**sbc✛**
SAIA BURGESS CONTROLS

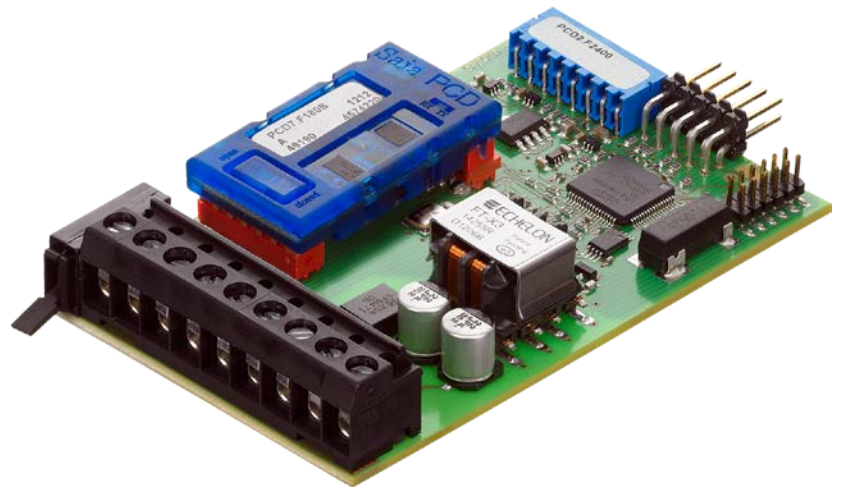# Hardware Manual



PCD3.F240                    PCD2.F2400

PCD3.F240/PCD2.F2400
LON interface module for TP/FT-10 channel

## 0.1 Document history

| Published | Version | Changed | Remarks |
|---|---|---|---|
| 12.12.2012 | v.00 | - | Creation of the document |
| 14.11 2013 | EN01 | Logo | And Company name |
| 18.11.2013 | EN02 | Corrections | The text for power-down network protection was wrong |
| 25.06.2014 | EN03 | | Reviewed before release |
| 10.07.2014 | EN04 | Chapter 1.2 | CPU family (PCDx.xxx0 instead of PCDx.xxxx) |
| 2016-04-06 | ENG05 | Chapter 1.4 | Picture of PCD2.F2400 Connection replaced |

## 0.2 Trademarks

Saia PCD® is a registered trademark of Saia-Burgess Controls AG.

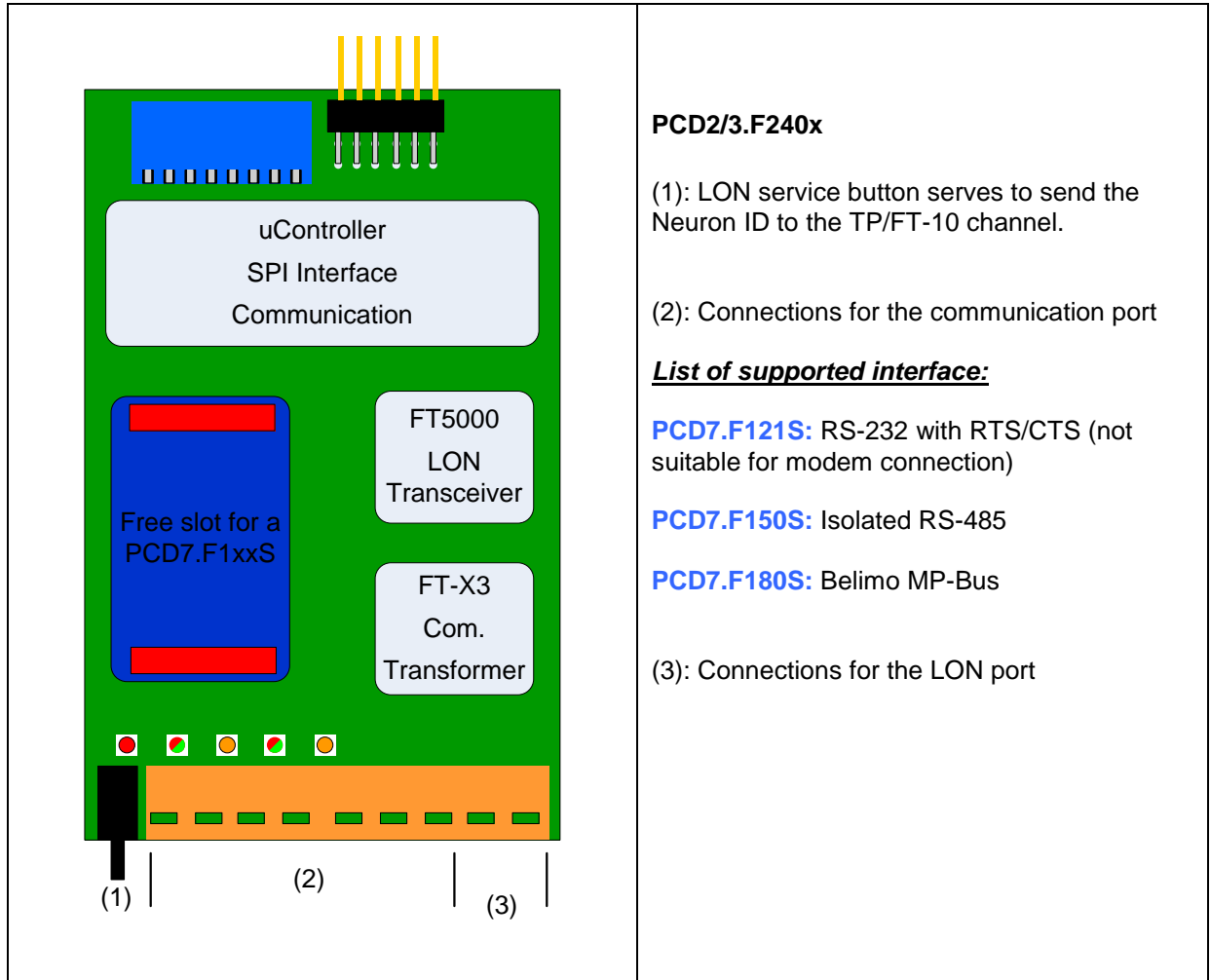Technical changes are subject to the state of technology.

