

3rd Party Modbus Serial Cabling Tips: Application Note: #1167

Introduction

This application note is intended as a supplement to the Proface Device/PLC Connections Manuals. It provides additional information to simplify connecting Proface hardware to communicate with a 3rd party device. The diagrams in this document are for a 1:1 connection between a Proface ST, AGP, or AST and an External Device. Additional diagrams multiple device Modbus networks can be found in the Proface Device/PLC Connections Manuals. Also, more information about Modbus cabling and communications can be found on the Internet at:

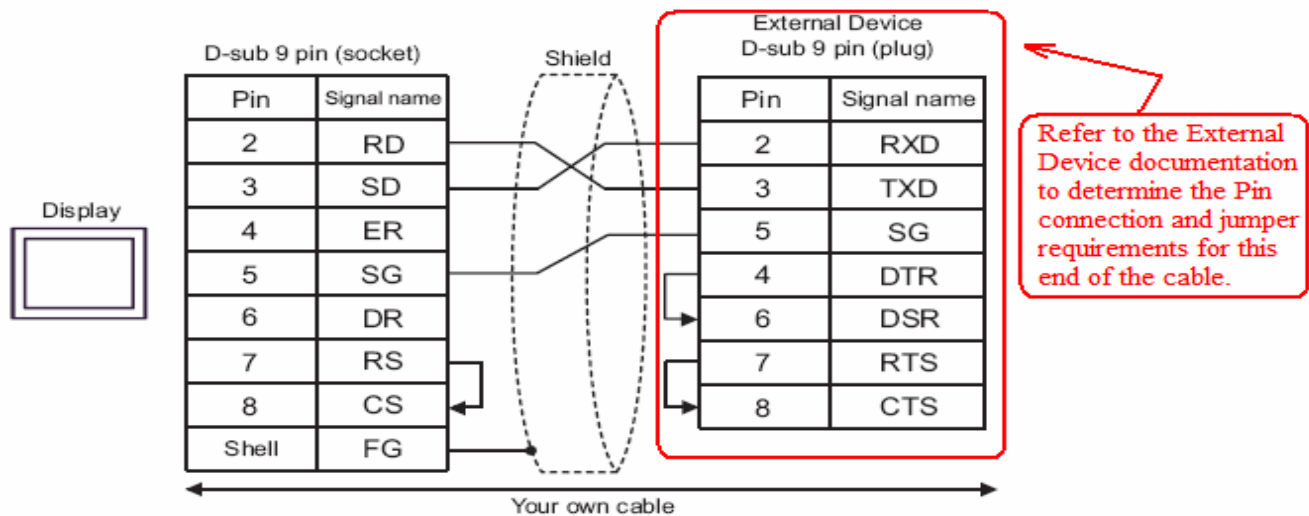
http://www.modbus.org/docs/Modbus_over_serial_line_V1_02.pdf

Cabling

Modbus serial cabling can be via a RS232 or a RS422/485 connection. The RS422/RS485 cabling connection can be "2-wire" or 4"wire". Cable diagrams in this document are for Proface hardware 9-pin serial ports. For connections diagrams to Proface 25 pin serial ports please refer to the Device/PLC Connections Manuals.

RS232 cabling is point to point and the cable pin-out is specific to the 3rd party External Device. The Proface hardware requires a minimum of 3 conductors and a jumper: Send Data (SD), Receive Data (RD), a Common (SG), and a jumper between the RS and CS. The cable pin-out and jumpers required by the connected External Device should be obtained from the device documentation. The following illustration is a typical RS232 connection to the Proface hardware:

Display (Connection Port)	Cable	Notes
AGP, AST (COM1) ST401, ST403	Your own cable	The cable length must be 15m or less.



RS422/485 Cabling. It is important to include a signal ground (SG) or common connection between the devices. When a common or signal ground connection is not provided on the 3rd party device the common reference can often be achieved by other means:

