

Jenal Communications

Model SC-51

Selcall/Telcall/GPS interface

(For use with Kenwood KMC32 or DTMF microphones)

Programming Instructions

(Software Version GBB 2.05)

(PCB Version 3.00)

Programming the SC51 Selcall/Telcall/GPS module

The SC51 unit can be configured using the Jenal SC51P203 configuration programming software (supplied on CD-Rom) by following these steps:

- 1) Put the SC51 into programming mode by pressing and holding the PTT switch (or emergency call button) while powering on the unit. The unit will produce three beeps to signify that it is in programming mode. Release the PTT switch (or emergency call button).
- 2) Start the Jenal SC51P203 programme on your computer by clicking on Start > Programs > Jenal > SC51 > SC51P203
- 3) Connect the serial port of a PC or laptop to the GPS RS232 port of the SC51.
- 4) Follow the on-screen prompts on your PC.
- 5) At the end of programming disconnect the SC51 from your PC and switch it's power off and then back on to reset into operating mode. Check that the unit functions as you require.

Note: The SC51P203 is a self-installing programme and cannot be run from the CD-Rom. You must install it on your hard disk first by running the sc51p203setup.exe file (un-zip first if necessary).

The sc51p203setup.exe programme can also be downloaded from our web site by going to:
<http://jenal.com/downloads>
and clicking on either the sc51p203setup.exe or the sc51p203setup.zip links.

Available Common Options

The SC51 has several programmable options some of which are not available for all the formats that can be selected. The following four types of calls are available in all formats:

- 1) Selcall
- 2) Telcall
- 3) Beacon Request
- 4) End of Call (Hang-up)

Sending of Telcalls is available fixed either in Barrett/Jenal format or Codan/Icom format. Alternatively, if the "Changeable Telcall Format" option is selected then the radio user can select between the two Telcall format options using a keypad microphone. Press # then 2 on the keypad for Barrett/Jenal format or press # then 3 for Codan/Icom format.

The selcall ID of the SC51 can be changed by clicking on the "CHANGE" button at the bottom of the "Selcall ID" box. The selcall ID is any four digit number between 0000 and 9999.

The length of the synchronising (reversals) sequence can be changed by clicking on one of the buttons marked 1 to 9 in the "Reversals - Seconds" box. Select 1 for a non-scanning system or (typically) 5 for a scanning system. Other periods can be selected to suit the system requirements.

Options not available for a particular format are disabled (greyed out) in the configuration screen.

The table opposite shows the other available options for the different formats.

SC51 Available Options

Option	Barrett	Codan	Icom	Jenal
Tx Selcall/GPS Emergency	YES			YES
Mute/Scan	YES	YES	YES	YES
Changeable Telcall Format	YES	YES	YES	YES
Roger (End of Tx) Beep	YES	YES	YES	YES
Un-Kill Code enable ¹				YES
Kill Code enable ¹	YES			YES
PTT = Emergency Call ²	YES			YES
GPS Baud rate selection	YES			YES

Notes:

1) When using the Barrett format the SC51 can be “killed” remotely but cannot be “un-killed”, however when using the Jenal format the SC51 can be both “killed” and “un-killed” remotely. The Kill Code number and the Un-Kill Code number can be different.

When “killed” the SC51 will both disable the PTT circuit and operate the Mute circuit. The unit will still respond to Beacon Request and GPS Position Request calls as well as Kill and Un-Kill calls. The SC51 can also be “un-killed” locally by entering it’s Un-Kill Code using a keypad microphone. The entry must be in the form “*NNNNNNNN#” where NNNNNNNN is the 8 digit Un-Kill Code.

2) In some Automatic Vehicle Location (AVL or Tracking) systems it may be desirable to have the SC51 operate independently of the user. In this case the SC51 can be configured to send an Emergency call by grounding it’s PTT lead using an “Emergency” button. The call sent will be either an Emergency Selcall or an Emergency GPS Position call depending on whether or not valid GPS data is available. When this option is selected the SC51 will ignore any signals it receives from a microphone except when the Kill Code is enabled and an UN-Kill Code is entered.

