12-38-0000

VHF / UHF Transceiver

PRODUCT MANUAL

Version 1.05

February 2019

Salcom Product Documentation

This document is designed to familiarize 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 12-38-0000 transceiver is capable of accurate control and telemetry over long distances. Designed to be used in industrial environments it can withstand temperature extremes as well as being resilient to electrical noise often found in industrial plants.

The transceiver, along with its integrated input/output interface is designed for the control and telemetry of industrial machines with high accuracy and speed.

The 12-38-0000 has an on-board SD card which is used to store the configuration of a unit, this allows for ease of copying a configuration between units e.g. to replicate a system, the capturing of log files and storage of audio wave files. The unit can be set up to respond to an event, such as an input, by selecting a radio channel and broadcasting the audio wave file. Anyone carrying a radio transceiver, set to that channel, can then receive the message.

The 12-38-0000 could also be configured as a store and forward radio repeater to extend the radio range of any installation. This will allow monitoring and control of sites in difficult locations without clear radio access.

The 12-38-0000 is a 5-watt analogue transceiver with POCSAG capability for both transmitting and receiving and comes in two variants, a VHF (136-174 MHz) or UHF (440-470 MHz). All parameters are programmable such as frequency, power output, deviation, POCSAG data transmission.

The USB port, or the RS232 serial port can be used to initiate paging transmissions using the SALCOM propriety protocol, Paging Entry Protocol (PET) or Telocator Alphanumeric Protocol (TAP) PG1 protocol

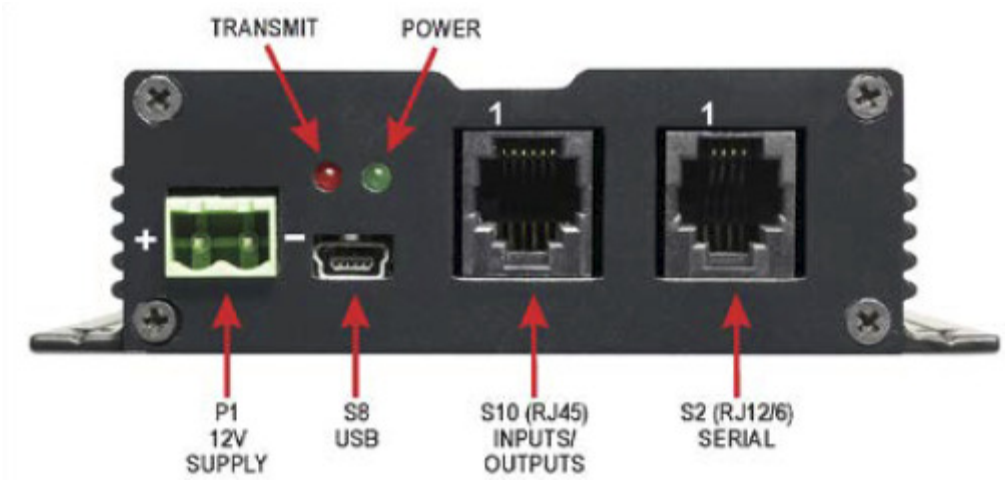
Installation and Connections

The power supply is connected via PI, green power connector to +13.8 Volts DC and Ground. The 12-38 is protected against reversed supply connections. The power source must be reasonably noise free.

Radiation Hazard: Important! To comply with FCC Controlled/Occupational Exposure Limits the aerial must be positioned or mounted to operate at least 0.26 metres away from Operational Staff and 0.57 metres away from the general public.

It is recommended to site the aerial a few metres away from the 12-38 to avoid the possibility of RF feedback causing problems with the transmitter operation. An outside aerial is preferable and will provide better radio coverage. The aerial connection is via the BNC connector and should present a nominal load of 50Ω, with a VSWR of better that 1.8:1.

External indicators consist of a power indicator GREEN LED, normally flashing ON once a second to indicate healthy microcontroller operation.



S2 RJ12	
Pin	**Description**
1	Ground
2	Output 1
3	Input 2
4	Input 1
5	RS232 Tx
6	RS232 Rx

S10 RJ45	
Pin	**Description**
1	Ground
2	PTT Input
3	Mic / AV In
4	Input 3
5	Output 2
6	Busy
7	Speaker / AV Out
8	+5V

Output1 and 2 are Open Collector and Inputs 1, 2 and 3 are triggered by grounding the pins.

Configuration

All serial commands are sent and received using a standard terminal application connected at 9600:N:8:1 using a 12-45 programming adaptor. Ensure that the correct COM port is selected.

Sending MAP<CR> to the 12-38 will display current configuration information. To change a parameter refer to the terminal programme instructions. An example is given below:

+03=456675000<CR> to change the RX frequency

Using the USB

If the connection is via the USB then the 12-38 will appear as a drive on the computer. The configuration information is held in the config.ini file which can be opened and edited using a standard text editor. Once the required parameter has been changed save the file back to the original location.

Whilst the USB is connected the Green LED will flash faster.

