SENSOR SUPER PACK

1 SENSOR SUPER PACK DATASHEET

Caution: Specifications are subject to change without notice.

1.1 Electrical

The following section provides information about the MFTB test bench AC input and DC output.

Input Rating	5-24VDC 50mA
I²C bus speed	37-400Kbps
I²C HIGH-level input voltage	2.7-3.3Vdc
I²C LOW-level input Voltage	-0.5 to +0.5Vdc

1.2 Environmental

Maximum Altitude	2,000 m (6,560 ft.), 800 mbar (at 25 °C ambient)
Pollution Degree	2
Indoor Use Only	

1.3 Operating Environment

Relative Humidity Range	10% to 90%, noncondensing
Ambient Temperature Range	0 °C to 60 °C

1.4 Compatible Universal LightProbe Sensors

S2 Penta Sensor
S2 Spectra Sensor
S2 Unicolor Sensor
S2 Unicolor Digital Sensor
S2 Blinx Digital Sensor
S2 Ultra-High Sensitivity Sensor

1.5 Communication Platform & Hardware Configuration

An I²C interface is required to establish communication with the Sensor Super Pack
 Successive Sensor Super Packs must be uniquely addressed via the DIP switch
I²C Base Address 0x30

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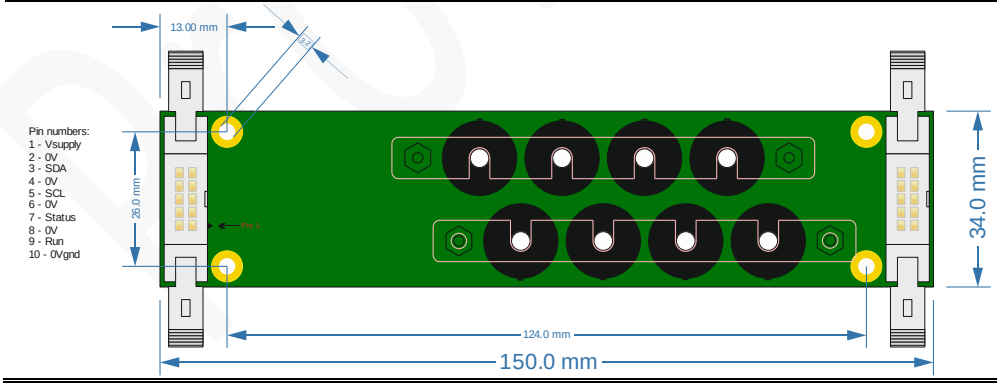
1.6 Features

Accommodates up to 8 Universal LightProbe Sensors per Sensor Super Pack
Supply voltage 5 to 28V
Communication via I^2C serial interface
Can be easily expanded by daisy chaining across Sensor Super Packs
Identical connectors at each end of module to permit easy expansion
Small size module 150mm x 34mm, (approximately 5.9" x 1.34")
Up to 8 Universal LightProbe Sensors are user mounted via zero profile sockets loaded in Sensor Super Pack
Support clamps are available to retain the Sensors securely in place
Sensor Super Pack is mounted using four M3/4-40UNC screws via standoffs
Communication via an I^2C interface on either of the two header connectors
Multiple Sensor Super Packs can be daisy chained using a 10way ribbon cable to connect succeeding Sensor Super Packs

1.7 Mechanical and Pin Out

Pin1	Vsupply
Pin 2	0V
Pin 3	SDA
Pin 4	0V
Pin 5	SCL
Pin 6	0V
Pin 7	Status
Pin 8	0V
Pin 9	Run
Pin 10	0Vgnd



The image above shows the position of the Sensor retaining clamps and how they are mounted to the PCB to secure the Sensors in position.

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2 RECOMMENDED CONFIGURATION

Ensure SW1 position 8 is set ON in all cases. This enables the power reset function.

