

808/847 Multidrop Communications Interface

Explains Correct Termination of
808/847 EIA-422 Communications
Interface

Defines Tri-State and Quiescent State
Conditions

Offers Troubleshooting Guidelines

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Section I

GENERAL DESCRIPTION

The 808/847 temperature controller is available with an EIA-422 (RS-422) communications interface port. This interface is electrically isolated from all other circuits within the controller as well as all inputs, all outputs and the line supply. The isolation boundary is rated to 265vac. It is recommended that this version of the communications interface be used whenever a host computer must be connected to more than one controller as this communications option is designed to support more than one unit on a given interface port.

Section 2

INTERFACE WIRING

2.1

TERMINAL DESIGNATIONS

There are five terminals on the rear terminal block assembly of the 808/847 controller which are associated with the communications interface. These are defined as:

| 808/847 Terminal | EIA-422 Designation | Purpose |
|-----------------------------|--------------------------------|----------------|
| 11 | Common | Common |
| 12 | A | Transmit Data |
| 13 | B | Transmit Data |
| 14 | A | Receive Data |
| 15 | B | Receive Data |

Common, Terminal 11, should be connected to the common terminal of the host computer to reduce the effects of any common mode interference. It must not be connected to cabinet ground at the controller, nor should it be used for the shield connection.

2.2

DATA STATES

The signals at the transmit and receive lines of the communications interface are differential signals; that is to say, they are not referenced to common but are considered with respect to each other. The logic condition is defined by whether a particular transmit or receive terminal is positive with respect to the other transmit or receive terminal. The signal level of any transmit, or receive terminal with respect to common is not critical provided the common mode voltage does not exceed the EIA-422 specified limit of plus twelve volts or minus seven volts.

The transmitter of the 808/847 EIA-422 interface will enter a high impedance state when it is not actively transmitting. When this transmitter assumes the high impedance state, the voltage levels at the output terminals will be dictated by the other instruments to which it is connected.

Receiver terminals are high impedance but do have termination resistors mounted internally within the 809/847. With high impedance terminations or no other external connections, terminal 14, A', will be pulled negative with respect to terminal 15, B'.

The transmit terminals will assume one of two conditions while actively transmitting.

A binary 1 (MARK or OFF) state is asserted when terminal 12, A, is negative with respect to terminal 13, B. A binary 0 (SPACE or ON) state is asserted when terminal 12, A, is positive with respect to terminal 13, B.

The receive terminals will recognize one of two configurations

A binary 1 (MARK or OFF) State is received when terminal 14, A', is negative with respect to terminal 15, B'. A binary 0 (SPACE or ON) state is received when terminal 14, A', is positive with respect to terminal 15, B'.

Note that if all connections to the receive terminals are left in the tri-state condition, the receiver will read a binary 1 (MARK or OFF) state.

Section 3

TROUBLESHOOTING AND SOFTWARE NOTES

3.1

LABELING CONVENTIONS

In connecting an 808/847 controller EIA-422 interface to some form of computer or data interface device it is important to understand which terminal on the interface is considered A, B, A' or B'. In many instances the terminations are labeled as Transmit plus and minus and Receive plus and minus. This can be confusing and lead to reverse polarity wiring,. Reverse polarity wiring will not damage the equipment but will result in inverted data and corrupted communications responses.

If data is transmitted to the 809/847 and this data is correct and understood, the LED dot in the upper left corner of the 808/847 display will flicker as the 808/847 transmits the reply. If the data to the 808/947 is assumed to be good but the controller does not respond it may be appropriate to interchange the wires on terminals 14, A', and 15, B'. If, on the other hand, the data being transmitted to the 808/847 causes the LED dot in the upper corner of the display to flash but data is not received correctly by the host computer, it may be appropriate to interchange wires on terminals 12, A, and 13, B.

Note that if data is transmitted to the 808/847 but the LED dot in the upper left corner of the display window does not flash, the suspect area is the transmission from he host system and not the transmission from the controller

3.2

DATA RECEIVER

The data receiver in the 808/847 expects to receive a binary 1 (MARK or OFF) state with terminal 14, A', negative with respect to terminal 15, B', while the communications port is in the idle condition. A transition from the binary 1 condition to the binary 0 condition will be considered the

leading edge of the start bit signifying the beginning of the transmission and cause activation of the receive channel in the 808/847. If the transmitter connected to the 808/847 does not assume the tri-state condition when idle but assumes a binary 0 state, the 808/847 will not recognize the beginning of the data transmission unless the transmitter first switches to a binary 1 state before beginning the transmission.

3.3

DATA TRANSMITTER

While the 808/847 transmitter is in the idle condition, the output will be in the tri-state condition. This will allow the terminals to be shifted to any appropriate voltage level by other devices on the port. When the transmit port of the 809/847 begins its data transmission, it will first bring the transmit port out of the tri-state condition and assert a binary 1 forcing terminal 12, A, negative, with respect to terminal 13, B. The start bit, signified by a binary 0, will be asserted in approximately 100 microseconds after the transmit port becomes active.

EIA standard EIA-422 (formerly RS-422) is available from:

Electronics Industries Association
2001 I Street, N.W.
Washington, D.C. 20006