Jenal Communications

Model SC-2

Selcall/Telcall Microphone

Programming Instructions

(Software Version 4.00)

(PCB Version 3.00)

IMPORTANT – READ THIS PAGE FIRST

Programming sequence for SC2 Selcall/Telcall unit

All programming is carried out via the keypad on the SC2 Selcall/Telcall microphone. 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, immediately release the ★ and # keys.   You then have a maximum of eight seconds between key entries. The only allowable inputs are 1 to 9 and 0. (DO NOT PRESS THE ★ or # KEYS).

Programming takes the form:

$$S1\ S2\ S3\ S4\ M1\ M2\ M3\ M4\ M5$$

where S1 to S4 is the self ID of the Selcall unit and M1 to M5 are five "MODE" control words.   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 to M5 determine the operating mode of the Selcall unit as shown on the following pages. To calculate M1 to M5, 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 positions.

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

a) Barrett Format - Changeable - Selcall/Telcall
therefore M1 =   2   +   4   +   0   = 6

b) Selcall Beacon - Receive enabled - No transmit
therefore M2 =   0   +   0   +   4   = 4

c)Horn Alarm   - Piezo Alarm   -   Normal Mute
therefore M3 =   1   +   2   +   0   = 3

d) Scan pulses - scan auto-reset timer defeat enabled
therefore M4 =   0   +   2   = 2

e) 7 minute scan auto-reset timer
therefore M5 =   7   = 7

The programming sequence is then   --   8 4 6 3 6 4 3 2 7

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	Format control - see below
			1	1	Format control - see below
		0		0	Format control - see below
		1		2	Format control - see below
	0			0	Fixed Format
	1			4	Changeable Format (from keypad)
0				0	Selcall/Telcall
1				8	Selcall Only

Valid codes are 0, 1 to 9.

MODE 1 Bits 0 and 1 = decimal 0   - Select Codan 16 digit Format for Telcalls

MODE 1 Bits 0 and 1 = decimal 1   - Select Codan 16 digit Format for Telcalls

MODE 1 Bits 0 and 1 = decimal 2   - Select Barrett 16 digit Format for Telcalls

MODE 1 Bits 0 and 1 = decimal 3   - Select Codan 12 digit Format for Telcalls

NOTE- Barrett and Codan Selcalls use a common format. The unit will automatically receive and store any of the Telcall formats. Unit will retransmit a stored Selcall/Telcall (by using "##" command) in the same format as it was received irrespective of what format is selected by Bits 0,1 and 2.

MODE 1 Bit 2 = 0 (add decimal 0)   - Sets unit for fixed transmit format as selected by Bit 0 and Bit 1.

MODE 1 Bit 2 = 1 (add decimal 4)   - Allows user to change between Barrett and Codan formats by the use of special keypad codes:-

   #2 selects Barrett format -16 digit telephone numbers
   #3 selects Codan format -12 digit telephone numbers
   #4 selects Codan format -16 digit telephone numbers

Unit defaults to format selected by Bit 0 and Bit 1 on power up.

MODE 1 Bit 3 = 0 (add decimal 0)   - Allows unit to transmit both Selcalls and Telcalls in selected format.

MODE 1 Bit 3 = 1 (add decimal 8)   - Allows unit to transmit Selcalls only. Unit can still receive Telcalls and store them for recall using ## command.

MODE 2

Bit 3	Bit 2	Bit 1	Bit 0	Decimal	Description
			0	0	Selcall beacon enabled
			1	1	Selcall beacon disabled
		0		0	xx99 beacon enabled
		1		2	xx99 beacon disabled
	0			0	Transmit enabled
	1			4	Transmit disabled
0				0	Receive enabled
1				8	Receive disabled

Valid codes are 0, 1 to 8.

MODE 2 Bit 0 = 0 (add decimal 0)   - Enables Selcall beacon response.

MODE 2 Bit 0 = 1 (add decimal 1)   - Disables Selcall beacon response

MODE 2 Bit 1 = 0 (add decimal 0)   - Enables xx99 beacon response

MODE 2 Bit 1 = 1 (add decimal 2)   - Disables xx99 beacon response

MODE 2 Bit 2 = 0 (add decimal 0)   - Transmit enabled

MODE 2 Bit 2 = 1 (add decimal 4)   - Transmit disabled. When selected stops use from initiating any Selcalls or Telcalls. Microphone PTT is still active as is "★" key. Unit will still respond to received Selcalls, Telcalls or Beacon requests.