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Published in Switzerland

# 1    F240/F2400 LON interface module

The PCD2/3.F240x has two ports. It includes a LON transceiver that is fully compatible for a TP/FT-10 channel and a communication port that can be established by the use of a PCD7.F1xxS.

## 1.1    Module overview



**PCD2/3.F240x**

(1): LON service button serves to send the Neuron ID to the TP/FT-10 channel.

(2): Connections for the communication port

*List of supported interface:*

**PCD7.F121S:** RS-232 with RTS/CTS (not suitable for modem connection)

**PCD7.F150S:** Isolated RS-485

**PCD7.F180S:** Belimo MP-Bus

(3): Connections for the LON port

## 1.2    Module compatibility

| CPU Family | LON TP/FT-10 with PCD2/3.F240x module |
|---|---|
| **PCD1.M2xx0** | Supported from hardware version F |
| **PCD2.M5xx0** | Supported from hardware version D |
| **PCD3.M3xx0** **PCD3.M5xx0** **PCD3.M6xx0** | Supported from hardware version H |
| **PCD3.Mxx60** | Supported |

### 1.3 Communication ports on the CPU's

**PCD3.F240:**
LON module for PCD3 family, pluggable in I/O slots 0…3

| | |
|---|---|
| I/O slot 0: | Port 100 for the LON port |
| | Port 101 Slot for PCD7.F1xxS |
| I/O slot 1: | Port 110 for the LON port |
| | Port 111 Slot for PCD7.F1xxS |
| I/O slot 2: | Port 120 for the LON port |
| | Port 121 Slot for PCD7.F1xxS |
| I/O slot 3: | Port 130 for the LON port |
| | Port 131 Slot for PCD7.F1xxS |
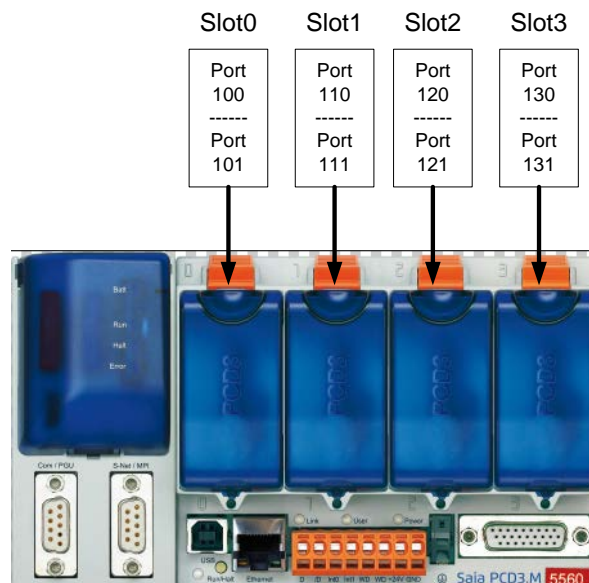


