Jenal Communications

Model SC-3

Selcall Microphone

Programming Instructions

(Software Version 3.00)

(PCB Version 2.00)

IMPORTANT – READ THIS PAGE FIRST

Programming sequence for SC3 Selcall unit

All programming is carried out via the keypad on the SC3 microphone/Selcall unit. Programming mode is entered by holding both the ★ and # keys down together then switching on the unit. When programming mode is entered you will hear three short beeps.   You then have a maximum of eight seconds between key entries. The only allowable inputs are 1 to 9 and 0. (DO NOT PRESS ★ or # KEYS).

Programming takes the form:

$$S1\ S2\ S3\ S4\ M1$$

where S1 to S4 is the self ID of the Selcall unit and M1 is the "MODE 1" control word. If S1 to S4 are set as:

$$S1 = 8 \qquad S2 = 4 \qquad S3 = 6 \qquad S4 = 3$$

then the Selcall number of the unit is 8463

M1 determines the operating mode of the Selcall unit as shown on the following pages.

To calculate M1 first decide which functions you require and then add up the "Decimal" numbers next to the functions. The result is the number which has to be programmed into the MODE position.

For example it is required to programme the Selcall with a self ID of 8 4 6 3 and with the following functions:

	Horn Alarm	-	Piezo Alarm	-	Normal Mute			
therefore add	1	+	2	+	0	= 3	=	M1

The programming sequence is then   --   8 4 6 3 3

After entering this sequence you will again hear three short beeps to signify the unit has been programmed. The unit is now ready for use.

If at any time in the programming sequence a long beep is heard then this indicates an error condition and programming will have to be started again. Note that in this case the previously entered programming details will be retained.

MODE 1

Bit 3	Bit 2	Bit 1	Bit 0	Decimal	Description
			0	0	Latch Alarm (continuous)
			1	1	Horn Alarm (pulsed for limited time)
		0		0	Audio Alarm
		1		2	Piezo Alarm
	0			0	Mute/Scan enabled
	1			4	Mute/Scan disabled
0				0	Normal Mute
1				8	Mute released during alarm tones

Valid codes are 0,1 to 9

MODE 1 Bit 0 = 0 (add decimal 0)   - Switches alarm relay driver on for duration of main alarm (ringing) - approximately 96 seconds.

MODE 1 Bit 0 = 1 (add decimal 1)   - Switches alarm relay driver on intermittently during main alarm period as follows:
00 to 24 seconds - OFF
24 to 48 seconds - ON for 1 second, OFF for 2 seconds
48 to 72 seconds - OFF
72 to 96 seconds - ON for 1 second, OFF for 2 seconds
96+ seconds   - OFF

MODE 1 Bit 1 = 0 (add decimal 0)   - Enables audio alarm via receiver audio stages.

MODE 1 Bit 1 = 1 (add decimal 2)   - Enables audio alarm via microphone piezo alarm.

MODE 1 Bit 2 = 0 (add decimal 0)   - Mute/Scan enabled. Mute (and Scanning) is controlled by the "★" key. On power-on the Mute/Scan is OFF (ie receiver is open) and each press of the "★" key alternates between Mute/Scan ON and Mute/Scan OFF.

MODE 1 Bit 2 = 1 (add decimal 4)   - Mute/Scan disabled. Unit will not go into Mute or Scan mode. The "★" key is used only to cancel alarms and make beacon calls.

MODE 1 Bit 3 = 0 (add decimal 0)   - Normal mute.

MODE 1 Bit 3 = 1 (add decimal 8)   - Switched mute. Mute is switched off while audio alarms tones are generated. Mute is switched on during silence periods.

SC3 Selcall Microphone connections

Power input - **RED** - Voltage input from radio. The SC3 requires +8 to +14 volts at 55mA maximum.

Ground - **SHIELD** - Ground input from radio. (Use the microphone ground).

Receive audio input - **BLUE** - Receive audio input from radio - preferably from a fixed level source (ie. from detector output and not affected volume control). This line can also be used to inject alarm audio back into the radio by making LK 1 on the SC3 micro board. Input level should be between 5mV and 3V peak to peak.

