Bowling Scoring System

LATITUDE PINSETTER INTERFACE (CONTROL) BOX

PMP SOLUTIONS SDN. BHD.

Table of Contents

1. Revision history

| Date	Version	Changes/Description
7/1/2021	V1.0	First Release
12/1/2021	V1.1	Mechanical characteristic added

2. Overview

The Latitude Pinsetter Interface Box is the main component used for communication between our scoring computers and your pinsetter. The Interface has different communication options to allow it to easily interface with most brands of pinsetters. Communication to the pinsetter can be accomplished using the Serial ports imbedded into the interface box. Supported interfaces are RS485, RS232 and RS422 when communication with serial-based pinsetters is required. For older model pinsetters, there are 8 opto-isolated inputs and 8 relay outputs.

3. Ethernet Port:

The scoring computer (lanes computer) or center management system can be connected to the Latitude control box using standard IEEE 802.3 Ethernet interface. We HIGHLY recommend that shielded cable be used to avoid any noise interference from the surrounding environment.

There are two status LEDs on the ethernet connector:
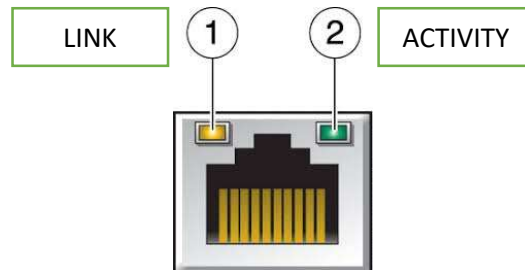
LED 1 (Orange/Green) is LINK LED. This LED indicates that there is an active connection on the Ethernet port.

LED 2 (Green) is Activity LED. When this LED blinks, it means data is being transferred.

4. TCP Ports

There are four listening TCP ports that are reserved for specific network connections. All ports can be connected individually or simultaneously. The below table shows the port list and corresponding status LED.

Port	Status LED	Reserved for
1	S1	Odd lane scorer computer
2	S2	Even lane scorer computer
3	S3	Management software
4	S4	Supervisor

ATTENTION: THESE TCP PORTS MUST NOT BE USED/CONNECTED FOR ANY 3RD PARTY DEVICE/APPLICATION/SOFTWARE/HARDWARE OR WARRANTY WILL BE VOIDED.

5. LEDs

There are 5 types of status LEDs on the control box:

- Output
- Input
- Serial Activity
- Status
- Power

a. Output LEDs

Located directly below all Output connections is a LED status indicator. If an indicator light is ON, the output is active. These LEDs are controlled by the main processor.

b. Input LEDs

Located below each Input connection is a LED status indicator. An LED that is on will indicate an input signal (voltage) is being sent to the input. There is NO processor control of the LEDs. For the input specification, please refer to Table 3 - Electrical characteristics.
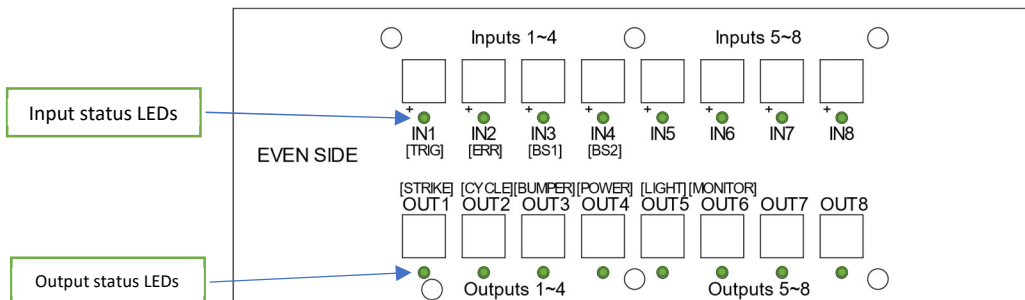
c. Serial Activity LEDs

There are two LEDs for each Serial port connection. They are labeled RX and TX. RX will blink whenever data is received by the interface box. TX will blink when the interface box is sending data to the network. These LEDs are controlled by the Interface box main processor.

d. Status LEDs

There are seven status LEDs which are labeled S1 to S7. Each LED serves a function in communicating the status of the Interface box.

The following table shows the various LED states and their associated meanings

LED	OFF state (950ms OFF, 50ms ON)	Blinking (500ms OFF, 500ms ON)	ON state (50ms OFF, 950ms ON)
S1	No Ethernet signal	Port 1 is Ready to be connected	Odd lane connected
S2	No Ethernet signal	Port 2 is Ready to be connected	Even lane connected
S3	No Ethernet signal	Port 3 is Ready to be connected	Management software connected
S4	No Ethernet signal	Port 4 is Ready to be connected	Supervisor is connected
S5		Reversed (ALWAYS OFF)	
S6			
S7	Main processor is up and running	Not defined	