**PCD2.F2400:**
LON module for PCD1.M2xxx, pluggable in I/O slots 0…1
LON module for PCD2.M5xxx, pluggable in I/O slots 0…3
The port numbering is the same as PCD3
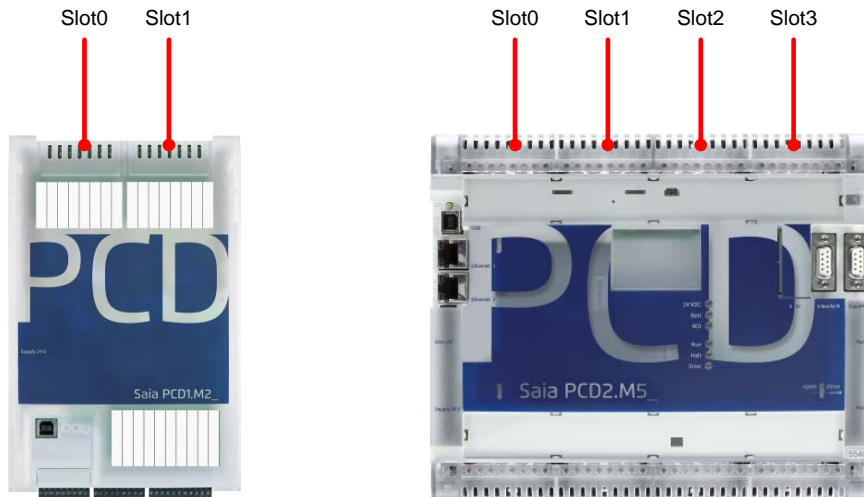
## 1.4 Connections and LEDs on the PCD2/3.F240x
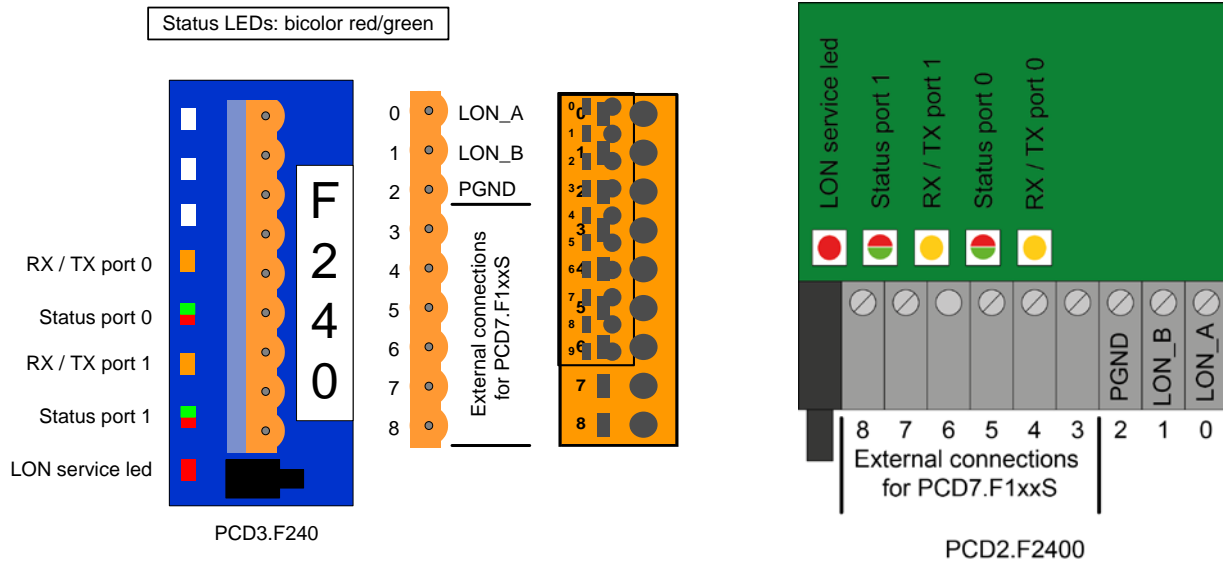


- **Connections**

### LON port

| Pin number | Description |
|------------|-------------|
| 0 (LON_A) | Connection to LON TP/FT-10 channel |
| 1 (LON_B) | |
| 2 (PGND) | Ground connection |

