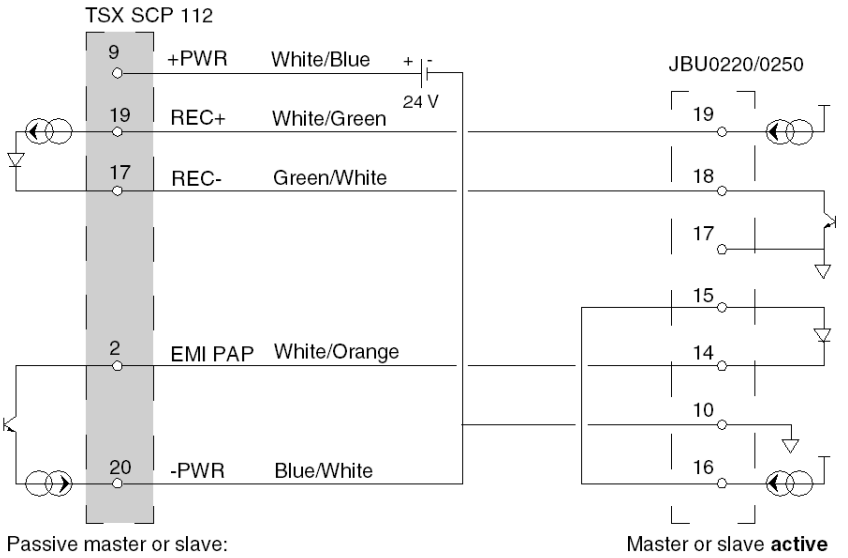
PCMCIA card **TSX SCP 112** 20 mA current loop is used to connect April communication modules **JBU0220** and **JBU0250**. The **multidrop connection** of PCMCIA card **TSX SCP 112** to modules **JBU0220** and **JBU0250** is carried out in **series mode**. To connect April modules refer to reference manual TEM60000F.

NOTE: Important: You must configure card **TSX SCP 112** in **point to point mode** in the Unity Pro configuration screen, for both the point to point or the multidrop series.

NOTE: The current loop authorizes a current of 20 mA when idle, in point to point as well as in multidrop mode.
If a slave is switched off the sender of this slave become active and the line is available.
If the loop supply is offset on one of the slaves, switching this slave off will cause communication to be interrupted.

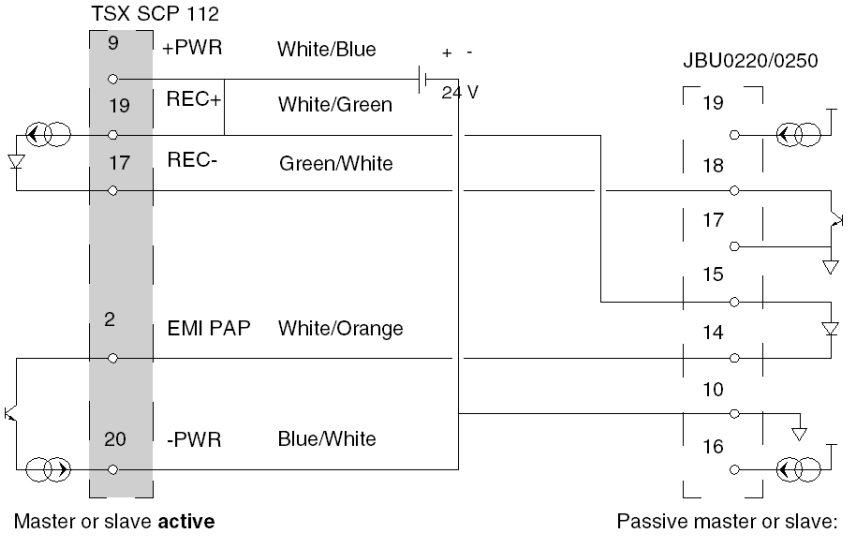
Point to Point Link: Module JBU0220 or Active JBU0250

Illustration:



Point to Point Link: Active TSX SCP 112 Card

Illustration:



Mixed Terminal Links

Illustration:

