220 Ballardvale Street, Suite D
Wilmington, MA 01887

Tel: 978-694-1006
Fax: 978-694-4006
info@agiltron.com
www.agiltron.com

Evaluation Kit & Driver User's Guide©

1. Introduction

This document describes the operation of the Evaluation Kit and Driver Ver. SW-DR-1 for exclusive use with the Agiltron MxN CrystaLatch™ (CL) series, LightBend™ (LB) series optical switches and DD series digital photonic delay lines. The evaluation board integrates both RS-232 and TTL interfaces and provides the control logic and configurations for customized control of NxM optical switches. A Windows® application program is included for evaluation, testing, and demonstration of switch and delay line operation.

The Evaluation Kit includes an electronic circuit board, a serial port connection cable, and a power supply.

The delivered Evaluation Kit circuit is internally programmed for drive compatibility with only one switch configuration.

2. Circuit board layout and functions

Fig. 1 shows the layout of evaluation kit circuit board (control board and switch board) for reference in the following description of operation.

Hardware Control Functions

16-Pin Header (**J1**): User-configured control connector for TTL and RS232 with pin-out defined in Table 1.

DIP Switch (**J2**): Data input for TTL Emulator control

Push Button Switch (**WRITE**): Write TTL Emulator input (as set by Dip Switch) to set switch state.

Push Button Switch (**READ**): Read TTL Emulator output (switch status) from switch controller to the switch and trigger LED indicator

LED Indicator (**D1~5**): Indicates switch triggering performing Read Switch operation using the TTL Emulator function. The switch status is defined with 5 bits as in section 7

LED Indicator (**D6, D7**): Power On indicator

DB9-Male (**J3**): Connector for communication with computer using serial port cable. Only the cable supplied with Evaluation Kit should be used to insure a successful connection.(Connection of the cable is straight through)

Power Jack (**J5**): Power supply connector. Power supply (+5V) is supplied with Evaluation Kit.

Electronic Connector (**J8)**: 14-pin connector for connecting switch to board for external connection to switch.