MODE 2 Bit 3 = 0 (add decimal 0)   - Receive enabled.

MODE 2 Bit 3 = 1 (add decimal 8)   - Receive disabled. When selected unit will not respond to any incoming Selcalls, Telcalls or Beacon requests. Unit can still send Selcalls, Telcalls and Beacon requests.

MODE 3

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

MODE 3 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 3 Bit 1 = 0 (add decimal 0)   - Enables audio alarm via receiver audio stages.

MODE 3 Bit 1 = 1 (add decimal 2)   - Enables audio alarm via microphone piezo alarm.

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

MODE 3 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.

MODE 4

Bit 3	Bit 2	Bit 1	Bit 0	Decimal	Description
			0	0	Scan Pulse mode
			1	1	Scan Stop mode
		0		0	Scan auto-reset timer defeat disabled
		1		2	Scan auto-reset timer defeat enabled
	0			0	End of Transmission tone disabled
	1			4	End of Transmission tone enabled
0				0	not used
1				8	not used

Valid codes are 0, 1 to 7

MODE 4 Bit 0 = 0 (add decimal 0) — Selects scan pulse mode. Scan pulses are 100ms active low open collector every 625ms (ie 8 scan pulses in 5 seconds). These Scan pulses may be used to pulse the "CHANNEL UP" line available on many transceivers. By using this method the SC2 can control the scanning of channels by the radio.

MODE 4 Bit 0 = 1 (add decimal 1) — Selects scan stop mode. Scan line goes low when Mute is OFF (stop scan) and goes high when Mute is ON (scan enable). Scan line also goes low during the reception of Selcalls and the transmission of any responses as well as for duration of main alarm tones (ringing) - approximately 96 seconds - then goes high again. This line may be used to as a signal to many radios to stop scanning.

MODE 4 Bit 1 = 0 (add decimal 0) — Auto-reset timer defeat disabled. When selected does not allow the defeating of the auto-reset timer for scanning

MODE 4 Bit 1 = 1 (add decimal 2) — Auto-reset timer defeat enabled. When selected allows the auto-reset timer to be defeated temporarily by entering "#5" from the keypad. The timer will stay inactive until the defeat is cancelled by either going into Mute ON (by using the "★" key) or switching power off and on again.

MODE 4 Bit 2 = 0 (add decimal 0) — Makes no noise when PTT is released.

MODE 4 Bit 2 =1 (add decimal 4) — Transmits a tone each time PTT is released.

MODE 5

Bit 3	Bit 2	Bit 1	Bit 0	Decimal	Description
			0	0	Scan Auto-on timer
			1	1	Scan Auto-on timer = 1 minute
		0		0	Scan Auto-on timer
		1		2	Scan Auto-on timer = 2 minutes
	0			0	Scan Auto-on timer
	1			4	Scan Auto-on timer = 4 minutes
0				0	Scan Auto-on timer
1				8	Scan Auto-on timer = 8 minutes

Valid codes are 0, 1 to 9

MODE 5 Code 0   - Switches scan auto-reset timer OFF. Unit will start scanning when Mute is ON and stop scanning when Mute is OFF.

MODE 5 Codes 1 to 9   - Switches scan auto-reset timer ON. Unit will start scanning when Mute is ON. If Mute is OFF unit will auto-start scanning (and switch Mute ON again) after a preset period. This period is the number of minutes selected by the code (ie. 1 minute to 9 minutes).

Note: Auto-reset timer can be defeated by the timer cancel ("#5") command if this option is enabled (see **Mode 4 Bit 1**). Timer defeat will stay in operation until unit is placed back into Mute by the "★" key or until unit is switched off and back on again.

Mute/Scanning can be completely disabled - see **MODE 3 Bit 2** - in which case the programming of **MODE 4 Bits 0 and 1** and **MODE 5 Bits 0 to 3** do not affect the operation of the unit but must still be entered in the programming stage.

SC2 Selcall/Microphone connections

Power input - **RED** - Voltage input from radio. The SC2 requires +5 to +15 volts at 55mA maximum. Current drain can be reduced by disconnecting the keypad LEDs.

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 closing LK 1 on the SC2 micro board. Input level should be between 5mV and 3V peak to peak.

Alarm audio output - **WHITE** - Alarm audio output feed into radio. There are two alternative alarm outputs - High impedance and Low impedance. The High impedance output 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 SC2 micro board. (The output level range can be changed by closing LK3 on the SC2 micro board). This output can be fed back down the receive audio input line if required by closing LK1 on the SC2 micro board. The Low impedance output may be suitable for directly driving a small loudspeaker.

