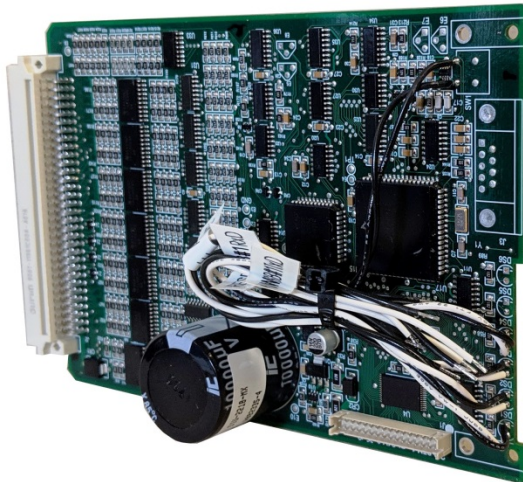


SIU-2218-MX

Serial Interface Unit Operations Manual

THIS MANUAL CONTAINS TECHNICAL INFORMATION FOR THE
SIU-2218-MX SERIES SERIAL INTERFACE UNIT

REVISION: NOVEMBER 2018
pn 888-0218-002MX



EBERLE DESIGN INC.

3510 East Atlanta Avenue
Phoenix, AZ 85040 USA
www.EDIttraffic.com

Tel (480) 968-6407
Fax (602) 437-1996



THE SIU-2218-MX SERIES IS DESIGNED AND MANUFACTURED IN THE USA
BY EBERLE DESIGN INC., PHOENIX, ARIZONA
AN ISO 9001:2008 REGISTERED COMPANY.

INFORMATION CONTAINED HEREIN IS PROPRIETARY TECHNICAL INFORMATION
OF EBERLE DESIGN INC. PUBLICATION, REPRODUCTION OR USE IN WHOLE OR
PART IS NOT PERMITTED EXCEPT UNDER TERMS AGREED UPON IN WRITING.

© COPYRIGHT 2013 EDI.

Table of Contents

Section 1 GENERAL	1
1.1 Overview	1
1.2 Input / Output Configuration	1
1.3 Ports 1	
1.4 SIU Addressing	1
1.4.1 SB #1 Address Assignment Report	1
Section 2 SIU FUNCTIONS	2
2.1 Power Requirements	2
2.2 Inputs/Outputs	2
2.2.1 Logic Level	2
2.2.2 Opto-Isolated Inputs	2
2.3 Serial Bus #1	2
2.3.1 Electrical	2
2.3.2 Frame Types	2
Section 3 FRONT PANEL DESCRIPTION	3
3.1 Indicators	3
3.1.1 Active Indicator	3
3.1.2 Power Indicator	3
3.1.3 SB #1 TxD Indicator	3
3.1.4 SB #1 RxD Indicator	3
3.2 Reset Button	3
3.2.1 SB #1 Address Assignment Report	3
Section 4 SPECIFICATIONS	4
4.1 Electrical	4
4.2 Mechanical	4
4.3 Environmental	4
Section 5 CONNECTOR ASSIGNMENTS	5
5.1 Main DIN Connector	5
5.2 LED and RESET Switch Wiring Guide	5

Section 1 GENERAL

1.1 OVERVIEW

The role of the Serial Interface Unit (SIU) is to read input and drive output data for each Output or Input Assembly and report this data to the ATC via Serial Bus #1 in an ITS Cabinet or ATC cabinet. The EDI model SIU-2218-MX meets with or exceeds all specifications outlined in the AASHTO/ITE/NEMA *Intelligent Transportation Systems (ITS) Standard Specification for Roadside Cabinets V01.02.17b* document.

1.2 INPUT / OUTPUT CONFIGURATION

The SIU can be configured with fifty four programmable Inputs or Outputs, along with four opto-coupled inputs. It also provides a Line Frequency Reference input and Assembly Address output.

1.3 PORTS

The Serial Bus #1 port is used to communicate directly to the Controller Unit of the cabinet and is the main port for controlling the functions of the SIU. The SIU also provides the Port 4 INBUS function for connecting the rack serial bus directly to the Serial Bus #2 of the cabinet.

1.4 SIU ADDRESSING

The Address Select input pins ADDRESS 0, ADDRESS 1, ADDRESS 2, and ADDRESS 3 define the Serial Bus #1 address of the SIU. The pins are left open for a logical False, and are connected to 24VDC GROUND for a logical True.

