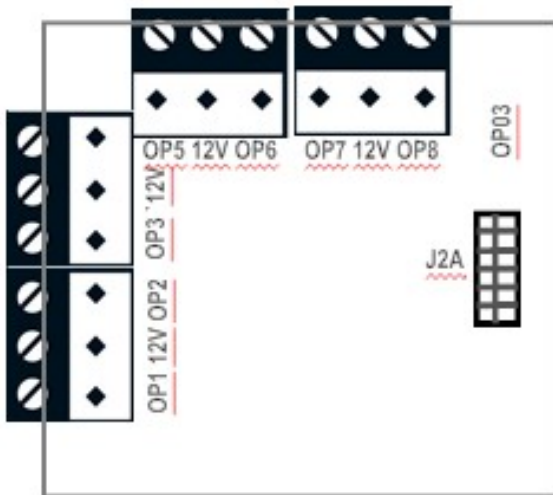


Slave Expansion Module

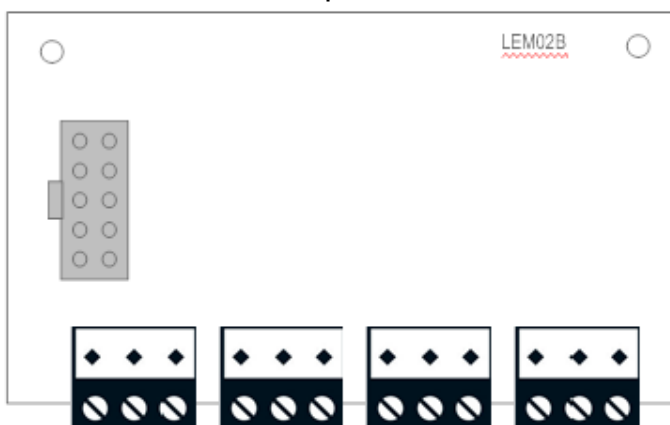
The Slave Expansion Module allows Comfort to be expanded beyond 16 Inputs and 16 Outputs. Each SEM01C/SEP01C contains 8 Inputs and 0 outputs, The SEM01C/SEP01C which can be expanded by connecting LEM01 (8 inputs, 8 outputs) or LEM02B (8 inputs), or LEM03 (16 Inputs). 8 (Open-collector) outputs can be added to SEM01C/SEP01C by plugging in the OP03 Output Submodule.

Part Numbers

- SEM01C: PCB only not including TT01-0022 power Supply
- SEP01C: SEM01C with the EN01D metal enclosure. SEM01C will refer to both SEM01C and SEP01C for functional description.
- EN01D: Metal Enclosure 310 x 350 x 95 mm with TT01-0022 Power Supply
- EN03D: Metal Enclosure 358 x 375 x 94 mm with TT01-0022 Power Supply
- TT01-0022: Power Supply 90 - 264 VAC 550-60 Hz Input, 15V 1.8A DC Output
- OP03: Output plug-in submodule for SEM01C with 8 outputs



- LEM02B: Local Expansion Module with 8 inputs, plug in to LEM header



- LEM01B: Local Expansion Module with 8 inputs, 8 outputs, with ribbon cable to LEM header
- LEM03- M2: Local Expansion Module with 16 Inputs, 0 outputs, , with ribbon cable to LEM header