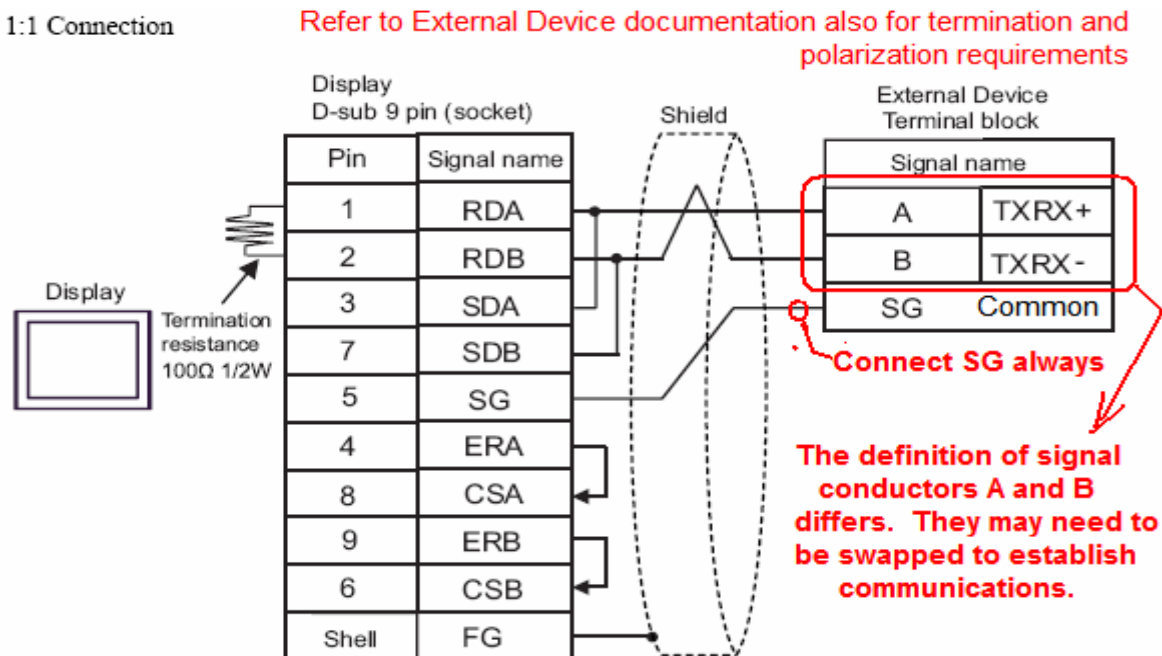
- 1> Some vendors specify connecting the shield on both ends for a common reference. In this case follow their instructions for their end of the cable and connect the shield to pin 5 (SG) or the shell of the DB9 connector on the Proface end.
- 2> If the 3rd party device has a signal ground, connect pin-5 of the Proface device to signal ground.
- 3> If the 3rd party device has a common that is referenced or “strapped” to safety ground connect pin-5 of the Proface device to that common. (review the 3rd party device connections and documentation to avoid short circuits and noise inducing “ground loops”)
- 4> Connect pin-5 to the safety ground on the device. (review the 3rd party device connections and documentation to avoid short circuits and noise inducing “ground loops”)
- 5> Line polarization using a device such as Proface CA4-ADPONL-01.

RS485 2-wire Cabling. The definition of the 2 signal wires is inconsistent among device manufacturers. The signal leads (A & B or TxRx+ & TxRx-) might need to be interchanged to establish communications to some field devices.

Display (Connection Port)	Cable	Notes
AGP.*1 (COM1) ST400, ST403 AGP-3302 (COM2) AST3201 (COM2)	Your own cable	The cable length must be 500m or less.

