12-62-3000 DESKTOP SYNTHESIZED 4 WATT PAGING/NRZ TRANSMITTER

PRODUCT INFORMATION

SEA AIR AND LAND COMMUNICATIONS LTD, 120 St Asaph Street, Christchurch, New Zealand

12-62-3000 DESKTOP POCSAG PAGING TRANSMITTER

1.0 DESCRIPTION

The 12-62-3000 is a paging transmitter allowing operator entry of numeric messages, or selection of preprogrammed alphanumeric messages for transmission to POCSAG pagers.

Up to 100 receiver identification codes (RICs) can be stored in the transmitter's pager lookup number table and 10 preprogrammed alphanumeric messages.

The 12-62-3000 is a 12-62 based POCSAG paging transmitter extended with a touch sensing front panel and LCD. The same firmware is used for all 12-62 variants, so the standard 12-62 PC configuration software can be used.

The 12-62 is a 138 - 174 MHz (VHF) or 427.5 - 475 MHz (UHF) 4 watt POCSAG paging transmitter with an in-built encoder. All parameters are programmable such as: frequency, power output, deviation, POCSAG or NRZ data transmission.

The unit can be controlled via a USB port or an RS232 serial interface to provide numeric, alphanumeric and tone-only POCSAG encoding. This enables a user to call a pager (over 2,000,000 codes), append an appropriate priority level (1 of 4), and add a numeric or alphanumeric message.

The 12-62 supports multiple message queuing, and will queue up to eight 240 character messages, or as many smaller messages that will fit into the available memory (up to 80). Pre-defined input messages are limited to a maximum length of 40 characters which may be configured using the Salcom programming software. Control via the USB or Serial port is achieved using ASCII character commands.

The unit supports 4 discrete inputs with a different pre-programmed message on high and/or low transition, plus voltage detection messages on the power input.

The inputs can be configured for a number of options. Provision to transmit a message more than once and variable time between transmissions are catered for.

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.

These ports can be used concurrently making it possible to connect a telephone interface unit and still initiate paging transmissions via the USB port.

Over temperature cutout: If the transmitter operates for extended periods in a hot environment, a protective thermal cutout may operate to reduce the output power to a safe level. It will reset when the unit temperature has fallen to below 70 deg.

Transmitter Duty cycle: The transmitter duty cycle is rated as 50% with a max 'on' time of 5 minutes. Higher duty cycles may be possible. Contact Salcom for advice.

2.0 WARRANTY

Our Products are warranted for a period of 12 months from 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 unauthorized alterations or repairs will invalidate the warranty.

3.0 DISCLAIMER

All information provided in this document is carefully prepared and offered in good faith as a guide in the installation and use of the 12-62. Installers must ensure that the final installation operates satisfactorily within the relevant regulatory requirements. We accept no responsibility for incorrect installation. We reserve the right to change products, specifications, and installation data at any time, without notice.

4.0 MECHANICAL DESCRIPTION

The 12-62 is enclosed in an extruded aluminium box. The end-plates unscrew and the lid slides off to allow access to the component side of the pcb. The complete pcb can then be slid out of the case if required, the heatsink relies on a light pressure contact with the case for heat dissipation, The case has four holes for mounting the unit. The 12-62 must be mounted away from sources of heat, damp or vibration.

5.0 INSTALLATION

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

Radiation Hazard: Important! To comply with FCC Controlled/Occupational Exposure Limits, the aerial must be positioned or mounted to operate at least 0.2 metres away from occupational staff and 0.5 metre away from the general public. Use only supplied aerial.

It is recommended to site the aerial a few metres away from the 12-62 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 50 Ω, with a VSWR of better than 1.8:1.