Alarm audio output - **WHITE** - Alarm audio output feed into radio. This input should connect into the radio audio circuits after the volume control and after any muting circuit. The level of the alarm can be preset by VR3 on the SC3 micro board. (The output level range can be changed by making LK3 on the SC3 micro board). This output can be fed back down the receive audio input line if required by shorting LK1 on the SC3 micro board. Alarm audio output type is selected by **MODE 1 bit 1** during programming.

PTT output - **GREEN** - The PTT line is used to key the transmitter. The output is an open collector driver capable of sinking 350mA from 30volts.

Transmit audio output - **YELLOW** - This line carries the Selcall transmit audio when the PTT switch IS NOT pressed and carries the microphone audio when the PTT switch IS pressed. The Selcall transmit audio level should be set using VR2 on the SC3 micro board. (The output level range can be changed by shorting LK2 on the SC3 micro board). Care should be taken to ensure the transmitter is not over-driven by the transmit audio level being too high. Set the power output to be between 30% and 70% of full output power (preferably 30% to 40%).
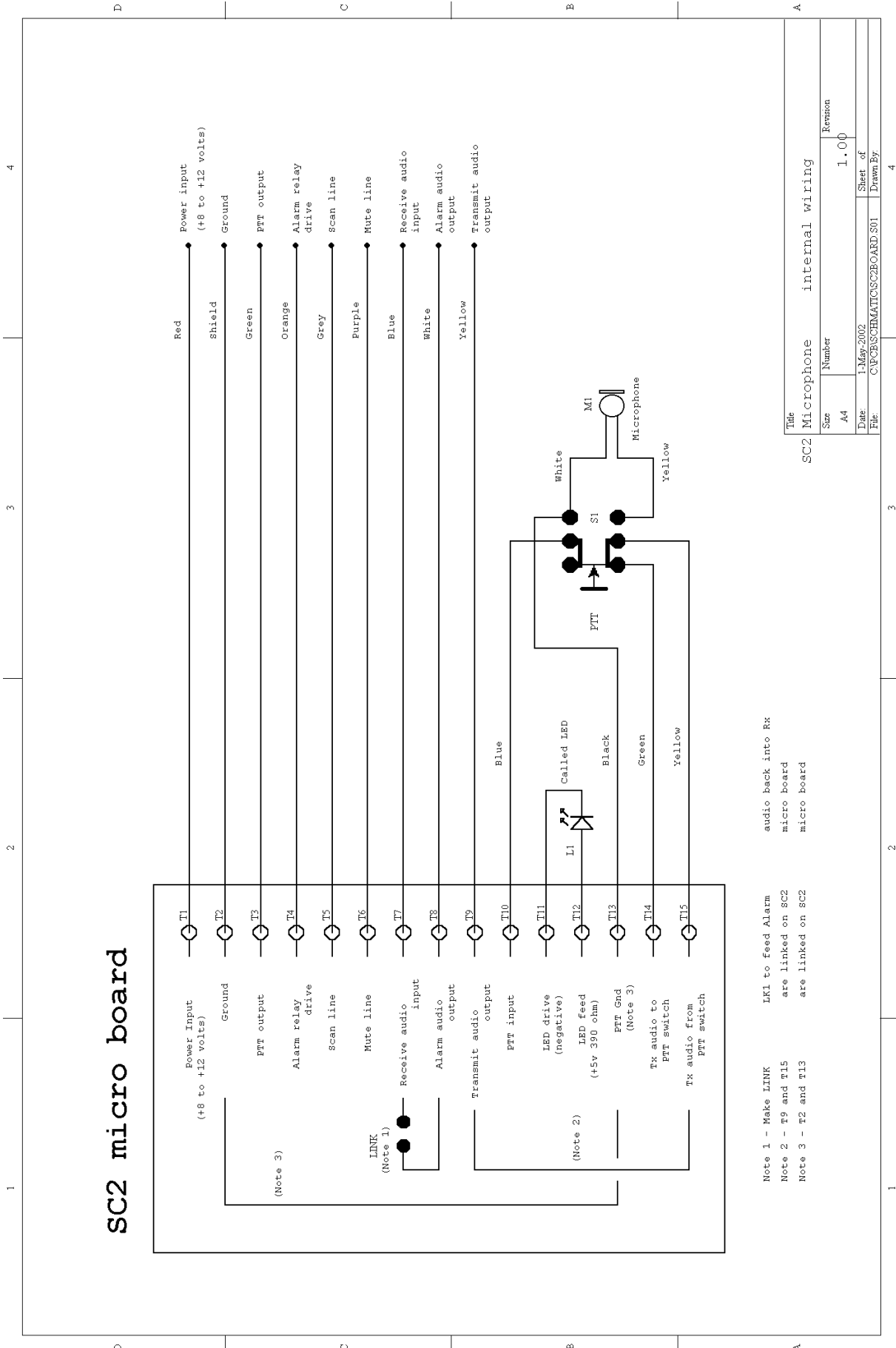
Scan line - **GREY** - The scan line can be used to control the scanning of the radio. In the SC3 this line generates SCAN PULSES and cannot be changed.
This line is normally HIGH and will pulse LOW for 100mS every 625mS (thereby scanning 8 channels every 5 seconds). The scan line can be used to pulse the "CHANNEL UP" line available on many radios to produce pseudo-scanning. The output is an open collector driver capable of sinking 350mA from 30volts.

