



SR3400 Base Station Module
Configuration and Use
Series-2 Cards Only

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Forward.

Thank you for your purchase of the SR3400 base station module. The following notes will help you configure the various options available within the module and also help with the interface of the module with other items.

The module has been designed to provide a ready made platform into which you, the user can fit one or two Motorola GM340 radio sets operating in four programmable modes. The case parts are also pre-drilled to take a number of control modules and diplexer / circulator equipment.

General Description.

The module is a standard 3U high case fitted with a switch mode power supply unit, fan, control card and interface sockets for mains electricity input, battery input, and line interface connections. The following items are intended to be fitted by the end user depending upon the operational requirement.

Item Part Number	Description	Number fitted	Fitted When
GM3400	Mobile radio set(s)	1 or 2	Before Use
Procom Filter	Duplex Filter 6N	1	If Duplex required
AFL	Circulator 25W	1	If on communal site
TC1	Line Control Card	1	If Motorola TRC or Philips line control required
TRIP	IP control card	1	If IP control over network required.

The 3U box has a central divider plate which has been pre-drilled to take combinations of the above equipment depending upon the user requirement. It is intended that this plate be removed for fitting of the lower radio set, duplex filter and circulator. All other optional items can be fitted from the top without removing the plate.

External Equipment and Compatibility.

The SR3400 has been designed to be plug and play compatible with our standard range of desk top controllers and switches for local connections. Where connection is to be achieved over private wire circuits or networks, the user has the option of fitting either a line control card (TC1), or network control card (TRIP). Connections to local controllers and network controllers are made via an RJ45 socket located on the rear panel using straight industry standard CAT5 leads.

PSU.

The power supply units has an input voltage range from 88v-264v AC 47~63Hz. The DC output is rated at 13.3v nominal @ 151.6watts. The secondary circuit used to charge the external battery if required is rated at 500mA.

Battery Charging & Switch Over.

When connected the battery will charge at a rate not exceeding 500mA when the main AC power is available. The battery is not connected to the load unless the main AC power has failed, at which time the battery is connected to the load via seamless electronic switching.

Whilst in main AC power failure mode, the battery terminal voltage is monitored and when falling to 11.5v DC, the battery will be isolated from the load to prevent destructive discharging of the battery. When the main AC power is restored, the battery will be reconnected to the charging circuit and will become available for back up service once the terminal voltage exceeds the cutoff point once again.

It should be noted that the battery will not be connected to the load when connected in isolation to AC supplies. To make the system available for truly portable (battery only operation for a single event) a Battery Reset button is fitted to the rear of the case. Operation of the reset button causes the battery to be connected to the load, where it will remain in operation until the battery terminal voltage drops below the safe charging level at which point the battery will be automatically disconnected.

L.E.D. Panel & Programming Panel.

The Case front carries a single RJ45 connector, nine LED devices and two switches, SW1 & SW2. The panel legend indicates the function of both switches and LED devices. The RJ45 connector can be used to program the radio sets fitted inside the base station module. The selection of which radio is being programmed is achieved by use of the toggle switch SW1, selecting radio "A" default transmitters in dual set configurations, or, radio "B" default receiver in dual set configuration.

The push button switch (SW2) is used when the module is placed into stand-alone talk-through operation. Depressing the switch will enable TT operation. See operating modes.

Control Board.

The control board has a microprocessor which monitors various control lines and sets the audio routing for the four modes of operation possible with the module. The processor utilizes an internal clock and drives a single LED (heart beat (HB) on front panel) device to indicate that it is in operation.

Interface to one or two GM340 mobile radio sets is achieved by using the 16 pin IO available on the back of these radio sets. These connections are matched pin for pin with 16 way headers on the control card marked Radio A and Radio B.

A 16 way connector marked TC1-TRIP is used to connect with line control cards when fitted as options.

There is also a 10 way header which connects the control card to the LED unit mounted on the front panel of the module.

A 3 pin header carries connection to the case fan which is driven from the microprocessor via a switching transistor.

The connector complement is completed with a 25 way D type male offered to the case rear, and an RJ45 connector which carries either line audio or network traffic depending upon the options selected.

The control board receives its 12v nominal power directly from the PSU unit, and distributes the power to the radio sets via self resetting fuses to each radio. The 12v DC is also made available on the 25 way connector via a 500mA self resetting fuse, and again on the internal 16 way connector used to connect the option cards into the control card.

