Niobrara Research & Development Corporation

P.O. Box 3418; Joplin, MO 64803
Telephone: (417) 624-8918   Facsimile: (417) 624-8920

SIM   Seriplex® Input Multiplexor

Introduction

The Seriplex® Input Multiplexer is a device which allows strings of Seriplex input devices to be multiplexed back to the Seriplex Master device. This theoretically extends the input capability of a seriplex network from 255 discrete bits to 3,824 discrete bits. The SIM operates using the Multi-plexing scheme of Seriplex in either Mode 1 or Mode 2.

The SIM allows a "branch" network of Seriplex inputs to be run off of the main Seriplex "trunk". The SIM is assigned a multiplex address (using a dip switch) and all of the inputs on the branch will be seen on the trunk only when the Seriplex Multiplex address sent by the Master (or clock module) matches the multiplex address of the SIM.

The SIM may be thought of as a switch that controls the connection of the DATA line of the branch network to the main network. (Figure 1).   The SHIELD, COMMON, POWER, and CLOCK lines on the Branch are always con-nected to the Main network. When the Master (clock) on the Main network sends the Multiplex channel address for the SIM, the SIM effectively closes the switch and allows the Seriplex inputs on the Branch to send their data to the Main network.
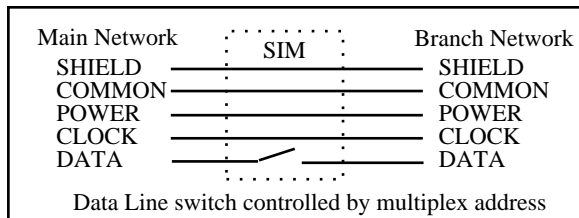

Figure 1   SIM Functionality

SIM Configuration

The SIM is configured through a DIP switch on its front. This switch is used to set the multiplex channel address for the SIM, a troubleshooting disable feature, and the Seriplex network Mode of operation. The SIM automatically adjusts itself to the network clock rate and size.

Table 1 provides a summary of the function of each switch. Switches 1, 2, 3, and 4 form a binary representation of the multiplexed channel number. Switches 5 and 6 are not used and should be left OFF (down). Switch 7 may be used to temporarily disable the SIM and force the "DATA switch" to latch ON and effectively short the Branch to the Main. This switch should normally be left OFF (down). Switch 8 sets the SIM for the mode of the network as MODE 1 or MODE 2. All Seriplex devices on the network must be set to the same MODE.

Table 1   DIP Switch Description

Switch Number	Function (Down/OFF)	Function (Up/ON)
1	Channel + 0	Channel + 1
2	Channel + 0	Channel + 2
3	Channel + 0	Channel + 4
4	Channel + 0	Channel + 8
5	Not used	Not used
6	Not used	Not used
7	Normal Operation	SIM Bypassed (Disabled)
8	MODE 1	MODE 2

Table 2   Channel Number Switch Settings

Channel	SW1	SW2	SW3	SW4
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1
9	1	0	0	1
10	0	1	0	1
11	1	1	0	1
12	0	0	1	1
13	1	0	1	1
14	0	1	1	1
15	1	1	1	1

1 = ON (up), 0 = OFF (down)

Figure 2 displays the DIP switch settings for a SIM set for Channel 5 and MODE 2 operation. From 1 to 8, the settings are 10100001 (ON, OFF, ON, OFF, OFF, OFF, OFF, ON).
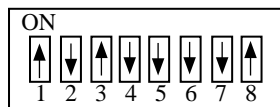

Figure 2   Switch Example for Channel 5, MODE 2

Electrical Connection

The SIM provides two terminal connectors for the Seriplex network Main and Branch connections. It is recommended that the user follow the standard Seriplex color code for all Seriplex connections. Table 3 shows the standard color code.

Table 3   Seriplex Color Code

Color	Description
Bare	SHIELD
Black	COMMON
Red	POWER
Green	CLOCK
White	DATA

Example

A large Seriplex network must be assembled with up to 80 bits of input and output on the Main network and up to 477 additional input points on multiplexed Branch networks. Only three Branch networks are necessary to meet the requirements. (Figure 3)

The host controller (Master) is configured for the following: Host MODE 2, Seriplex bus size 256 bits including 96 non-multiplexed bits and 10 multiplexed words (160 bits). Bits 96 through 255 are multiplexed across 4 channels. Seriplex bits 1, 2, 3, and 4 are reserved for multiplex channel control. The Seriplex clock speed is set to 64 kilohertz.

Notice that the Master is set to 4 multiplexed channels. This application only requires 3 channels but the Master only offers 0, 4, 8, 12, or 16 channels. This extra channel could be used by another SIM branch network or another Multiplex device with no loss of system performance.

All of the time sensitive inputs are placed on the Main network in bits 5 through 95. These inputs are updated on every scan of the network (approx. 16.3mS). All outputs must be placed on the Main network in bits 5 through 95. Again, these are updated on every scan.

The input devices on the Branch lines are all addressed for bits 96 through 255. These addresses may appear on each

Branch line but may not appear on the Main. The complete scan time for the multiplexed networks is about 65.2mS.
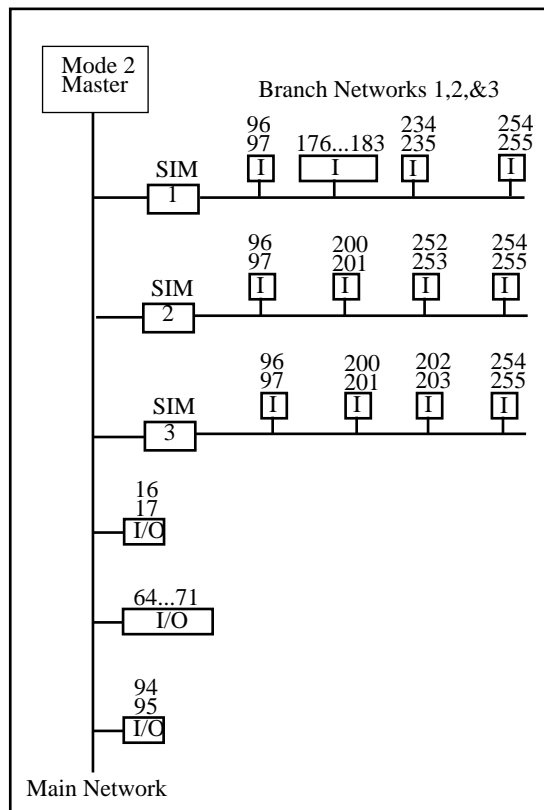

Figure 3   SIM Example Network

All three SIMs are configured for MODE 2 with switch 8 ON. The settings of the DIP switches are listed in Table 4.

Table 4   Example DIP Switch Settings

SIM	DIP Switch (12345678)
1	00000001
2	10000001
3	01000001

Troubleshooting

Check the Channel address, Mode, and power. The SIM requires 12 or 24VDC to function. Be sure that the power supplies on the network will support the entire load of the Main and Branch lines. The Master (clock) module on the network provides the current source for the network; do not overload its rating with too many modules. Dip switch 7 may be used to disable the SIM. When ON, the DATA line will be directly connected to the Main network and the data from its Branch will appear in all multiplexed channels.