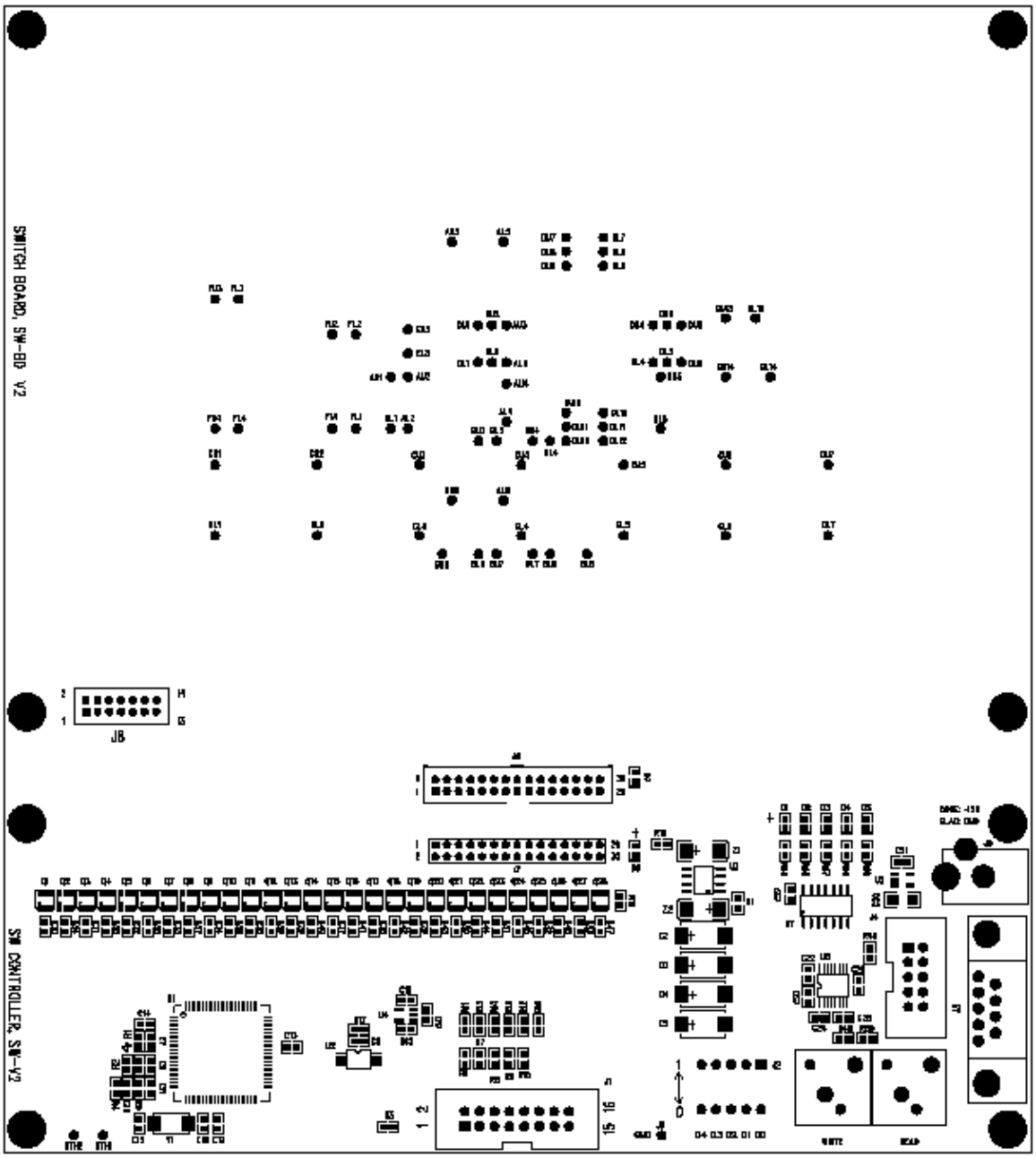

Fig. 1: Layout of evaluation kit circuit board.

Table 1 Connector Pin-Out (J1)

Pin #	Symbol	I/O	Description
1	+5V	In	+5V power supply
2	GND		Ground
3	D0	I/O	Switch status (least significant bit)
4	D1	I/O	Switch status
5	D2	I/O	Switch status
6	D3	I/O	Switch status
7	D4	I/O	Switch status (most significant bit)
8	NC		No Connect
9	WRITE	In	High to low transition triggers switching Minimum time at low: 10µs
10	READ	In	High to low transition triggers reading Minimum time at low: 10µs Data remain valid at REDA low
11	BUSY	Out	BUSY goes from high to low within 5µs at WRITE/READ trigger. Then it goes from low to high at completion of WRITE/ READ
12	NC		No Connect
13	Tx	Out	Tx of RS232 (LVTTL)
14	Rx	In	Rx of RS232 (LVTTL)
15	GND		Ground
16	+5V	In	+5V Power Supply

3. Electrical Specifications

Table 2 provides the electrical specifications of the switch driver circuit board provided in the Evaluation Kit.

Table 2 Electrical Specifications

Parameters	Min	Nom	Max	Unit	Notes
Number of Coils	1		14		
Switching Voltage		2.5 or 5		V	Vsw ≅ 5–(Rs+0.35)×Isw Rs: Resistance of Series Resistor Isw: Switching current in A
Switching Current (Pulse)			2	A	Individual coil
Total Switching Current (Continuous)			1.2	A	
Output Pulse Width	50		32,767	µs	Adjustable by calibration software
Power Supply Voltage	4.75	5.0	5.25	V	
Power Supply Current (No Switching)			50	mA	Hot pluggable. Less than 1.5A inrush current
RS232		±7		V	Direct connection to PC
Module Temperature Reading Accuracy		±3		°C	Microcontroller built-in sensor
External Thermistor Temperature Reading Resolution		10-Bit			Un-calibrated

4. Switch Configuration Setting

Agiltron has configured the Truth-Table logic in the circuit board firmware for a specific switch type.

5. Control MxN switch through Windows® and serial port computer connection

Please refer to Agiltron's *Fiberoptic Switch Evaluation Kit Windows® Switch Operation Program User's Guide©*

This document is included with the Evaluation Kit both in hard copy and on the accompanying CD.

6. Control MxN Switch through RS-232 in Command/Response format

Agiltron provides a switch control interface for customized programming through RS-232. The command set is compatible with most current versions of software development environments. The commands and responses are of fixed length binary format given in Table 3. There are 4 bytes for command and 4 bytes for response. The command set is provided in Table 4.

Table 3: RS232 Command/Response Format

Command:	<Addr>	<Code>	<Dx>	<Dy>
Response:	<Addr>	<Code>	<Dx>	<Dy>

<Addr> <Code>	Module Address: 0 for all modules and 1-255 for specified module. Default: 1 Control Code: Refer to Command Code Table
<Dx>	One byte data, high byte
<Dy>	One byte data, low byte

Table 4: RS232 Command Code Table

Code	Description
0x01	Read Module Address Address = <Dx> <Dy>
0x02	Set Module Address <Dx> <Dy> = 1 ~ 255
0x03	Read Module Serial Number (Higher 2 Bytes) S/N (Higher 2 Bytes) = <Dx> <Dy>
0x04	Read Module Serial Number (Lower 2 Bytes) S/N (Lower 2 Bytes) = <Dx> <Dy>
0x05	Read Module Type Type = <Dx> <Dy> (m × n switch: n — first two digits from left; m — third and fourth digit from left)
0x06	Read Module Version Hardware Version = <Dx> / 10; Firmware Version = <Dy> / 10
0x11	Read Switch Status N = <Dx><Dy> ($D_4D_3D_2D_1D_0$ = N-1)

