ASD Devices Network Wiring within Building Operation

- **ASD Device Transceiver**
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When incorporating a network of ASD devices into Building Operation, the physical wiring and network topology must meet certain requirements for cable shielding, unit loads, network biasing, and end-of-line terminations.

ASD Device Transceiver

The transceiver used in ASD devices is the SN75176 series, manufactured by Texas Instruments:

- The transceivers used in ASD controllers are non-failsafe, 1 unit-load transceivers with optical isolation.
- The transceivers used in RPTR-WIRE model ASD repeaters are non-failsafe, 1 unit-load transceivers without isolation.
- In each ASD device, an internal 56k bias resistor provides a weak bias, adding 0.21 unit-load. The result is a total unit-load of 1.21 per device.

Non-isolated Devices

When connecting ASD devices within Building Operation, certain restrictions apply to non-isolated devices:

- In an RS-485 network of isolated devices, only one non-isolated device should be used. The presence of two or more non-isolated devices changes the electrical characteristics of the network, thereby causing communications to be degraded.
- On an ASD network that has no other non-isolated devices, connecting a non-isolated device, such as an Automation Server, changes the electrical characteristics of the network so that the recommended maximum number of devices is 20.

ASD Network Configuration Guidelines

Observe the following guidelines to configure ASD networks connected to Building Operation through an Automation Server or an AS-P.

Network Node Count

The recommended maximum number of nodes on an ASD network segment, when connected to an Automation Server or an AS-P, is 20.

Cable Lengths

The allowed maximum cable length for an ASD network is 1200 m (4000 ft), using 0.20 mm² (24 AWG) or larger cable.

Cable Shielding

When connecting ASD devices within Building Operation, prepare the RS-485 cable shield drain wire:

- At each ASD device, the RS-485 cable shield drain wire must be disconnected from the SHIELD terminal of the ASD device and then reconnected together so that the device is bypassed. In this way, the shield continues past the devices for the full length of the bus.
- Connect the shield drain wire to earth ground terminal rail in the panel with the SmartStruxure server device. This is the only ground connection of the shield for the entire cable segment. Connect the RET/Shield terminal on the SmartStruxure server device to the ground rail in the panel using a 3.31 mm² (12 AWG) to 0.82 mm² (18 AWG) wire.
- The RS-485 cable shield drain wire must be continuous throughout the entire length of the network bus and must be grounded at one location only.

Biasing

Observe the following biasing requirements:

- Each ASD network segment must have two sets of 5 VDC biasing, each with one pair of 1000 ohm resistors. This dual end-point scheme requires external biasing resistors, and the 5 VDC supply voltage may be supplied by either an AS-P or an external power supply.

- For biasing, do not use the 3.3 VDC bias voltage available on the Bias+ terminal of the Automation Server or the onboard bias on the RPTR-WIRE NETWORK 8000 RS-485 repeater.

- The recommended location for the 5 VDC bias is at the two ends of the network segment cable, but the bias voltage remains effective when the bias is applied within 60 m (200 ft) of the end of the network segment.

- When using an AS-P positioned within 60 m (200 ft) of the head end of the network segment, you can use the 5 VDC available on the server's Bias+ terminal to provide the head-end bias. You use an external 5 VDC power supply to provide the bias at the far end of the network segment. When using an Automation Server, you use external 5 VDC power supplies at both ends of the network segment to provide the network bias. The recommended power supplies are discussed separately. For more information, see Power Supply Selection for Generic RS-485 Network Device Configuration 7 and 8 .

End-of-Line Resistors

Observe the following requirements for end-of-line resistors:

- The ASD network uses 120 ohm end-of-line resistors.

- Each network segment must have its own set of end-of-line resistors.

