eSM E30—Multiplexed Rockers

eSM E32—Multiplexed Rockers

eVu—Electronic Vehicle Display

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eSM E30—Multiplexed Rocker Switch Units

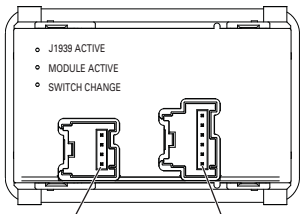
Contents

Product Description

eSM E30 modules are designed to operate using at least one master module and any number from zero to seven expansion modules. The master module communicates to the outside world using the SAE J1939 data bus over CAN 2.0b. The master module also communicates to up to seven expansion modules using an eSM E30 sub bus. The master module can easily be distinguished from the expansion module by looking at the backside. A master module has one connector with four terminals and one connector with six terminals. In addition, the master module has the "J1939" label next to the third opening. The expansion module has two connectors with four terminals and it does not have the "J1939" label.

Application Description

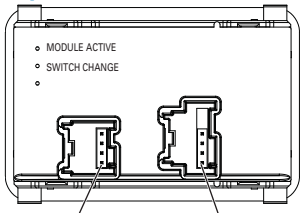
Master Module



Pin	Function
4	Vcc out
3	Ground
2	Sub bus +
1	Sub bus –

Pin	Function
6	Keyswitch
5	Dimmer
4	Ground
3	J1939 +
2	J1939 –
1	+12 Vdc

Expansion Module



Pin	Function
4	Vcc out
3	Ground
2	Sub bus +
1	Sub bus –

Pin	Function
4	Vcc in
3	Ground
2	Sub bus +
1	Sub bus –

Product Selection

Note: All products are custom ordered. Contact your local Eaton Sales Representative.

Technical Data and Specifications

Default Connection

When starting your evaluation, apply 12 Vdc to pins 1, 5 and 6 and ground to pin 4 of the 6-terminal connector and your CANbus to pins 2 and 3.

Other Connections

For evaluating the modules in power down mode (which typically occurs if the vehicle's ignition key is turned off), you may interrupt the 12 Vdc signal to pin 6 on the master. An internal resistor will pull this pin to ground.

The dimmer signal (pin 5 on the master) can be used to dim the light inside the modules. It allows dimming controlled by a 0–10 Vdc signal on this terminal.

Connectors

Delphi Micro VHT 15499927

Delphi Micro VHT 13513469

Power Supply

A regulated 12 Vdc power supply capable of providing 1.5A should be connected to terminals 1, 5 and 6 of the six-pole connector of the master module only. All connected expansion modules receive their supply power from the master module.

Indicators

The LED indicators at the back of the modules show the status of the internal diagnostics as follows:

Indicators

Label	Color	Meaning
J1939 ACTIVE	Red	CANbus active
MODULE ACTIVE	Amber	Sub bus active
SWITCH CHANGE	Green	Switch change

Communication

The communication to and from the master module is fully compliant to the SAE J1939/CAN 2.0b protocol. Alternatively, masters can be programmed to comply with:

- ISO 11898/CAN 2.0a,
- SAE J1709/1587 or
- LIN

If you have not requested any special configuration, the installed protocol is J1939.

The application-specific J1939 message parameters are as follows:

Transmission repetition rate	100 ms
Data length	8 bytes
Data page	0
PDU format	255
PDU specific	160
Default priority	5
Parameter group number	65440

Message Contents

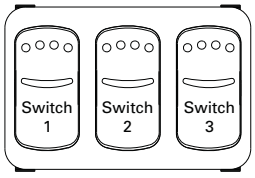
Byte 1	Master module status
Byte 2	Expansion module 1 status
Byte 3	Expansion module 2 status
Byte 4	Expansion module 3 status
Byte 5	Expansion module 4 status
Byte 6	Expansion module 5 status
Byte 7	Expansion module 6 status
Byte 8	Expansion module 7 status

Within each status byte, the bits are assigned to the individual switches as follows:

Bit 8&7	Not defined
Bit 5&6	Switch 1 status
Bit 3&4	Switch 2 status
Bit 1&2	Switch 3 status

where the switches are numbered as shown below.

Switches

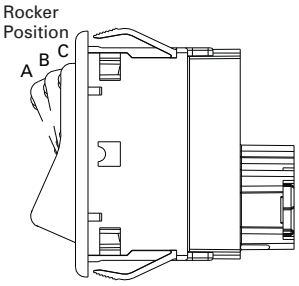


The two status bit pairs represent the switch state in the following manner:

00	Switch in DOWN position
01	Switch in MIDDLE position
10	Switch in UP position
11	Not defined

where the position assignment is as shown below.