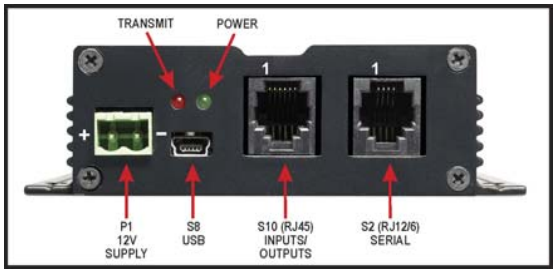
External indicators consist of a power indicator GREEN LED, normally flashing ON once per second to indicate healthy microcontroller operation.

After a debounce period, the green LED will flash rapidly if the low supply detector is activated. The RED LED will indicate when the unit is transmitting. A flashing RED LED indicates the unit cannot transmit as either the synthesiser is out of lock, the 12-62 is critically hot or an internal fault has been detected.

S2 and S10 Connections

S2 Connections:-	
Pin 1	Ground
Pin 2	Interrupt
Pin 3	SCL
Pin 4	SDA
Pin 5	RS232 Tx
Pin 6	RS232 Rx

S10 Connections:-	
Pin 1	PTT OUT, 50mA max.
Pin 2	GROUND
Pin 3	Discrete Input 4
Pin 4	Discrete Input 3
Pin 5	Discrete Input 2
Pin 6	Discrete Input 1
Pin 7	PTT Input for NRZ operation
Pin 8	Modulation Input for NRZ operation



6.0 OPERATION

The 12-62 can transmit 3 types of POCSAG message, with any one of 4 function levels:

- Alphanumeric transmissions. Message can contain any alphanumeric 'ASCII' character.
- Numeric transmissions. Message contains only Numeric characters and some symbols.
- Tone Only transmissions (Alphanumeric or numeric with no message)

6.1 Alphanumeric transmissions: Messages can contain any alphanumeric character. The 12-62 will accept the standard ASCII 7 bit character set**.**

6.2 Numeric transmissions: Messages can contain numeric characters and some symbols. These can convey a telephone number, or other numerically coded information. The transmitted message is shorter, and therefore there is a smaller chance of errors received by the pager.

The numeric character set is as follows: **0 1 2 3 4 5 6 7 8 9 [ ] - U <space>**

6.3 Tone Only transmissions: Any numeric or alphanumeric paging message without an actual text message is also considered 'Tone Only'. A function level will control the number of beeps on the receiver (four different function levels can be sent).

7.0 INITIATING TRANSMISSION

There are five ways of initiating a paging message transmission:

(1) Using the external discrete inputs (action)
(2) Supply detector threshold (action)
(3) Watchdog (action)
(4) RS232 Serial commands
(5) Keypad entered messages

An action is defined as a paging message, RIC (Receiver Identification Code or capcode) and flags. Flags are discussed in the PSD (product support disk) section.

7.1 External Discrete Inputs: An action can be initiated from the 4 external inputs with an input transition to LOW (connection to GND) and/or HIGH (input floating or connection to >+3.5v).

7.2 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.

7.3 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).

7.4 Using the RS232 Serial Commands: Serial commands can be "manually" issued to an 12-62 using a terminal program such as PROCOMM or Hyper-terminal.

Tone only, numeric and alphanumeric pagers can be called using serial commands. These commands will be processed in parallel with other inputs actions for transmission.

Some basic commands are described in section 8.0. Information on the full protocol command set is available on request.

8.0 PROTOCOL COMMAND SET

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 12-62 microcontroller
Example: RES<CR>
Response: SALCOM 12-62-0000 VX.XX<CR><LF>

SN?

Usage: SN?<CR>
Description: Retrieve unit serial number and firmware revision
Example: SN?<CR>
Response: SALCOM 12-62-0000 VX.XX 5122345<CR><LF>

8.1 Serial Error Codes/Reports

ER1 SYNTAX	You entered an invalid command
ER3 OPERND	You entered a valid command with invalid values
ER6 BUSY	12-62 is too busy to process the entered command, try again later.
ER7 OVERTEMP	12-62 is critically hot, transmission not possible until cooler.

9.0 DESKTOP PAGER OPERATION

There are four RIC modes of operation:

(1) DB Only (pager ID 0-99 supported only): In this mode only pager IDs that are part of the RIC DB can be used.