3 SOFTWARE SUPPORT

The software drivers provide functions for reading data from Sensors attached to one or more Sensor Super Pack boards, which are addressed using IDs 1-16, corresponding to the following DIP switch positions:

SSP Board ID	DIP Switches		SSP Board ID	DIP Switches
1	00000000		9	00001000
2	00000001		10	00001001
3	00000010		11	00001010
4	00000011		12	00001011
5	00000100		13	00001100
6	00000101		14	00001101
7	00000110		15	00001110
8	00000111		16	00001111

This allows up to 128 Sensors to be installed (16 Sensor Super Pack boards, 8 Sensors per board).

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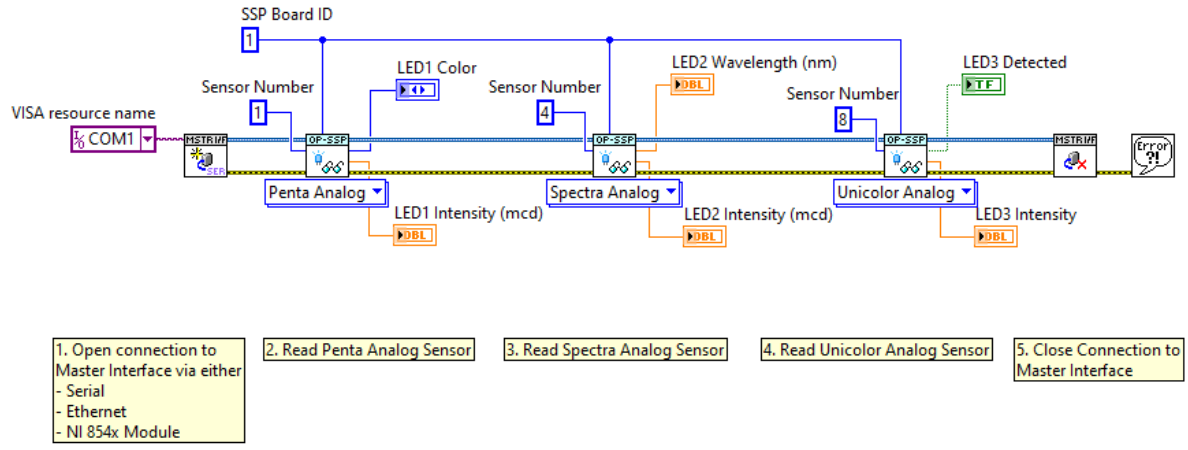
All drivers function in a similar way:

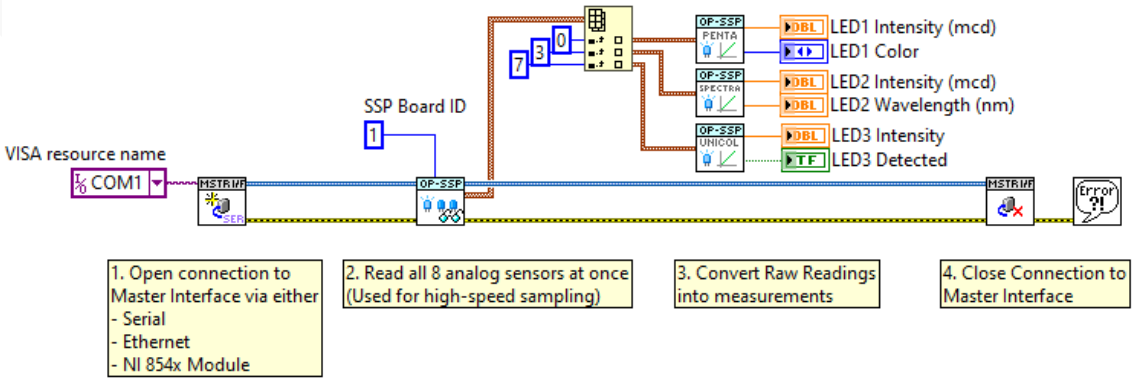
- Open a connection to the Master Interface Module
- Perform read operations:
  - Read S2 Penta analogue Sensor
  - Read S2 Spectra analogue Sensor
  - Read S2 Unicolor analogue Sensor
  - Read all Sensors from a particular Sensor Super Pack board (for high speed sampling).
- Close connection to the Master Interface Module

1.8 LabVIEW Driver

The following example shows reading S2 Penta, S2 Spectra and S2 Unicolor analogue Sensors connected to positions 1, 4, and 8 respectively on a Sensor Super Pack board. This mode of operation is recommended unless very high speed sampling of Sensors is required.