Position Assignment



A = DOWN
B = MIDDLE
C = UP

Wiring

The master unit is connected using six unshielded wires. The connection from the master to the first expansion module and between any consecutive expansion modules is made using four unshielded wires.

Master Unit Wiring

Dimensions

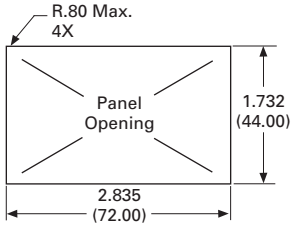
Approximate Dimensions in Inches (mm)

Mounting

If you want to mount the modules in a panel, the opening in the panel should be rectangular, 2.835 in wide and 1.732 in high (72.00 mm wide and 44.00 mm high).

The panel thickness should be between 0.039 and 0.157 in (1.00 and 4.00 mm).

Mounting Dimensions



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eSM E32—Multiplexed Rocker Switch Units

Contents

Product Description

Multiplexed Master Module using a LIN sub bus to communicate with up to seven expansion modules.

Offering a high level of flexibility, the above-panel electronic multiplex switch module (eSM E32) covers your wide range of switch and indicator applications using standard or custom graphics, as well as a full range of circuits and illumination options. The above-panel eSM E32 has top, center and bottom LED lighting with software that offers advanced circuit and lighting flexibility, including dimming and flashing options via J1939 CANbus communication. The indicator bar can be lighted with up to four separate colors to indicate operational status, vehicle mode and faults. All standard combinations of maintained and momentary switch actions, matching indicator caps and dummy plugs, along with the complementary styled SVR electromechanical rocker switch are available to complete the offering.

Compared with electromechanical switches, multiplexed switch modules offer several advantages.

- Reduced assembly labor due to ease of installation, allowing for mounting and connection of three switches at one time versus individually
- Reduced wire harness complexity, using one harness to a controller to accommodate up to 24 switches and a three-wire interconnect between expansion and master modules
- Reduced harness size offers an overall reduction in weight, improving operational efficiency of the equipment
- Increase in switch life-cycle over traditional electromechanical switches (200k cycles)

Application Description

Target Market Segments

This product is targeted at the bus/coach, truck and specialty vehicle markets. The product is especially suitable where a customer has "gangs" of switches mounted in a panel or dashboard, and expansion modules can be connected easily to a master module.

- On-road specialty vehicle
- EMS vehicles
- Street sweepers
- Recreational vehicles
- Motor coach/bus
- Refuse vehicles

Features and Benefits

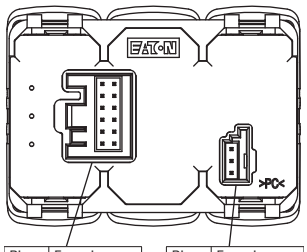
- Fully compliant with J1939 messaging
- IP53 degree of protection
- Easy address assignment
- 12V and 24 Vdc options available
- 9–16 Vdc operating voltage
- 16–32 Vdc operating voltage
- Immune to SAE J1455 and J1113 power disturbances
- Front panel removable for ease of maintenance
- Sleep mode available to reduce current draw on the battery
- Wake on switch change configurable
- LED lighting in top, center and bottom positions
- Decorative-style rocker with matching indicator option available
- Late point definition of circuit and rockers to reduce inventory to accommodate multiple application requirements
- Field reprogrammable

Product Selection

Note: All products are custom ordered. Contact your local Eaton Sales Representative.

Wiring

Master Module Wire Harness



Pin	Function
1	VBAT (clamp 30)
2	Ground
3	CAN high
4	CAN low
5	500 mA output
6	Address 1
7	Address 2
8	Address 3
9	Address 4
10	No connect
11	No connect
12	No connect

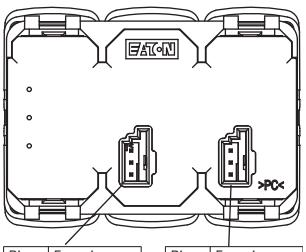
Pin	Function
1	VBAT (clamp 30)
2	Ground
3	LIN sub bus

The interconnection between master module and controller uses a simple four-wire harness with addressing specified by jumping between pins 6 to 9. An additional pin-out is provided for a 500 mA output if required.

