

DRAFT COPY ONLY

Jenal Communications

Model SC-33

Selcall Decoder/Encoder
& Display

(Software Version GAB 2.00)

(PCB Version 1.00)

Programming the SC33

Before any programming can be carried out you must have first set up the hardware as shown in the “Hardware set-up” section and have installed the sc33p200.exe programme on your computer.

Press and hold both the ALARM key and the SCAN key together then turn on the SC33 using the VOLUME/ON/OFF control. The SC33 will display the following three messages, in rapid succession, on it's LCD .

```
Serial No: ANNNN  
S/w ver GAB 2.00
```

(where ANNNN is the serial number of the unit)

```
Serial No: ANNNN  
Self ID nnnn
```

(Where nnnn is the SC33 unit's self ID)

```
PROGRAMMING MODE
```

The unit is now ready to programme.

Connect a serial data lead between the SC33 and the computer.

Double click on the sc33p200.exe programme to run it and follow the on-screen instructions. There is a help file available from the main programming window which explains the various selectable options.

At the end of programming, disconnect the serial lead between the SC33 and the computer and then reset the SC33 by switching off and back on again. The unit is now ready to be used.

The SC33 will display the following message

```
Select function:  
MUTED CHAN 1
```

The second line may say MUTED if the mute is switched on and may say either CHAN, SCAN, SCANNING or nothing depending on the operating mode.

Hardware set-up

Accessing the SC33 internal controls

To gain access to the SC33 PCB, and the controls and links on it, requires the removal of the cover. Follow the steps below:

- a) Remove the SC33 from it's mounting cradle (if fitted) by removing the two 4mm Allen key head screws.
- b) Remove the top and bottom covers from the SC33 by removing the four 3mm Philips head screws.
- c) Remove the rear topmost screws on the left side and right side of the chassis. Loosen the lowest central screws on the left side and right side of the chassis.

The rear panel of the chassis can now be rotated out of the housing allow access to the adjustments.

Reverse the above steps to re-assemble the unit.

Power switching

As supplied the SC33 VOLUME/ON/OFF control is configured to locally turn on and off the power to the SC33 only and optionally control an external relay if required. The SC33 can also be configured to control an external power on/off relay which is available in some radios (eg. Barrett SB220/225, Codan 7727, etc.).

This configuration is set by links placed on the 6 way (3 x 2) header CN5. See the page titled "Power switching" for the three available options and the relevant link positions.

Preset potentiometers

Before using the SC33 there are several potentiometers which need to be adjusted to enable the unit to work with your radio. These are as follows:

- VR1 - Centre frequency adjust
- VR2 - Alarm audio level
- VR3 - Selcall transmit level
- VR4 - LCD contrast
- VR5 - Microphone gain
- VR6 - Maximum volume preset

Follow the adjustment procedures below.

VR1 - Centre frequency adjust

The centre frequency of the FSK detector is factory preset and normally should not require re-adjustment. In the case where adjustment is necessary then a high input impedance frequency counter should be connected to TP3. Follow the steps below:

- a) Close link LK4 and open link LK5.
- b) Adjust VR1 for a reading of 1785Hz on the frequency counter.
- c) Close link LK5 and open link LK4.

This completes the adjustment of the centre frequency.

VR2 - Alarm audio level

Generate alarm audio by pressing keys on front panel of the SC33 unit. Various alarm noises are generated for key press, error, etc. Adjust VR2 to give a suitable level for the user. This level is unaffected by the position of the VOLUME control.

VR3 - Selcall transmit level

Transmit a selcall from the SC33 unit adjust VR3 to give a transmitted power output of 30% to 40% (recommended) of full power level. Under no circumstances should the power output exceed 70% of the full power level.

VR4 - LCD contrast

The LCD contrast level is factory preset and should not normally need adjusting. In the event that it does need adjusting then set to a suitable level using VR4.

VR5 - Microphone gain

The SC33 incorporates a microphone pre-amplifier to cater for changes in levels when using a different microphone or when using a different transmitter input. While using the microphone adjust VR5 to give a suitable level of transmitter output power. This control only affects the level from the front panel microphone connector.

VR6 - Maximum loudspeaker volume preset

Connect an oscilloscope to measure the audio voltage across the Loudspeaker. Select a channel on the receiver and inject a 1mV carrier into the antenna socket at the channel carrier frequency + 1KHz for USB (or - 1KHz for LSB). Turn the VOLUME control to maximum and adjust VR6 for a maximum undistorted sine wave on the oscilloscope (approximately 6v peak to peak).

This completes the adjustment of VR6.

