



12-32-0000

32 Port Input Expansion Module



PRODUCT MANUAL

Version 1.04
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Salcom Product Documentation

This document is designed to familiarise you with Salcom products and guide you through the hardware, configuration, installation and overall system management.

Salcom is an environmentally conscious company and in an effort to conserve paper no longer prints manuals with shipped products. All relevant documentation can be downloaded in PDF form from our website www.salcom.com

Warranty and Disclaimer

Salcom products are warranted for a period of 12 months from the date of purchase against faulty materials and workmanship. Should any fault occur, the unit should be returned to the vendor, freight pre-paid. Please include a description of the fault to assist with prompt return. Any unauthorised alterations or repairs will invalidate the warranty.

All information provided in this document is carefully prepared and offered in good faith as a guide in the installation, use and servicing of Salcom products. Installers must ensure that the final installation operates satisfactorily within the relevant regulatory requirements. Salcom accept no responsibility for incorrect installation. We reserve the right to change products, specifications and installation data at any time without notice

Product Overview

The 12-32-0000 is a 32-input expansion module that may be used either autonomously with a serial to ethernet converter or with any transmitter that supports Salcom protocol. Input modules may be daisy chained together to provide as many inputs as required.

A simple LCD provides indication of current inputs states and system messages. LEDs provide indication of system health, upstream and downstream serial port activity. When a message is generated by an input module the content of the message will display (up to the first 16 characters) on the LCD momentarily.

The 12-32 supports multiple message queuing, and will queue at least 50 messages. Pre-defined input messages are limited to a maximum length of 40 characters which may be configured using Salcom programming software.

The input module may be configured to tag each message with a source description (e.g., [01] or [Shed 1]).

Installation and Connections

The power supply is connected via P1, green power connector to +13.8 Volts and Ground. The supply input is protected against reversed connection.

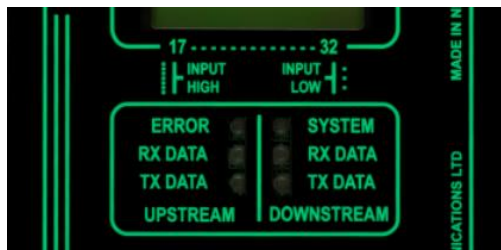
S1 (Upstream / Programming) Connections	
Pin	Description
1	Ground
2	Not Used
3	Not Used
4	Not Used
5	RS232 Tx
6	RS232 Rx

S2 (Downstream) Connections	
Pin	Description
1	Ground
2	Not Used
3	Not Used
4	Not Used
5	RS232 Rx
6	RS232 Tx

Input Connectors	
Connector Type	Purpose
16-Way Screwless Terminal Block	Digital Inputs (1-16)
16-Way Screwless Terminal Block	Digital Inputs (17-32)
9-Way Screwless Terminal Block	Ground (Common)
9-Way Screwless Terminal Block	+12V (Common)

Indicators

There are 6 indicators on the top panel consisting of:



Purpose	Label	Description
System Error	ERROR	The RED error LED will indicate when there is a system error. A flashing RED LED indicates the unit cannot communicate with the transmitter or an adjacent input module, or if the message buffer is full
Upstream Receive Data	RX DATA	This GREEN LED flashes to indicate serial data is being received from an upstream device
Upstream Transmit Data	TX DATA	This RED LED flashes to indicate serial data is being transmitted to an upstream device
Power Indicator	SYSTEM	The GREEN power LED, which normally flashes ON once per second to indicate healthy micro-controller operation. After a de-bounce period, the green LED will flash rapidly if the low supply detector is activated
Downstream Receive Data	RX DATA	This GREEN LED flashes to indicate serial data is being received from a downstream device
Downstream Transmit Data	TX DATA	This RED LED flashes to indicate serial data is being transmitted to a downstream device

Operation

Each input module will send its input message when triggered, to the downstream unit (connected to the left-hand side RJ12 socket). This may be either a transmitter, or another input module. A module connected downstream will acknowledge receipt of a Salcom protocol message, so reliable delivery to the transmitter can be ensured.

The input module may be configured to operate without acknowledging, so that input modules may be connected to a PC or unit that does not support Salcom protocol (but this is not advised, since messages may be lost).

When configured to wait for acknowledgment the input module will attempt to resend the last message again with a frequency as set by the user (up to every 10 seconds – default 1 second).