Mating Connector Information

Housing:
Amp/Tyco #1394048-1
Cover:
Amp/Tyco #2-1355524-3

Expansion Module Wire Harness



Pin	Function
1	VBAT (clamp 30)
2	Ground
3	LIN sub bus

Pin	Function
1	VBAT (clamp 30)
2	Ground
3	LIN sub bus

The interconnection between modules uses a cost-effective three-wire harness. This simplified wire harness reduces cost, weight and assembly labor for the end-user.

Mating Connector Information:

Amp/Tyco #1-1718346-1
Coding A

Technical Data and Specifications

Message Structure

Each CAN message contains 8 bytes of data. The first data byte is used to define the type of data carried in bytes 2 through 8. This difference compared to common J1939 message structure allows a single J1939 PGN address to support all of the data needed for switch status, LED status, system status, wake "on" change, dimmer level, and all other data used by a master and seven expansion modules.

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Dimensions

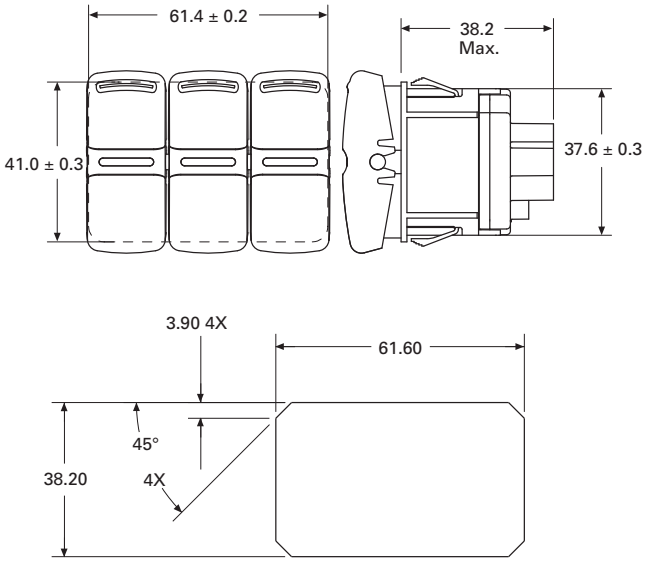
Approximate Dimensions in Inches (mm)

Mounting Instructions

The modules are easily mounted with plastic retention clips. Clips can be compressed from the front for easy removal. Modules are mounted in a single, space-saving cutout, reducing assembly time and accommodating up to three switches in a compact design.

The unit will accommodate 1.5 to 3 mm panel thickness.

Mounting Dimensions



eVu—Electronic Vehicle Display

Contents

Product Description

With a focus on communications, convenience and safety, Eaton Corporation is pleased to introduce eVU (pronounced eVIEW).

Rugged dashpanel displays simplify the viewing, selecting, inputting and downloading of key equipment/trip data.

Working in sync with existing on-board computers and networks, the displays provide the driver with valuable information.

eVU displays are equipped with:

- Internal warning/ alert buzzer
- Backlighted legend displays
- Sunlight readable LCD characters
- Internal power supply

So, what's the e for?

Easy, **e**lectronic and **e**volutionary. eVU fills the gap (literally) between on-board systems and displays, function by function.

Application Description

Typical applications for information display include:

- Temperature
- Pressure
- Speed
- Distance
- Capacity

Features

Communication and Networking

eVU displays can interface with smart engines, controllers and equipment software.

In addition, eVU displays can receive input from analog transducers and sub-systems.

Designed for Easy Installation

Some advancements in technology create installation obstacles. That isn't the case with eVU. The displays fit into the same cutouts as standard rocker switches, 0.866 x 1.732 in (22.00 x 44.00 mm), making installation easy. The simplified architecture not only saves dash space, it also saves costs.

Safety

eVU displays are easier to access than typical touch screens or soft-key applications. Keeping the dashboard displays within the driver's line of vision helps keep the driver and everyone else on the road safe. Additionally, the eVU displays are designed to meet SAE-1455 specification.

What Do You Want to View?

There are many types of eVU displays and they can be customized with various colors, resolutions and character configurations. Choose the functionality you want with the flexibility you need.

eVU Auto Shift Indicator

- Meets general auto shift specifications
- Includes audio tone generation
- Communicates with all major auto shift transmissions

Product Selection

Note: All products are custom ordered. Contact your local Eaton Sales Representative.