Using the SC33 Keypad

The SC33 has a total of 20 keys on it's front panel, not all of which are used in this application. The keys are as follows:

0 to 9 - Numeric keys & UP (^) and DOWN (v) keys
CLEAR
SCAN / .
MENU - Not used
SEL / TEL
SEND
END
ALARM
BEACON
GPS RQ / MUTE
GPS / CHAN

and are described below:

ALARM - This key is primarily used to send alarm calls (see later). This key is also used in conjunction with the SCAN key to enter programming mode and this use is described in the section "Programming the SC33". This key is also used in conjunction with the CLEAR key to enter the unkill code, when the unit has been locked, and this use is described in the section "Kill/Unkill".

SEL/TEL - This key is used to initiate one of several types of selcall. When the key is first pressed the unit will display:

Destination ID nnnn

(Where nnnn is either blank or shows the last selcall number entered)

Enter a (new if required) selcall number to call using the numeric keypad. Pressing the first digit on the keypad will clear the existing displayed number and put the digit in the leftmost position.

Enter a total of four digits corresponding to the selcall number you wish to call.

If you try to enter more than four digits an "error" sound will be produced by the unit. Mistakes can be corrected by pressing the **CLEAR** key (pressing the **CLEAR** key while the cursor is in the first position will return the unit to the standby mode).

At this stage six different types of call can be sent - Selcall, Beacon, End (Hang up), GPS

transmit, GPS Request or Telcall. The sending of these calls are described below and all assume that the selcall number to send to has been entered as explained above.

To send a selcall press the **SEND** key. The unit will display:

```
Sending to: nnnn  
Selcall
```

To send a beacon request press the **BEACON** key. The unit will display:

```
Sending to: nnnn  
Beacon request
```

To send a hang-up command press the **END** key. The unit will display:

```
Sending to: nnnn  
End of call
```

To send a GPS position (Barrett format only) press the **GPS/CHAN** key. The unit will display:

```
Sending to: nnnn  
GPS Position
```

If no data is available from the GPS unit connected to the SC33 then the display will change after 6 seconds to say:

```
Sending to: nnnn  
No GPS data
```

an error noise will sound and no call will be transmitted.

To send a GPS Request command (Barrett format only) press the **GPS RQ/MUTE** key. The unit will display:

```
Sending to: nnnn  
Request GPS data
```

After the request is transmitted the display will change to say:

```
Waiting for data  
from remote GPS
```

Any received data will be displayed in Latitude (Lat) and Longitude (Lon). If no data is received after a predetermined time the display will change to say:

```
No response from  
remote GPS unit
```

and an error noise will sound. After two seconds the unit will return to the “select function” display.

To send a Telcall press the **SEL/TEL** key a second time. The unit will now display:

```
Enter Phone No.
```

(Where the second line of the display will either be blank or display the last called telephone number).

Enter a (new if required) telephone number to call using the numeric keypad. Pressing the first digit on the keypad will clear the existing displayed number and put this digit in the leftmost position.

Enter a maximum of sixteen digits corresponding to the telephone number you wish to call.

If you try to enter more than sixteen digits an “error” sound will be produced by the unit. Mistakes can be corrected by pressing the **CLEAR** key (pressing the **CLEAR** key while the cursor is in the first position will return the unit to the selcall number entry mode).

To send a telcall press the **SEND** key. The unit will display:

```
Sending to: nnnn  
Telcall
```

At the end of the call the unit will return to the standby mode.

GPS RQ/MUTE - When in stand-by mode this key is used to switch **ON** and **OFF** the audio amplifier muting circuit in the SC33. When the amplifier is muted the unit displays:

```
Select function:
MUTED
```

The mute circuit can be switched off by pressing either the **GPS RQ/MUTE** or **CLEAR** keys or by pressing the PTT pressel on any microphone plugged into the 8 pin microphone connector located on the front panel.

After pressing the **GPS RQ/MUTE** or the **CLEAR** key the unit returns to the standby mode.

After pressing the PTT on the microphone the unit displays:

```
Select function:
Release PTT
```

When the PTT is released the unit returns to the standby mode. Pressing the PTT again puts the SC33 into transmit mode and the unit displays:

```
Select function:
Transmit
```

When the PTT is released the unit again returns to the standby mode.

NOTE: Pressing a key normally produces a “Beep” sound as confirmation. If a key is pressed when it is not allowed then an “Error” sound will be heard instead.

GPS/CHAN

Pressing this key while in standby mode instructs the SC33 to get the GPS data from the connected GPS receiver. If the GPS data is available then the SC33 shows the Latitude and Longitude on it's display. The information will stay on the display until the CLEAR key is pressed.

If no information is available then the SC33 will produce an “Error” sound and show an error message for two seconds before returning to stand-by mode.

