12-86-5500
Paging Transceiver PCB

PRODUCT INFORMATION

SEA AIR & LAND COMMUNICATIONS LTD, CHRISTCHURCH, NEW ZEALAND

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GENERAL

The 12-86-5500 is a small, high specification, low cost Paging transceiver PCB measuring 60mm by 31mm and only 6mm deep with battery fitted.

The 12-86-5500 has been tested and type approved as a bare PCB, allowing integration into other products without further type approval testing being required.

The 12-86 range of products are POCSAG direct to pager transmitters, allowing low cost systems to be developed since intermediate receivers and transmitters are not required for short range applications.

12-86 transmitters support up to 5 inputs, each of which can be programmed with up to a 35 character message. The 12-86-5500 also allows messages to be accepted serially for transmission using Salcom protocol. Serial messages can be up to 48 characters in length.

The 12-86-5500 is also a high sensitivity POCSAG receiver, suitable for use with local and wide area paging networks. Decoded messages of any length can be sent directly to the serial port (accessible via the programming lead) or used to control 3 on board outputs(when configured). Four separate RICs can be defined or a “decode all” option can be used.

Using programming software up to 3 of the module inputs can be configured to be outputs, capable of driving LEDs directly or buffered to control relays.

Although the 12-86 is a low power transmitter, a direct line of sight transmission range of up to 200 metres can be expected. Transmit range within buildings is reduced, but still considerable having proven to be effective in some cases between floors and across buildings.

OPERATION

Pressing any button will transmit a pre-programmed POCSAG message assigned to that button. The red transmit LED will illuminate for the duration of the transmission.

Once the transmission has completed, the 12-86-5500 will return to its normal receiver operation.

The red transmit LED can also be used as an indication of battery health, and should the LED be dim or fail to light, the battery should be replaced.

When not transmitting, the 12-86-5500 listens on the configured frequency for a valid paging message (in the same fashion as all other paging receivers), and should the message match the programmed RIC code, then the message payload will be sent out the serial port. If the message fits the form of the Salcom relay control protocol, and the unit id is correctly set, the on board outputs can be controlled.

Because the 12-86-5500 operates as a receiver when idle, a 3V battery (or fixed supply) should be selected that suits the intended application. The receiver has a receive current of approximately 4mA, and if a coin cell was used for constant operation the coin cell would be depleted after only several days of operation. Selecting an AA battery pack will allow constant operation for approximately 1 month.

PROGRAMMING

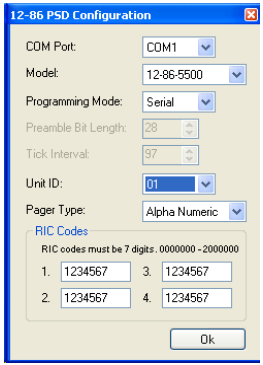
Programming software for the 12-86-5500 can be downloaded from the Salcom website (www.salcom.co.nz). The software requires a Windows™ XP computer with an available serial port.

A Salcom 12-47 programming lead is required to program the 12-86 transmitters (the same lead used to program the 11-85 transmitters.

Connect the 12-47 as shown below, with the dot (circled in yellow) on the 12-47 socket towards the centre of the PCB (mating with the square pad).

The 12-86 Programming Software allows the transmitter frequency and button messages to be set.

1 Press “Connect”. The red LED will light, as a message is transmitted. After the message has been sent, the green LED above the 4th button will light for approximately 1 second. The status at the bottom of the 12-86 PSD will indicate if successfully connected.
2 Press “Read”. The current configuration is read from the 12-86-5000.
3 Make any required changes.
4 Press the “Program” button.
5 Press “Disconnect”, then remove programming lead.



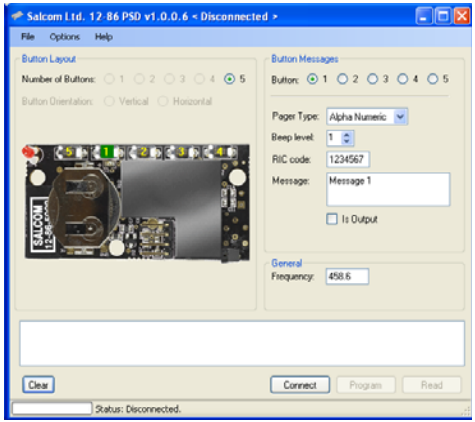
General Configuration

Before beginning to configure ensure that the Model has been set to “12-86-5500”.

Unit ID: 2 character id which identifies this unit when the Salcom relay protocol is used.

Pager Type: Defines how the message is decoded, either as an alphanumeric or numeric message.

RIC Codes: The 4 RIC codes that can be set to decode messages. Set to 0000000 to disable. Set to 0000001 to decode all. Typically RIC codes from 0000008 to 2000000 can be used.