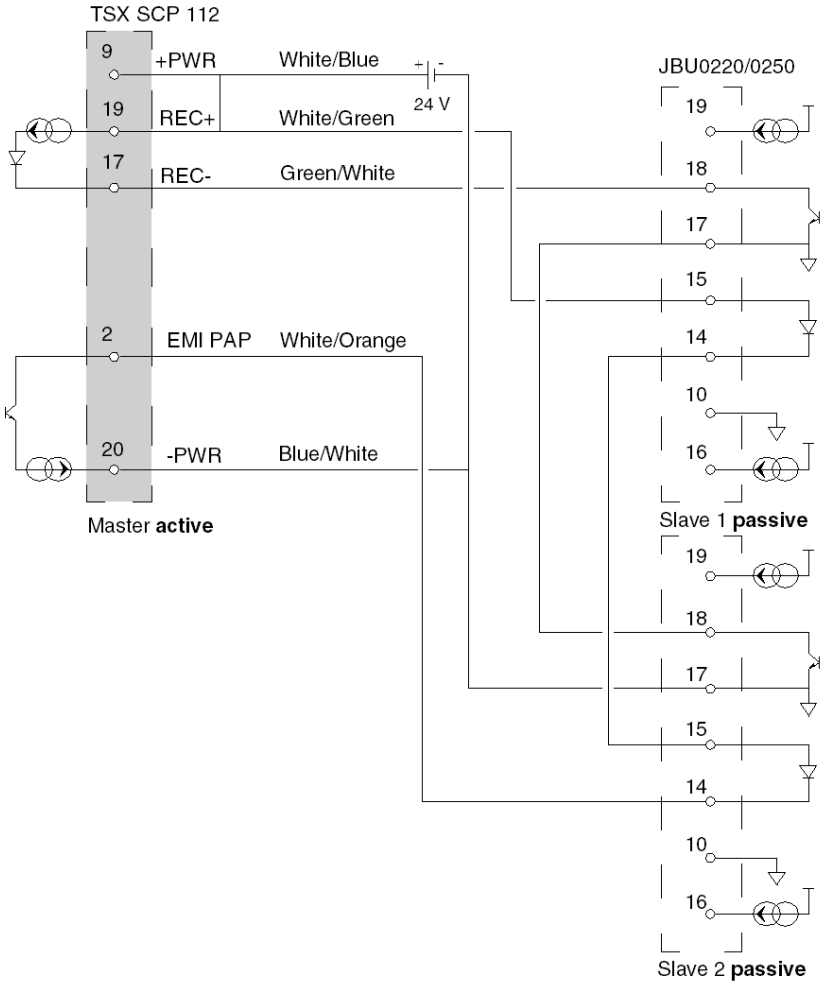


Multidrop Type Link

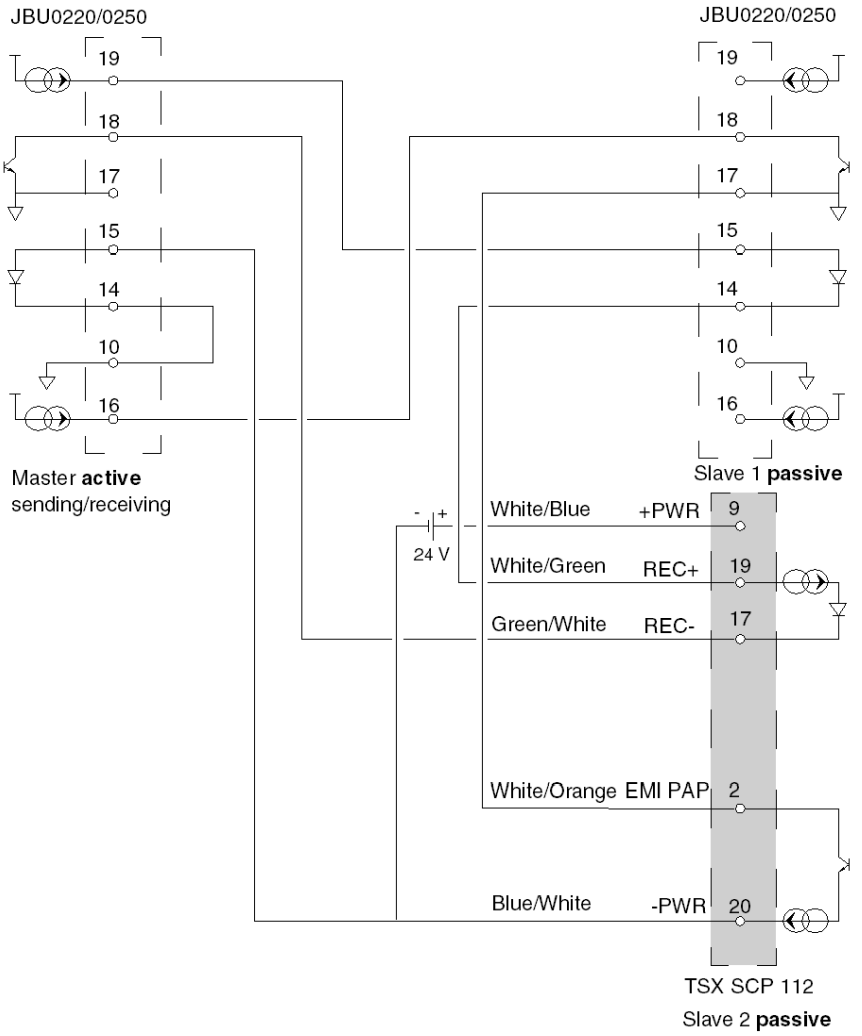
The following examples describe the different wiring possibilities for card **TSX SCP 112** with modules **JBU0220/0250**.

