

2089F and 222N9F

RS-232 TO RS-422/RS-485 CONVERTERS

Description

The Model 2089F Converters are small modules that convert single-ended RS-232 signals into differential RS-422 or RS-485 signals without the need for external power. Signal conversion is completely bidirectional - outgoing RS-232 signals are converted to RS-422/RS-485 differential levels and incoming RS-422/RS-485 differential signals are converted into single ended RS-232 signals. The Converter has a DE-9 female connector on one end that mates to the DE-9 male connector found on the rear of most PCs and other serial devices. Besides its use with PCs, the Model 2089F Converters can be used with any 9-pin RS-232 device whose pinout matches that of a PC's COM port. Once equipped with the Converter, the PC or RS-232 device can communicate with other RS-422 or RS-485 devices.

Converter Differences

The 222N9F Converter is physically similar to the 2089F but has less capability. The 222N9F is designed for lower speed applications that do not require data rates greater than 19,600 baud and only provides four-wire RS-422 signals.

Communicate with RS-485 Devices

The Model 2089F and 222N9F Converters can be used in several applications. The most common application is to convert RS-232 signals on a PC's COM port to interface one or more RS-485 or RS-422 devices as shown in Figure 1. The small size of the Converters and its female connector lets it plug directly into the communication port on the rear of the PC computer or onto any device with a 9-pin male RS-232 connector. The device's signal pinouts should match the PC signal pinouts listed in Table 1.



A 2089F or 222N9F Converter

Extend RS-232 Signals

Figure 2 shows how two Model 2089Fs or Model 222N9Fs can be used to extend the distance between two RS-232 devices up to 1,200 meters and at the same time increase their resistance to outside interference. Typical applications are PC-to-PC data transfer or a PC to one or more remote devices. For best results use a cable with two twisted shielded pairs of wires.

The past approach to extending RS-232 links beyond the specified 50 foot limit has been to reduce the baud rate to compensate for cable length and noise pickup. Still, noise sources such as fluorescent light ballasts, motors easily corrupt single ended RS-232 signals and create erroneous data transmission. The reduction in the data transfer rate is objectionable to the user and does not allow newer devices to be used at their higher transfer rates.

- Convert single ended RS-232 signals to RS-485 or RS-422 differential signals. *Bidirectional data transfer with increased noise rejection.*
- Extends RS-232 transmission distance to 1.2 Km. *Overcomes RS-232's 50 foot cable limit.*
- Self powered design *No separate power supply*
- Adds multi-drop capability to an RS-232 signal. *Drives up to 50 loads.*
- Hi-speed 2089F provides 115.2 kbaud data rates. *Works with the fastest data systems.*
- Low-speed 222N9F provides only 4-wire signals. *Saves money where the application permits.*
- 2089F setup by an internal rocker switch. *No jumpers to solder.*
- Meets FCC Class A and European CE requirements. *Should not interfere with other devices.*