### Communication port

| No | Signal | | |
|----|------------|------------|------------|
| | PCD7.F121S | PCD7.F150S | PCD7.F180S |
| 3 | GND | Not used | GND |
| 4 | TXD | D | MP |
| 5 | RXD | /D | 'MFT' |
| 6 | RTS | Not used | 'IN' |
| 7 | CTS | Not used | Not used |
| 8 | Not used | GND_ISO | Not used |

- **LEDs**

| | |
|---|---|
| **RX / TX port 0** | Activity on the LON port |
| **RX / TX port 1** | Activity on the communication port |
| **Status port 0 & Status port 1** | Displays the status of Port 0 (LON) and Port 1 (com. interface), green means that the port is working properly.<br><br>Both LEDs permanently red: F240x not running<br><br>Both LEDs green 25% / red 75%: F240x start-up procedure<br><br>Both LEDs green 50% / red 50%: F240x running, but no communication with the PCD<br><br>Status port x LED green 75% / red 25%: F240x running, channel closed<br><br>Status port x LED green 90% / red 10%: F240x running, channel open with error<br><br>Status port x LED green 100%: F240x running, channel open OK |
| **LON service led** | State of the FT5000 device „see manual 26/883 on the support website for details" |

### 1.5 Technical data

- **Module current consumption**

| Base module | Port x.1 config. | +5V bus Current [mA] | V+ Current [mA] |
|---|---|---|---|
| PCD2/3.F240x | None | 90 | 0 |
| | PCD7.F121S | 105 | 0 |
| | PCD7.F150S | 225 | 0 |
| | PCD7.F180S | 105 | 15 |

- **LON port specifications summary**

| | |
|---|---|
| Data communications type | Differential Manchester encoding |
| Network polarity | Insensitive |
| Isolation between Network and FT5000 | 0-60Hz, continuous 277Vrms |
| Transmission speed | 78kbits/s |
| Network wiring | 24 to 16 AWG twisted pair, see document 005-0023-01P_Jbox_wiring.pdf available on the ECHELON website for qualified cable types |
| Network Length in Free Topology | 500m (1,640 feet) maximum total wire with no repeaters.500m (1,640 feet) maximum device-to-device distance. |
| Network Length in Doubly-terminated Bus Topology | 2700m (8,850 feet) with no repeaters. |
| Number of transceiver per segment | Up to 64 locally powered devices For up to 254 Network Variables |
| Maximum Stub Length in Doubly-terminated Bus Topology: | 3m (9.8 feet) |
| Network termination | One terminator in free topology; two terminators in bus topology (more details can be found in the following document 005-0199-01B_Series_5000_Databook.pdf available on the ECHELON website) |
| Power-down network protection | High impedance when unpowered |

- **Communication port specifications summary**

| General communications mode supported | MC0 Character mode, no automatic handshake |
|---|---|
| | MC1 Character mode with RTS/CTS handshake |
| | MC4 Character mode for RS485 interface |
| | MC5 As MC4 with rapid switching between sending and receiving |
| | SM1 S-Bus master, parity mode |
| | SM2 S-Bus master, data mode |
| | SS1 S-Bus slave, parity mode |
| | SS2 S-Bus slave, data mode |
| | GS1 S-Bus Gateway slave, parity mode |
| | GS2 S-Bus Gateway slave, data mode |
| | GM S-Bus gateway master → Gateway always via PCD3. |
| Baud rates supported (bits/sec): | 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 |

*Communication port with PCD7.F121S*

| Cable length | Up to 30m depending on transmission speed |
|---|---|
| Transmission speed | Up to 115.2kbits/s |

*Communication port with PCD7.F150S*

| Cable length | Depending on transmission speed |
|---|---|
| Transmission speed | Up to 115.2kbits/s |
| Network Insulation (between terminals 3,4,8 and GND) | 500VDC continuous |