NOTE: The 24 V supply of each TSX SCP 112 present on the loop must be connected, whether passively or actively, otherwise the link will not function.
These supplies must not have any shared (potential) point between them. Do not connect the -24 V supply to the earth.

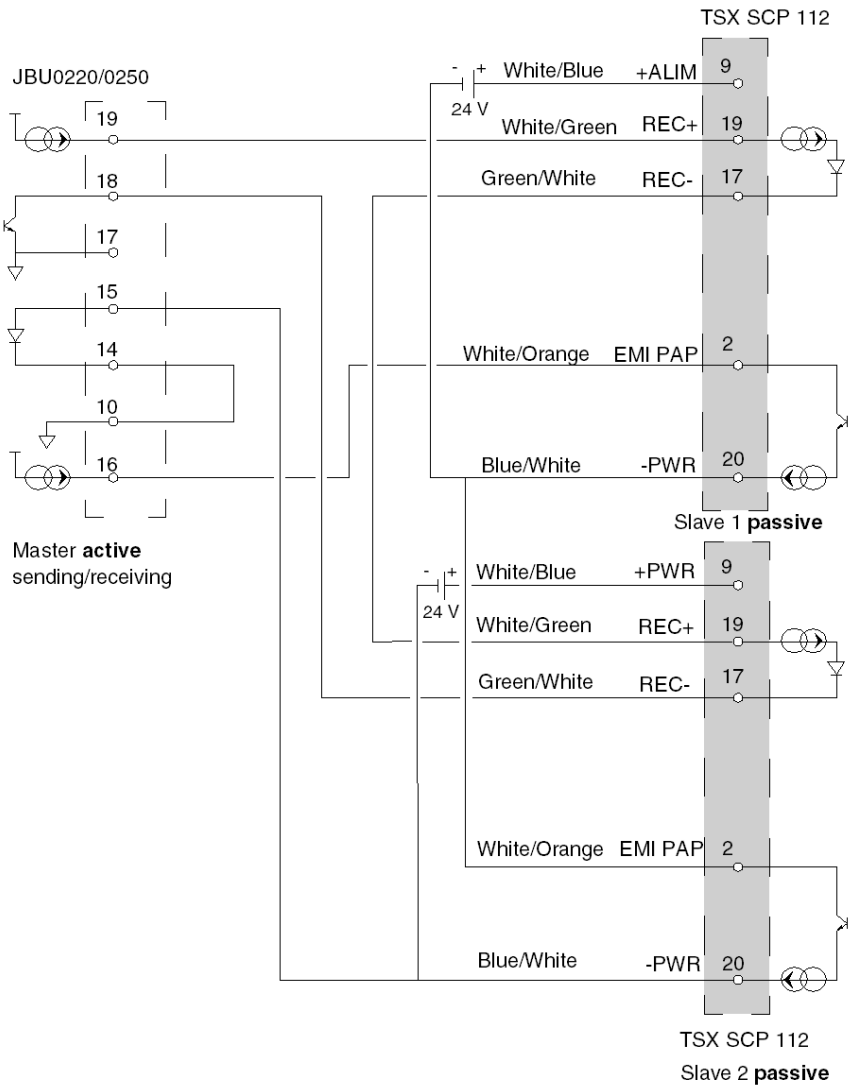
Example 1: active master TSX SCP 112 multidrop