Alarm relay drive - **ORANGE** - This line can be used to drive a relay to switch on external alarm devices (ie. Flashing light, Horn alarm, etc.) as selected by **MODE 1 Bit 0**.The output is an open collector driver capable of sinking 350mA from 30volts.

Mute line - **PURPLE** - This line can be used to control a mute circuit in the radio to switch off the audio output of the radio while waiting for calls. The mute circuit can be electronic or electro-mechanical (ie. a relay) as the output is an open collector driver capable of sinking 350mA from 30volts. The operation of the mute line is determined by **Mode 1 Bit 3** during programming. Mute on is active low, mute off is active high.

NOTE: Protection diodes should be used on any lines which are driving relays to prevent damaging the SC3 micro board.

SC3 Microphone internal wiring

SC2 micro board

Terminal	Label
T1	Power Input (+8 to +12 volts)
T2	Ground
T3	PTT output
T4	Alarm relay drive
T5	Scan line
T6	Mute line
T7	Receive audio input
T8	Alarm audio output
T9	Transmit audio output
T10	PTT input
T11	LED drive (negative)
T12	LED feed (+5v 390 ohm)
T13	PTT Gnd (Note 3)
T14	Tx audio to PTT switch
T15	Tx audio from PTT switch

LINK (Note 1)

(Note 3)

(Note 2)

Wire colours:
- Red — Power input (+8 to +12 volts)
- Shield — Ground
- Green — PTT output
- Orange — Alarm relay drive
- Grey — Scan line
- Purple — Mute line
- Blue — Receive audio input
- White — Alarm audio output
- Yellow — Transmit audio output

M1 Microphone

White
Yellow

S1
PTT

L1 Called LED

Blue
Black
Green
Yellow

Note 1 - Make LINK   LK1 to feed Alarm   audio back into Rx
Note 2 - T9 and T15   are linked on SC2   micro board
Note 3 - T2 and T13   are linked on SC2   micro board

Title: SC2 Microphone   internal wiring
Size: A4   Number: Revision: 1.00
Date: 1-May-2002   Sheet of
File: C:\PCB\SCHMATIC\SC2BOARD.S01   Drawn By:

SC3 Circuit board layout

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TOP VIEW
SC2/3 version 2.00 PCB
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Receive centre frequency (VR1)
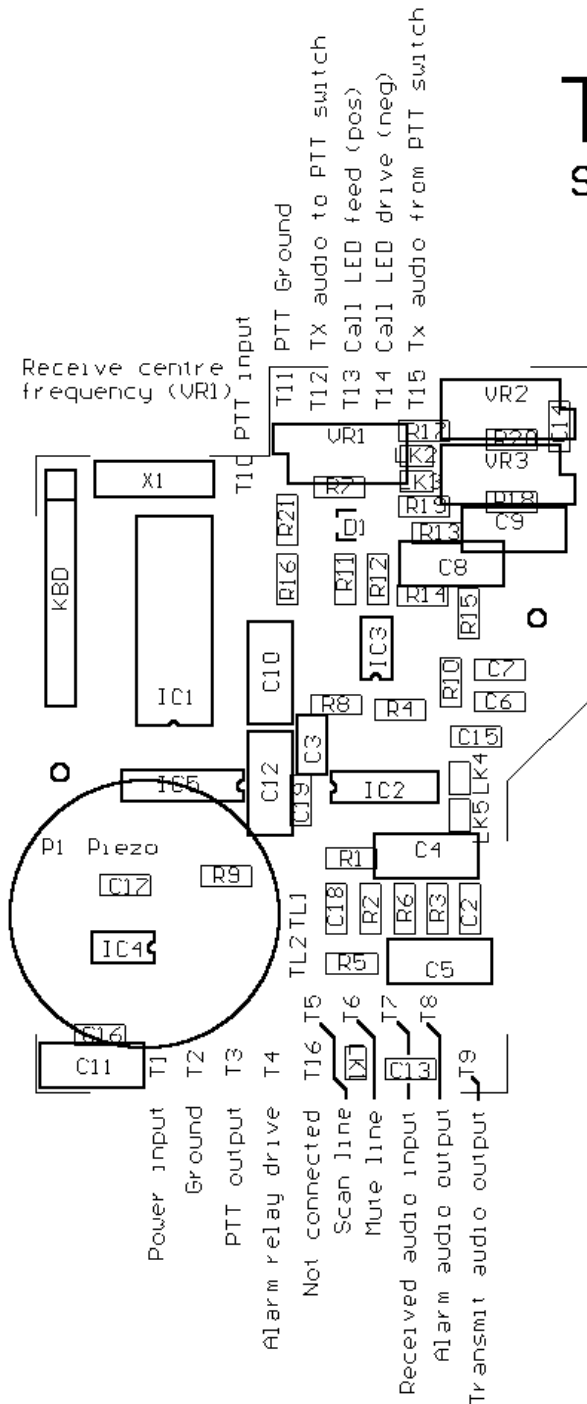
Transmit audio level (VR2)

Alarm audio level (VR3)

To set up Rx centre frequency –
1) Close LK4 and open LK5
2) Adjust VR1 for 1785 Hz
3) Open LK4 and close LK5

TL1 - Keyboard LED supply

TL2 - Keyboard LED ground

LINKS
LK1 - when made allows alarm
      audio to be fed back
      down receive audio line
LK2 - when made increases
      transmit audio level
LK3 - when made increases
      alarm audio level
LK4 - open = normal operation
      closed = frequency set-up
LK5 - closed = normal operation
      open = frequency set-up

Board component labels:
X1, KBD, IC1, C10, IC5, P1 Piezo, C17, IC4, C16, C11, C12, C19, C3, R8, R4, IC2, C15, IC3, R10, C7, C6, R16, R21, R11, R12, R14, R15, C8, C9, R19, R13, R18, R7, VR1, LK2, K1, R17, R20, VR3, VR2, D1, R1, C4, LK5, LK4, C18, R2, R6, R3, C2, R5, C5, R9, C13

Top edge connectors:
T10 PTT input
T11 PTT Ground
T12 Tx audio to PTT switch
T13 Call LED feed (pos)
T14 Call LED drive (neg)
T15 Tx audio from PTT switch

Bottom edge connectors:
T1 Power input
T2 Ground
T3 PTT output
T4 Alarm relay drive
T5 Not connected
T6 Scan line
T7 Mute line
T8 Received audio input
T9 Alarm audio output
Transmit audio output
T16, TL2, TL1
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# SC3 Circuit board schematic



Title: **SC2/3** Selcall/Microphone

Size: A4 Ver 2.00 PCB

Number

Date: 1-May-2002

File: C:\PCB\SCHMATIC\SC2V2_00.S01

Sheet of

Drawn By:

Revision

# ADJUSTING THE SC3 SELCALL MICROPHONE

There are minimal adjustments to be made to the SC3 Selcall microphone. Programming of the Selcall self ID number and the various operating modes are covered separately in the Programming Instructions booklet.