Modes of Operation.

There are four modes of operation which are selected by using two DIP switches located top left of the control card. These modes are as follows.

SW1	SW2	Mode	Used When	PTT from	TT enable	POB
Off	Off	1	2 set cross band repeat	A or B mute	Front Panel	NA
On	Off	2	2 set Line control	Line & Mute B	Line/FP	Yes
Off	On	3	2 set Repeater	Mute B	Front Panel	NA
On	On	4	Single Radio Line Control	Line Card optional	NA	NA

General Logic Rules.

The mode of operation also sets how the audio is routed internally. The following guide lines should be followed when configuring your system for operation.

DRC1=Desk top controller, DRC1s= Desk top controller, DS32 = switch
 TC1 =line control receiver, TRIP= IP based line control

- 1, Fitting a **single** radio set for line/ local connection, use mode 4 and connect to DRC1,DS32,TC1, TRIP.
- 2, Two frequency simplex operation use mode 2 and connect to DRC1, DS32, TRIP, TC1
- 3, Duplex operation line control use mode 2 and connects to DRC1,DS32,TRIP, TC1
- 4, Duplex repeater stand alone. Use mode 3-no other connections
- 5, CBS repeater, use mode 2 and connect CBS panel via 25 way
- 6, Cross-band stand alone, use mode 1 no other connections.

Pip On Busy.

Series two cards have the facility to inject a busy pip sound on the outgoing transmission when the receiver detects a valid PL tone and the squelch is open. The POB signal is then only available if Talk Through is not enabled and the Line PTT is not active. POB is only available in mode 2, and if the POB jumper is fitted.

Fitting the GM340 radio sets.

The radio slots are designated A&B. In all modes radio set “A” is the default transmitter, radio set “B” is the default receiver.

Radio set “A” is fitted to the underside of the pre-drilled divider panel, and connects via the 16 way ribbon cable to connector ”A” on the control board.

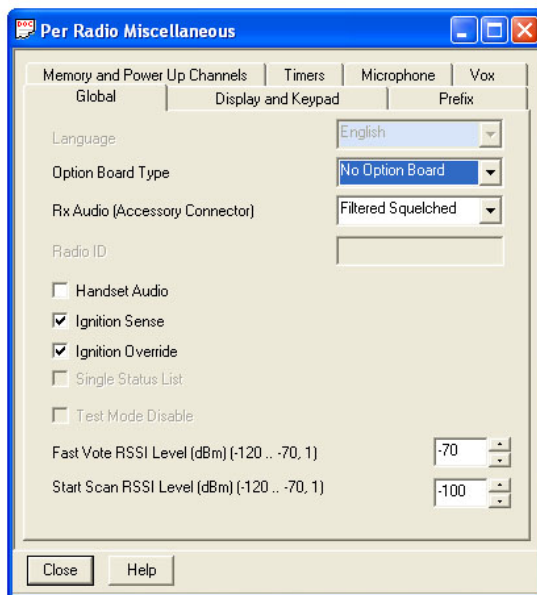
Radio set “B” fits to the upper side of the divider panel and connects via the 16 way ribbon cable to connector “B” on the control board.

The ribbon cables can be difficult to fit into the radio expansion socket, and care must be taken to ensure the correct pins are engaged and the polarization of the connectors is correct.

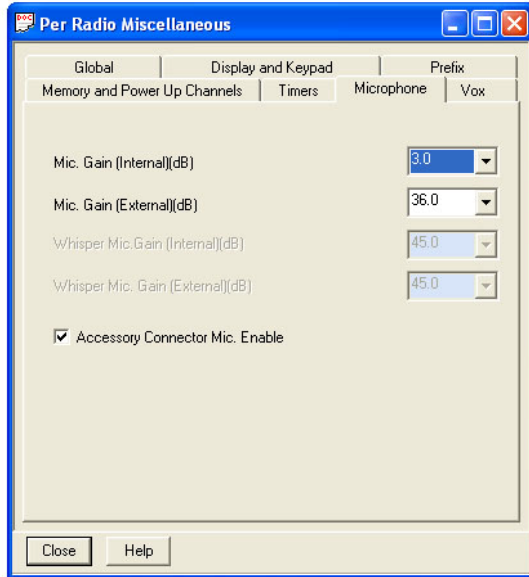
As you look into the rear of the radio set, the inner 16 pins are used, the extreme outer 4 pins (two on either side of the connector) are not used. The 16 way header should be carefully fitted so as to engage only the middle 16 pins of the accessory socket with pin 1 (red stripe on ribbon) to the lower **LEFT** corner of the connector. See photo.