When a message cannot be acknowledged (probably due to a break in a serial cable link somewhere downstream) the input module may eventually fill its message queue, and stop acknowledging messages from upstream modules. If the input module is in an error or busy state preventing the offloading of messages, the module “breaking” the chain can easily be identified by inspecting the serial traffic and error LEDs.

Sending an Input Module Message

There are three ways of initiating a message sent from the input module:

- Using the external discrete inputs
- Supply detector threshold (Low supply message)
- Watchdog

External Discrete Inputs

An action can be initiated from the 32 external inputs with an input transition to LOW (connection to GND) and/or HIGH (input floating or connection to $>+3.5\text{v}$).

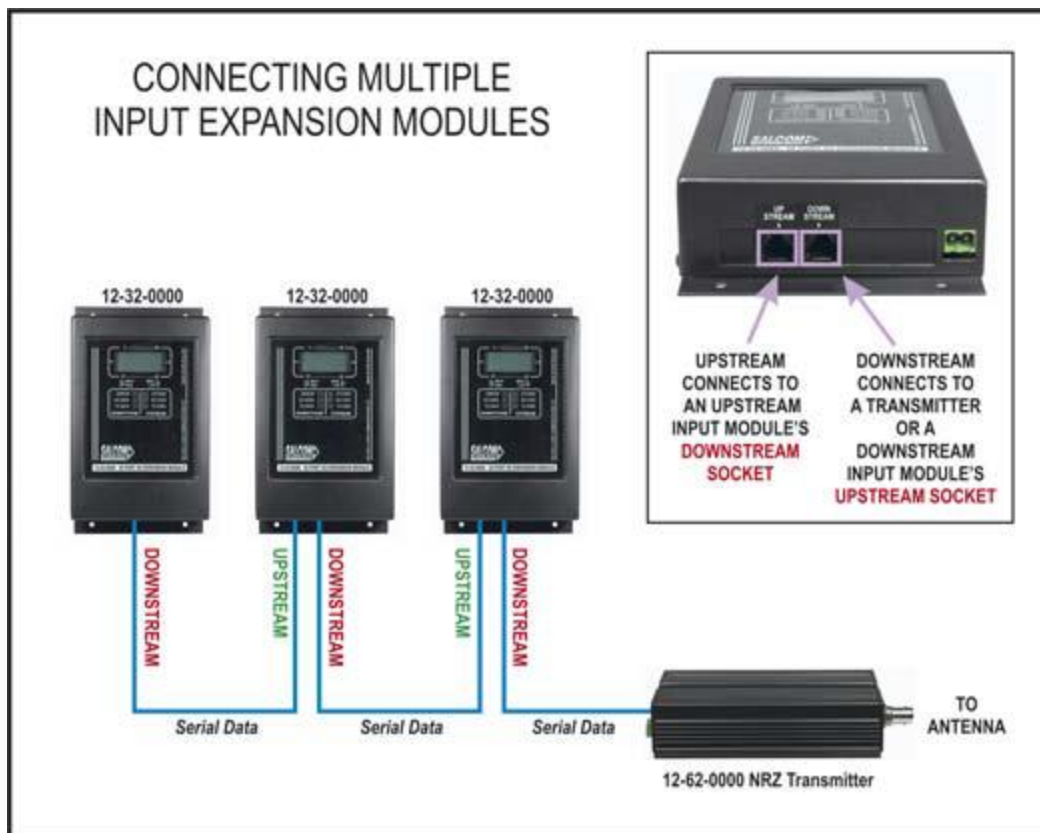
Low supply message

After a debounce period, the low-supply detector can initiate an action for both “supply going high” and “supply going low” conditions.

Watchdog

The watchdog feature will initiate an action after a predetermined period. The watchdog also optionally allows the transmission of the current state of selected inputs (including supply level).

Connecting Multiple Input Expansion Modules



System Configuration using multiple Input Modules

Error Codes

Error Code	Description
ER2 NOACK	The downstream device failed to acknowledge the last sent message
ER6 BUSY	12-32 is too busy to process the received message – memory is full

Trouble Shooting

The following table may help in problem solving where necessary:

Fault	Check
No illumination of Green LED	Bad power supply connection
Input activated but no message sent	PSD configuration incorrect
No RS232 serial communication	Comport connections, baud-rate 9600 no parity, eight data bits, one stop bit
Red LED flashes rapidly	Downstream device not acknowledging – check serial cables and traffic LEDs. Device is busy - memory is full or transmitter unable to clear volume of messages.
Green led flashes rapidly	Low supply detector threshold

Programming

Preparations for Connecting the Programming Software

To change the field programmable options, the unit must be connected to a PC running the 12-32 PSD programming software in Windows XP via the standard serial port S1 (Upstream / Programming) connector.