Receiving calls

When an incoming call is received the SC33 will sound it's audio alarm and will display one of the following:

```
Selcall frm nnnn
```

where nnnn is the selcall number of the calling station

Or

```
Telcall frm nnnn  
tttttttttttttttt
```

where nnnn is the selcall number of the calling station
and ttttttttttttt is the attached telephone number

Or

```
Selcall frm nnnn  
Pagecall
```

Or

```
Selcall frm nnnn  
GPS Position
```

Or

```
Selcall frm nnnn  
Emergency Selcal
```

Or

```
Selcall frm nnnn  
Emergcy Position
```

The alarm can be cancelled by pressing either the CLEAR key or pressing the PTT on any attached microphone. When the CLEAR key is pressed the alarm is cancelled and the call details stay on the display. On the second press of the CLEAR key the unit goes back into standby mode. The call details are saved to allow the user to call back the originating station.

Note: if the unit was in scanning mode when the CLEAR key is pressed then the unit will return to channel on which the call was received (if Channel Control is being used).

When the PTT is pressed the alarm is cancelled and the display changes to:

```
Selcall frm nnnn  
Release PTT
```

Or

```
Telcall frm nnnn  
Release PTT
```

When the PTT is released the call details stay on the display.

On a second press of the PTT the display changes as above but this time when the PTT is released the unit returns to the standby mode. Pressing the PTT again puts the SC33 into transmit mode and the unit displays:

```
Select function:  
Transmit
```

When the PTT is released the unit again returns to the standby mode.

Note: if the unit has returned to scanning mode when the CLEAR key or PTT is pressed then the unit will return to channel on which the call was received (if Channel Control is being used).

The originating station can be recalled by pressing the SEL/TEL key and then SEND key in the case of any received call type.

If the received call was a telcall then the originating telephone caller can be recalled by pressing the SEL/TEL key twice and then pressing the SEND key.

When the alarm has been cancelled and the call details are still displayed then it is possible to use the SCAN key to get a second display of information for some types of calls:

When a Pagecall has been received pressing the SCAN button will toggle between the caller detail page and the actual page message.

When a GPS Position or Emergency Position call has been received pressing the SCAN button will toggle between the caller detail page and a page showing the Latitude and Longitude of the caller.

Scanning

Pressing the SCAN key puts the unit into scan mode (if enabled) and remembers the

channel. Pressing the SCAN key a second time stops the scanning on the displayed channel. Alternatively pressing the CLEAR key or the PTT will stop the scanning and return the unit to the channel it was on when the scanning was started (if Channel Control is being used).

Alarm mode

This is only available in Barrett format and has to be specifically enabled by the dealer to enable your unit to both send and receive emergency selcalls.

Press and hold the ALARM key for at least two seconds. The display will change to show the following:

Hold key for
2 Seconds

After two seconds the unit will make an acknowledgment noise and the display will change to the following:

Sending to: ALL
GPS emergency

and the unit will wait to load your Latitude and Longitude data from your attached GPS unit. Once the data is loaded the emergency call containing you position is sent.

If the GPS data is not available (after a maximum of six seconds), or no GPS unit is connected, the display will change to say the following:

Sending to: ALL
Selcal Emergency

and a Selcall Emergency call (containing no location data) is sent instead.

If an Alarm call is received (Emergency Selcall or GPS Emergency call) the SC33 will produce a series of five rising tones as a special alarm sound.

UP(^) and DOWN(v) keys

When the SC33 is using Channel Control and is able to display channel numbers then the 1, 2 and 3 keys also function as CHANNEL UP keys , while the 4, 5 and 6 keys also function as CHANNEL DOWN keys.

If a CHANNEL UP key is pressed when the unit is on it's highest channel the unit will switch to Channel 1. Likewise if a CHANNEL DOWN key is pressed while the unit is on Channel 1 then the unit will switch to it's highest channel.

Kill/Unkill

The SC33 can be remotely Killed (and in some cases remotely Unkilled) by sending the correct selcalls to the unit. Receiving a Kill command selcall, or turning on the SC33 while it is killed, results in the display saying "LOCKED" , no keys are enabled, the receive audio is muted and the PTT will not work

When the SC33 has been Killed it can be Unkilled in three different ways:

1) By using the sc33p200.exe configuration software. When the SC33 is programmed using this software it automatically Unkills the unit. Simply reading and re-programming the SC33 will unkill it.

2) By sending an Unkill command selcall the the SC33 (only available in Jenal format).

3) By entering the "Unkill code" from the SC33 keypad. To do this turn off the SC33 then keep pressed the ALARM and CLEAR keys together while switching on the SC33 again. Keep the keys pressed while the SC33 cycles through it's power up sequence until the display shows "Unlock code?".

Release the keys and enter the Unkill code on the keypad then press the SCAN key. If successful the SC33 will produce three beeps and then immediately go into standby mode. If unsuccessful the SC33 will produce an error noise and request the unlock code again.