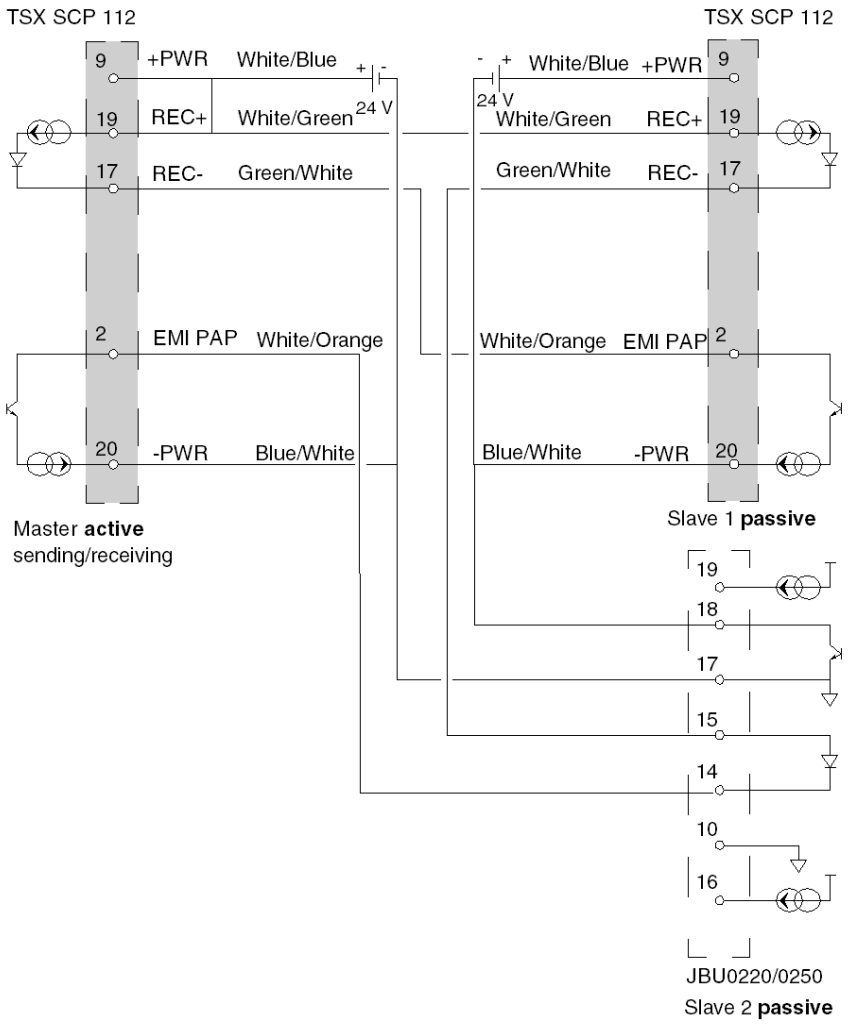
Example 2: active send/receive JBU0220/0250 multidrop



Example 3: multidrop master JBU0220/0250 active send/receive - slaves TSX SCP 112



Example 4: multidrop active master TSX SCP 112



Section 5.6
Connection of the TSX SCP 114 Card

Subject of this Section

This section deals with the hardware installation of **TSX SCP 114** PCMCIA cards.

What Is in This Section?

This section contains the following topics:

Topic	Page
Connection to the Uni-Telway Network	135
Connecting to the Modbus Bus	138
Multi-protocol asynchronous link connection RS 422	140
Connecting to Modbus Full-Duplex in Premium Hot Standby Configuration	142

Connection to the Uni-Telway Network

General

The **TSX SCP 114** RS 485 physical support card, connects to the UNI-TELWAY network by the **TSX SCP CU 4030** cable via the **TSX SCA 50** connection device, or by the **TSX SCP CU 4530** cable (provided with SUB-D 15 pin connector) via device **TSX SCA 62**. The card is inserted in the processor or in the module **TSX SCY 21601**.

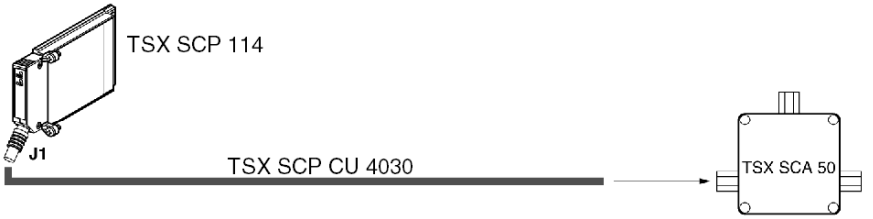
The **TSX SCA 50** is passive and made up of a printed circuit board fitted with 3 sets of screw terminal blocks. It is used to connect a station by branching on the main section of a Uni-Telway bus.