Programming the GM340 radio sets.

For correct operation of the control card, the GM340 radio sets must have their programmable IO set to the correct settings. Whilst we do not intend teaching the dealer everything he needs to know about programming these sets, the following settings are always required.

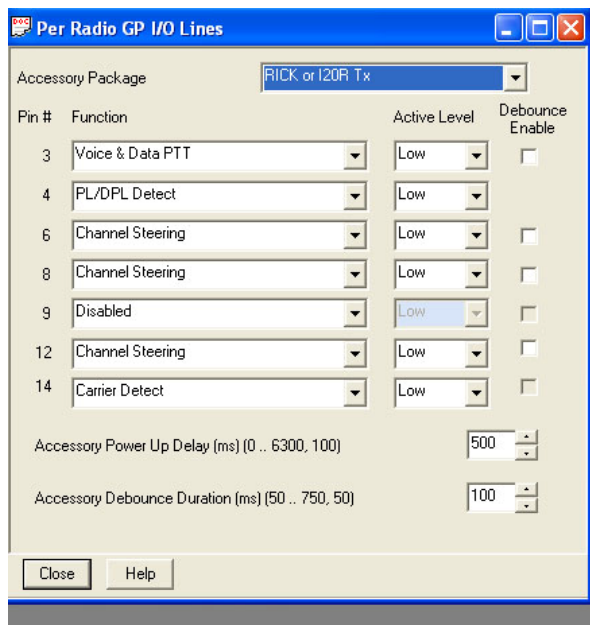
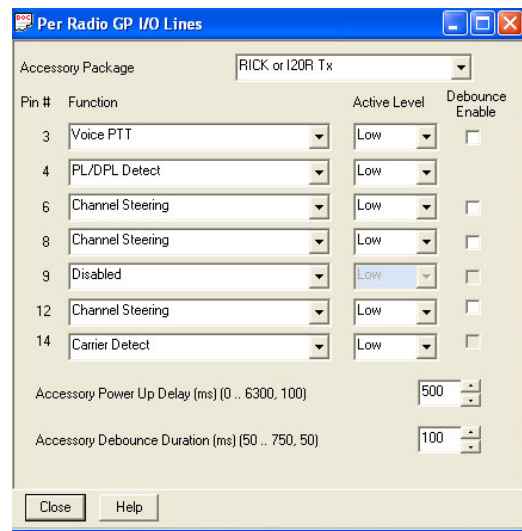


From The Miscellaneous screen, set the ignition Sense and Ignition Override boxes. This will enable the radio sets to switch on automatically when power is applied. Also set the audio to filtered and squelched

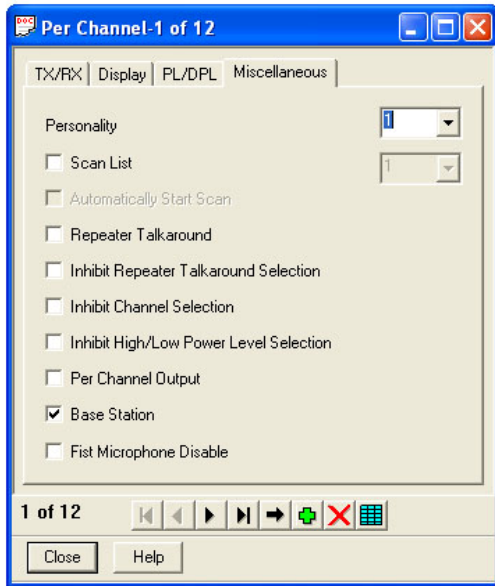


Also in the miscellaneous screen, set the accessory connector mic enable to on, and set the external gain to 36dB. The gain of the external microphone circuit is much lower than the normal microphone input.