Receive Options - Page 1

Reception of the following types of calls can be enabled or disabled for all formats:

- 1) Selcall Beacon
- 2) xx99 Beacon
- 3) 0000 - Broadcast calls to all stations
- 4) x000 - All calls to all stations with IDs x001 to x999 (where x = 0 to 9)
- 5) xx00 - Group calls to all stations with IDs xx01 to xx99 (where x = 0 to 9)
- 6) xxx0 - Sub-group calls to all stations with IDs xxx1 to xxx9 (where x = 0 to 9)

Additionally reception of the following types of calls can be enabled or disabled for Barrett and Jenal formats:

- 1) Emergency Selcalls
- 2) Emergency GPS data calls

The appropriate type of revertive is generated in response to any of the above calls which are enabled and received . Unavailable options are disabled (greyed out) in the programming interface.

SC51 Interface connections

CN1 - GPS interface connector - Connect via ribbon cable to 9 way D female connector for GPS data

CN1	Colour	Description	DE9F
pin 1	Brown	GPS TTL data level input to TTL/RS232 converter	pin 1
pin 2	Red	not connected	pin 6
pin 3	Orange	RS232 output to GPS data port	pin 2
pin 4	Yellow	not connected	pin 7
pin 5	Green	RS232 input from GPS data port	pin 3
pin 6	Blue	not connected	pin 8
pin 7	Violet	GPS RS232 data level input from TTL/RS232 converter	pin 4
pin 8	Grey	not connected	pin 9
pin 9	White	Ground	pin 5
pin 10	Black	not connected	n/c

Note: when using a GPS with a TTL output then connect it to pin 1 of the 9 way D connector and link pins 3 and 4 of the 9 way D connector.

Programming cables

The connecting cable between the PC and the SC51 should only connect to pins 2, 3 and 5 of the DE9 socket on the SC51 ribbon cable. Do not connect any other pins.