It ensures continuing operation of electrical signals, shielding and end of line adaptation function.

Type of Connection

The cable of the PCMCIA card has bare wires at its ends which the user must connect to the terminal located inside the device.

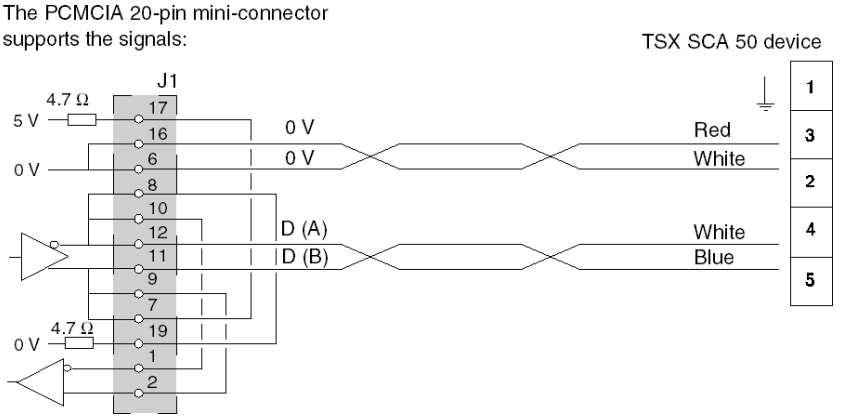
Illustration:



NOTE: The branching device configures the wiring system of the card and a branching type of connection system.

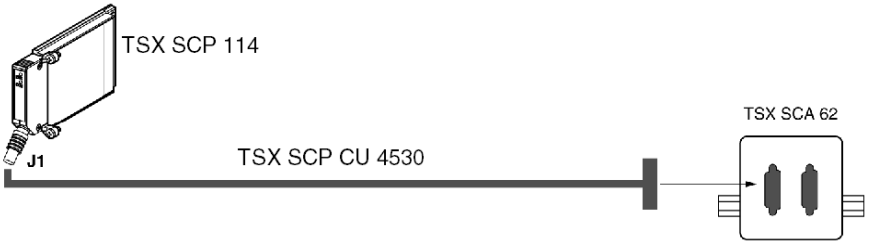
Description of TSX SCP CU 4030 Cable

Illustration:



Connection via a TSX SCA 62 Device

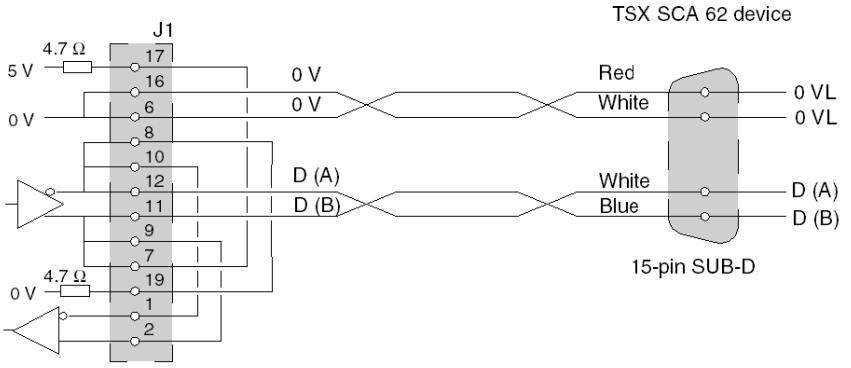
Illustration:



Description of TSX SCP CU 4530 Cable

Illustration:

The PCMCIA 20-pin mini-connector supports the signals:



Connecting to the Modbus Bus

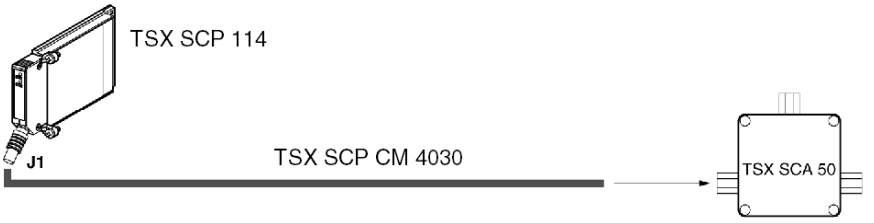
General Points

The **TSX SCP 114** PCMCIA card is connected to the Modbus bus using the **TSX SCP CM 4030** link cable. This cable is connected to the branching device **TSX SCA 50**.

