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MEMS Switch Evaluation Kit & Driver User's Guide©

1. Introdution

This document describes the operation of the MEMS Switch Evaluation Kit and Driver Ver. SW-DR-3 for exclusive use with the Agiltron MxN MEMSLatch™ series.
The evaluation board integrates RS232 or USB based Virtual COM Port plus 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 and functions

Fig. 1 & 2 repectively shows the layout of RS232 and USB based VCP evaluation kit circuit board for reference in the following description of operation.

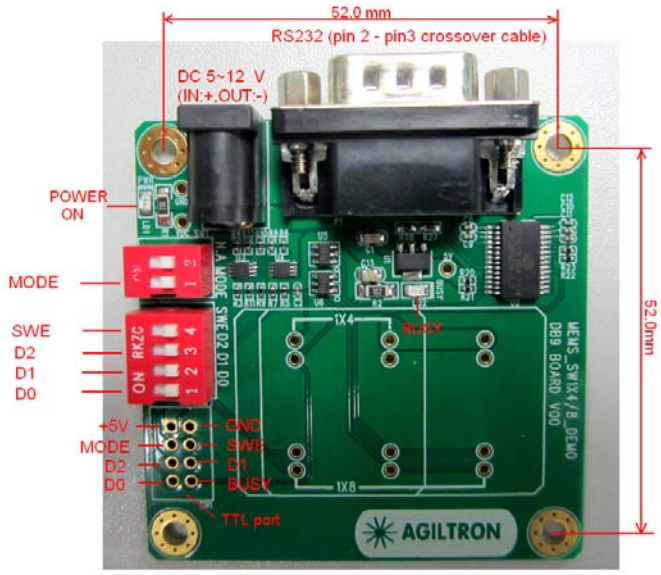


Fig. 1: Layout of RS232 control board.
Board's size: 60* mm L x 60 mm W x 15 mm H
(*: protrusion of RS232 connector is not included)

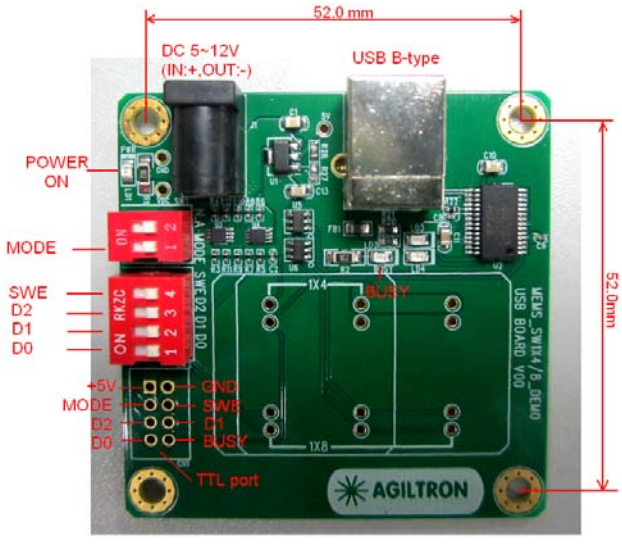


Fig. 2: Layout of VCP control board
Board's size: 60 mm L x 60 mm W x 15 mm H

3. Functional Descriptions

2-Pin DIP switch: MODE selection, ON possiton is for RS232 mode, OFF possition is for TTL mode
4-Pin DIP switch: SWE control and TTL data input.
J1: Power supply connector, possitive inside and negative outside, operating range is 5V~16V.

CN1: External TTL connection port. When using this port, push all DIP switches to OFF possition.
P1: RS232 connector, DB9 male type, connect to PC with pin 2-3 crossover cable.
Or USB B-type connector, connect to PC with standard B-type head USB cable.
LD1: Power ON indicator.
LD2: BUSY indicator.

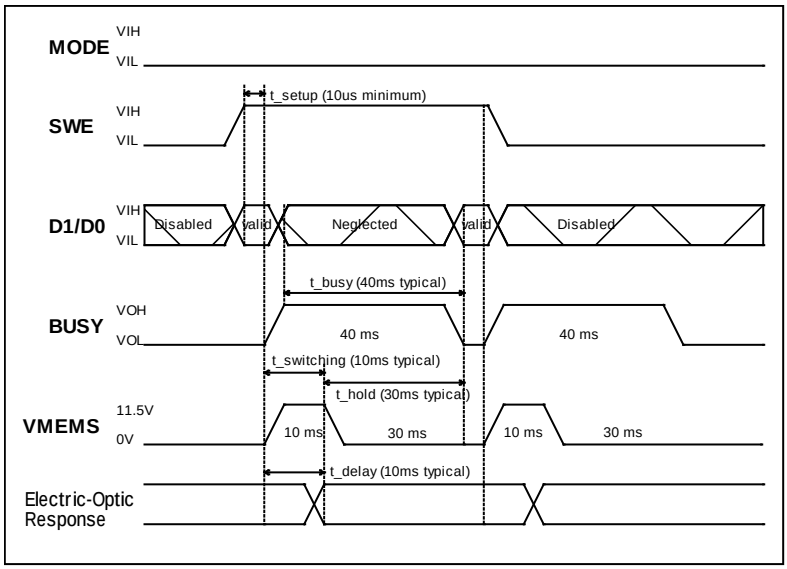
4. TTL Mode (MODE DIP selction: **oppsite** possition of **ON**)