- NOTE -

The RESET button of the SIU must be pressed following any change in the SIU Serial Bus #1 Address Inputs. The SIU will only recognize a new address following a RESET or Power-up cycle.

1.4.1 SB #1 ADDRESS ASSIGNMENT REPORT

The SIU will report its current Serial Bus #1 address using the SB #1 RxD indicator. When the RESET button is held depressed, the SIU will pulse the SB #1 RxD indicator for a count sequence equal to the address assignment. This count sequence will repeat as long as the RESET button is held depressed. The SIU will continue to operate normally in this mode.

Section 2 SIU FUNCTIONS

2.1 POWER REQUIREMENTS

The SIU requires a nominal supply voltage of 24 VDC \pm 2 VDC. A voltage of 16 VDC or less is considered loss of power and a voltage of 18 VDC or more is considered adequate for operation. On initial application of power, current draw is limited to a maximum of 1.25 amperes peak. Upon reaching steady state, the SIU requires no more than 200 mA over the voltage range of 16 to 30 VDC. The SIU may be plugged in or unplugged while under power without the risk of damage.

2.2 INPUTS/OUTPUTS

2.2.1 LOGIC LEVEL

The SIU provides 54 configurable I/O lines. An input voltage less than 8 VDC is considered the Low (True) state, and a voltage greater than 16 VDC is considered the High (False) state. Over the range of 0 to 26 VDC the input current in or out does not exceed 10 mA. The Input impedance to 24 VDC is typically 10 K Ohms.

The Low (True) state will drive an output voltage to less than 4 VDC while sinking up to 100 milliamperes. With an external impedance of 100 K Ohms or greater the output will transition from 4 to 16 VDC in less than 0.1 milliseconds. High (False) state impedance is typically 10 K Ohms to 24 VDC.

2.2.2 OPTO-ISOLATED INPUTS

The SIU provides four dedicated optically isolated inputs. Each opto-input provides at least 10 M Ohms resistance and 1000 VAC RMS minimum breakdown to all connector pins except the opto common pin. These inputs exhibit a nominal impedance of 5 K Ohms. An input voltage of 3 Vrms or less is False and 8 Vrms or greater is True.

2.3 SERIAL BUS #1

2.3.1 ELECTRICAL

The Tx Data+, Tx Data- and Rx Data+, Rx Data- and Tx Clock+, Tx Clock - and Rx Clock +, Rx Clock -circuit pairs consist of two interface links conforming to the requirements of the Electronic Industries Association EIA-485, Standard for Electrical Characteristics of Generators and Receivers for use in Balanced Digital Multipoint Systems, dated April 1983.

All voltage potentials on the interface links are referenced to LOGIC GROUND. If provided, shields shall be terminated to Equipment Ground.

2.3.2 FRAME TYPES

The SIU is configured to respond to frame definitions and protocol defined in the documents referenced in Section 1.1

Section 3

FRONT PANEL DESCRIPTION

3.1 INDICATORS

3.1.1 ACTIVE INDICATOR

A red ACTIVE indicator will illuminate in response to commands received from the ATC on Serial Bus #1.

3.1.2 POWER INDICATOR

A green POWER indicator will illuminate to indicate DC voltage is proper. The POWER indicator will flash at a 2Hz rate until the +24VDC input is greater than 16 Vdc and the NRESET input is false.

3.1.3 SB #1 TXD INDICATOR

A yellow SB #1 TxD indicator will pulse On each time the SIU transmits a frame on Serial Bus #1.

3.1.4 SB #1 RXD INDICATOR

A yellow SB #1 RxD indicator will pulse On each time the SIU correctly receives a frame on Serial Bus #1.

When the RESET button is held depressed, the SIU will pulse the SB #1 RxD indicator for a count sequence equal to the address assignment. See Section 1.4.

3.2 RESET BUTTON

Depressing the RESET button resets the SIU. When the RESET button is depressed all indicators will be illuminated for 300 milliseconds. Continuously depressing the Reset button will not affect SIU operation.

3.2.1 SB #1 ADDRESS ASSIGNMENT REPORT

The SIU can report its current Serial Bus #1 address using the SB #1 RxD indicator. When the RESET button is held depressed, the SIU will pulse the SB #1 RxD indicator for a count sequence equal to the address assignment. See Section 1.4. This count sequence will repeat as long as the RESET button is held depressed. The SIU will continue to operate normally in this mode.