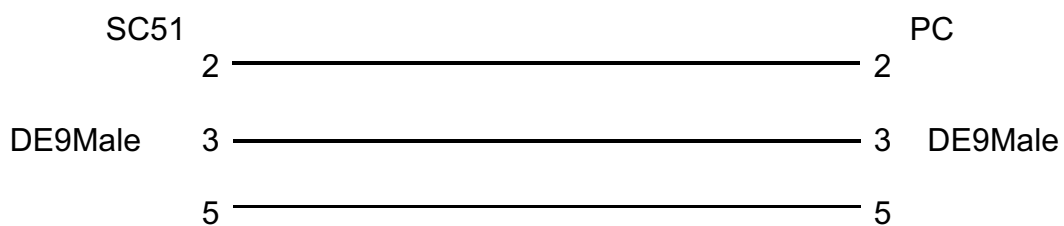


Fig.1 - 9 pin plug to 9 pin plug

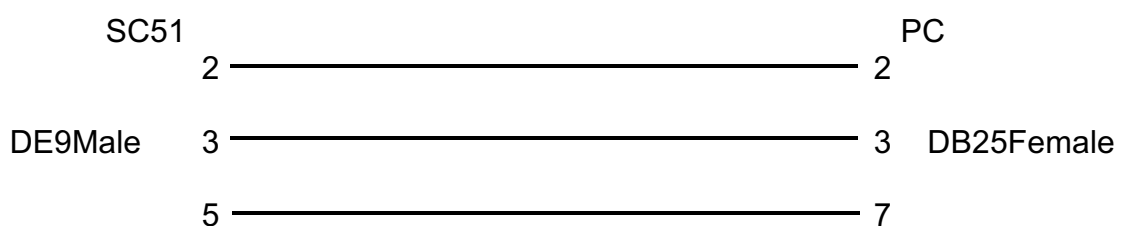


Fig.2 - 9 pin plug to 25 pin socket

CN2 - Radio internal interface

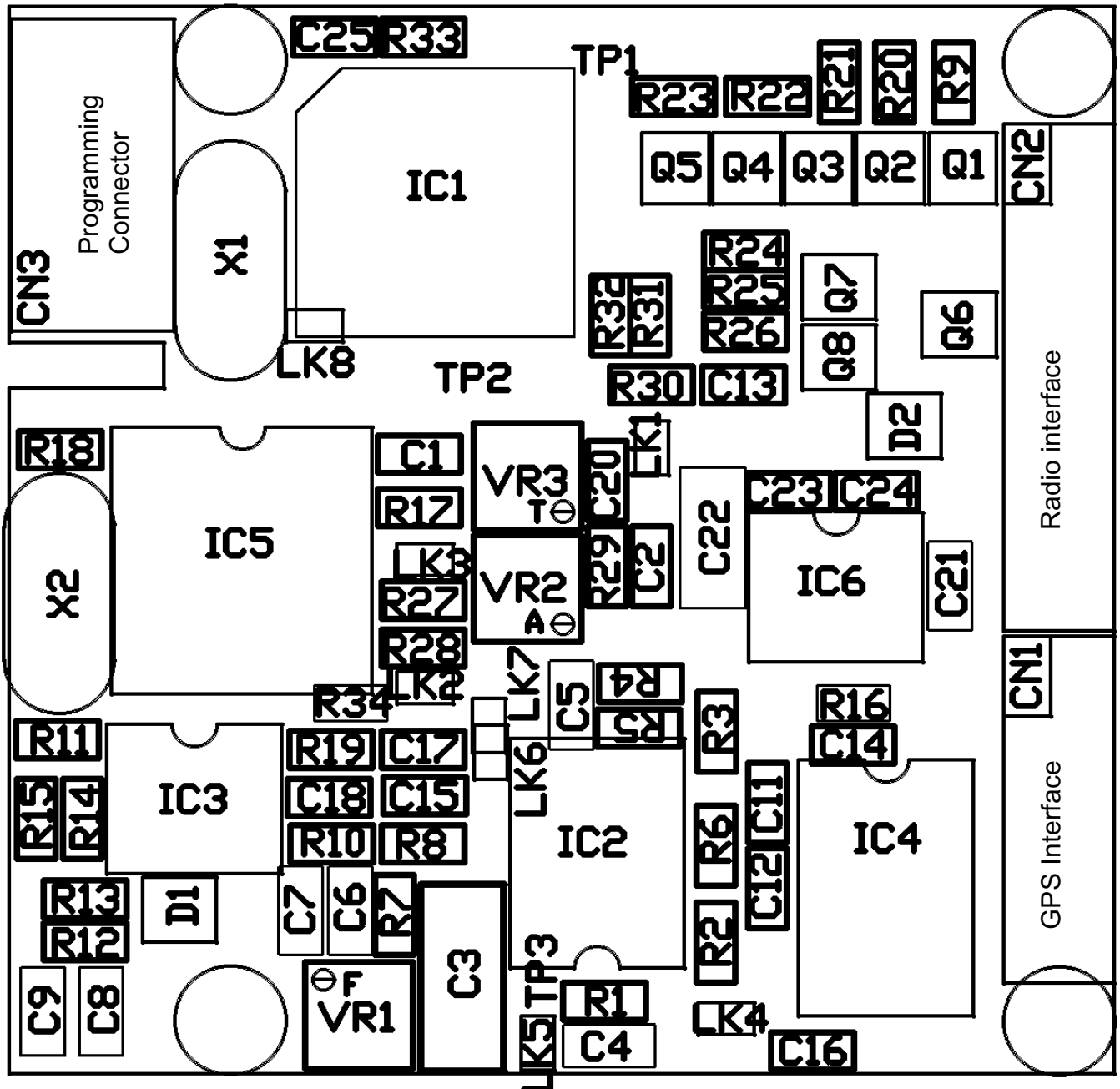
CN2	Colour	Description
pin 1	Brown	GROUND. Connect to "microphone" ground of radio to avoid ground loops.
pin 2	Red	MUTE line. Active low open collector output to control the radio mute circuit.
pin 3	Orange	SCAN PULSE line. Active low going pulses open collector output. Can be used to make the radio step through channels by pulsing UP or DOWN control lines.
pin 4	Yellow	SCAN STOP line. Active low open collector output to control the radio scan circuit. A low on this line tells the radio to stop scanning.
pin 5*	Green	VOICE PTT OUT line. Active low open collector output to control the radio PTT circuit when the microphone PTT is pressed. (Can be tied to pin 9 if required).
pin 6	Blue	LATCH ALARM line. Active low open collector output goes low when a call is received. Used to switch on an external alarm. Output is reset when a call is answered. Used to drive a Piezo Buzzer when in "One Button" mode.
pin 7	Violet	CALLED LED line. Active low open collector output goes low when a call is received. Can be used to operate an LED. Output is reset when a call is answered.