Note: To make up a serial cable, the S1 (Upstream/Programming) connections are shown earlier. Alternatively purchase an optional Salcom serial programming cable.

Note: The 12-32 must be powered during programming.

Ensure that the 12-32 PSD has the correct com port selected. Once correctly configured perform the following:

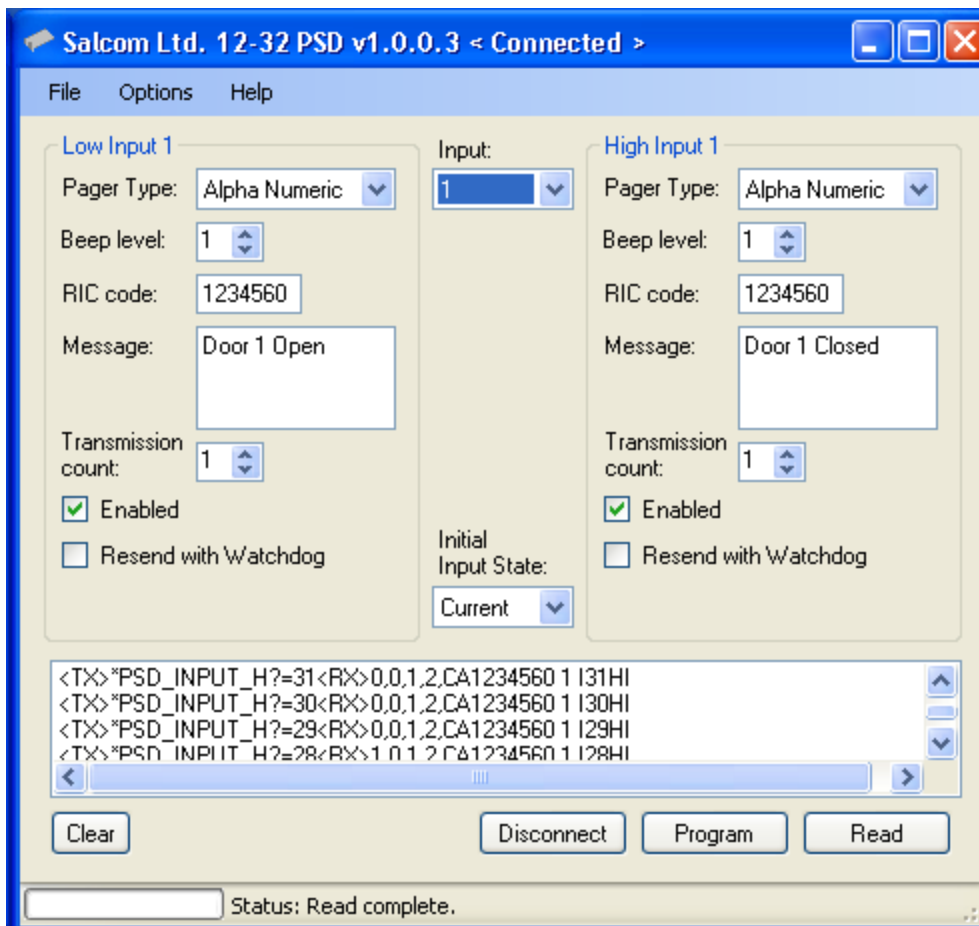
1. Press connect. The status at the bottom of the 12-32 PSD will indicate if successfully connected.
2. Press the read button, or load a PSD configuration file. This will load all settings of the 12-32, which is required before any changes can be programmed. The 12-32 PSD will provide feedback if the user selected operations are successful.

Using the Programming Software

The 12-32 PSD allows the user to configure the following characteristics:

- Input actions, watchdog and low supply detector settings
- Pre-defined messages
- Configuration of input module ID (which will be added to each message sent).

Once the program is running, the opening screen appears. Use the mouse to select the configuration fields for each feature.



PSD Input Configuration

All inputs may be configured in a similar fashion, including supply voltage monitoring. The input drop down box provides support for all of the 32 inputs.

The battery input is at the very bottom of the input list. Each input may have a message defined for both a high and low state. Input parameters may be configured as follows:

Pager type: Numeric or Alpha numeric. Tone only pagers are supported by ensuring that the message field is left blank.

