SVIM Synchronous Versatile Input Module
Part Number #18111

Basic Specifications

Inputs

- 6 x Fast analogue voltage inputs
- 10 x High resolution analogue voltage inputs
- 8 x High resolution differential analogue voltage inputs
- 2 x Speed inputs

Internal sensors

- Battery voltage
- Internal temperature
- Internal voltages

Communications

- 1 x CAN

Power Supply

- Operating voltage 7 - 30 V
- Operating current 0.22 A excluding sensor currents
- Reverse battery protection
- Battery transient protection

Physical

- Case size 48 x 90 x 26.2 mm
- Weight 150 grams
- Connectors
  – 1 x 55 pin Autosport connector
  – 1 x 5 pin Autosport connector
- Internal temperature range –40 to 85 °C
- Ambient temperature range –40 to 70 °C

Other Information

Compatibility

- MoTeC Data Loggers: ACL and ADL3

The **SVIM (Synchronous Versatile Input Module)** is a compact expander that works in conjunction with the ACL and ADL3 Data Loggers to facilitate the synchronised logging of high speed, high resolution inputs.

The SVIM acquires data of the highest integrity for use in advanced chassis and suspension analysis. It samples 18 inputs at the same instant in time using 18 separate converters with 5th order anti-aliasing filters.

Multiple SVIMs are synchronised so that every SVIM in the vehicle samples its high resolution AV inputs at the same instant in time. This is important when looking at the relationships of signals collected from different sensors around the vehicle and useful for test rigs and real time simulations.

SVIMs are versatile in nature and can be located close to sensors, reducing the weight and complexity of wiring. When used in multiples, up to 200 sensor inputs are available. The SVIM supports many different types of sensors, including unamplified thermocouples and strain gauges.

The SVIM is configured and controlled using Data Logger Manager software, that has special programming functions for the SVIM.

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Product specifications are subject to change

Connectors and Pinout

Connector 1

55 pin Autosport connector
Mating connector: #68090

Pin	Name	Function
1	0V 1	Sensor 0 V 1
2	AV H1	Analogue Volt High Res 1
3	AV H2	Analogue Volt High Res 2
4	0V 4	Sensor 0 V 4
5	0V 1	Sensor 0 V 1
6	AV H3	Analogue Volt High Res 3
7	AV H4	Analogue Volt High Res 4
8	AV H5	Analogue Volt High Res 5
9	AV H6	Analogue Volt High Res 6
10	0V 4	Sensor 0 V 4
11	R1	Pull-up Resistor 1
12	R2	Pull-up Resistor 2
13	AV H7	Analogue Volt High Res 7
14	AV H8	Analogue Volt High Res 8
15	AV D1+	Analogue Volt Diff 1 +
16	AV D1−	Analogue Volt Diff 1 −
17	0V 3	Sensor 0 V 3
18	5V	Sensor 5 V
19	AV H9	Analogue Volt High Res 9
20	AV H10	Analogue Volt High Res 10
21	AV D8+	Analogue Volt Diff High Res 8 +
22	AV D8−	Analogue Volt Diff High Res 8 −
23	AV D2+	Analogue Volt Diff High Res 2 +
24	AV D2−	Analogue Volt Diff High Res 2 −
25	0V 3	Sensor 0 V 3
26	5V	Sensor 5 V
27	5V	Sensor 5 V
28	AV D7+	Analogue Volt Diff High Res 7 +
29	AV D7−	Analogue Volt Diff High Res 7 −
30	AV D5+	Analogue Volt Differ High Res 5 +
31	AV D5−	Analogue Volt Diff High Res 5 −
32	0V 2	Sensor 0 V 2
33	R3	Pull-up Resistor 3

Pin	Name	Function
34	R4	Pull-up Resistor 4
35	5V	Sensor 5 V
36	AV D4+	Analogue Volt Diff High Res 4 +
37	AV D4−	Analogue Volt Diff High Res 4 −
38	AV D6+	Analogue Volt Diff High Res 6 +
39	AV D6−	Analogue Volt Diff High Res 6 −
40	0V 2	Sensor 0 V 2
41	SPD1	Speed 1
42	SPD2	Speed 2
43	5V	Sensor 5 V
44	5V	Sensor 5 V
45	AV D3+	Analogue Volt Diff High Res 3 +
46	AV D3−	Analogue Volt Diff High Res 3 −
47	AV F1	Analogue Volt Fast 1
48	AV F2	Analogue Volt Fast 2
49	AV F3	Analogue Volt Fast 3
50	AV F4	Analogue Volt Fast 4
51	AV F5	Analogue Volt Fast 5
52	AV F6	Analogue Volt Fast 6
53	10V	Sensor 10 V
54		Not Used
55		Not Used

Connector 2

5 pin Autosport connector
Mating connector: #65033

Pin	Name	Function
1	BAT −	Battery −
2		Not Used
3	BAT +	Battery +
4	CAN LO	CAN Low
5	CAN HI	CAN High