Differences – SEM01C and SEM01-M2

- SEM01C does not have EOL shunts to determine if EOL resistors should be connected to the zone. The EOL setting is programmed in Comfigurator 3.11.14 and above. The older SEM01-M2 has EOL shunts for each zone.
- LEM02B Local Expansion Module 8 inputs 0 outputs can be plugged in and mounted to SEM01C, not in SEM01-M2
- SEM01C does not come with Outputs. OP03 output submodule can be plugged in to provide 8 outputs. SEM01-M2 comes with 8 outputs.
- Setting of ID for SEM01C is by use of ID button and LEDs ID0 to ID4 to show the ID. SEM01-M2 has ID shunts to set ID
- X10 connector has been removed from SEM01C.
- SEM01C Tamper connector is 3-way terminal block with spare center pin for series connection of Tampers in series.
- Analog/Power Supply section uses TT01-0022 universal switched power supply (90-260VAC Input), 15VDC output, hence a large heatsink is not needed. SEM01-M2 uses Power transformer 14VAC output.
- SEM01C and SEM01-M2 Digital and Analog sections are interchangeable, ie the Digital Section of SEM01C or SEM01C can be plugged in to the analog/power supply sections of either SEM, provided the correct power supply/transformer is connected to the Analog / Power supply side.

Specifications - SEP01C/SEM01C

Zone Inputs

- 8 programmable zones expandable to 16 with Local Expansion Module (LEM01, LEM02) or to 24 with LEM03
- Each zone configurable for 0 or 2 end-of-line resistors by software setting (no shunts needed)
- Up to 32 predefined Zone types to simplify zone configuration
- Surge/Over voltage protection for each Input

Outputs

- SEM01C does not include Outputs. OP03 must be plugged in (to OP03 header) to give 8 open-collector outputs (see OP03 Section below)

Power Supply

- TT01-0022 Switched Mode Power Supply Input 90 to 260 VAC, Output 15VDC, 1.8 Amps (order separately)
- Built-in regulated 13.8V Output voltage supply and battery charging circuit. Supplies 1A DC max to 12V, S12V and outputs combined. independent of the main Comfort panel. This allows the 12V power in the whole system to be distributed between the Comfort and Slave power supplies. Each SEM01 requires its own 12V 7 AH back-up battery.
- SEM01 Quiescent current 100 mA max, 50 mA typical.

Auxiliary Supply Outputs

- 12V unswitched supply

Slave Expansion Module

- S12V switchable supply (programmable for reset operation eg for Smoke detector reset)
- Note: Both 12V and S12V auxiliary supplies and 8 Outputs have a combined continuous current limit of 1A, protected by common resettable fuse of 1.3A

System Supervision

- Individual Zone tamper (open-circuit or short-wiring) with 2 end of line (EOL) resistors
- Dedicated 24 hour Tamper input

Input/Output Expansion

Each Slave Expansion Module can be expanded using one of the Local Expansion Modules

- LEM01 - Local Expansion Module 8+8 (8 zones, 8 outputs)
- LEM02B - Local Expansion Module 8+0 (8 zones, 0 outputs), plug in to J5 connector.
- LEM03 - Local Expansion Module 16+0 (16 inputs, 0 outputs)
- Each Slave can support a total of 16 inputs and 16 outputs (or 24 Inputs, 8 outputs with LEM03). 5 SEMs can be installed in a Comfort System, giving a system capacity of 96 inputs and outputs. If LEM03 is connected to a SEM, then SEMs with a higher ID cannot be connected. Eg if SEM01 ID 1 has an LEM03, then SEMs 2,3,4,5 cannot be added to the system