Type of Connection

The cable of the PCMCIA card has bare wires at its ends which the user must connect to the terminal located inside the device.

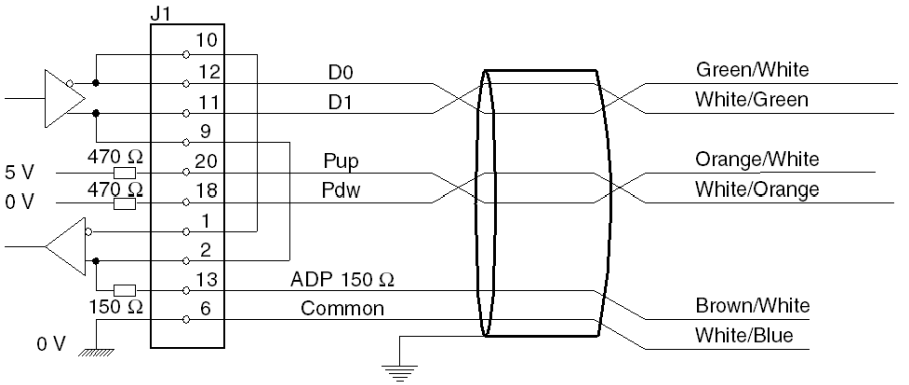
Illustration:



NOTE: The length of the cable used (3 m), makes it possible to link a device to a **TSX SCA 50** connection device located within a 3-meter radius of the card. This length ensures connection inside a standard cabinet

Description of the TSX SCP CM 4030 Cable

The 20-pin miniature PCMCIA connector supports the following signals:



NOTE:

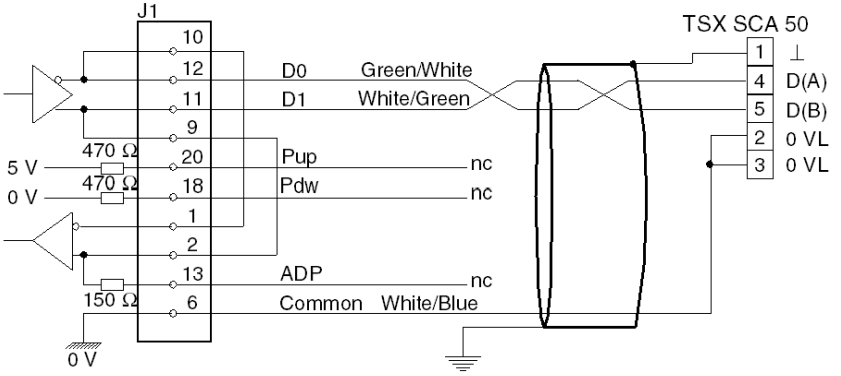
On a Modbus bus you must:

- Polarize the line, in general in only one spot (usually on the master device) with 470 O resistors. Connect Pdw to D0 (D(A)) and Pup to D1 (D(B)).
- Adapt the line on the two end devices with a 150 O resistor between D0 and D1 (D1 is already connected internally via the card).

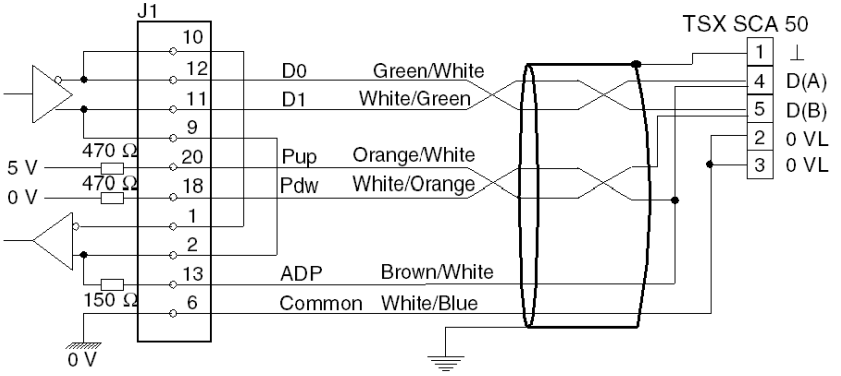
To connect a **TSX SCP 114** card to a PLC Series 1000 (S1000), D1 must be connected to L-.