Button Configuration

Button Messages: Select the button to view the message, RIC and beep level assigned to that button. New button settings can be entered, but will not be written until the program button is pressed. The program button only needs to be pressed after all button details have been populated.

Frequency: The transmit frequency between 440 and 470MHz to be set, 25kHz channel spacing.

Pager Type: If set to “alphanumeric”, then any message can be set into the message box, and can only be used with pagers that support alphanumeric messages. When “numeric” is set then only 0,1,2,3,4,5,6,7,8,9,0,[,],-,E and U characters can be used. Tone only pagers are supported by leaving the message box empty.

Beep Level: Pager beep priority set - 1 highest, 4 lowest.

RIC Code: Pager ID. Valid codes are 0000008 to 2000000

Is Output: Checking this option will disable the button as an input, and allow the button to be used as an output using the Salcom relay control protocol. Only buttons 1, 4 and 5 can be configured to be outputs. Care must be taken not to exceed the rated current for these outputs when configured. Pulling the button to ground (as when used as an input) when configured as an output will destroy the device.

RELAY CONTROL PROTOCOL

Although the outputs on the 12-86-5500 obviously are not relays, for consistency across Salcom products (that do use relays) the Salcom relay control protocol has been used. A very simple implementation allows only a single output to be controlled at a time.

The message type can be either numeric or alphanumeric, although numeric messages are faster to transmit.

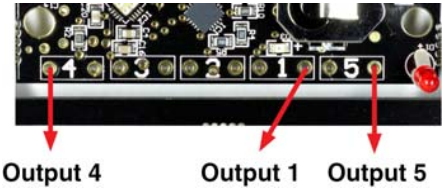
Since there are only 3 outputs the controlling messages can be easily listed below without describing the full extent of the protocol.

Assuming the unit id has been set to 23, and the receiver has been configured to use a suitable RIC code the controlling commands are as follows.

Message Payload	Action
23109	Set output 1 high.
23019	Set output 1 low
23409	Set output 4 high
23049	Set output 4 low
23509	Set output 5 high
23059	Set output 5 low

Connecting to Configured Outputs:

For each output configured, connect to the pins as shown below. Note that buttons 2 and 3 cannot be configured to be outputs. Each output can drive up to 20mA at 3V. Output are not over current protected, and will be damaged if connected directly to ground or supply.



SALCOM PROTOCOL

Salcom protocol as used in the 12-86-5500 takes the form:

PPXXXXXXX<SP>L<SP>MMMMMM<CR>
Where:

- PP is either CA(512baud alpha), CN(512 baud Numeric)
- XXXXXXX is a 7 digit RIC code.
- L is a digit (1-4 beep level).
- M is the message payload (up to 48 characters).
- <SP> is a space character.
- <CR> is a carriage return.

example:
CA1234567 1 Test Message<CR>

Note: Only 512 baud is supported for the 12-86-5500.

On a reception of a correctly formed Salcom protocol packet the 12-86-5500 will light the red transmit LED until the transmission has completed.

SPECIFICATION

RF Frequency	UHF: 440-470MHz Synthesized.
Dimensions.	61mm x 31mm x 6mm.
Supply Voltage	2.7-3.3.
Power Consumption	Sleep:100nA, LED flashing:1mA, Transmit:48mA Receive: 4mA (average) - 20mA when actively decoding.
Continuous Operation Battery Life (without transmitting)	CR2032 Coin Cell: 2-4 days AA 3V Battery Pack (2500mAH) 1 Month
Temperature limits	-10 to +55deg, -30 to +60 on request.
Environmental protection	Needs protection from weather and should be mounted in an enclosure. When used without an enclosure the unit can be damaged by ESD.
Channel Spacing	25kHz
Output Power	-5dBm
Modulation	Carrier FSK with NRZ data
Deviation	+/-4.5kHz
Transmit Duty Cycle	Up to 20%, 30 seconds continuous
Baud Rate	512 Baud
Discrete Inputs	2 - 5 (Configuration dependent)
Type Approvals	AS/NZS 4769.1:2000 and EN 300 224-2. Tested to and meets FCC Part 90.
TX Aerial	Integrated PCB
RX Aerial	External wire
RX Sensitivity	-124dBm
Max Output Current.	20mA

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BATTERY REPLACEMENT

Care must be taken when replacing the 3V battery. When a coin cell is used, the cell must be fitted with the '+' up and the '-' touching the PCB. When any other battery (or fixed supply) is used extreme care must be taken to ensure that voltage and polarity are both correct. Incorrect battery installation or polarity may result in damage to the 12-86-5500.

After battery replacement, test that the 12-86 is functional by sending a test message and verifying the red LED lights. If the unit fails to operate, remove battery and confirm correct battery orientation.

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.

DISCLAIMER

All information provided in this document is carefully prepared and offered in good faith as a guide in the installation, use and servicing of our products.

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.

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