Parameter Format

Each parameter follows the same format. An example is given below:

;Tx Frequency set the Transit Frequency in Hz the command description

;+20=456675000 an example for the correct format

+20=456675000 the actual parameter set

Analogue Transmissions Via External Modulation Source

Connect the External Modulation Source to Pin 3 of connector S10. This input is configured for a fixed amplitude input source of 100mV rms, or 280mV p-p. Monitor the RF output on a FM modulation on a meter and adjust the deviation to ±4kHz. Adjust the deviation by fine adjustment of the input signal, or via the PSD by changing the DAC setting within the '***Audio in Atten***' box. Do not click '**Enable Calibration**' tick box for this adjustment. It is important to '**Read**' first, then alter the settings, a higher number gives more deviation and lower number less deviation.

It is also important to keep the deviation to ±4kHz to avoid getting into the compression range. Then press '**Program**' in the '**Configuration**' section to save the settings.

Salcom Protocol

Salcom protocol takes the basic form: ***PPXXXXXXXsLsMMMMMM<CR>***, where:

- **P** is either **CA** (512 baud alpha), **CN** (512 baud numeric), **ca** (1200 baud alpha), or **cn** (1200 baud numeric).
- X is a 7 digit RIC code.
- **S** is a space.
- **L** is a digit (1 to 4 beep level)
- **M** is the message payload (up to 240 characters).
- **<CR>** is a carriage return (enter key)

CA _____

Usage: CA<pager#>[<space>]<level>[<space>]<message><CR>

Description: Call alphanumeric pager

Example: CA1119358 1 Please return to reception<CR>

Response: CA11193581<CR><SPACE>Page Sent<CR><LF>

CN _____

Usage: CN<pager#>[<space>]<level>[<space>]<message><CR>

Description: Call numeric pager

Example: CN1119358 1 777<CR>

Response: CN11193581<CR><SPACE>Page Sent<CR><LF>

RES _____

Usage: RES<CR>

Description: Reset 12-38 microcontroller

Example: RES<CR>

Response: SALCOM 12-38-0000 VX.XX<CR><LF>

SN? _____

Usage: SN?<CR>

Description: Retrieve unit serial number and firmware revision

Example: SN?<CR>

Response: SALCOM 12-38-0000 VX.XX 5122345<CR><LF>

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 transmission	Software configuration incorrect
Unit transmits but nothing received	Poor aerial Wrong frequency Incorrect RIC Incorrect baud-rate Power too low Unit too hot (the unit will also send out an alter via the serial port) Too much vibration
No RS232 serial communication	Incorrect COM port connection selected Software configuration incorrect Cable faulty
Unit starts, but does not complete transmission	Poor supply voltage RF interference (the unit will also report an error on the terminal port)

Technical Specification

Technical Specification 12-38-0000 – VHF / UHF Transceiver	
Frequency Range	136 - 174MHz - VHF (Model No. 12-38-0150) 440 - 470MHz - UHF (Model No. 12-38-0450)
Frequency Selection	User configurable
Power Supply	+13.8V typical (11 to 15 VDC range)
Power Consumption	Standby: 140mA Transmit: 1.2A @ 5W
Transmit Power	5W, 4W, 2W, 1W, 500mW, 250mW
Channel Spacing	6.25kHz, 12.5kHz, 25kHz
Modulation	FSK with NRZ Data True FM for Audio
Deviation	±2.25kHz or ±4.5kHz
Transmit Duty Cycle	Up to 100%
Receiver Sensitivity	-119dBm for 12 dB SINAD
Audio Modes	Analogue FM transmission and reception
Audio Conditioning	300Hz to 3kHz passband software defined pre-emphasis DTMF and CTCSS (<300Hz)
Muting	Software defined muting level
Baud Rates	512, 1200 Will not operate with 1200 baud rate pagers
Message Format	POCSAG
Configuration Application	Salcom 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	3 (Ground activated)
Discrete Outputs	2 (Open collector)
Other I/O	PTT; Busy; Mic/AV In; Mic/AV Out; +5V
Connectors	Serial Port (RS232) = RJ12 (6P6C) Serial Port / Flash Drive = mini USB Input / Outputs = RJ45 (8C)
Power Connector	2-way plug & socket, screw connections (supplied)
RF Connector	50Ω BNC
Environmental Protection	Not suitable for outdoor use and should be protected from adverse environmental conditions
Operating Temperature	-10°C to +60°C (+14°F to +140°F)
Indicators	Power LED (Green) - Slow Flashing = Normal Operation - Rapid Flashing = USB Connected Status LED (Red) - On = Transmitting - Flashing = Error Condition
Weight	318g

Enclosure Dimensions	100mm x 130mm x 30mm (WxDxH)
Enclosure Material	Extruded aluminium
Colour	Matt black
Type Approvals	AS/NZS 4295: 2004 (RF) AS/NZS 4769.1:2000 + Amendment 1:2002 (RF)

How to Contact Us

Sea Air and Land Communications (Salcom) Ltd
10 Vanadium Place
Addington
Christchurch 8024
New Zealand
T: +64 (0)3 379 2298
W: www.salcom.com
E: support@salcom.com
E: sales@salcom.com