(2) Any RIC: In this mode any RIC code between 8 and 2000000 can be entered.

(3) DB plus Any RIC: In this mode the first 2 digits are used to form a DB ID from the RIC DB. If any further digits are entered, it is assumed to be a RIC code instead of a DB ID.

(4) Prefix only: In this mode a number between 0 and 9999 can be entered. The first 3 digits are made up from a RIC prefix configured through the PSD. If a prefix of 000 has been configured, then the ID entered is frame 0 aligned – this means that an ID of 1 will give a RIC code of 8, ID of 2 gives 16, 3 gives 24 etc.

RIC Mode Examples: The following examples show how messages may be sent using the front panel keypad. The large "tick" button should be considered to be synonymous with "accept", and the "cross" button should be considered to be "cancel".

The following examples assume that the message and RIC database has been pre-configured (that's 100 RIC codes and 10 messages). RIC codes programmed are from 1234000 to 1234099, pre-programmed messages are from "Msg0" to "Msg9".

DB Only Mode:
To send a tone only message to RIC database entry 1:
1. Press 1 ("Pager ID 01" will now be displayed on LCD)
2. Press Accept ("Sending Page" will now be displayed on LCD)

A tone only message is sent to pager RIC code 1234001

To send pre-programmed message 1 to RIC database entry 99:
1. Press 9 ("Pager ID 09" will now be displayed on LCD)
2. Press 9 ("Pager ID 99" will now be displayed on LCD)
3. Press P ("Recall Msg ID" now be displayed on LCD)
4. Press 1 ("Msg1" now be displayed on LCD)
5. Press Accept ("Sending Page" will now be displayed on LCD)

The message "Msg1" is sent to pager RIC code 1234099

To send a custom numeric message "123" to RIC database entry 4:
1. Press 4 ("Pager ID 04" will now be displayed on LCD)
2. Press * ("Enter Num Msg" now be displayed on LCD)
3. Press 1 ("1" now be displayed on LCD)
4. Press 2 ("12" now be displayed on LCD)
5. Press 3 ("123" now be displayed on LCD)
6. Press Accept ("Sending Page" will now be displayed on LCD)

The message "123" is sent to pager RIC code 1234004

Any RIC Mode
To send a tone only message to RIC code 1234567:
1. Press 1 ("RIC Code #0000001" will now be displayed on LCD)
2. Press 2 ("RIC Code #0000012" will now be displayed on LCD)
3. Press 3 ("RIC Code #0000123" will now be displayed on LCD)
4. Press 4 ("RIC Code #0001234" will now be displayed on LCD)
5. Press 5 ("RIC Code #0012345" will now be displayed on LCD)
6. Press 6 ("RIC Code #0123456" will now be displayed on LCD)
7. Press 7 ("RIC Code #1234567" will now be displayed on LCD)
8. Press Send ("Sending Page" will now be displayed on LCD)

A tone only message is sent to pager RIC code 1234567

DB And Any RIC Mode: In this mode the first 2 digits are assumed to form the DB entry ID, but any more than 2 digits form a RIC code.

To send a tone only message to RIC code 1234567:
1. Press 1 ("Pager ID 01" will now be displayed on LCD)
2. Press 2 ("Pager ID 12" will now be displayed on LCD)
3. Press 3 ("RIC Code #0000123" will now be displayed on LCD)
4. Press 4 ("RIC Code #0001234" will now be displayed on LCD)
5. Press 5 ("RIC Code #0012345" will now be displayed on LCD)
6. Press 6 ("RIC Code #0123456" will now be displayed on LCD)
7. Press 7 ("RIC Code #1234567" will now be displayed on LCD)
8. Press Send ("Sending Page" will now be displayed on LCD)

A tone only message is sent to pager RIC code 1234567

Prefixed Only Mode: In this mode a configured prefix sets the top 3 digits of a RIC code. Up to 4 digit can be supplied to set the lower 4 digits. The following example assumes that the prefix has been configured to be "123".