PTT output - **GREEN** - This 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 transmit audio level should be set using VR2 on the SC2 micro board. Care should be taken to ensure the transmitter is not over-driven by the transmit audio level being too high.

Scan line - **GREY** - This line can be used to control the scanning of the radio. Two options are available by software selection - a)SCAN PULSES or b)SCAN STOP.
If SCAN PULSES are selected then this line is normally HIGH and will pulse LOW for 100mS every 625mS (thereby scanning 8 channels every 5 seconds). This line can be used to pulse the "CHANNEL UP" line available on many radios to produce pseudo-scanning.
If SCAN STOP is selected then this line is normally HIGH to allow scanning and will go LOW to stop scanning.
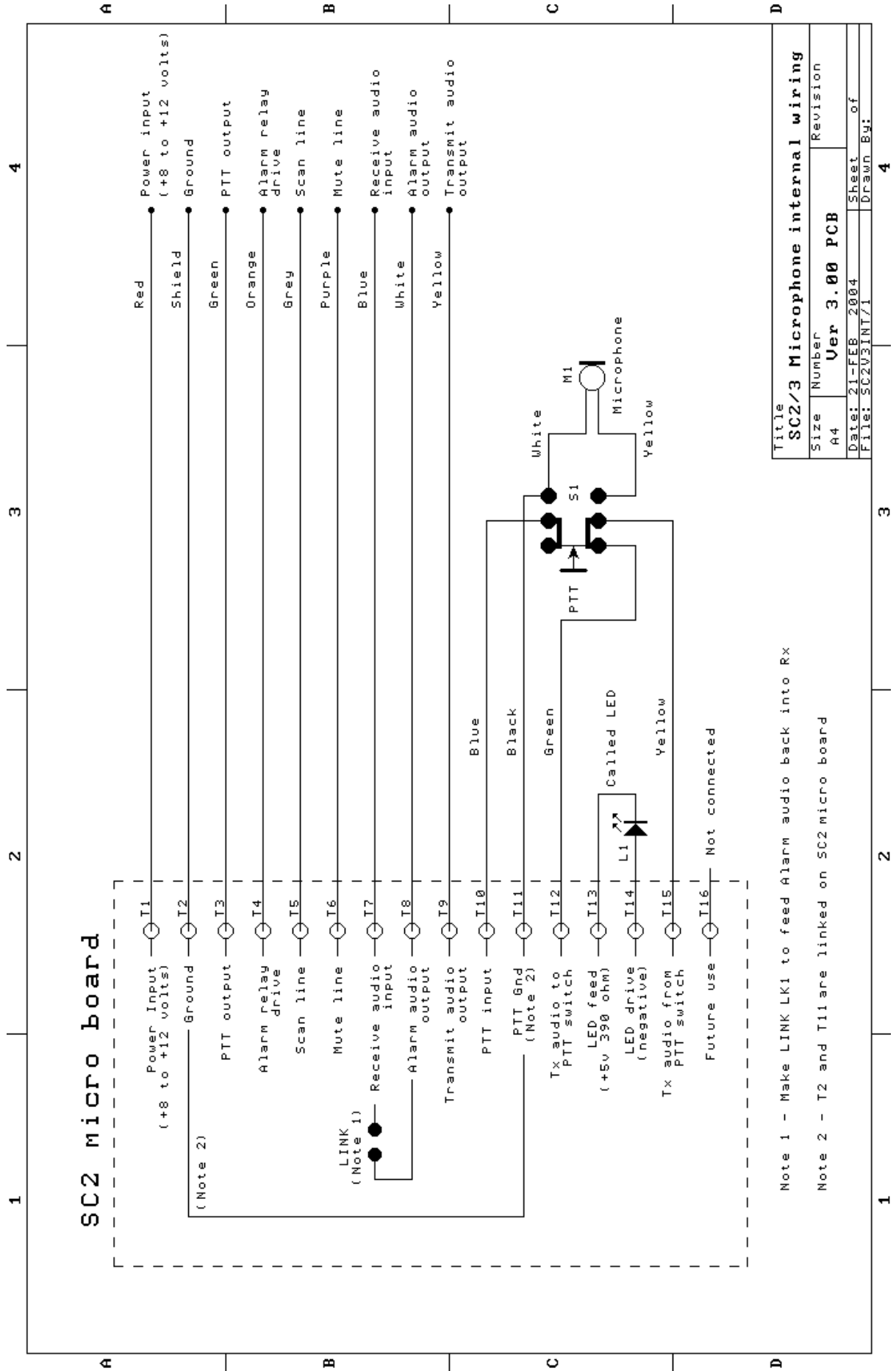The output is an open collector driver capable of sinking 350mA from 30volts.
(For a fuller description of operation see the **MODE 4 Bit 0** programming details.)
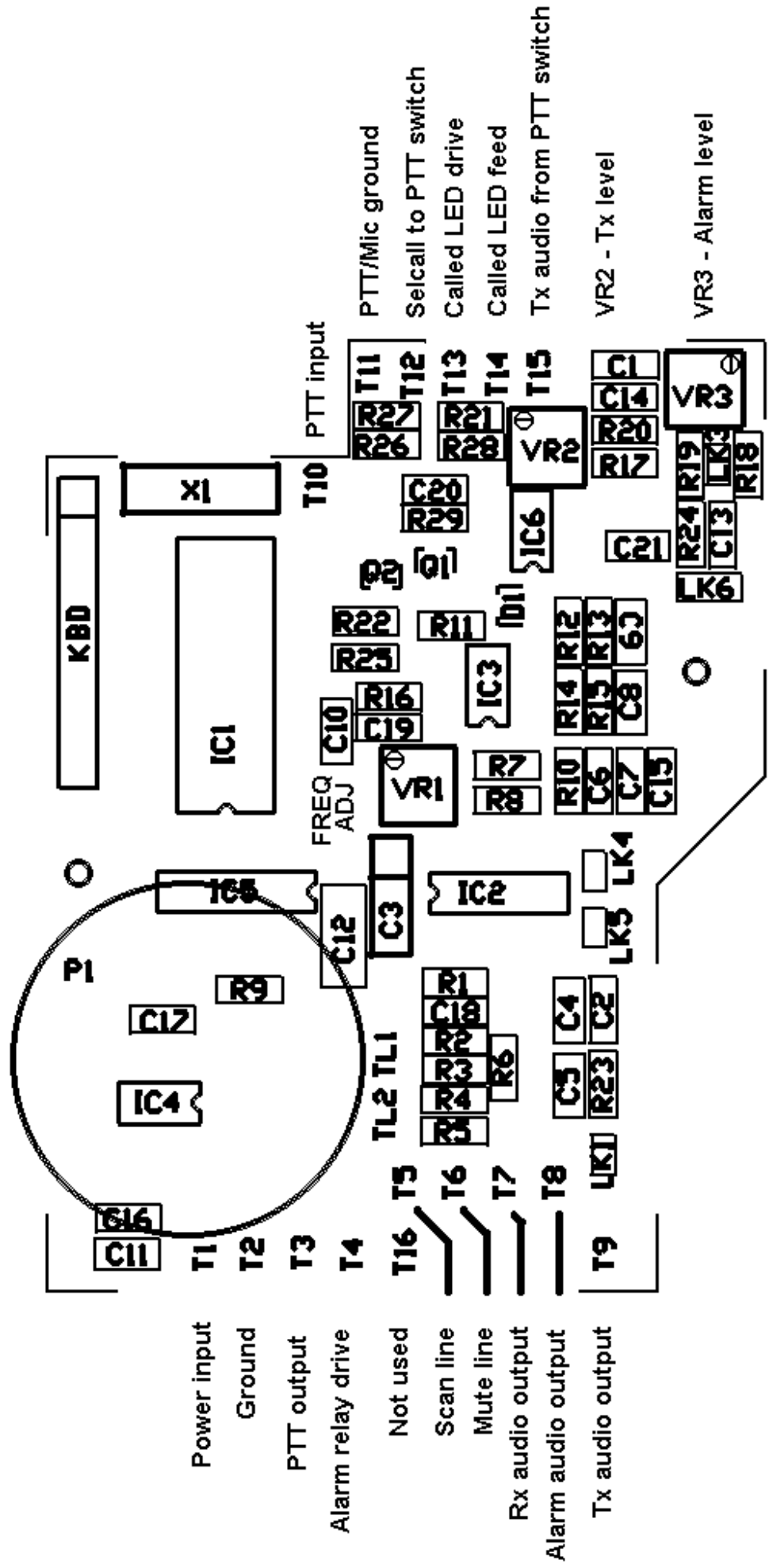
Alarm relay drive - **ORANGE** - This line can be used to drive a relay to switch on external alarm devices (ie. Flashing light, Horn alarm, etc.) as selected by **MODE3 Bit 0**.The output is an open collector driver capable of sinking 350mA from 30volts.