Size

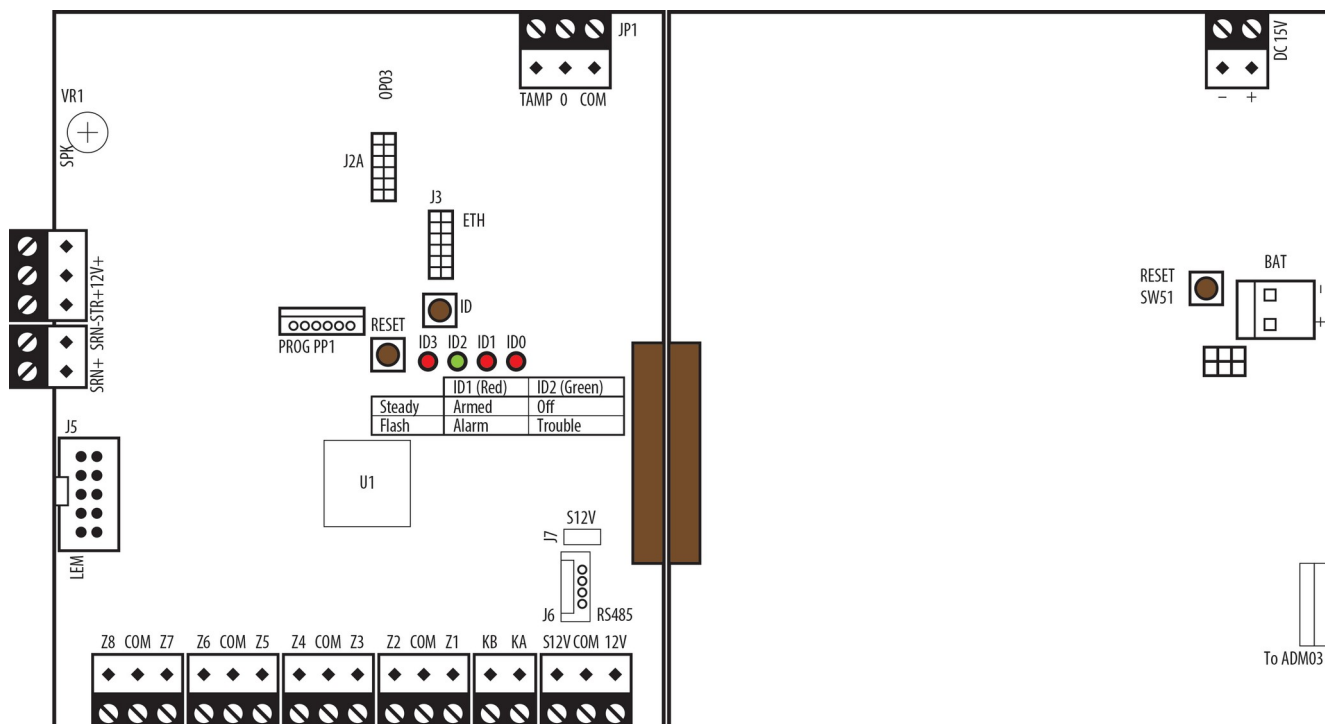
- SEM01C: 230 x 130 mm.

Alarm Outputs

- Siren (12V) Output
- Speaker output for Internal speaker 8 ohm to 32 Ohms
- Strobe (12V) Output

Slave Expansion Module

SEM01C PCB



SEM01C Printed Circuit Board

SEM01C consists of 2 printed circuit boards; A Digital section and an Analog/Power supply section on the right in the above illustration.

ICs

- U1 - Program IC. This IC contains the firmware for the SEM's embedded operation, marked SEM 7.xxx. Firmware can be upgraded using Comfigurator.

Connections

- DC 15V – Switched Power Supply connection
- BATT - 12V Battery Connection for Sealed Lead-Acid Rechargeable Battery
- Z1/COM/Z2: Zones 1-2 input connections
- Z3/COM/Z4: Zones 3-4 input connections
- Z5/COM/Z6: Zones 5-6 input connections
- Z7/COM/Z8: Zones 7-8 input connections
- 12V/COM/S12V: Unswitched and Switched 12V Supply (3 way terminal block)
- KA/KB: RS485 Bus. This is connected via twisted pair to the same terminals of Comfort
- TAMP/0/COM- Connection to Tamper Switch. Short terminal block with wire-link if Tamper Input is not used. '0' is a spare connection point for ease of connecting 2 tampers in series.
- SRN+/SRN- Supply/ Connection to external Bellbox
- SPK-/12VF/STR - Connection to Internal Speaker and Strobe.
- LEM (J5): Connector for LEM02B Plug-in board or ribbon cable to LEM01/LEM02.
- OP03 (J2A): fro OP03 plug in Output driver
- RS485 - 4 way header for RS485 4 way cable