Connecting Modbus to TSX SCA 50 Device

Connection with no line terminator:



Connection of a SCA 50 with line terminator:



Multi-protocol asynchronous link connection RS 422

General

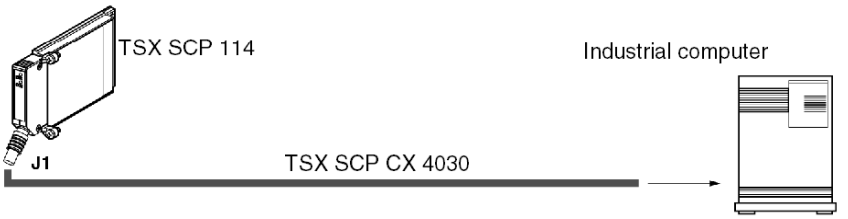
Connecting the **TSX SCP 114** card in Character Mode does not require any specific accessories.

The product reference for the RS 485/RS 422 PCMCIA card linking cable is **TSX SCP CX 4030**. It is 3 meters in length.

Type of connection

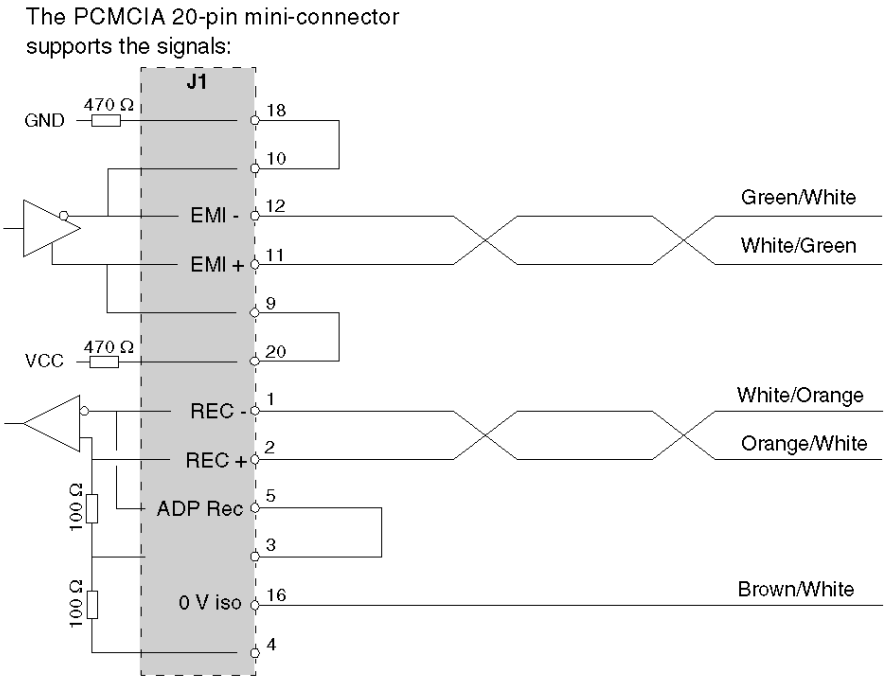
The **TSX SCP 114** PCMCIA card is connected in point to point to an RS 422A standard device VAX station type.

Illustration:



Description of the TSX SCP CX 4030 cable

Illustration:



See also *Character Mode Connection for TSX_SCY_21601, page 100* (**TSX SCY 21601** module integrated link)