*1 All GP models except AGP-3302B

1:1 Connection



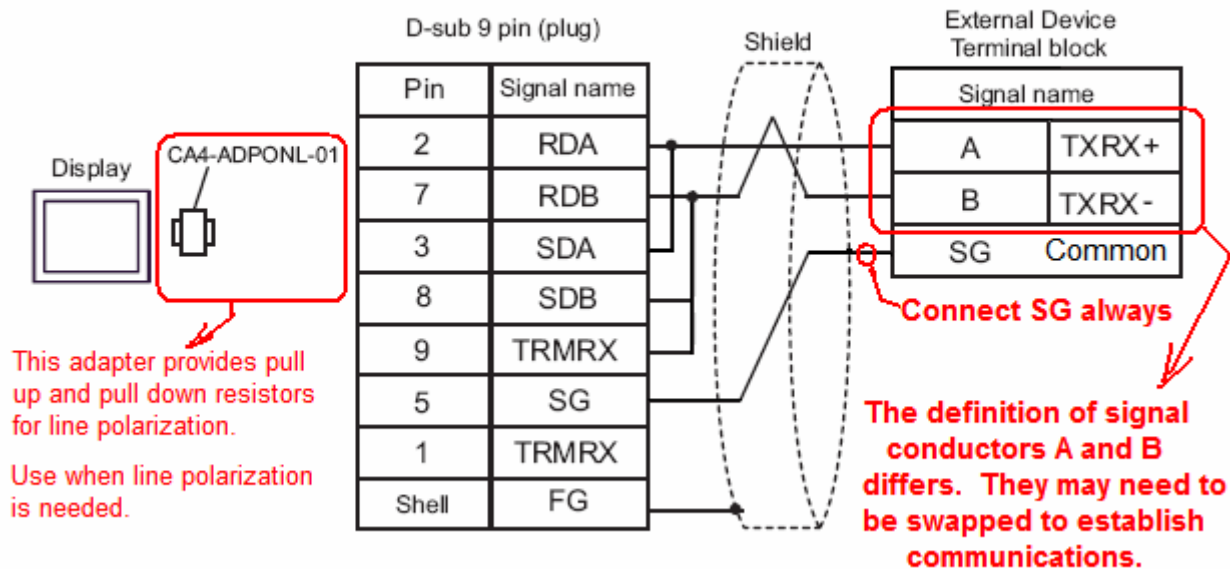
Line Polarization. AGP Port Adapter CA4-ADPONL-01 is a convenient line polarization solution for use where polarization is needed. The purpose of line polarization is to improve the noise immunity on an RS485 network. It is NOT required in all cases. Be sure to follow network design standards when deciding whether to use this device and where to locate it. Polarization requirements vary depending on the network layout and the specifications of the connected devices. More than 2 polarization devices can cause communication problems on the network. For Modbus 2 wire RS485 networks only one polarization circuit should be used.

Note: The polarization adapter CA4-ADPONL-01 cannot be used on COM1 and cannot be used on COM2 of some AGP models.

Display (Connection Port)	Cable	Notes
AGP*1 (COM2)	Your own cable	The cable length must be 500m or less.

*1 All AGP models except AGP-3200 series and AGP-3302B

1:1 Connection Refer to External Device documentation also for termination and polarization requirements



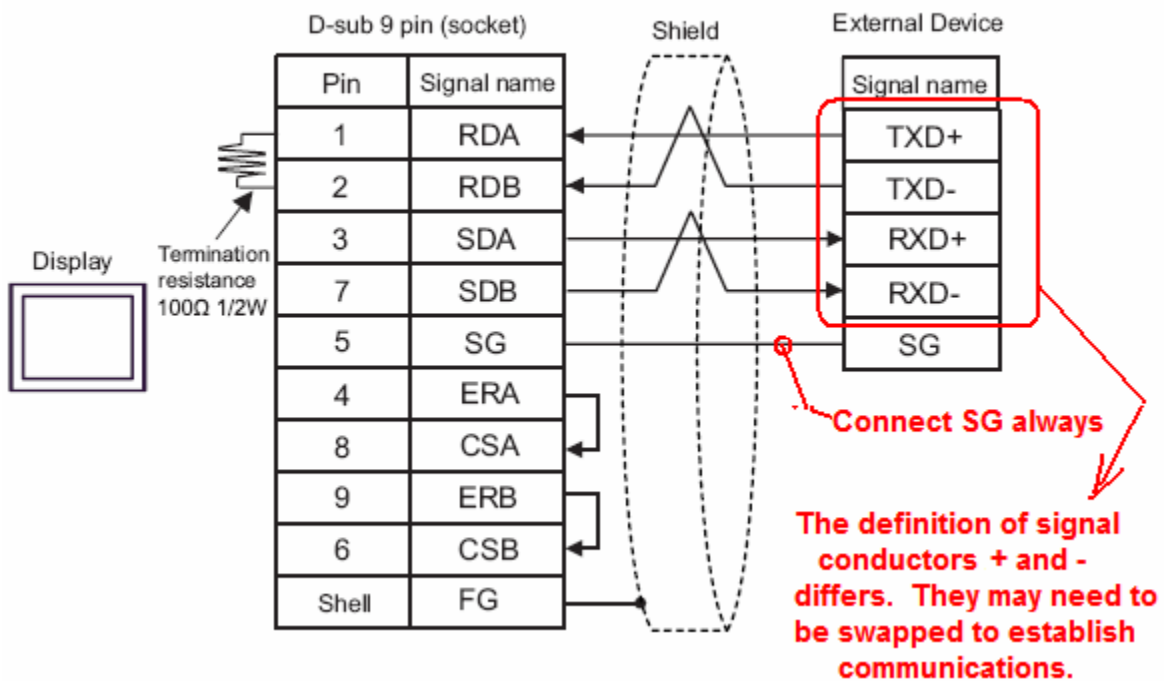
RS422/485 4-wire Cabling.