Buttons/ Jumpers

Slave Expansion Module

- Reset Switch. This switch resets the SEM and is normally not used.
- ID Pushbutton - RS485 ID setting (see below)
- S12V – shunt if S12V output is not to be switched. This means S12V is continuous 12V output and cannot be switched off

LED Indicators (when not setting ID)

- ID2 (Green) - Normally On. If this Slave ID is not addressed for 3 seconds, ID2 will blink continuously. This indicates that the Number of Slaves in Configurator is not set correctly.
- ID1 (Red) - Normally Off. If RS485 communications from Comfort is not received for 9 seconds, ID1 will blink continuously. Hence if KA/KB is not connected, ID1 and ID2 will blink continuously.

ID Setting

The SEM ID is displayed on the LEDs by pressing the ID button for less than 2 seconds. The ID display is according to the table below.

ID	ID3	ID2	ID1	ID0
1	Off	Off	Off	On
2	Off	Off	On	Off
3	Off	Off	On	On
4	Off	On	Off	Off
5	Off	On	Off	On
None	On	On	On	On

E.g. for ID=1, only ID0 is On. For ID=2, only ID1 only is on.

To change the ID, press and hold the ID button for 2 seconds until the LEDs change state to the next ID, e.g. for ID=2 ID1 only is on. Press and release to increment the ID until the maximum ID 5 and then back to 1. If the ID button is not pressed for 4 seconds, the new ID is confirmed and all LEDs will momentarily turn on. Check the D9 and D10 LEDs are both blinking

It is important that No 2 SEMs have the same ID as this will cause both SEMs to lose communications. SEM ID should be consecutive with the first starting at ID=1, with no missing ID, eg if there are 3 SEMs, they should be set up as ID = 1,2,3. and not 1,3,5.

Installation

Location

The SEP01 should be mounted in a dry area, with access to an unswitched AC power source. It does not have to be next to the Comfort controller as the RS485 bus allows a distance of at several hundred meters.

Mounting

Remove the knockout holes and mount the cabinet to the wall. Do not connect the transformer and backup battery until all other wiring is complete. Take precautions against damage by static discharge by using an anti static wrist strap tied to a suitable earth point.

A Local Expansion Module (LEM) may be mounted on top of a SEM PCB using 4 standoffs

Slave Expansion Module

RS485 Bus Connection

Connect the KA and KB terminals to the corresponding terminals (KA to KA, KB to KB) on the Comfort panel. Connect the COM (ground) of all the SEM and Comfort together

Normal CAT 5 cable can be used for connection of the SEM to Comfort, for up to 300 meters distance. The SEM can be mounted up to 1 km away from the main Comfort panel provided shielded CAT 5 cable (STP or FTP) is used. Two pairs should be used to double up the 12V and ground pair for such long distances

The white 4 way RS485 cable be used to connect the Slave to Comfort instead of the individual 12V/COM/KA/KB if the distance is short enough.

If the Bus is not connected, the ID2 (Red) LED will flash.

Power Supply

The power supply secondary wires should be connected to the DC IN terminal blocks. The power supply primary wires should be connected to an unswitched power supply outlet (for UK). Connect a 16 AWG green-jacketed solid conductor ground wire from the earth terminal on the studs provided on the enclosure to a metal pipe, grounding rod or other established earth ground for protection against lightning-induced surge.

- ➔ **The mains installation should be carried out by a qualified electrician in accordance with Electrical Wiring Regulations (BS 7671). As this is a permanently connected equipment, the fixed wiring must have a readily accessible disconnect device, e.g. isolation switch.**
- ➔ **Do not share the transformer secondary with any other equipment. Do not connect the transformer until all other wiring is completed.**

Setting ID

See ID Setting section above

Tamper

Connect the Case Tamper to the Tamp/COM inputs. This causes a tamper alarm if the input is open. The middle (0) terminal is a spare unconnected point for convenience of connecting 2 tampers in series.