Input Specification

Type	Qty	Update Rate	Bits	Gain Range	
AV F	6	5000 Hz*	12	1	* 1000Hz when used with ADL3
AV H	10	1000 Hz	15	1-64	
AV D	8	1000 Hz	15+Sign	1-64	
AV SPD	2	100 Hz	12	1	

Type	Range	Resolution	Input Resistance
AV F	0 to 5 V	1.22 mV/step	66 kΩ
AV H	at Gain=1: 0 to 5 V	at Gain=1: 0.153 mV/step	at Gain=1: 240 kΩ
	at Gain=64: 0 to 78 mV	at Gain=64: 0.00238 mV/step	at Gain>1: 40 MΩ
AV D	At Gain=1: −5 to 5 V differential 0 to 5 V absolute	at Gain=1: 0.153 mV/step	at Gain=1: 300 kΩ differential
	at Gain=64: −78 to +78 mV differential 0 to 3 V absolute	at Gain=64: 0.00238 mV/step	at Gain>1: 2 MΩ differential
AV SPD	0 to 10.3 V	2.5 mV/step	90 kΩ (Magnetic mode)

Notes

- Each fast AV input is sampled within 50 µsec. There is a consistent timing relationship between fast AV inputs and the other inputs.
- All high resolution AV inputs are sampled at the same time, typically within 5 µsec (maximum within 20 µsec).
- For consistent phase delay all inputs must be logged at the same rate
- Where multiple SVIMs are used, they are all precisely synchronised so all inputs of the same type are sampled simultaneously.
- The voltage on both inputs of the differential AV must be positive; they cannot be used to measure sensors with bipolar outputs (outputs that go positive and negative).

Maximum Sensor Currents

Sensor Supply Voltage	Battery Voltage			
	<15V	**17V**	**20V**	**30V**
5V	200mA	200mA	200mA	200mA
10V	200mA	150mA	100mA	50mA

CAN Bus Limits

The total available CAN bandwidth on a single CAN bus is 1 Mbit/sec. The bandwidth used by the total of all devices on the CAN bus must not exceed approximately 90% of this value (900000 bits/second)

If using multiple SVIMs and fast logging rates, it may be necessary to put some SVIMs on one CAN bus and some on the other to avoid exceeding the CAN bus bandwidth limit.

Approximate bandwidth = Total measurement rate (samples/second) x 30 (bits per sample)

Note The measurement rate for an input equals the logging rate or 50 Hz, whichever is higher.

The Manager software will warn if the bandwidth is likely to be exceeded.
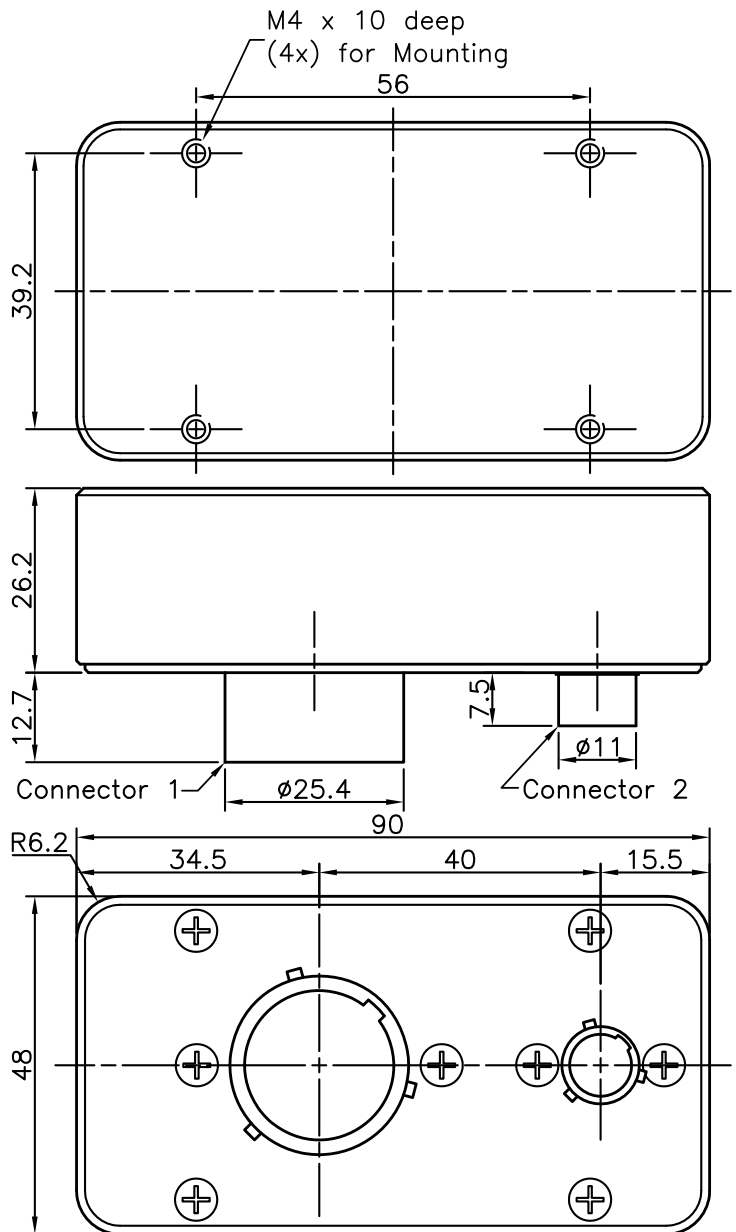
Example