Table 3.1. TTL Driving Table

Control Input Pins (Note 1)					Optical Path Directing	Status Output Pin (Note 1)
MODE	SWE	D2	D1	D0		BUSY
L	H	L	L	L	Comm→Port 1	H: Device is at busy status, D2,D1,D0 input will not be accepted under this condition. L: Device is at free status and is able to accept D2,D1,D0 input.
		L	L	H	Comm→Port 2	
		L	H	L	Comm→Port 3	
		L	H	H	Comm→Port 4	
		H	L	L	Comm→Port 5	
		H	L	H	Comm→Port 6	
		H	H	L	Comm→Port 7	
		H	H	H	Comm→Port 8	
	L	X	X	X	No change	

Note 1 **H:** DIP's **ON** possition, **L:** DIP's **opposite** possition of ON, **X:** don't care

Figure 3.1. Example of TTL Driving Timing Diagram



5. UART Mode (MODE DIP selction: **ON** possition)

5.1. UART Port Settings

Baud rate: 9600 bps, data length: 8 bits, parity: none, stop bit length: 1 bit.

Table 4.1. UART Command Format

Command (Host to Device):	<Addr>	<Code>	<Dx>	<Dy>	
Response (Device to Host):	<Addr>	<Code>	<Dx>	<Dy>	

<Addr>	One byte module address: 0 for all modules and 1-255 for specified module. Default: 1
<Code>	One byte control instruction code: Refer to Table 4.2. Command Codes.
<Dx>	One byte parameter data, higher byte.
<Dy>	One byte parameter data, lower byte.

Table 4.2. UART Command Codes

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> (D4D3D2D1D0 = N-1)
0x12	Set Switch to Status N (N = D4D3D2D1D0+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(℃) = <Dx> <Dy> / 10
0x23	Read Power Supply Voltage V(mV) = <Dx> <Dy>
0x31*	Read Low Temperature Alarm Threshold T(℃) = <Dx> <Dy> / 10
0x32*	Set Low Temperature Alarm Threshold <Dx> <Dy> = 10 × T(℃)
0x33*	Read High Temperature Alarm Threshold T(℃) = <Dx> <Dy> / 10
0x34*	Set High Temperature Alarm Threshold <Dx> <Dy> = 10 × T(℃)

*: Not supported for this version.

5. Electrical Specifications

Table 5.1. Absolute Maximum Ratings

Parameter	Min	Typ	Max	Units
Operating Temperature Range	-10	--	70	℃
Storage Temperature Range	-40	--	85	℃
Voltage on VDC with Respect to GND	-0.3	--	16.0	V
Voltage on any Port I/O Pin with Respect to GND	-0.3	--	5.5	V
Note: Stresses outside of the range of the “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the devices at those or any other conditions outside of those indicated in the operation listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.				

Table 5.2. Electrical Characteristics

Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage Range of VDC	Operating Range	5.0	12.0	16.0	V
Supply Surge Current on VDC	@Path Switching, VDC=12V	--	--	1.3	A
Supply Average Current on VDC	Repetitive switching in 20Hz,VDC=12V Idle, VDC=12V	-- --	-- --	0.3 0.01	A
Output High Voltage (VOH) of BUSY	IOH = –10 μA, VDC=12V IOH = –3 mA, VDC=12V IOH = –10 mA, VDC=12V	4.75 4.3 --	-- -- 4.2	-- -- --	V
Output Low Voltage (VOL) of BUSY	IOL = 70 μA IOL = 8.5 mA	-- --	-- --	0.04 0.4	V
Input High Voltage (VIH)	VDC = 12V	3.5	--	5.5	V

on D2, D1/RX, D0/TX, SWE, MODE					
Input Low Voltage (VIL) on D2, D1/RX, D0/TX, SWE, MODE	VDC = 12V	0	--	1.5	V
Input Leakage Current on D2, D1/RX, D0/TX on SWE, MODE	VDC = 12V	-- --	-- --	±5 50	µA