Backup Battery

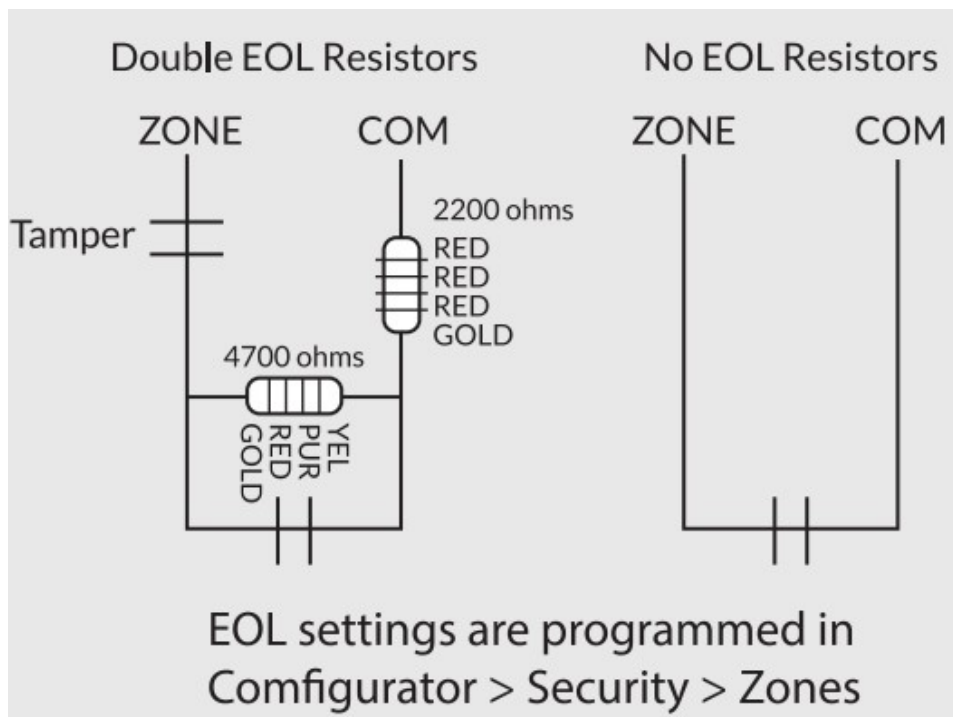
Connect a 12V 7 AH sealed lead-acid battery to the BATT terminals. This will give more than 24 hours of standby power to the system if 200 mA or less of auxiliary current is used. The LEM Expansion board requires less than 35 mA. Connect the positive terminal of the battery to the + terminal of the BATT connector and the negative terminal of the battery to the - terminal. The battery provides standby power to the system in the event of power failure and supplies additional current when required, e.g. to drive the siren during an alarm. The battery current is limited to 2.5A by a resettable fuse (F1). **Do not connect the battery until all wiring is completed.**

Inputs/Zone

Security sensors are connected to the Input terminals. Either No End-of-Line resistors (NEOL) or Double End-of-line (DEOL) resistors can be used for each Input. Unlike the older SEM01-M2, the End of Line configuration is not

Slave Expansion Module

determined by shunts. Instead, Configurator is used to determine if each zone should have No EOL or Double EOL resistors.