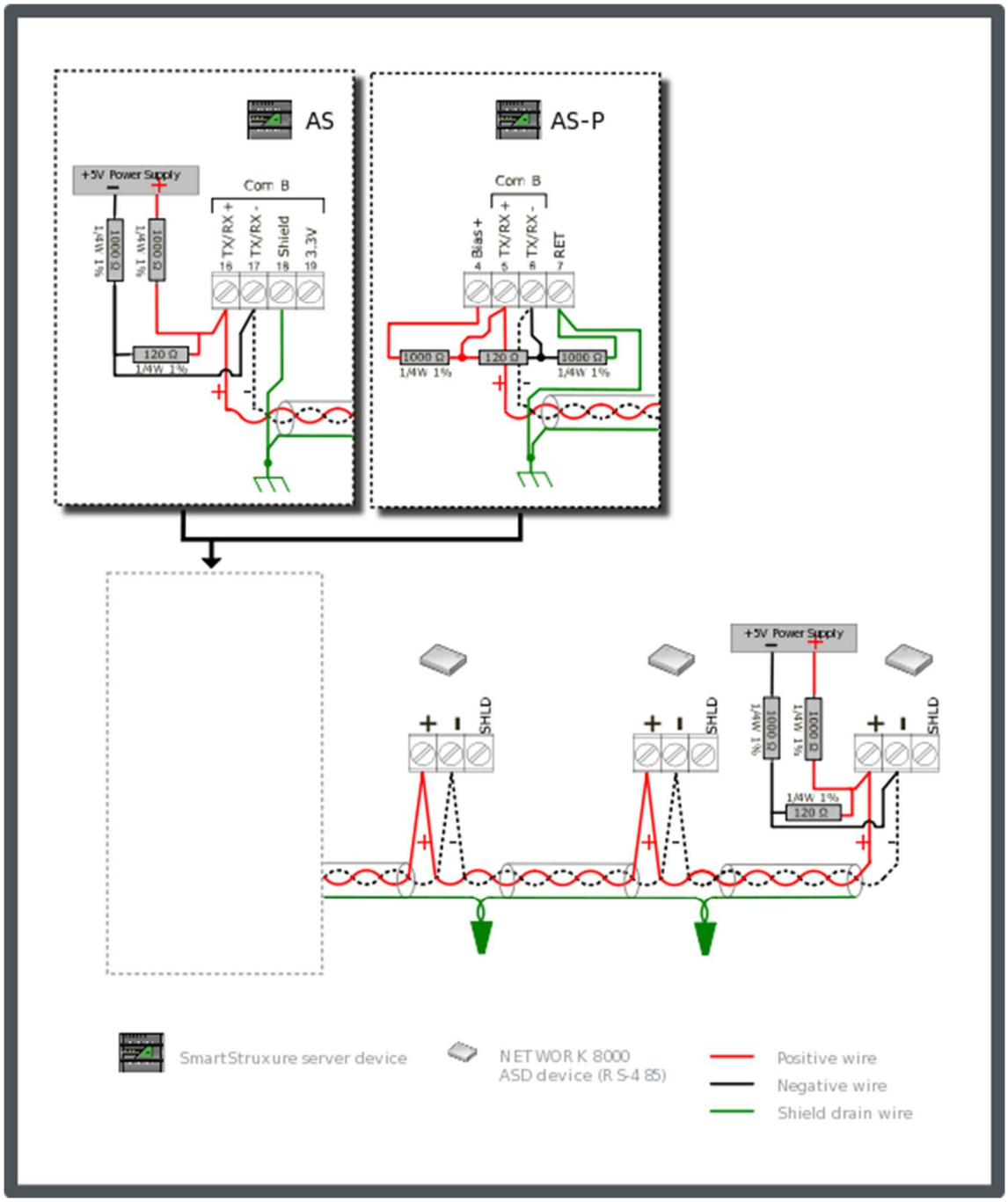
- Connect a 120 ohm termination resistor across the + and – data lines at the head end of the network segment (typically at the SmartStruxure server device). Connect another 120 ohm termination resistor across the + and – data lines on the last node at the far end of the network segment (a repeater or the last device).

- The dual end-point bias configuration supports the preferred termination resistor values of 120 ohm with one positioned at each end of the network segment.