To send a tone only message to prefixed ID 1:
1. Press 1 ("Pager ID 0001" will now be displayed on LCD)
2. Press Send ("Sending Page" will now be displayed on LCD)

A tone only message is sent to pager RIC code 1230001

To send a tone only message to prefixed ID 167:
1. Press 1 ("Pager ID 0001" will now be displayed on LCD)
2. Press 6 ("Pager ID 0016" will now be displayed on LCD)
3. Press 7 ("Pager ID 0167" will now be displayed on LCD)
4. Press Send ("Sending Page" will now be displayed on LCD)

A tone only message is sent to pager RIC code 1230167

Pressing the Cancel button at any time will reset the message being set, and "Enter Pager ID" will be displayed.

Changing Message Page Beep Level: After selecting any valid pager ID or RIC code, page level can be changed. If not changed it is assumed to be level 1, or the level configured in the RIC database. Changing the page level will override the RIC database page level.

To send a tone only message to prefixed ID 167 page level 3:
1. Press 1 ("Pager ID 0001" will now be displayed on LCD)
2. Press 6 ("Pager ID 0016" will now be displayed on LCD)
3. Press 7 ("Pager ID 0167" will now be displayed on LCD)
4. Press # ("Enter Level1-4" will now be displayed on LCD)
5. Press 3 ("Level: 3" will now be displayed on LCD)
6. Press Send ("Sending Page" will now be displayed on LCD)

A beep level 3 tone only message is sent to pager RIC code 1230167

Periodic Messages: In some cases it is useful to have more than 1 watchdog or periodic message. The desktop transmitter will allow for 2 additional periodic messages, with configurable timeouts from 5 to 20 seconds. These periodic messages will be able to be enabled or disabled via the 'P' button on the keypad, and also display the programmed function of the periodic message, and active state.

9.0 TROUBLE SHOOTING

The table on the next page may help in problem solving where necessary.

Fault	Check
No illumination of Green LED	Bad power supply connection
Input activated but no transmission	PSD configuration incorrect
Unit transmits but nothing received	Poor aerial. Wrong frequency, RIC, baud-rate. Power too low. Unit too hot. Too much vibration
No RS232 serial communication	Comport connections, baud-rate 9600 no parity, eight data bits, one stop bit
Red LED flashes rapidly	VCO out of lock, unit too hot or internal fault detected. Connecting a serial lead to the 12-62 will allow the nature of the fault condition to be determined.
Green led flashes rapidly	Low supply detector threshold
Unit starts, but does not complete transmission	Poor supply volts, RF interference.

10.0 PROGRAMMING

10.1 Installing the VCP USB Driver: To use the USB port to communicate with the 12-62, a Virtual Com Port driver must be installed on the PC. To install the Silicon Laboratories USB driver, run the driver installer CP210x_VCP_Win2K_XP_S2K3.exe provided on the supplied PSD CD and follow the on screen instructions. Once the driver is installed, an additional COM port will be available via the Salcom PSD programming software.

VCP USB driver updates are provided periodically by Silicon Laboratories and may be downloaded free of charge from https://www.silabs.com/support.

10.2 Preparations for Connecting the Programming Software: To change the field programmable options, the unit must be connected to a PC running the 12-62 PSD programming software in Windows XP via either the preferred USB port S8 (using the supplied USB mini cable), or the standard serial port S2. To use the USB connector, the supplied virtual COM port USB driver must be installed

Note: To make up a serial cable, the S2 connections are shown on page 3. Alternatively purchase an optional Salcom serial programming cable.

The 12-62 must be powered during programming, +13.8V to power terminals.