- 4 channels at 2000 Hz
- 20 channels at 500 Hz
- 40 channels at 20 Hz (occupies 50 Hz)

Total measurement rate (samples/sec) = 4 x 2000 + 20 x 500 + 40 x 50 = 20000

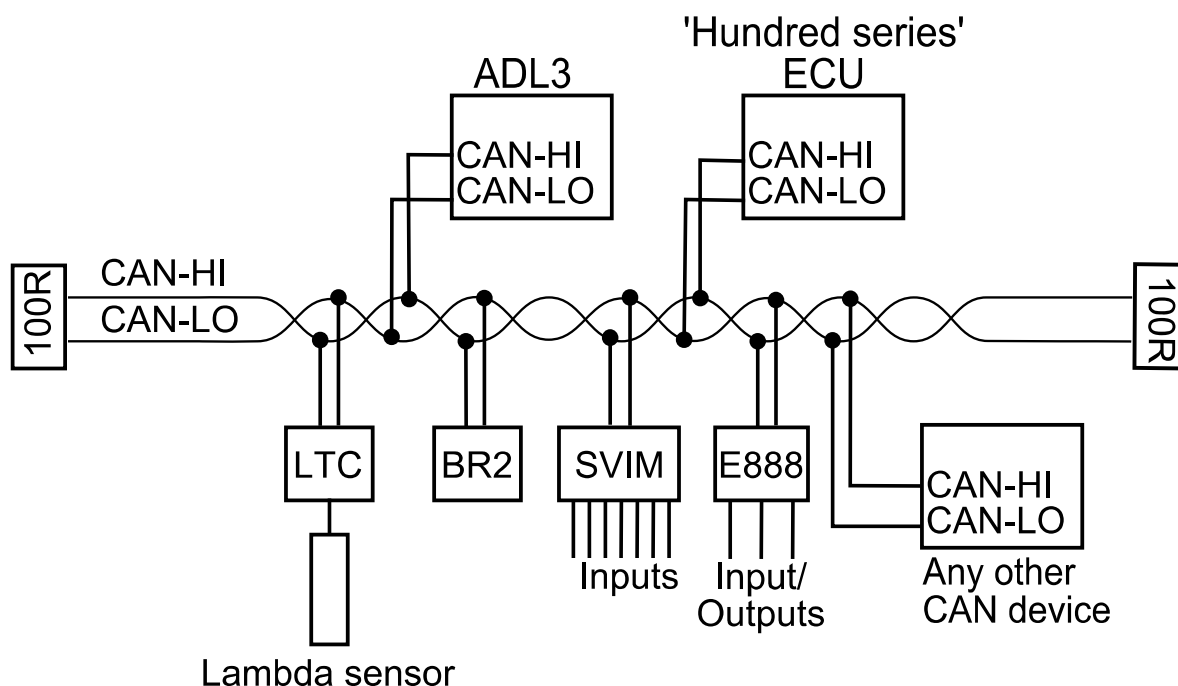Approximate bandwidth (bits/sec) = 20000 x 30 = 600000

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Dimensions

Configuration

The SVIM has no stand-alone software package. It is configured using the special SVIM control options in the Manager software of the controlling device; ACL or ADL3.

Data Logger Control

- In ACL Manager software, on the **Inputs** menu, click *ACL Connections*
  OR
  In ADL3 Manager software, on the **Connections** menu, click **Devices**.

- In the *Connections* screen click *Edit > Add* to add an SVIM to the devices list.

- In the *Connection Properties* screen enter the SVIM serial number and CAN bus number.

- The various inputs can then be assigned to a channel and calibrated.

There is no need to configure the communications section in ACL/ADL3 Manager; this is done automatically.

Firmware

When sending the configuration file to the ACL/ADL3, the Manager software will also automatically update the firmware version in the SVIM if necessary.

To check the current firmware version

- On the **Help** menu, click **About MoTeC ACL/ADL3 Manager**.
  This will list the firmware versions of all supported devices

Wiring

The SVIM is powered from the vehicle battery and connected to the Data Logger via the CAN bus.

Information on CAN bus wiring can be found in the Data Logger user manual, available for download from www.motec.com/downloads

⚠️ **Important**

Please ensure wiring is according to CAN requirements and the CAN bus has at least one 100R terminating resistor.