CE Approved

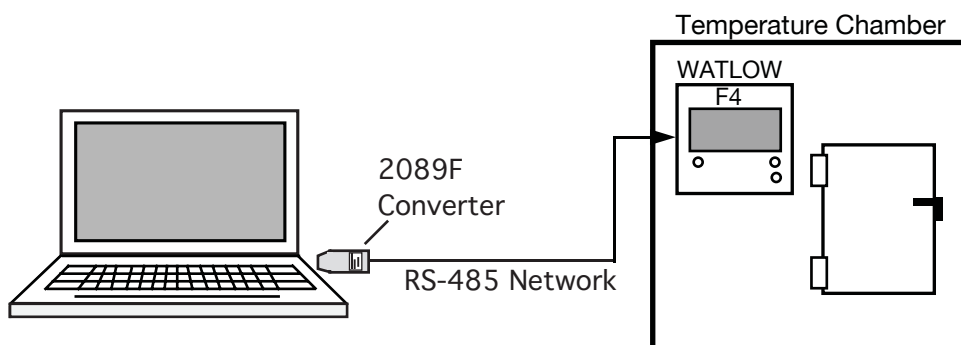


Figure 1 Using a 2089F Converter to connect a Laptop PC to factory equipment

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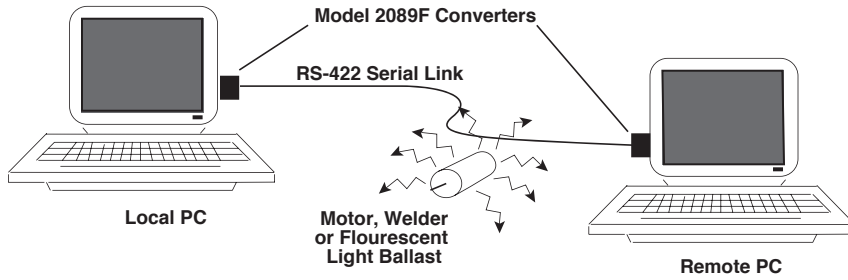


Figure 2 A Pair of 2089F Converters extends Serial Transmission Distance up to 1,200 feet and increases Noise Resistance.

**TABLE 1
PC SIGNAL PINOUT**

Pin Number	Signal
1	Data Carrier Detect
2	Received Data
3	Transmitted Data
4	Data Terminal Rdy
5	Ground
6	Data Set Ready
7	Request to Send
8	Clear to Send
9	-

Connections and Power

The RS-485 or RS-422 signal pairs can plug into a RJ-11/RJ-45 connector on the back side of the converter. If the RS-485 or RS-422 wires do not have a RJ-11/RJ-45 plug, the RJ-11/RJ-45 connector can be bypassed and the RS-485 or RS-422 wires can be connected to screw terminals inside the converter.

2089F Internal Switch

The 2089F has two internal 4 position rocker switches that sets the RS-485 transmit options. See Table 2

TABLE 2

SWITCH S1 SUMMARY TABLE (factory defaults in bold)

Position	Function	OFF Position	ON Position
S1-1	RCV Impedance	16 kOhm typ.	120 Ohm
S1-2*	2-wire/4-wire	4-wire	2-wire
S1-3*	2-wire/4-wire	4-wire	2-wire
S1-4	Echo Mode	Echo OFF	Echo ON

SWITCH S2 SUMMARY TABLE (factory defaults in bold)

Position	Function	OFF Position	ON Position
S2-1	Carrier Control	Constantly ON	RTS
S2-2	RTS/CTS Delay	No Delay	8 mSec
S2-3*	“XMT Off” impedance	High	Intermediate
S2-4*	“XMT Off” impedance	High	Intermediate

SPECIFICATIONS

RS-232 Specifications

Connections	DE 9 pin female connector.
Signals	DCE configuration per EIA/TIA-574 Standard.
Pinouts	See Table 1
Physical	
Size	2.50" L x 1.2" W x 0.75" H (64 mm L x 31 mm W x 19 mm H)
Power	Derived from RS-232 data and control lines
Temperature	Operating 0 to 50 °C

2089F RS-485/422 Specifications

Signals	2 or 4 wire RS-485/RS-422
Transmit Mode	4-wire, full or half duplex; 2-wire half duplex
Output Drive	up to 50 loads
Data Rate	115.2 Kbaud
Distance	1200 meters at 115.2k
Surge Protection	600W power dissipation at 1mS
RTS-CTS Delay	0 or 8 ms selectable
Control Signals	DSR turns “ON” immediately after the terminal raises DTR; DCD turns “ON” after recognizing the receive signal from the line; CTS turns “ON” after the terminal raises RTS.

222N9F RS-422 Specifications

Signals	4 wire RS-485/RS-422
Transmit Mode	4-wire, full duplex
Transmit Level	0 dBm
Output Drive	up to 50 loads
Data Rate	19.2 Kbaud
Distance	1200 meters at 19.2
Surge Protection	Compliant with IEC 801.5 level 2, 1kV
Control Signals	CTS (Pin 8) turns ON immediately after the terminal raises RTS (Pin 7). DSR (Pin 6) and DCD (Pin 1) turn ON immediately after the terminal raises DTR (Pin 4).

ORDERING INFORMATION

RS-232 to RS-422/RS-485 Converter with 9-pin female connector, 115.2 kbaud data rate	2089F
RS-232 to RS-422/RS-485 4-wire Converter with 9-pin female connector, 19.2 kbaud data rate	222N9F

Part Number