The following example shows reading all Sensors on a Sensor Super Pack at once, then converting the raw readings to LED measurements. This mode of operation is recommended for scenarios where fast sampling of multiple LEDs is required.



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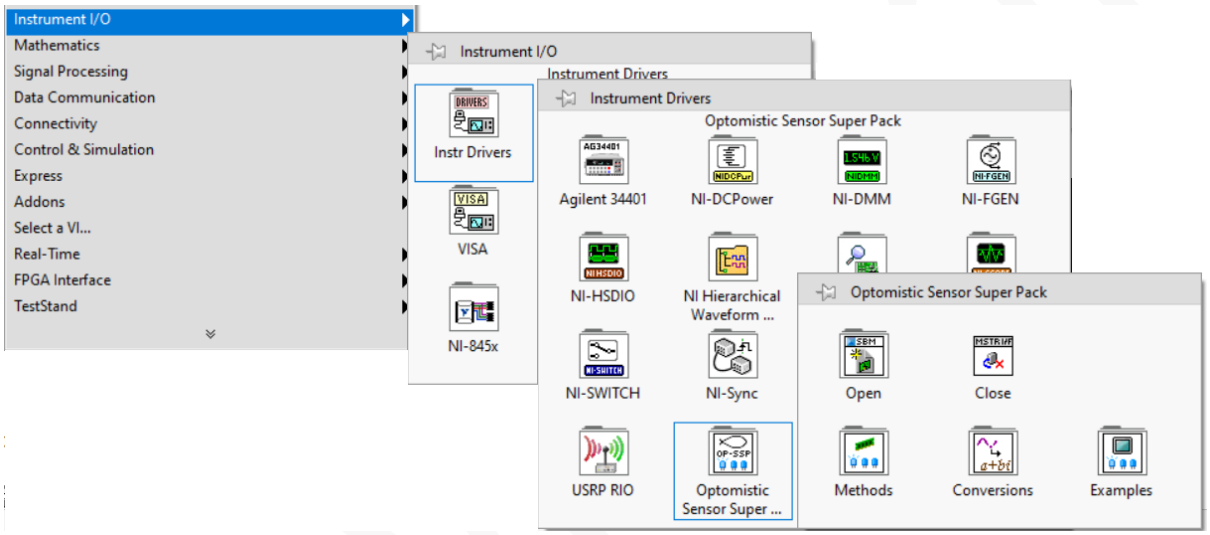
The LabVIEW drivers can be installed using VI Package Manager. Both included packages need to be installed in the following order:

- **peak_test_lib_peak_system_modules**
- **optomistic_products_lib_sensor_super_pack**

The easiest way to achieve this is to double click each *.vip file, which will open VI Package Manager and give the option to install the drivers. Once installed, restart LabVIEW and the VIs will be available on the functions palette:

Instrument I/O >> Instrument Drivers >> Optomistic Sensor Super Pack



1.9 .NET Driver

The following example shows reading S2 Penta, S2 Spectra and S2 Unicolor analogue Sensors connected to positions 1, 4, and 8 respectively on a Sensor Super Pack board. This mode of operation is recommended unless very high speed sampling of Sensors is required.

The example also shows reading all Sensors on a Sensor Super Pack at once, then converting the raw readings to LED measurements. This mode of operation is recommended for scenarios where fast sampling of multiple LEDs is required.