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 3 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 SC2 micro board.

SC2 Microphone internal wiring

SC2 micro board

Terminal	Description	Wire colour	Signal
T1	Power Input (+8 to +12 volts)	Red	Power input (+8 to +12 volts)
T2	Ground (Note 2)	Shield	Ground
T3	PTT output	Green	PTT output
T4	Alarm relay drive	Orange	Alarm relay drive
T5	Scan line	Grey	Scan line
T6	Mute line	Purple	Mute line
T7	Receive audio input	Blue	Receive audio input
T8	Alarm audio output	White	Alarm audio output
T9	Transmit audio output	Yellow	Transmit audio output
T10	PTT input	Blue	
T11	PTT Gnd (Note 2)	Black	
T12	Tx audio to PTT switch	Green	
T13	LED feed (+5v 390 ohm)	Called LED	
T14	LED drive (negative)		
T15	Tx audio from PTT switch	Yellow	
T16	Future use	Not connected	

LINK (Note 1)

M1 Microphone

S1 — PTT

L1 Called LED

White / Yellow

Note 1 – Make LINK LK1 to feed Alarm audio back into Rx

Note 2 – T2 and T11 are linked on SC2 micro board

Title: SC2/3 Microphone internal wiring
Size: A4 Number: Ver 3.00 PCB Revision
Date: 21-FEB-2004 Sheet: of
File: SC2V3INT/1 Drawn By:

Top View - SC2/3 Version 3.00 PCB

SC2/3 Circuit board layout

Connection labels (top):
- PTT/Mic ground
- Selcall to PTT switch
- Called LED drive
- Called LED feed
- Tx audio from PTT switch
- VR2 - Tx level
- VR3 - Alarm level
- PTT input

Connection labels (bottom):
- Power input
- Ground
- PTT output
- Alarm relay drive
- Not used
- Scan line
- Mute line
- Rx audio output
- Alarm audio output
- Tx audio output

SC2 Circuit board schematic

SC2/3 Selcall/Microphone
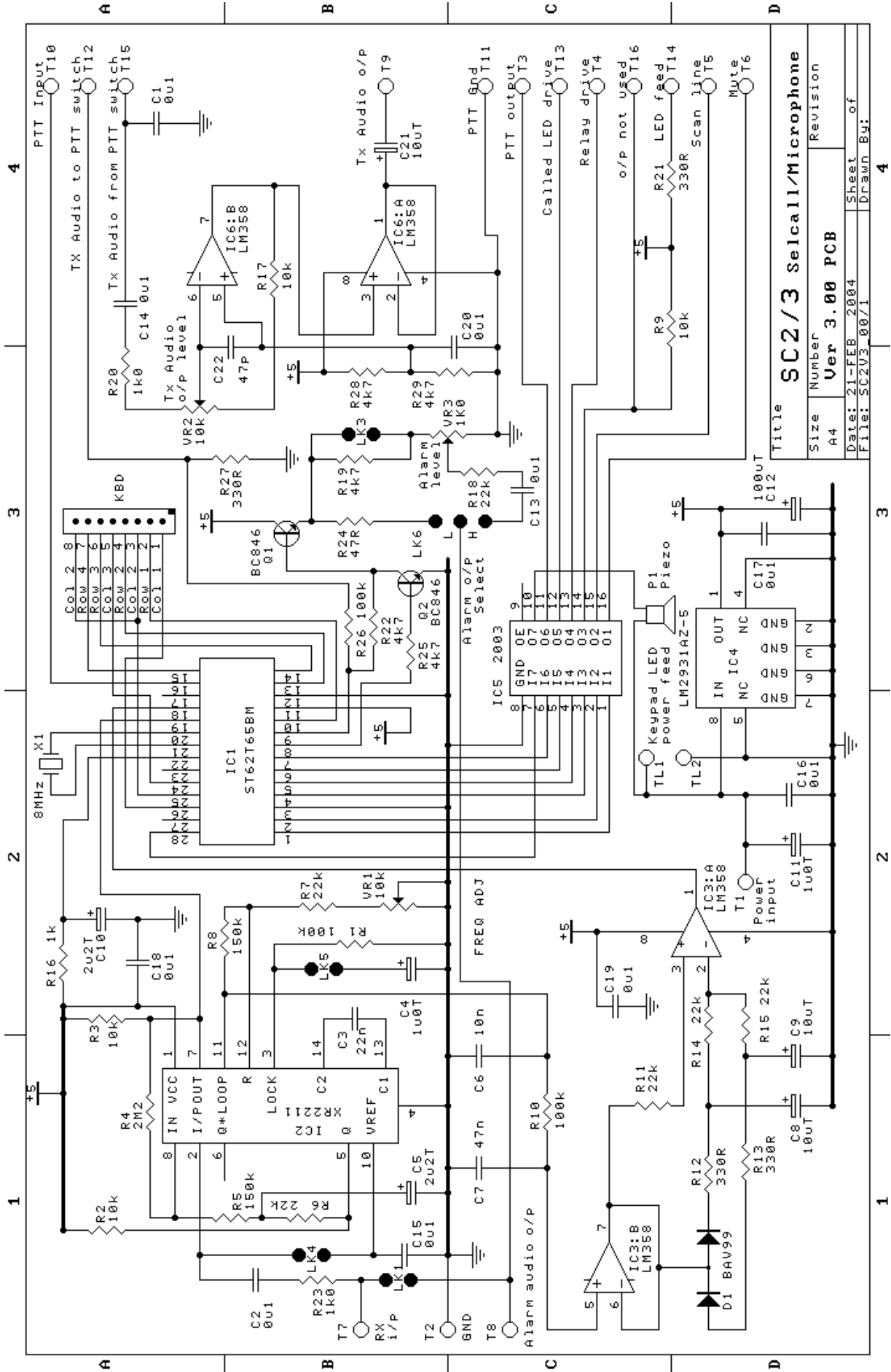
Title	SC2/3 Selcall/Microphone
Size A4	Number Ver 3.00 PCB	Revision
Date: 21-FEB 2004	Sheet of
File: SC2V3 00/1	Drawn By:

ADJUSTING THE SC2 SELCALL/TELCALL MICROPHONE

There are minimal adjustments to be made to the SC2 Selcall/Telcall microphone. Programming of the Selcall self ID number and the various operating modes are covered separately in this Programming Instructions booklet.

Removing the SC2 micro board

First remove the back shell of the SC2 Selcall/Telcall microphone by removing the three back shell screws.

To remove the SC2 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.

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 (7 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 Transmit Audio level by VR2 (7 turn) to give a suitable microphone level. Check that the output power is less than 70% of full output power while a Selcall is being transmitted.

Note: this adjustment adjusts both the microphone AND the selcall output level.

Audio Alarm level

This adjustment is only necessary when using the High Impedance Audio Alarm option.

Adjust the Audio Alarm level by VR3 (7 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.

The High Impedance Audio Alarm option is selected by shorting Link H of LK6. This option is suitable for feeding into the receive audio amplifier change after any mute gate.

The Low Impedance Audio Alarm option is selected by shorting Link L of LK6. This option may be suitable for direct connection to a loudspeaker.

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 SC2 Selcall/Telcall Microphone unit

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

To send a Telcall   - enter four digit Selcall number
(if enabled)   - press "#"
                        - enter telephone number
                        - press "#"

To send Selcall   - enter four digit Selcall number
beacon request   - 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)

The following commands may only be used if enabled:

To select Barrett   - press "#"
16 digit format   - press "2"

To select Codan   - press "#"
12 digit format   - press "3"

To select Codan   - press "#"
16 digit format   - press "4"

To switch off   - press "#"
 auto-scan timer   - press "5"

Notes:

The Auto-scan reset timer (if selected) is re-enabled when selecting mute ON.

The Mute is switched ON by pressing the "★" key. It can be switched OFF by pressing the "★" key or PTT. The Mute must be switched OFF (or disabled) before any keyboard entries (except "★") can be made

Alarms can be cancelled by pressing either the "★" key or PTT. This automatically turns the Mute OFF.

NOTES

Programming Code: ___ ___ ___ ___ - ___ ___ ___ ___ ___
                   (Selcall ID Number) - (Operational   mode)

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

Format	❏	Barrett 16 digit
	❏	Codan 12 digit
	❏	Codan 16 digit
	❏	Selcall only
	❏	Selcall and Telcall
	❏	Fixed
	❏	Changeable
Mute/Scan	❏	Enabled
	❏	Disabled
Transmit	❏	Enabled
	❏	Disabled
Receive	❏	Enabled
	❏	Disabled
Horn Alarm	❏	Continuous
	❏	Pulsed
Alarms	❏	Audio
	❏	Piezo
Scan auto reset timer	❏	Enabled _____ Minutes
	❏	Disabled
End of Transmission tone	❏	Enabled
	❏	Disabled