Connecting to Modbus Full-Duplex in Premium Hot Standby Configuration

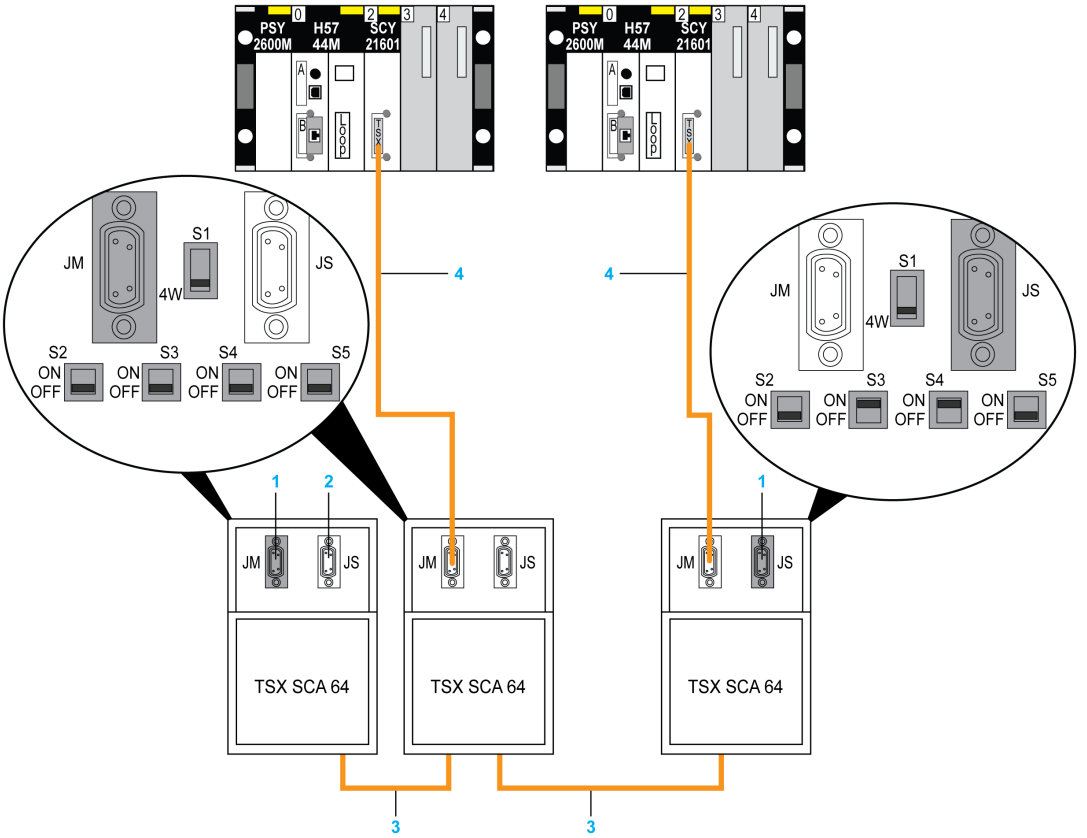
General

Two Premium PLCs in a Hot Standby configuration are connected in Full-Duplex mode to the common target through **TSX SCP 114** cards an a branching device **TSX SCA 64**.

NOTE: TSX SCP 114 card version must be ≥ V3.3

Wiring Connection Example

The following drawing shows an example wiring connections for two Premium PLCs in a Hot Standby configuration to the Modbus bus in Full-Duplex mode:



1 **TSX SCA 10** End of line adaptor
2 Slave
3 Bus
4 **TSX SCP CM 4530**

Section 5.7
Summary of Connection Devices

Summary of PCMCIA Card Connection Devices

TSX SCP 111

Type of Cable	Product Reference	Designation
Modem cable	TSX SCP CC 1030	Connection cable via Modem DTE/DCE 9 signals RS 232C, L = 3 m
Standard cable	TSX SCP CD 1030 TSX SCP CD 1100	Connection cable DTE/DTE RS 232C, L = 3 m or 10 m

TSX SCP 112

Type of Cable	Product Reference	Designation
Current loop cable	TSX SCP CX 2030	Current loop cable 20 mA, L = 3 m

TSX SCP 114

Type of Cable	Product Reference	Designation
Universal cable	TSX SCP CX 4030	Universal cable type RS 485 and RS 422, L = 3 m
Uni-Telway cable	TSX SCP CU 4030	Cable type RS 485, L = 3 m
Modbus cable	TSX SCP CM 4030	Cable type RS 485, L = 3 m
Connection device	TSX SCA 50	Connection device screwed to bus for RS 485 series link
Connection device	TSX SCA 62	Connection device via connector to bus for RS 485 series link
Converter device	TSX SCA 72	RS 232C/RS 485 converter device

Section 5.8
Precautions when Connecting PCMCIA Cards

Precautions for Connecting PCMCIA Cards

Important

Cards must be connected or disconnected in the host device (processor or **TSX SCY 21601**) **when the device is switched off**.

The ferrule, placed in direct contact with the PCMCIA card device, is used to handle electrical interference carried by the link cable braids.

Section 5.9
Consumption of PCMCIA Cards

Consumption of PCMCIA Cards

TSC SCP 111

Table of consumption:

Voltage	Typical Current	Maximum Current	Power Dissipation
5 volts	140 mA	300 mA	1.5 W max.

TSC SCP 112

Table of consumption:

Voltage	Typical Current	Maximum Current	Power Dissipation
5 volts	120 mA	300 mA	1.5 W max.

TSC SCP 114

Table of consumption:

Voltage	Typical Current	Maximum Current	Power Dissipation
5 volts	150 mA	300 mA	1.5 W max.

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