Display (Connection Port)	Cable	Notes
AGP.*1 (COM1) ST400, ST403 AGP-3302 (COM2) AST3201 (COM2)	Your own cable	The cable length must be 500m or less.

*1 All GP models except AGP-3302B

1:1 Connection

Refer to External Device documentation also for termination

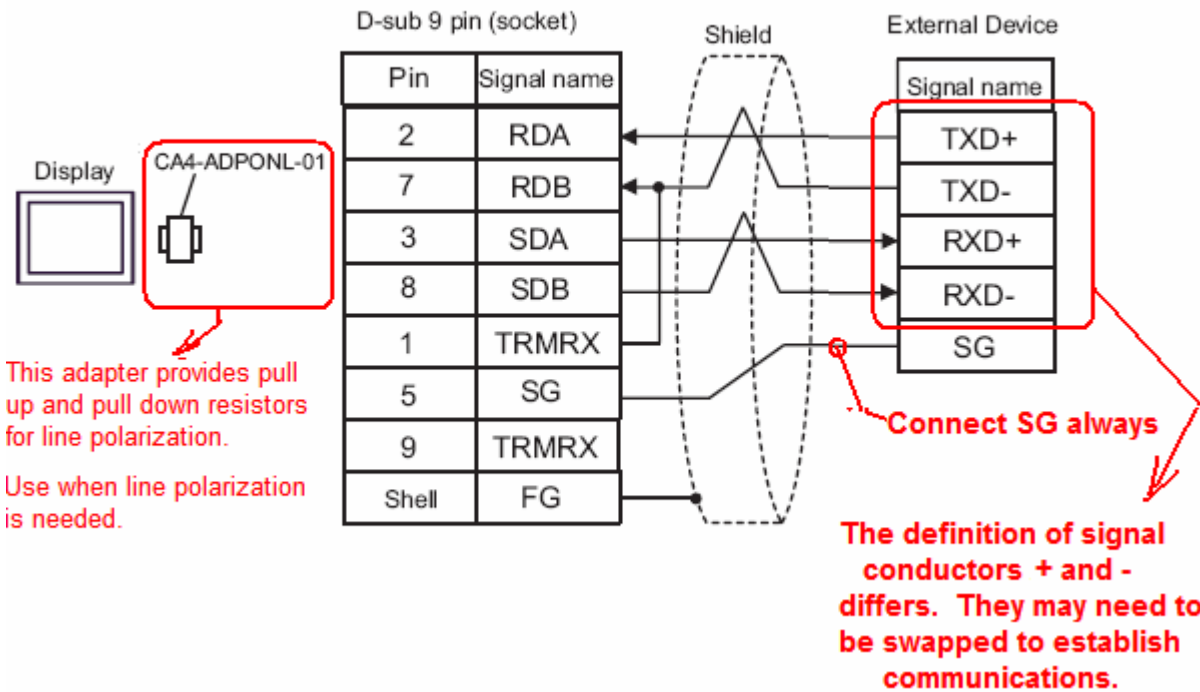


RS485 4-wire Cabling (continued)

Display (Connection Port)	Cable	Notes
AGP.*1 (COM2)	Your own cable	The cable length must be 500m or less.

*1 All AGP models except AGP-3200 series and AGP-3302B

Refer to External Device documentation also for termination and polarization requirements



Configuring the Device Driver and Establishing Communications:

Master or slave device driver? In most installations the HMI is the master and the connected devices are slaves. Modbus serial allows a slave to have only one master. If the project is GP-Pro/PB3 use the "Schneider Modbus RTU 1:n comm." device/PLC driver. If the device has an ASCII – RTU protocol selection choose RTU.

If the HMI is the slave and the connected device is the master select the Modbus Slave driver. In GP-Pro/PB3 select the "Modicon Modbus (SLAVE)" driver.

For supplemental information on configuring a Modbus device driver refer to App Note 1168; "Modbus Establishing Communications Hints". It provides suggestions to help you establish and troubleshoot Modbus communications with third party devices.

For more information on Pro-face and our full line of HMI, Operator Interface and Industrial PC products please visit our web site at www.profaceamerica.com.