Section 4 SPECIFICATIONS

4.1 ELECTRICAL

Power Requirements

Operating Voltage 18 to 30 Vdc
Power Consumption 5 Watts Maximum

Logic Inputs

Not Active (False)..... greater than 16 Vdc
Active (True)..... less than 8 Vdc

Opto Inputs

Not Active (False)..... less than 3 Vrms
Active (True)..... greater than 8 Vrms

4.2 MECHANICAL

Height..... 4.500 inches
Width 2.340 inches
Depth (front PCB edge to rear edge of DIN connector)..... 6.868 inches

4.3 ENVIRONMENTAL

Storage Temperature Range -45 to +85 °C
Operating Temperature Range -34 to +74 °C
Humidity (non-condensing)..... 0 to 95% Relative

Section 5 CONNECTOR ASSIGNMENTS

5.1 MAIN DIN CONNECTOR

The SIU main connector is a three row DIN 4161296 Header Type:

Pin	Description	Pin	Description	Pin	Description
A1	+24 VDC in	B1	+24 VDC in	C1	Input / Output 47
A2	Input / Output 0	B2	Input / Output 1	C2	Input / Output 48
A3	Input / Output 2	B3	Input / Output 3	C3	Input / Output 49
A4	Input / Output 4	B4	Input / Output 5	C4	Input / Output 50
A5	Input / Output 6	B5	Input / Output 7	C5	Input / Output 51
A6	Input / Output 8	B6	Input / Output 9	C6	Input / Output 52
A7	Input / Output 10	B7	Input / Output 11	C7	Input / Output 53
A8	Input / Output 12	B8	Input / Output 13	C8	SB1 TxD +
A9	Input / Output 14	B9	Input / Output 15	C9	SB1 TxD -
A10	Input / Output 16	B10	Input / Output 17	C10	SB1 RxD +
A11	Input / Output 18	B11	Input / Output 19	C11	SB1 RxD -
A12	Input / Output 20	B12	Input / Output 21	C12	SB1 TxC +
A13	Input / Output 22	B13	Input / Output 23	C13	SB1 TxC -
A14	Input / Output 24	B14	Input / Output 25	C14	SB1 RxC +
A15	Input / Output 26	B15	Input / Output 27	C15	SB1 RxC -
A16	Input / Output 28	B16	Input / Output 29	C16	LINESYNC +
A17	Input / Output 30	B17	Input / Output 31	C17	LINESYNC -
A18	Input / Output 32	B18	Input / Output 33	C18	NRESET +
A19	Input / Output 34	B19	Input / Output 35	C19	NRESET -
A20	Input / Output 36	B20	Input / Output 37	C20	ASSEMBLY ADR
A21	Input / Output 38	B21	Input / Output 39	C21	INBUS RTS
A22	Input / Output 40	B22	Input / Output 41	C22	SB2 TxD +
A23	Input / Output 42	B23	Input / Output 43	C23	SB2 TxD -
A24	Input / Output 44	B24	Input / Output 45	C24	SB2 RxD +
A25	Input / Output 46	B25	Opto Input 1	C25	SB2 RxD -
A26	Opto Input 2	B26	Opto Input 3	C26	SB2 TxC +
A27	Opto Input 4	B27	Opto Input Ground	C27	SB2 TxC -
A28	Address – 0	B28	Address – 1	C28	SB2 RxC +
A29	Address – 2	B29	Address – 3	C29	SB2 RxC -
A30	INBUS TxD	B30	INBUS RxD	C30	INBUS TxC
A31	Equipment Ground	B31	AC Line Reference	C31	INBUS RxC
A32	24 VDC Ground	B32	24 VDC Ground	C32	SIU/BIU

5.2 LED AND RESET SWITCH WIRING GUIDE

Indicator / Switch	Wire Color / Connect To	Wire Color / Connect To
ACTIVE	Black / LED Cathode	White / LED Anode
POWER	Black / LED Cathode	White / LED Anode
SB #1 TxD	Black / LED Cathode	White / LED Anode
SB #1 RxD	Black / LED Cathode	White / LED Anode
Reset	Black / Norm Open A	Black / Norm Open B