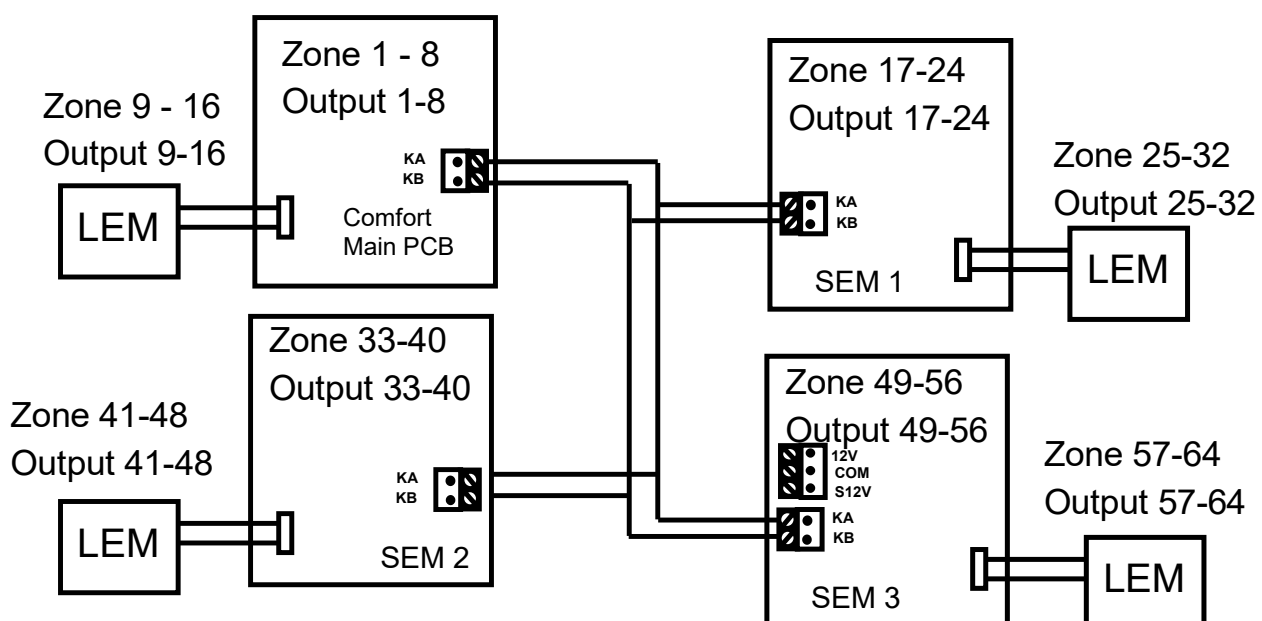


LEM Input and Output Expansion with SEMs

Only 1 LEM may be connected to the SEM, and this must be mounted inside the same metal enclosure. LEM02B has 8 inputs without outputs can be plugged into the SEM PCB. LEM01 has 8 inputs and 8 outputs, LEM03 can be connected.

Up to 5 SEMs may be connected in a Comfort system, giving a maximum of 96 inputs and 96 outputs, provided a LEM is used for the control panel and each SEM.

If only one SEM is connected, then the ID must be set to 1. The next SEM added must be 2, and the next should be 3 etc with no missing IDs.



Slave Expansion Module

The figure above shows the ID settings for each SEM, and the zones and output numbers associated with each SEM and LEM.

- **The 16 zone LEM03 with no outputs can be used with the SEM or the Comfort panel, but this means that SEMs with higher ID than the SEM with LEM03) cannot be installed due to conflict of zone numbers.**
- **Note that SEM Input and Numbering are fixed ie 17 to 24 for SEM 1 regardless of whether Local Expansion Modules are used.**

Programming

Programming is done using Comfigurator and a UCM (Universal Communications Module with USB or Ethernet interface connected to a PC).

Alarm Reporting

Each SEM monitors and reports the following conditions to the Control Panel

Low Battery

When the battery voltage drops to approximately 11 V, a low battery alarm is reported to Comfort. This is reported on the Event Log and announcement as "Battery Warning, id", where id is the RS485 ID, i.e. 33 = SEM 1, 34 = SEM 2, 35 = SEM 3, 36 = SEM4, 37 = SEM 5. A low battery on the Control panel will be reported as 'Battery Warning, 1".

Mains Failure is not reported by the SEM as this may result in multiple alarms if there is a general mains failure in the area.

Tamper

The Tamper input is monitored as a 24 hour alarm, and reported to the Comfort Control panel as "Tamper Alarm, id" The meaning of id is as explained above.

Document History

- Rev 1.00 Initial Release 7 July 2017
- Rev 1.01 Added Part Number Section 25 August 2020

Important Note

The printed manual may not always be the most current version. Please check and download the latest version from <http://www.cytech.biz/manuals.html>