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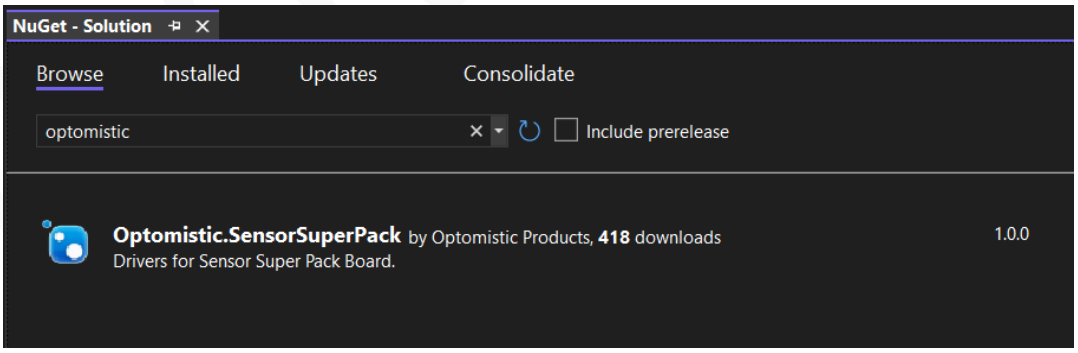
```
using (MasterInterface mastIntf = new SerialMasterInterface("COM1"))
{
    byte boardID = 1;

    // Reading one sensor at a time (recommended for most use cases)
    // -------------------------------------------------------------

    byte sensorNumber = 1;
    PentaAnalogSensorReading pReading = mastIntf.SensorSuperPack_ReadPentaAnalogSensor(boardID, sensorNumber);
    Console.WriteLine(pReading.Color); // Enumeration: Blue, Green, Yellow, Orange, Red, White
    Console.WriteLine(pReading.Intensity);

    sensorNumber = 4;
    SpectraAnalogSensorReading sReading = mastIntf.SensorSuperPack_ReadSpectraAnalogSensor(boardID, sensorNumber);
    Console.WriteLine(sReading.Wavelength);
    Console.WriteLine(sReading.Intensity);

    sensorNumber = 8;
    UnicolorAnalogSensorReading uReading = mastIntf.SensorSuperPack_ReadUnicolorAnalogSensor(boardID, sensorNumber);
    Console.WriteLine(uReading.Detected);
    Console.WriteLine(uReading.Intensity);

    // Reading all analog sensors from board, with conversion from raw values
    // -----------------------------------------------------------------------

    // Reads all 8 analog sensors at once, used if fast read speeds are required,
    // especially when using multiple boards
    RawAnalogSensorReading[] readings = mastIntf.SensorSuperPack_ReadRawAnalogSensors(boardID);
    pReading = readings[0].ConvertToPentaAnalogReading();
    sReading = readings[1].ConvertToSpectraAnalogReading();
    uReading = readings[2].ConvertToUnicolorAnalogReading();
}
```

The simplest way to consume the driver is via the nuget package manager. Search for "Optomistic.SensorSuperPack" or enter the following command in the package manager console: `Install-Package Optomistic.SensorSuperPack`



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1.10 Firmware Version 2.03

Board address is configured using elements 1-4 of the 8 element DIP switch. The address set by the switch is added to the board base address programmed within the firmware (0x30), therefore a switch address of 0x06 will result in a board address of 0x36.

Function	Command Byte 1	Command Byte 2	Response	Response Description
Read firmware version	0x01	n/a	4 bytes	The 2 byte response contains the version of the installed firmware. Byte 1 Command echo Byte 2 ACK / NAK Byte 3 Major revision Byte 4 Minor revision For example 0x01 0x06 0x01 0x07 reflects firmware version 1.07.
Read status bytes	0x02	n/a	4 bytes	The 2 byte response contains status bytes. These are currently both set to return 0x00. Byte 1 Command echo Byte 2 ACK / NAK Byte 3 Status byte 0 Byte 4 Status byte 1
Read all Sensor channels (colour & intensity)	0x10	n/a	34 bytes	The 34 byte response contains the colour and intensity values of all 8 Sensors. The first 2 bytes are the command echo and ACK/NAK, the next 4 bytes are Sensor 1, the next 4 are Sensor 2, etc. Each pair of bytes represent the ADC value of the Sensor output (ADC count = (3.3/1024)/2. Byte 1 MSB Intensity Byte 2 LSB Intensity Byte 3 MSB Colour Byte 4 LSB Colour

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Function	Command Byte 1	Command Byte 2	Response	Response Description
Invalid command	Undefined value	n/a	2 bytes	The 2 byte response contains the received command byte followed by a NAK character (0x15).

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