Table 2 - Status LEDs
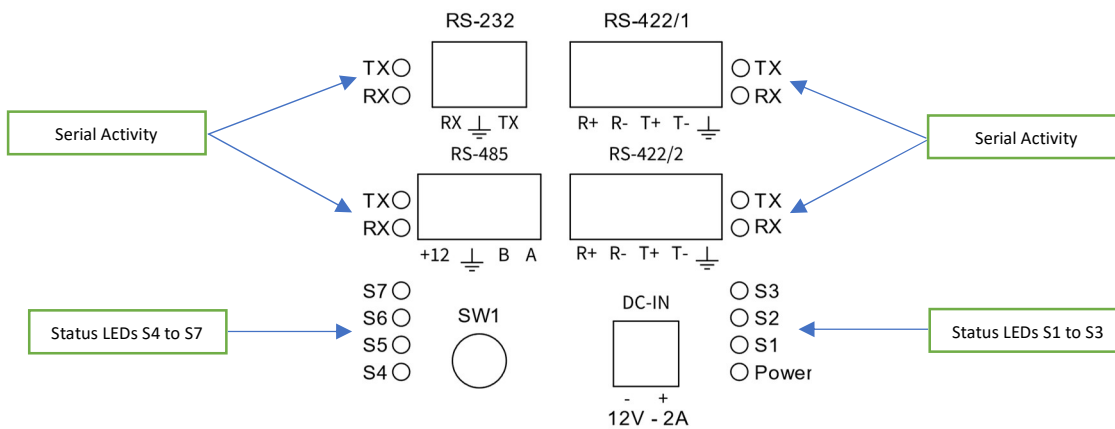
6. Serial Ports

All Serial ports are controlled by the Interface box main processor. These ports enable connection to and control of pinsetters equipped for Serial communication. The serial ports are:

a. 1x RS-232
b. 1x RS-485
c. 2x RS-422

7. SW 1

The SW1 pushbutton is multi-purpose. It is used for self-testing the Interface box and showing the current static IP address.

ATTENTION: THIS PUSH BUTTON IS ONLY FOR TESTING AND MUST NEVER BE USED WHEN THE INTEFACE BOX IS CONNECTED TO A PINSETTER!!!!

NOTE: THE IP ADDRESS IS STATIC AND CAN NOT BE CHANGED USING THIS SWITCH.

8. USB Port

The USB port is used to set the Interface box network IP address, MAC address and other network settings. These settings are stored in the Interface box main processor non-volatile memory.

ATTENTION: ONLY AUTHORIZED INDIVIDUALS MAY USE THIS PORT TO CHANGE SETTINGS. SETTING THE INTERFACE BOX IP ADDRESS TO AN INCORRECT VALUE WILL CAUSE THE BOX TO DISCONNECT FROM THE SYSTEM. PINSETTER CONTRTOL WILL NO LONGER BE POSSIBLE IF THE INTERFACE BOX DOES DISCONNECT FROM THE SYSTEM!!!

9. Electrical characteristic

The following table is describing the electrical characteristic of each input/output

Name	Min.	Typical	Max.	Note
DC Power voltage	DC 11v	DC 12v	DC 14v	High quality power supply recommended.
DC Power current	2A			
Inputs [IN1~8] voltage	DC 8v	DC 12v	DC 26v	
Inputs [IN1~8] working current	50 mA			
Output Relay switching voltage			DC 60V	
			AC 125V	
Output relay switching current			0.5 A @ 125 VAC 1 A @ 24 VDC	Contact resistance: 100 mΩ max. Insulation resistance: 1,000 MΩ min @ 250 VDC between contacts of same polarity
RS-232 TX pin	VOL=-5v		VOH=5v	Reference is the chip datasheet
RS-232 RX pin	VI= -16v	± 8v	VO=16v	
RS-485 A, B pin	-7v		+12v	
RS-485, +12v current			0.1 A	
RS-422 R+, R-, T+, T1	-7v		+12v	

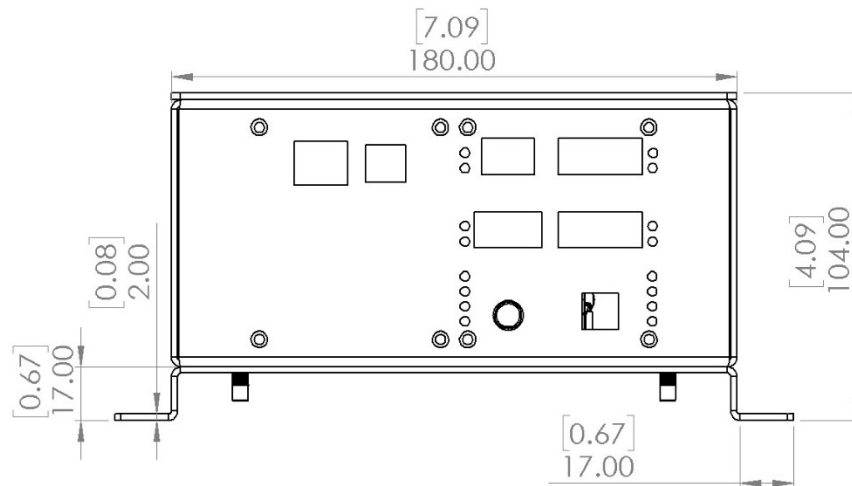*Table 3 - Electrical characteristics*

10. Mechanical characteristic

Figure 1 - Front View

Figure 2 - Bottom View