Beep Level: Page beep levels 1-4.

RIC Code: Pager ID. Valid Codes are:

0000008 to 2007663

2007672 to 2045055

2045064 to 2097143

Message: User message, up to 40 characters in length.

Transmission Count: How many times that message will be sent if triggered.

Enabled: When selected, the configured message will be sent when triggered.

Resend with Watchdog: When the watchdog is enabled, the input message will be sent periodically as configured if in the enabled state. When using this feature, the watchdog must be enabled and use a valid RIC code.

Initial Input State: Input messages are sent when transitioning to the enabled state.

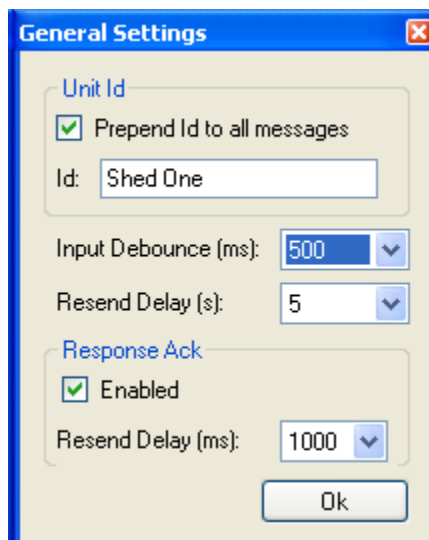
If on start-up “Current” has been selected the current input state is read, so that the input message will not be sent on start-up.

If “High” is selected, the input on startup is assumed to be in the high state, so when found to be low (if this is the case) the transition will result in a message being sent (if enabled).

If “Low”, the opposite will occur, the input is assumed to be low on startup, the transition to high resulting in message being transmitted (if enabled, and the input is in the high state).

PSD General configuration

Selecting Options->General will display the general configuration screen as shown overleaf. The following items may be set here.



Unit Id: The Identifying string (up to 10 characters) that may be prepended to each outgoing message. Note that this ID should be numeric if numeric pagers are being used.


Input Debounce: The time delay between the input being triggered and the message being sent.

Resend Delay: When an input has been configured with a transmission count greater than 1, then the resend delay is the delay in seconds before sending the message again.

PSD Configuration files:

The current 12-32 configuration can be saved using File-Save. Previously saved configuration files can be loaded and edited with, or without a 12-32 connected.

Technical Specification

Technical Specification 12-32-0000 - 32 Port Input Expansion Module		
Power Supply	+13.8V typical (11 to 15 VDC range)	
Power Consumption	Normal Operation: 40mA	
Configuration Application	12-32 Configuration Tool	
Programming Cable	12-45-0000 (RJ12 to DB9) Can be used with a USB to RS232 DB9 Serial Adapter Cable	
Serial Port	9600 , N, 8, 1; RS232	
Serial Protocols	Salcom	
Discrete Inputs	32 (Ground activated)	
Connectors	Upstream / Programming interface (RS232) = RJ12 (6P6C) Downstream interface (RS232) = RJ12 (6P6C) Discrete Inputs (1-16) = 16-way screwless terminal block Discrete Inputs (17-32) = 16-way screwless terminal block Gnd = 9-way screwless terminal block +12V = 9-way screwless terminal block	
Power Connector	2-way plug & socket, screw connections (supplied)	
Environmental Protection	Not suitable for outdoor use and should be protected from adverse environmental conditions	
Operating Temperature	-10°C to +50°C (+14°F to +122°F)	
Indicators	ERROR LED (Red) - On = System Error; Flashing = Unit Cannot Communicate with Transmitter, or Adjacent Input Module, or Message Buffer Is Full RX DATA LED (Green) - Flashing = Serial Data Is Being Received from An Upstream Device TX DATA LED (Red) - Flashing = Serial Data Is Being Transmitted to An Upstream Device SYSTEM LED (Green) - Slow Flashing = Normal Operation; Rapid Flashing = Low Supply Voltage RX DATA LED (Green) - Flashing = Serial Data Is Being Received from A Downstream Device TX DATA LED (Red) - Flashing = Serial Data Is Being Transmitted to A Downstream Device	
Weight	385g	
Enclosure Dimensions	113mm x 193mm x 40mm (WxDxH)	
Enclosure Material	Steel case	
Colour	Matt black	
Type Approvals	EN 60950-1:2006 (Safety) EN 301 489-2 V2.1.0 (EMC)	

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