## Removing the SC3 micro board

First remove the back shell of the SC3 Selcall microphone by removing the three back shell screws.

To remove the SC3 micro board remove the two PCB retaining screws and lift straight up. When re-assembling the unit be careful to align the "Called" LED with the corresponding hole in the front shell.

The board has to be removed to adjust the FSK detector centre frequency. It is possible to adjust the Transmit Audio level and the Audio Alarm level simply by removing the PTT pressel.

## FSK detector centre frequency

Note: when making this adjustment make sure there is no audio present on the receive input line. When measuring the FSK centre frequency a high impedance probe MUST be used. The frequency is factory preset and should not normally require adjustment.

Adjustment is made by VR1 (10 turn).  First close link LK4 and open link LK5.

Measure the frequency on IC2 pin 3 (XR2211) and adjust VR1 for a centre frequency of 1785 Hz.

Finally open link LK4 and close link LK5.

## Transmit Audio level

Adjust the Selcall Transmit Audio level by VR2 (10 turn) to give less than 70% of full output power while a Selcall is being transmitted (30% to 40% recommended).

If the available level is insufficient then it may be increased by closing link LK2.

**Note:** this adjustment does **NOT** adjust the microphone output level, only the selcall level.

## Audio Alarm level

This adjustment is only necessary when using the Audio Alarm facility. It does not apply when using the Piezo Alarm.

Adjust the Audio Alarm level by VR3 (10 turn) to give a suitable alarm level.

If the available level is insufficient then it may be increased by closing link LK3.
The Audio Alarm may also be fed back down the receive input line by closing link LK1.
The adjustment for the alarm level is still as above.

# Alarm Tones

| Alarm | Audio alarm sound | Piezo alarm sound |
|---|---|---|
| Key press | short high pitched tone | short beep |
| Error | long low pitched tone | long beep |
| Acknowledge | three short high pitched tones | three short beeps |
| Mute on | low to medium tone | long warbling beep |
| Mute off | medium to high tone | two short warbling beeps |
| Selcall received | one long telephone ring (one second) every 3 seconds | one long warble (one second) every three seconds |
| Telcall received | two short telephone rings every three seconds | two short warbles every three seconds |
| Background Selcall alarm | one short beep every five seconds | one short beep every five seconds |
| Background Telcall alarm | two short beeps every five seconds | two short beeps every five seconds |

# Using the SC3 Microphone Selcall unit

**To send a Selcall**    - enter four digit Selcall number
                                - press "#"
                                - press "#"

**To send Selcall**
**beacon request**    - enter four digit Selcall number
                                - press "#"
                                - press "★"

**To send xx99**    - enter four digit Selcall number (must end in 99)
**beacon request**    - press "#"
                                - press "#"

**To repeat a call**    - press "#"
**or recall a caller**    - press "#"

**To send a hang**    - press "#"
**up command**    - press "8"
(to station last called)

## Notes

Mute is switched ON by pressing the "★" key.  Can be switched OFF by pressing the "★" key or PTT.  Mute must be switched OFF (or disabled) before any keyboard entries, except "★" can be made
Alarms can be cancelled by pressing the "★" key or PTT.  This automatically turns mute OFF.

# NOTES

Programming Code: ___  ___  ___  ___  -  ___

<div align="center">(Selcall ID Number)   - (Mode )</div>


**Operational Mode on Power-up**
(tick boxes for applicable options)


Mute/Scan            ❏     Enabled
                     ❏     Disabled


Horn Alarm           ❏     Continuous
                     ❏     Pulsed


Alarms               ❏     Audio
                     ❏     Piezo

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