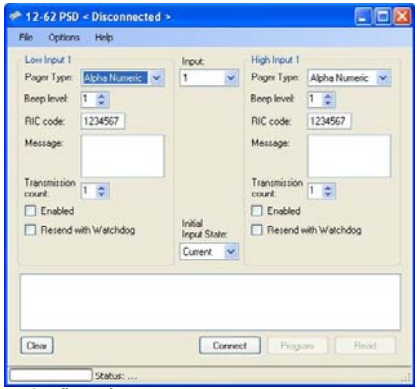
Ensure that the 12-62 PSD has the correct com port selected. Once correctly configured perform the following:

1 Press connect. The status at the bottom of the 12-62 PSD will indicate if successfully connected.
2 Press the read button, or load a PSD configuration file. This will load all settings of the 12-62, which is required before any changes can be programmed. The 12-62 PSD will provide feedback if the user selected operations are successful.

10.3 Using the Programming Software: The 12-62 PSD allows the user to configure the following characteristics:

> Input actions, watchdog, low supply detector and POCSAG transmission settings
> Pre-defined messages
> RF frequency, deviation and output power
> 99 pager numbers for use with the Salcom 12-36 telephone interface.

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



10.4 PSD Input Configuration

All inputs may be configured in a similar fashion, including supply voltage monitoring. The input drop down box provides support for the 4 inputs available on S10. 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
0000000 may be used as a "drop" code. This may be used for the watchdog when the watchdog is used, but a watchdog message is to be suppressed.

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.

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).

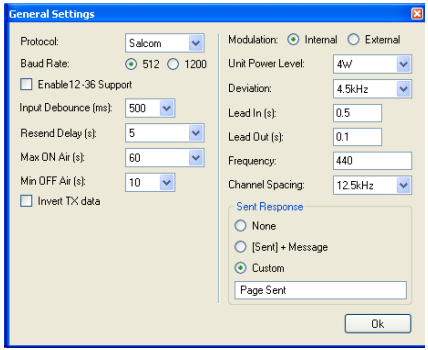
10.5 PSD General configuration

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

Baud Rate: Changing this setting will result in all configured messages to be sent at the selected baud rate (512 or 1200 Baud).

Protocol: Allows the serial protocol to be changed

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



Enable 12-36 Support: Enabling 12-36 support will allow the 12-36-0000 telephone interface to be configured. Configuration options will become available through the options tab (refer to 10.7: PSD 12-36 Support).

Invert Tx data: Internally generated data is inverted when Internal modulation is selected. The Invert Tx Data option is unavailable when external modulation is selected.

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.

Max On Air: When the 12-62 is transmitting, this setting controls how long the transmitter may be continuously on air. When this period of has been exceeded the transmitter ceases transmission and will remain off air for the duration defined by the Min OFF Air setting. This setting has no effect when external modulation has been selected.

Min Off Air: When the 12-62 has exceeded the max on air continuous transmission time, the Min OFF Air setting controls how long the transmitter will remain powered down before allowing transmission to continue.

Lead In: The lead in defines how long the transmitter carrier will be present before data transmission commences.

Lead Out: The lead out time controls how long the transmitter will remain on air after data transmission has finished.

Frequency: Configures the transmission frequency. Note that the selected frequency must be evenly divisible by the channel spacing.

Channel Spacing: Defines the frequency step resolution.

Unit Power Level: The power level to transmit at. Note that the power will be reduced when the 12-62 exceeds 70 degrees.

Deviation: How much the selected frequency deviates by when transmitting data. Note the custom setting is not to be used unless the 12-62 has been factory set to support this option.

Modulation: If external modulation has been selected then no serial or input controlled messages will be sent, data transmission is solely controlled by the PTT and Modulation inputs on connector P2. When internal modulation is selected then the PTT and modulation inputs do not serve any purpose.

Sent Response: Controls the serial response when a page has been transmitted. Historically "Page Sent" would be sent by Salcom products to the serial port to provide a controlling application with feedback that another message may be submitted for transmission. Since the 12-62 may queue many messages "Page Sent" may not describe sufficiently which page has been transmitted. Selecting "[Sent] + Message" will allow feedback to the user which message has been transmitted, but may introduce backwards compatibility problems with applications supporting other Salcom products. Selecting "Custom" will allow any user defined response up to 40 characters in length. Selecting "None" will result in no serial feedback on completion of a message transmission.