Note: the Kill code and the Unkill code do not have to be the same but are both eight digits long.

Interface connectors

There are three connectors on the recessed rear panel of the SC33. They are as follows:

- 1) 3.5mm mono jack socket - loudspeaker output
- 2) 9 way D connector (female) - data interface
- 3) 15 way D connector (female) - radio interface

3.5mm mono jack socket

This socket is used for connecting a loudspeaker to the SC33. The SC33 is designed to work with a 4 Ohm loudspeaker.

9 way D connector (female)

This socket is for connection to a GPS unit or a computer serial input port. This port operates at either 1200, 2400, 4800 or 9600 bps (8 data, no parity, 1 stop bit) when programmed for GPS use. The port defaults to 4800 bps when in programming mode.

Only five pins are used for :

- Pin 1 - Data input to SC33 (TTL)
- Pin 2 - Data output from SC33 (RS232)
- Pin 3 - Data input to SC33 (RS232)
- Pin 4 - Data output from TTL/RS232 converter.
- Pin 5 - Ground

If a GPS unit with TTL output is being used then connect the GPS unit to pins 1 and 5 and link pins 3 and 4. Do not connect to any other pins.

15 way D connector (female)

This socket is used to interface directly to a radio and supply power to the SC33. The pins are used as follows:

- Pin 1 - Ground
- Pin 2 - Channel control bit 2
- Pin 3 - Channel control bit 4
- Pin 4 - Channel control bit 6
- Pin 5 - PTT out
- Pin 6 - Mic control 2
- Pin 7 - Receive audio input
- Pin 8 - DC input
- Pin 9 - Channel control bit 1

Pin 10 - Channel control bit 3
Pin 11 - Channel control bit 5
Pin 12 - External Alarm out
Pin 13 - Mic control 1
Pin 14 - Transmit audio out
Pin 15 - Remote on/off

Pin 1 - Ground

Connect to ground of supply (preferably to a microphone in ground if available).

Pins 2 to 4 and 9 & 11 - Channel control lines

These six pins present binary channel control output. They are open collector outputs and can be set active low or active open by the programming software. The six lines can be programmed for straight binary (00 to 63) by selecting 64 Chs or 2 x BCD (00 to 39), by selecting 40 Chs, where the first four lines (0 to 9) represent channel unit digits and the fifth and sixth lines (0 to 3) represent channel tens digits.

Another option is 100 Chs where the data is strobed out as two lots of BCD (contact us for more details).

Pin 5 - PTT out

This output is an open collector output and can be used to connect to the PTT input of a radio or can drive a relay to control a radio.

Pin 6 - Mic control 2

This pin normally connects to pin 6 of the front panel microphone socket to allow the use of any controls fitted to an attached microphone. Note that the microphone connector pins can be re-allocated - see Microphone connector details below.

Pin 7 - Receive audio input

Receive audio input from a radio (or some other source) is fed into the SC33 on this pin. The gain level of the SC33 is adjusted by potentiometer VR6 to give a suitable maximum output level in the loudspeaker. See the HARDWARE SET-UP section.

Pin 8 - DC input

This pin is the supply feed for the SC33. The unit will accept input voltages from +11 volts to + 30 volts.

Pin 12 - External Alarm out

This output is an open collector output and can be used to drive an external Piezo alarm or a relay to control other alarm devices (Klaxon, flashing light, etc.)

Pin 13 - Mic control 1

This pin normally connects to pin 5 of the front panel microphone socket to allow the use of any controls fitted to an attached microphone. Note that the microphone connector pins can be re-allocated - see Microphone connector details below.

Pin 14 - Transmit audio out

Connect this pin to the transmitter audio (microphone) input on the radio and adjust the SC33 transmit power to a suitable level. See the HARDWARE SET-UP section.

Pin 15 - Remote on/off

This pin can be used for switching on and off remotely another unit or a radio. See the HARDWARE SET-UP section for more details.

NOTE: Any output which is controlling a relay, or other inductive device, should be suitably protected against any back emf, eg. using reverse diodes or zener diodes.

Microphone connector

The eight pin microphone connector on the front panel of the SC33 can be used instead of a microphone connected to the radio. It is supplied wired as follows:

- Pin 1 - Ground
- Pin 2 - PTT input
- Pin 3 - Microphone input
- Pin 4 - Receive audio output
- Pin 5 - Mic control 1
- Pin 6 - Mic control 2
- Pin 7 - Not connected
- Pin 8 - optional +10v output (un-protected)

These pin numbers correspond to the pin number on CN7. If required the microphone connections can be re-assigned by changing the order of the wiring on CN7.

Voltage (+10v) can be fed out of pin 8 by making link LK1 on the SC33 PCB. This may be required for some microphone types (eg. electret microphones).

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