The GP IO lines need to be set to match the control boards logic.
 Set Pin 3 to voice PTT (non CBS)/ low
 Pin 4 to PL/DPL detect is using tone/ Low
 Pin 6 Channel steer / low
 Pin 8 Channel steer / low
 Pin 9 Disabled
 Pin 12 Channel steer / low
 Pin 14 Carrier detect / Low

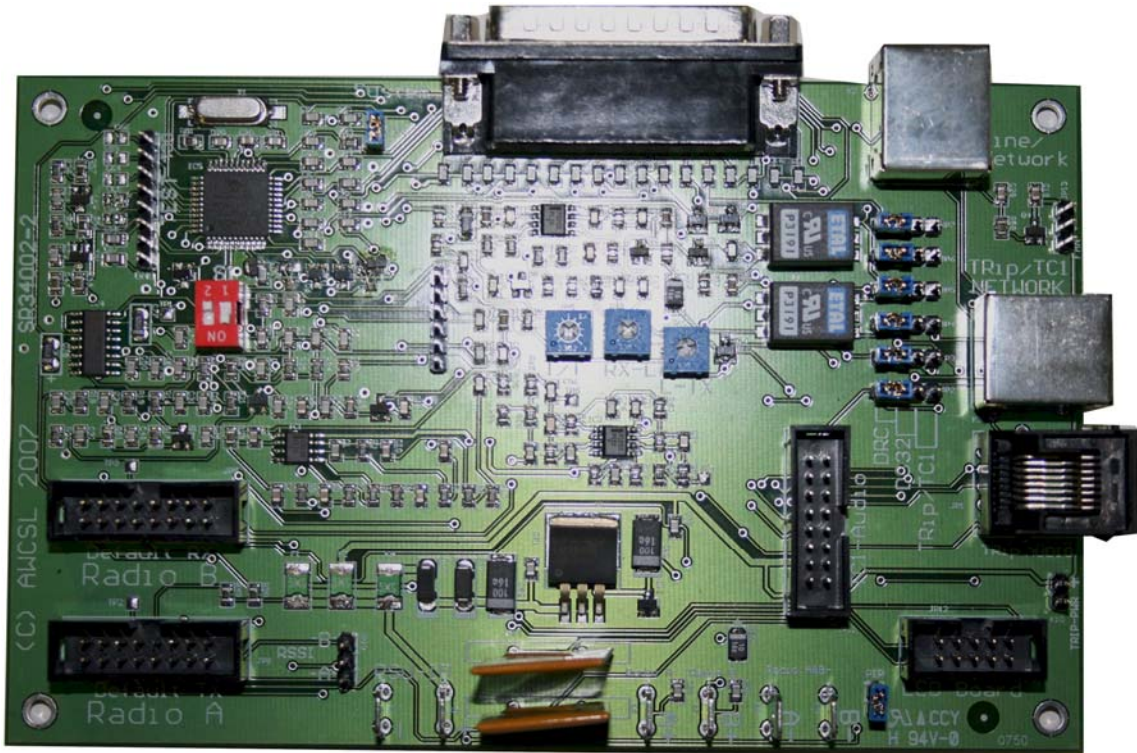


For applications where sub audio is to be injected via the 25 way connector and not generated by the GM3400, then set Pin 3 to voice and data PTT. This enables a second input to the modulation circuit for frequencies below 300Hz.



Finally on a per channel basis, check the Base Station box which will improve the R.F. performance of the radio set.

Series 2 cards



Series two cards are cards with the main number =SR34002-x

The control card is depicted above. In the centre of the card can be found three potentiometers which are used to set audio levels to and from line, and repeater deviation.

RV2, RX-L sets the line level which results from received audio.

RV3, TXD-L sets the TX deviation resulting from line input

RV4, TT-D sets the Talk-Through deviation.

The control card has been factory preset to use -10dBm line levels. Follow the following procedure when you have fitted and programmed the radio sets.

1, Set line configuration jumpers for DRC operation.

Set mode switches for single radio set operating mode

Switch on unit

Using an RF test set, with the modulation analysis set for audio in the 300hz to 3Khz bandwidth to exclude the PL content of the modulation:-

Inject an RF signal into receiver "A" at full system deviation and set RX-L to give -10dBm into a 600Ω terminated line level meter connected across the RX lines, see table below for connections.

[Note. RF test set deviation audio filters need to be set to 300Hz HP & 3Khz LP to exclude PL tone in measurement.](#)

2, Connect transmitter test set to radio "A"

Inject 1Khz audio at -20dBm into the TX lines and key the transmitter. Set TXD-L to give a deviation of 750hz. As measured on the test set

3. If using Talk Through

Switch off unit.

Set mode switches for 2 set line control option.

Switch on unit.

Connect RF signal generator to radio "B" and TX test set to radio "A"

Inject a signal into the receiver at 1Khz deviation, enable talk through on the front panel and set TT-D for 1Khz deviation in the transmitter.