pin 8	Grey	HORN ALARM. Active low open collector output. Pulses low after 30 seconds after a call is received. Can be used to operate a relay to switch on an external alarm. Output is reset when a call is answered or after two minutes.
pin 9*	White	SELCALL PTT OUT line. Active low open collector output to control the radio PTT circuit when the SC51 unit is sending. (Can be tied to pin 5 if required).
pin 10	Black	TRANSMIT AUDIO OUTPUT. Selcall transmit audio output has to be fed into the audio input of the transmitter. Adjust the level with VR3.
pin 11	Brown	VOICE PTT IN. Input from the microphone PTT circuit to control the SC51 unit. Also used as Emergency Call/Reset Button input in "One Button" mode.
pin 12	Red	ALARM AUDIO OUT. Alarm tones output should be fed into the radio audio amplifier (after the Mute gate). Adjust the level with VR2.
pin 13	Orange	RX AUDIO IN. Received audio input to the SC51. Should be taken from before the Mute gate in the radio.
pin 14	Yellow	MIC DATA IN. Either DTMF audio input to the SC51 from a DTMF microphone or serial data input from a Kenwood KMC-32 (or similar) microphone.
pin 15	Green	12V DC INPUT. Power supply for the SC51 - between 6v DC and 14v DV.
pin 16	Blue	GROUND. Connect to "microphone" ground of radio to avoid ground loops.