*Communication port with PCD7.F180S (MP-Bus Belimo)*

| Transmission speed | 1200 bits/s |
|---|---|

## 2   Installation instructions

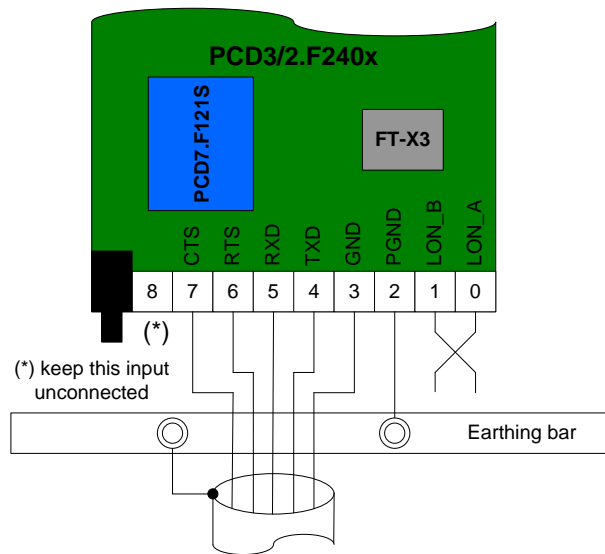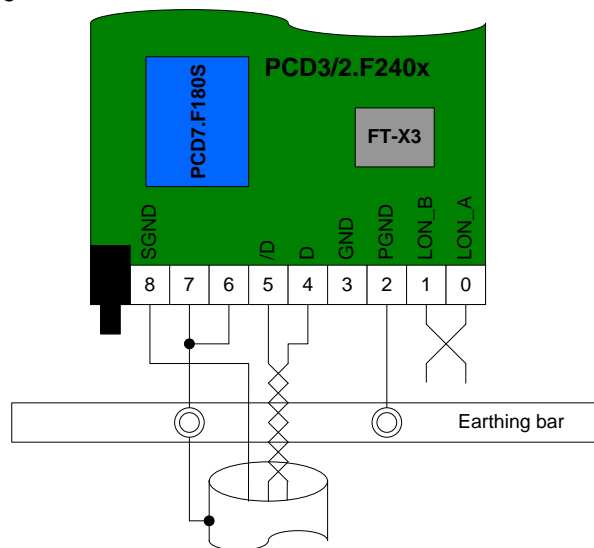### 2.1   Wire strip length for the module's connector

Wire preparation : 0.5mm² - 2.5mm²

6-8mm
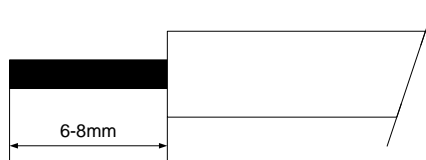
### 2.2   Module installation

For problem-free operation, the following installation instructions shall be respected

- **RS-232**
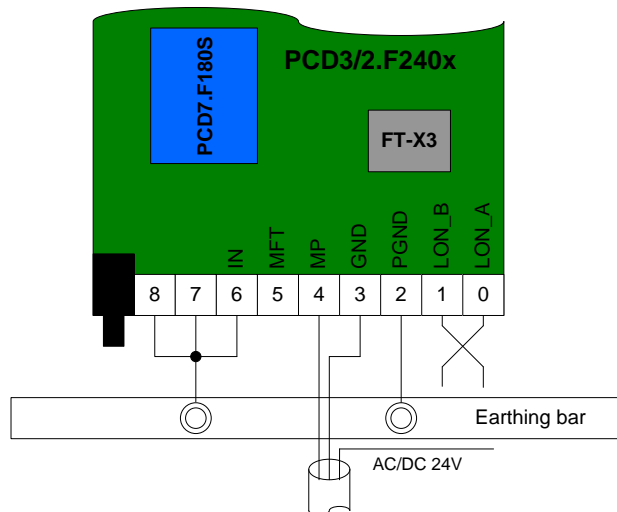


(*) keep this input unconnected

- **Isolated RS-485**



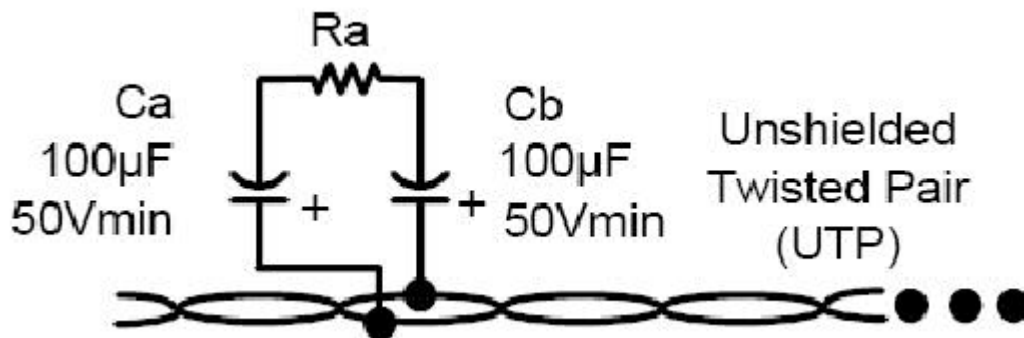For installation details about RS-485 networks, see manual 26/740 "Installation components for RS-485 networks"

