

The logo for Niobrara Research & Development, featuring the letters 'NR&D' in a stylized green font inside a white square with a green border.

# SC902

## SY/MAX Programming Cable

### Description

The Niobrara SC902 Smart Cable is a SY/MAX® compatible RS-422 cable with a miniature RS-232/RS-422 converter built into the 9-pin RS-232 end. It is intended to be used to connect the 9-pin RS-232 COM: port of a personal computer directly to any SY/MAX compatible RS-422 port such as the COMM port of a SY/MAX programmable controller, a NIM, a D-LOG, or the RS-422/RS-485 port of any NR&D modules.

When connected to a PLC COMM port or a powered RS-422 port of NR&D modules the SC902 is powered by the 5 volts normally used to power the hand-held programmer. When connected to a NIM, the D-LOG, or the non-powered RS-422 port of NR&D modules, or when running long distances (over 30 feet), the SC902 can be powered by the included AC adapter. Since the SC902 is not powered by the signal lines of the personal computer, it will work when other solutions fail, such as when the RS-232 signal power is too low, or the personal computer software does not turn on the DTR or RTS pin. When connected to a NIM the SC902 provides the loop-back required for the handshaking lines. No additional cabling or jumper is needed.

The RS-232 end is a female 9-pin connector with screws. The RS-422 end is a male 9-pin connector with slide locks. The SC902 is normally 6 feet long but other lengths (up to 2,000 feet) are available. See price list for ordering information. The SC902 can also be extended with a NR&D DE1 cable.

The SC902 is a versatile RS-232/RS-422 adapter which can be modified for special applications. Call the factory for more information.

### Installation

- 1: Connect the male (silver backshell) end of the SC902 to an RS-422 port on the SY/MAX device.
- 2: Connect the female (black backshell) end of the SC902 to COM1: or COM2: of the personal computer. If the computer is equipped with a 25-pin RS-232 port, use the NR&D SC902K Smart Cable instead of the SC902 or use an SD016 9- to 25-pin adapter with the SC902.
- 3: If the SY/MAX device does not provide power, connect the cord from the AC adapter to the 3.5mm power jack on the back of the RS-232 backshell and plug the adapter body into a 120VAC 50/60 Hz outlet.
- 4: Refer to the instructions for the software package you are using.

### Cable Pinouts

The male DE9 end of the cable is compatible with SquareD SY/MAX RS-422 ports. The pinout is as follows:

Pinout			
Pin	Function	Pin	Function
1	RXD-(data out of PLC)	6	CTS+
2	RXD+	7	GND or RTS-
3	TXD-(data into PLC)	8	CTS-
4	TXD+	9	Cable Shield
5	V+ or RTS+		

Pins 5 and 7 power the converter when driven to 5 volts by the hand-held programmer power output of a

“SY/MAX programming cable with RS-232 <-> RS-422 converter built-in”

“Custom lengths are available”

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programmable controller or echo the differential true signal to pins 6 and 8 for a NIM when the cable is powered by the AC adapter.

The female DE9 end of the cable is an RS-232 DCE interface. The pinout is as follows:

Pinout			
Pin	Function	Pin	Function
1	DCD	6	DSR
2	TXD (to computer)	7	RTS
3	RXD (fom computer)	8	CTS
5	SG		

DSR and DCD are driven high by the SC902. The state of pins 4 (DTR) and 9 (RI) is ignored.

## Ordering Information

The SC902 is available as:

- **SC902** 6' programming cable with TR92 transformer.
- **SC902-xx** Custom length SC902 where xx is the length in feet.
- **SC902IC** Include connector: RS-422/485 end is left off for pulling cable through bulkhead or conduit.
- **SC902PP** Permanently powered: transformer leads are soldered to converter.
- **SC902ST** Stripped and tinned end: RS-422/485 end is stripped and tinned no connector.
- **SC902K** 6' programming cable with an SD016 adapter for use with a 25-pin RS-232 port .
- **SC902NT** 6' programming cable, transformer not included .

## Related Equipment

The SC902 has the following equipment available:

- **TR92** Replacement transformer, 120VAC (U.S.).
- **DE1** Differential extension cable.

## Trouble Shooting

The baud rate of the COM: port of the personal computer is not the same as the baud rate of the SY/MAX port.

The cable is not connected to the correct COM: port of the personal computer.

The route being used in the software is not valid.

The AC adapter is required with the following devices:

AIM4-D, -M, -2D, -2M ports 1 through 4; EPE5 all SY/MAX ports; MEB all SY/MAX ports; RM14K SY/MAX port; SPE4-1D, -2D, -3D ports 1 through 4; Spectrum Controls Operator Interface; Square D Company: ALL SY/MAX ports except processor ports and processor ports more than 30 feet away; UCM4-D, -M all ports

## Specifications

Warranty	The SC902 carries a one year warranty from the date of shipment. See Niobrara's Standard Terms and Conditions of Sale for additional warranty information.
Dimensions	Standard SC902 length is 6'.
Power	External Power: from TR92 110 VAC transformer (included) or 9 VDC, 200 mA power through the 3.5mm mono jack (tip +) or Port power: 5VDC, 100 mA from RS-422 port (pin 5 V+, pin 7 GND).
Operating Conditions	0 to 60 degrees C operating temperature; -40 to 80 degrees C storage. Humidity up to 90% noncondensing; pressure altitude -200 to +10,000 feet MSL.

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