* Some radios require separate PTTs for voice or sending selcalls (eg. Kenwood). If separate PTTs are not required then pins 5 & 9 can be simply joined together and connected to the radio's PTT circuit.

Note: When using the SC51 to control the radio's PTT, the normal PTT input from the microphone should be broken at the microphone socket and the SC51 pin 11 connected to the microphone side of the break. SC51 pin 5 (and possibly pin 9) should be connected to the radio side of the break. If the SC51 is NOT controlling the radio's PTT then DO NOT break the PTT circuit and leave pin 5 not connected. In this case pin 11 should still be connected to the radio's PTT circuit.

CN3 - Programming connector - CAUTION! Do not make any connections to these pins.

SC51 PCB Layout



Links

LK1 - Make this link to send the alarm audio tones back down the receive audio line.

LK2 - Make this link to give an increased audio alarm tones level

LK3 - Make this link to give an increased selcall transmit level

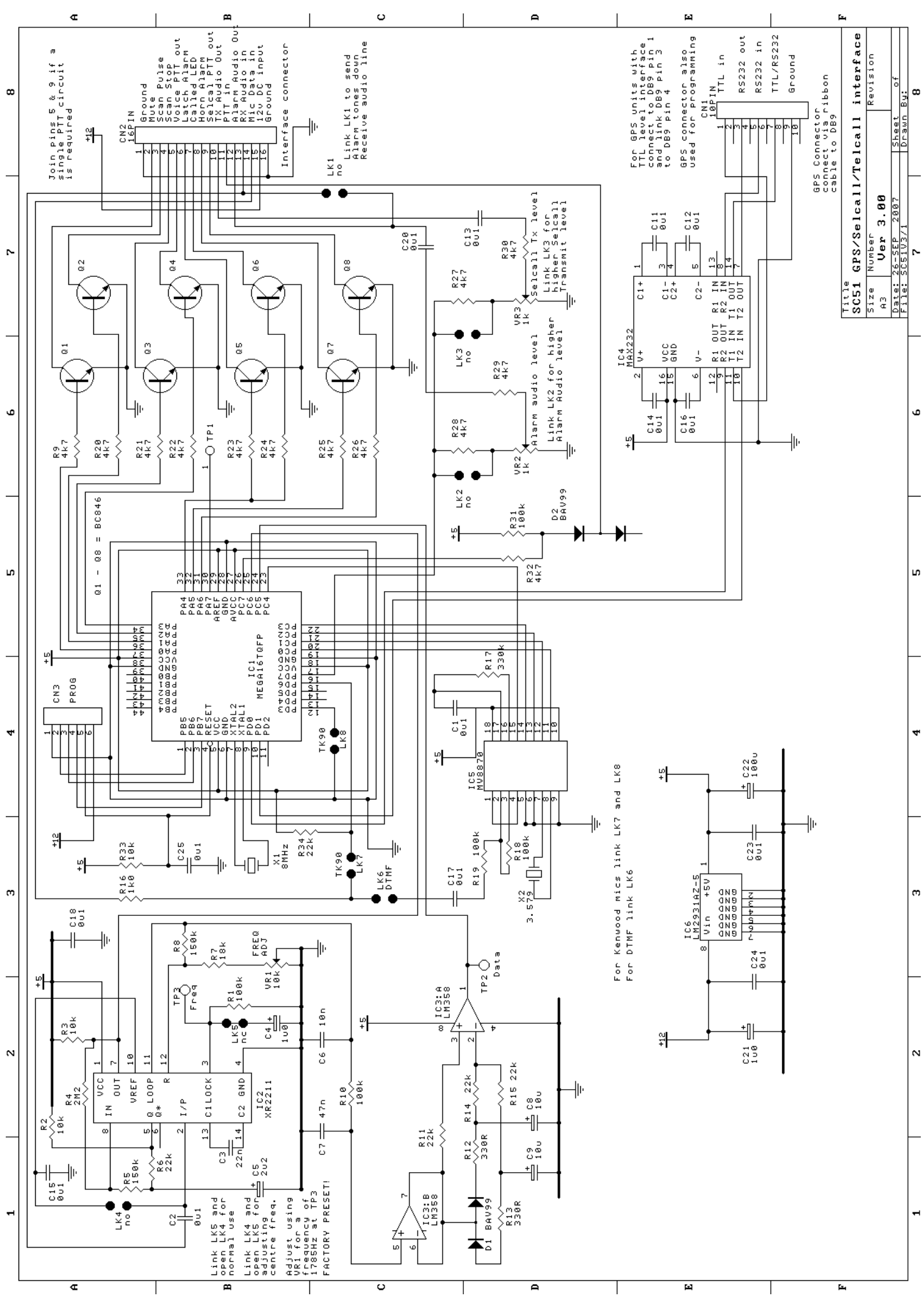
LK4/LK5 - Used for setting FSK detector centre frequency (see "Adjusting the SC51")

LK6 - Make this link when using a DTMF microphone

LK7 - Make this link when using a Kenwood KMC-32 (or similar) data microphone

LK8 - Make this link when using a Kenwood KMC-32 (or similar) data microphone

Note: LK6 and LK7 have a common centre pad



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Adjusting the SC51

Selcall transmit level

The transmit level is set by sending a selcall and measuring the transmitted output power of the radio.

While sending a selcall adjust VR3 to give a reading of, preferably, between 30% and 40% of full power output (in no circumstances should you exceed 70% of full output power). If the transmit power level is too low it can be increased by placing a solder link across Link LK3.

Audio alarm level

The audio alarm level can be set by pressing keys on the microphone keypad while listening to the audio level out of the loudspeaker of the radio.

While pressing keys on the keypad adjust VR2 to give a suitable level of alarm tones out of the loudspeaker. If the level is too low it can be increased by placing a solder link across Link LK2.

If required the Audio alarm tones can be injected back into the receive audio line by placing a solder link across Link LK1

FSK detector centre frequency

The FSK detector centre frequency is pre-set before delivery and should not require adjustment.

If, for some reason, you need to re-set the FSK centre frequency then you will need a high impedance input frequency counter to measure the frequency. The procedure for the adjustment is as follows:

- 1) Close Link LK4 and open Link LK5
- 2) Connect the frequency counter to test point TP3
- 3) Adjust VR1 for a reading of 1785Hz on the frequency counter
- 4) Remove the frequency counter
- 5) Close Link LK5 and open Link LK4

The FSK detector centre frequency is now set up correctly and the unit should be tested to confirm correct operation.