10.6 PSD Desktop Options

After pressing the connect button "Desktop Options" can be found under the Options tab.

Echo Desktop Messages:
When checked all desktop messages are sent out both Legacy and USB serial ports in salcom protocol format.

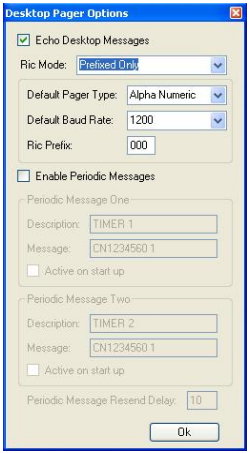
Ric Mode:
> DB Only (pager ID 0-99 supported only).
In this mode only pager IDs that are part of the RIC DB can be used (this is the shared 12-36-0000 telephone interface database).

> Any RIC: In this mode any RIC code between 8 and 2000000 can be entered.

> DB plus Any RIC: In this mode the first 2 digits are used to form a DB ID from the RIC db. If any further digits are entered, it is assumed to be a RIC code instead of a DB ID.

> Prefix only: In this mode a number between 0 and 9999 can be entered. The first 3 digits are made up from a RIC prefix configured through the PSD.

If a prefix of 000 has been configured, then the ID entered is frame 0 alligned – this means that an ID of 1 will give a RIC code of 8, ID of 2 gives 16, 3 gives 24 etc.



Default Pager Type: When a RIC Code is manually entered (i.e not from the RIC database) the pager will be treated as this type.

Default Baud Rate: When a RIC Code is manually entered (i.e not from the RIC database) the pager message will be sent at this baud rate.

Enable Periodic Messages: When checked the periodic messages as configured will be able to be enabled and disabled (and visible) from the desktop pager.

Periodic Description: This is the 8 character timer description that will be visible on the desktop pager LCD – "TIMER 1" and "TIMER 2" by default.

Periodic Message: This is the message (must be in salcom protocol) that is resent every resend delay period when enabled.

Active on startup: This configures if the period timer is active and periodically sending messages as configured when unit is started (may still be disabled by user on desktop pager front panel).

Period Message Resend Delay: How frequently each of the period timer messages are resent. Min 6 seconds, Max 1800 seconds.

10.7 PSD Reset Options: Selecting Options-Reset to Factory Defaults will allow the user to restore the 12-62 to it's original factory state. This option will not affect any factory calibrated settings.

10.8 PSD Configuration files: The current 12-62 configuration can be saved using File-Save. Previously saved configuration files can be loaded and edited with, or without a 12-62 connected.

11.0 SPECIFICATIONS

Power Supply	+13.5 V nom, +11.5 V to 15.2 V
RF Frequency	VHF: 138-174MHz UHF: 427.5-475 MHz
Switching Range	Full range with no tuning
Channel Spacing	12.5 KHz or 25 KHz
Output Power	7 settings, 50mW to 4W ± 1 dB 50Ω
Input Current	Standby : 40 mA Transmit: 1.2A approx
Modulation	Carrier FSK with NRZ data
Deviation	±2.25kHz or ±4.5kHz
Baud rate	512, 1200 Baud
Message format	POCSAG
Spurious Outputs	-37dBm or less
Serial input/output	S2, pins 1, 2, RS-232 (DCE), 9600 baud no parity, 8 data bits, 1 stop bit
Serial paging command protocols	SALCOM proprietary
Discrete inputs	Pulled up to +12v (47K), ground to activate PTT on P2 pin 6. External modulation on S10, pin 8
Discrete outputs	PTT sink, 50mA on S10, pin 1
Case Dimensions	155 x 101 x 30mm
Type Approvals	AS/NZS4769, EN 300 224, FCC Pt 90
Transmit duty cycle	Up to 50%, max 5 minutes 'on' time.

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