- **MP-Bus**



- **LON port**

## *Network Termination*

The LON port is polarity insensitive but the network needs termination(s) to work properly



**Ref 1:  See LonWorks FTT-10A Free Topology Transceiver User's Guide manual on the ECHELON website**
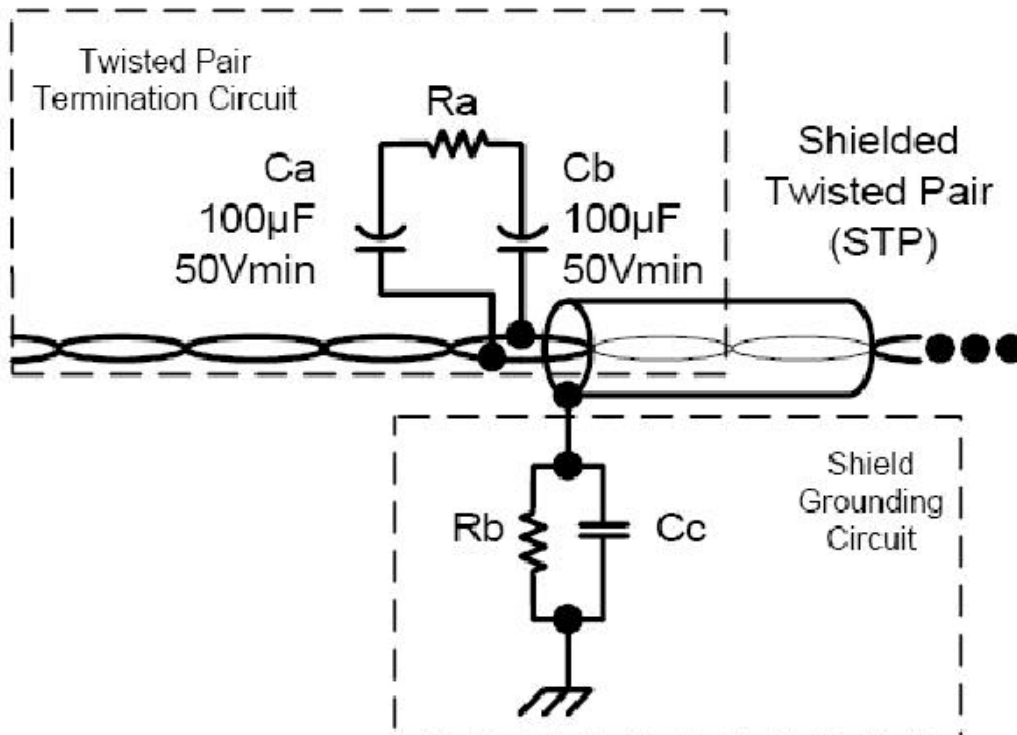
Free Topology Network Segment
Only one termination-> RC circuit, with Ra = 52.3 Ω ±1%, 1/8 W

Doubly Terminated Bus Topology Segment
One termination at **each** end of the cable -> RC circuit, with Ra = 105 Ω ±1%, 1/8 W

## *Shielding*

It is not mandatory to provide a shield but ECHELON gives following information when a shielded twisted-pair is used.



**Ref 2: See LonWorks FTT-10A Free Topology Transceiver User's Guide manual on the ECHELON website**

The cable shield should be grounded using a capacitor to tie the shield to earth ground, and a large-value resistor to bleed off any static charge on the shield.
Tie the shield to earth ground through a capacitor, instead of using a direct connection, to avoid DC and 50/60 Hz ground paths from being formed through the shield. Typical values for Rb and Cc are:

• Cc = 0.1 µF, 10%, Metalized Polyester, ≥ 100V
• Rb = 470 kΩ, 1/4 W, ±5%

The cable shield should be grounded at least once per segment, and preferably at each device. Grounding the shield at every device assists in suppressing 50/60 Hz standing waves.

# 3 Appendix

## 3.1 Address of Saia-Burgess Controls AG

**Saia-Burgess Controls AG**
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Home page:     www.saia-pcd.com
Support:       www.sbc-support.com

## 3.2 References

**ECHELON corporation**

Home page: http://www.echelon.com/