Audible Alarm Tones

Alarm	Audio alarm sound
Key press	short high pitched tone
Error	long low pitched tone
Acknowledge	three short high pitched tones
Mute on	low to medium tone
Mute off	medium to high tone
Selcall received	one long telephone ring (one second) every three seconds
Telcall received	two short telephone rings every three seconds
Background Selcall alarm	one short beep every five seconds
Background Telcall alarm	two short beeps every five seconds
Power up	One long high beep
Killed power up	One long high beep followed by one longer low pitched tone

Note: The Audio Alarm may also be fed back down the receive input line by placing a solder link across Link LK1. The adjustment for the alarm level is still as above.

When a Selcall or Telcall is received the unit will make “ringing” tones for a period of time after which the SC51 will go into “background alarm” mode and make “beeps” every five seconds.

Stored Number Facility

This version of SC51 has the facility to store up to 10 selcall or telcall numbers for “short dialling”. The numbers are stored by using the keypad and are stored in locations 0 to 9. Selcall or Telcall numbers are simply called by pressing n # # (where n is a number from 0 to 9). Users can easily change these numbers as and when required.

Kenwood KMC-32 (and similar) microphones

This version of SC51 can be controlled by either a DTMF microphone or a Kenwood KMC-32 (or similar) microphone. When using the KMC-32, or other digital microphone, it is important that the data connection from the microphone to the radio’s microprocessor is broken. In the Kenwood TK-90 this is accomplished by removing resistor R21 on the display board.

Using the SC51 Selcall/Telcall/GPS unit

- To send a Selcall** - enter four digit Selcall number, press “#” , press “#”
- To send a Telcall** - enter four digit Selcall number, press “#”
- enter telephone number, press “#”
- To send Selcall beacon request** - enter four digit Selcall number
- press “#”, press “*”
- To send xx99 beacon request** - enter four digit Selcall number (must end in 99)
- press “#”, press “#”
- To repeat call or recall caller** - press “#”, press “#”
- To send a hang up command** - press “#”, press “8”
- To send GPS position report** - enter four digit Selcall number
- press “*”, press “*”
- To send GPS emergency call** - press “#”
- press “5” **Hold for at least two seconds (wait for 3 beeps)**
- To select Barrett format** - press “#”, press “2”
- To select Codan format** - press “#”, press “3”
- To store a Selcall number** - enter 1 digit memory number, press “#”
- enter 4 digit selcall number, press “#”, press “#”
- To store a Telcall number** - enter 1 digit memory number, press “#”
- enter 4 digit selcall number, press “#”
- enter telephone number (max 16 digits), press “#”
- To recall a stored number** - enter 1 digit memory number, press “#”, press “#”
- To delete a stored number** - enter 1 digit memory number, press “#”
- press “*” **Hold for at least two seconds (wait for 3 beeps)**

Notes:

- 1) Mute/Scan (if enabled) is switched ON by pressing the “*” key. Mute/Scan (if enabled) can be switched OFF by pressing the “*” key or PTT. Mute/Scan must be switched OFF (or disabled) before any keyboard entries, except “*”, can be made.
- 2) Alarms can be cancelled by pressing the “*” key or PTT. This automatically turns the mute OFF.
- 3) GPS emergency calls and GPS position report calls can only be sent in Barrett/Jenal format.
- 4) If no GPS data is available then a Selcall Emergency call will be sent when a Send Emergency GPS call is requested. (Selcall Emergency calls cannot normally be sent.)
- 5) If no GPS data is available when a GPS position report call is sent then the error tone will be heard and no selcall will be sent.

Configuration details

Serial Number _ _ _ _ _

Selcall Number _ _ _ _ _

GPS Baud Rate _____

Reversals (Secs) ____

Kill Code _ _ _ _ _

Un-Kill Code _ _ _ _ _

Format :-

- Barrett
- Codan
- Icom
- Jenal

Options :-

- Tx Selcall/GPS Emergency
- Mute/Scan
- Changeable Telcall Format
- Roger (End of Tx) Beep
-
- Un-kill Code Enable
- Kill Code Enable
- PTT = Emergency call

Receive options - Page 1 :-

- Selcall Beacon calls
- xx99 Beacon calls
- Selcall Emergency calls
- GPS Emergency calls
- 0000 - Broadcast calls
- x000 - All calls
- xx00 - Group calls
- xxx0 - Sub-group calls

Technical notes:

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