0x12	Set Switch to Status N (N = $D_4D_3D_2D_1D_0$+1, 1≤N<≤32) <Dx><Dy> = N
0x13	Read Individual Switch Status Status = <Dx><Dy>. Bit-M: 0 — Switch (M+1) L Position; 1 — Switch (M+1) U Position;
0x14	Set Individual Switch Positions <Dx><Dy> Bit-M: 0 — Switch (M+1) L Position; 1 — Switch (M+1) U Position;
0x21	Read Module Alarm Normal: <Dx> <Dy> = 0 Temperature Alarm: [Bit-0 of <Dx> <Dy>] = 1 Power Supply Alarm: [Bit-1 of <Dx> <Dy>] = 1
0x22	Read Module Temperature T(°C) = <Dx> <Dy> / 10
0x23	Read Power Supply Voltage V(mV) = <Dx> <Dy>
0x31	Read Low Temperature Alarm Threshold T(°C) = <Dx> <Dy> / 10
0x32	Set Low Temperature Alarm Threshold <Dx> <Dy> = 10 × T(°C)
0x33	Read High Temperature Alarm Threshold T(°C) = <Dx> <Dy> / 10
0x34	Set High Temperature Alarm Threshold <Dx> <Dy> = 10 × T(°C)

7. Control of MxN switches using TTL interface

Switch control can also be implemented through the TTL interface. TTL control is provided through J1 connectors with its definition provided in Table 1. The switch position status is defined by three-bits, given in Table 5.

Table 5: TTL Bit Definition

$D_4D_3D_2D_1D_0$	00000	00001	00010	…	…	11101	11110	11111
Status	1	2	3	…	…	30	31	32

Timing diagram of TTL interface is illustrated in Fig.3.

8. Control MxN Switch with TTL interface emulator

TTL control emulation is provided on the evaluation board and is controlled as follows.

Read switch port status: Set D0~4 on **Dip Switch (J2)** to position 1. Press and hold READ push button switch and D1~5 will indicates port status

Set switch port: Set D0~4 on **Dip Switch (J2)** to specified positions refer to Table 5. Press WRITE push button switch

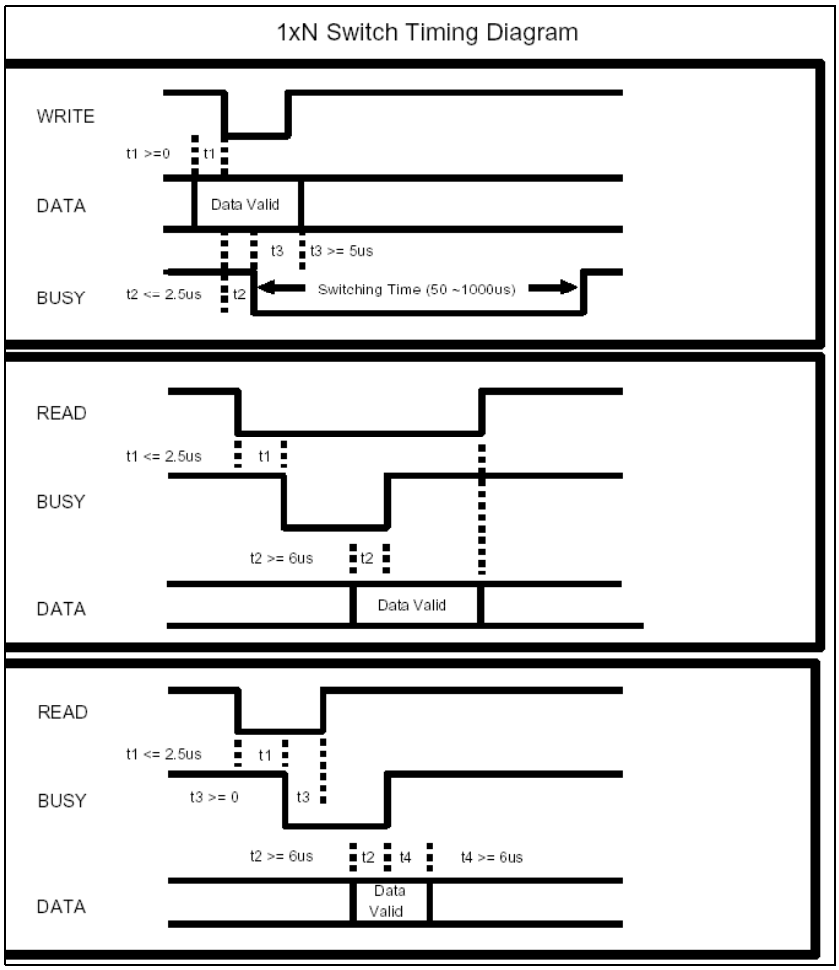

Fig. 3: Timing diagram of TTL Interface