Network Wiring and Topology Diagrams

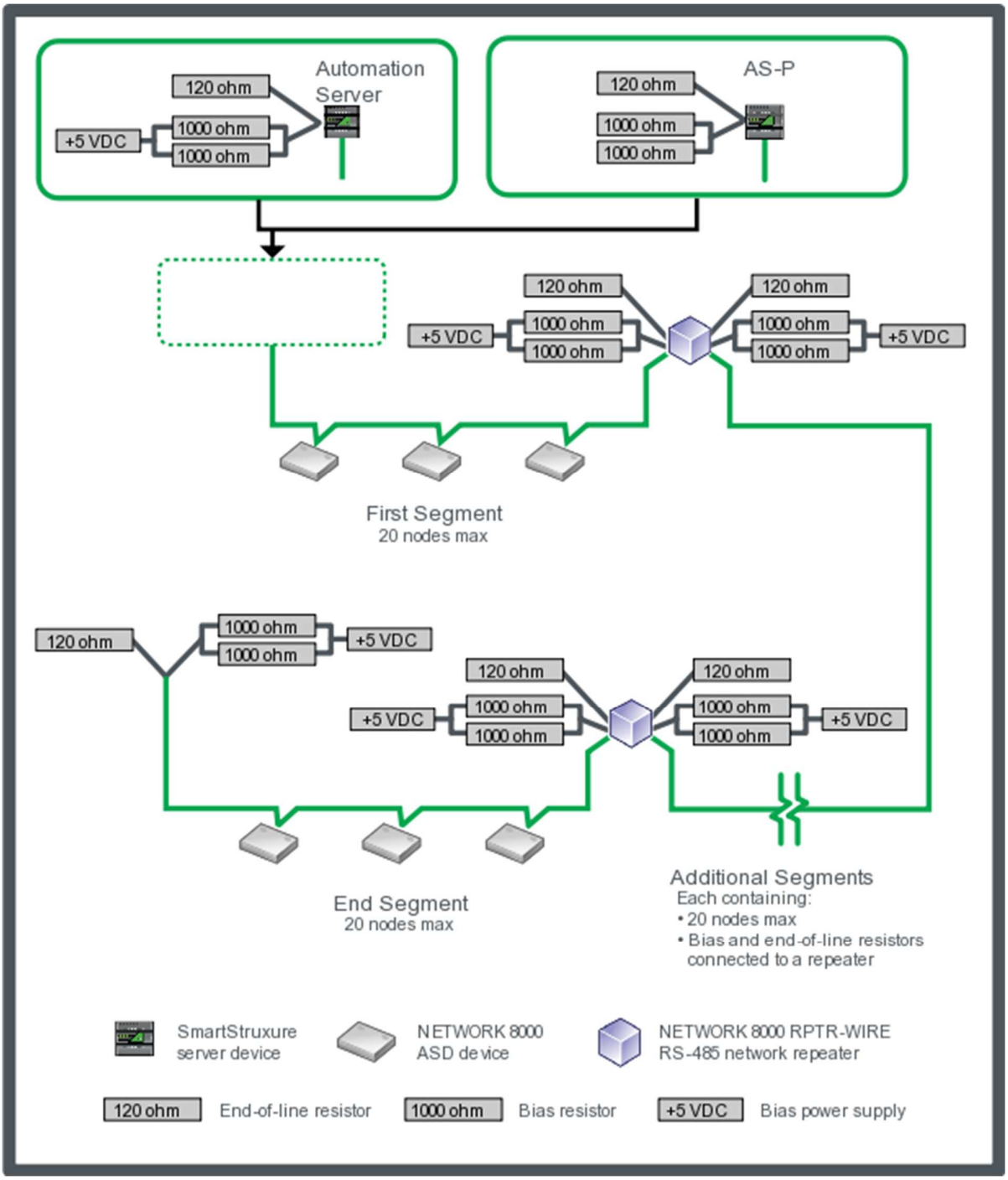
As shown in the diagrams, connect a 1000 ohm bias resistor from the TX/RX+ terminal to the 5 VDC bias supply, either by connecting the resistor to the Bias+ terminal on an AS-P or to the positive terminal on an external 5 VDC power supply. Connect another 1000 ohm bias resistor from the TX/RX– terminal to the 5 VDC bias supply, either by connecting the resistor to the RET terminal on the AS-P or to the negative terminal on the external 5 VDC power supply. Connect an external 5 VDC power supply to the RS-485 bus pair through two 1000 ohm bias resistors at the far end of the cable.

The network configuration and wiring diagram shows the alternate RS-485 terminal block connections for the Automation Server and AS-P. It also shows the RS-485 Com B connections on the Automation Server and AS-P, which are the same for Com A. The configuration in the diagram supports the maximum cable length of 1200 m (4000 ft) per ASD network.



RS-485 network configuration and wiring for NETWORK 8000 ASD devices connected to an Automation Server or an AS-P

The network topology diagram shows the use of RPTR-WIRE NETWORK 8000 RS-485 repeaters to join together multiple ASD network segments. The network configuration in the diagram supports the maximum cable length of 1200 m (4000 ft) per ASD network.



NETWORK 8000 ASD device network topology with multiple segments connected to an Automation Server or an AS-P