Connection Tables.

The lines onto which go and return line audio are presented to the outside world change which the Accessory jumper links found on the right hand side of the board. These links force compatibility with our range of desk-top controller and switches, The table below gives the correct pin-out when the jumpers are in the **DRC** position, **as seen by the DRC-1.**

Rear Line Connector

Pin Number	Signal	Notes
1	Line input 0	600Ω balanced
2	Line input 1	600Ω balanced
3	Line output 0	600Ω balanced
4	TX data	Not used in this application
5	Tx data	Not used in this application
6	Line output 1	600Ω balanced
7	PTT	Active Low
8	Ground	

25 Way Rear Panel

Pin Number	Signal	Notes
1	Line output 1	600Ω balanced
2	Line input 2	600Ω balanced
3	PTT radio A	Active Low
4	TT enable	Active I Low
5	AUX	Not Used
6	Channel select 1	Active Low
7	Channel select 2	Active Low
8	Channel select 3	Active Low
12		
13	12v 500mA	Fused 500mA
14	Line output 2	600Ω balanced
15	Line input 1	600Ω balanced
16	Squelch state B set	Open Collector-active low
17	RSSI	
19	CTCSS input	
20	Squelch state A set	Open Collector-active low
22	RX audio	Low level unbalanced
25	Ground	

Internal System Connector

Pin Number	Signal	Notes
1	Channel Select 1	Active Low
2	RX audio	Low level
3	Channel Select 2	Active Low
4	12v +	500mA fused
5	Channel Select 3	Active Low
6	Line input 0	600Ω balanced
7	AUX	Active low
8	Line output 0	600Ω balanced
9	PTT A	Active Low
10	Line output 1	600Ω balanced
11	RSSI	
12	Line input 1	600Ω balanced
13	TT enable	Active low
14	Squelch state A set	Active low
15	Ground	
16	Squelch state B set	Active Low

Jumpers.

On the left hand side bottom of the PCB will be found jumper JP10 also marked as RSSI. This jumper enables the RSSI signal from either radio set A (single set mode of operation), or radio set B (two set operation), to be routed to the outside world if required.

Top right of the uP can be found the Pip On Busy jumper. See POB earlier in this text.

On the right hand side of the board can be found a row of six, four way jumpers. These are used to set the audio and PTT routing when the base station module is to be directly connected to one of our desktop controllers or switches.

Setting the jumpers to the extreme left hand position (marked DRC) provides plug and play compatibility with our DRC1 desktop controller. The centre position is used to set compatibility with our system switch DS32.

The extreme right hand position is used to set compatibility for line control and a TC1 card is fitted, or, network control and a TRIP card is fitted.

Both of the above cards will be supplied with an extra lead which will plug into the 16 way Control header located near to the jumpers.

Other Notes.

Line control of the radio sets is only permitted in modes 2 and 4. It should be noted that when it mode 2 and TT is enabled and operating, a line control signal will take priority and TT audio will be lost for the duration of the control message. TT audio will be re-enabled when line PTT is dropped.

Type Of Talk-Through

DRC1 desk top units and the remote TC1 unit are capable of 2 different types of talk-through control. When using the SR3400 with either unit, care should be taken when choosing the talk-through type on the DRC1/TC1.

The three basic types of talk-through are:-

- 1, Where the SR3400 receive audio is applied to the transmitter together with a PTT key.
- 2, Where receive audio is sent down the line to the DRC1 and returned up the line with a PTT key tone.
- 3, Where line fail talk-through is selected and audio is turned around within the TC1.

In mode 2 (2 set line control) the SR3400 will apply receive audio to it own transmitter when the TT line is at logic 0. The TT line may be held low by the connected control device (TC1), or by the SR3400 front panel TT push-button switch. In either case the control device should not process TT audio.

If line-fail TT is required, then the SR3400 front panel TT push-button should not be operated. The control system should be set to use M80 supervisory signaling and line proving enabled. Upon failure of the line, the TC1 will provide the TT function by turning the receive audio around and applying a PTT key, and not the TT key.

Motorola Code Plugs.

Sample code plugs for the GM340 radio sets used in the SR3400 can be found on our website. These are labeled Radio Set A and Radio Set B. the end user should set the frequency and transmitter power levels required in the application.

Document Number	Issue	Notes
SR34002-2	01	none
Joe Bell	Jan	08