Robot upgrade EPROM V4.6 with HQ mode, Instructions supplement

New features.

1) Introduction of two new **H**igh **Q**uality (sharper pictures) modes - HQ 1 (90 Sec.) for normal use and HQ 2 (112 Sec.), for use when conditions are noisy.
2) Support for 256 line save and load - third party software required.
3) Automatic power up in Martin 1 - single key press to Scottie 1 and HQ.

Installation.

The V4.6 EPROM is installed in exactly the same way as the earlier V4.0, V4,2 and V4.2A EPROM's. Note:- the V4.6 EPROM is not a direct replacement for the V4.1, V4.3 and V4.3A EPROM's unless the EPROM socket connections are restored to the original Robot configuration.

Please observe correct handling procedure for ESD devices as the EPROM is easily damaged by static electricity.

WARNING - if the V4.6 EPROM is reversed in the socket it will be destroyed the moment that the 1200C is powered up !!!!

Operation.

When the 1200C is powered up it will be automatically set to the Martin 1 mode, to select the **HQ** mode simply press the **"Output Select Color Bars"** key (top row, extreme right), press the key once again to return to Martin 1. Note:- HQ mode should only be selected when Martin mode has been selected first, all other modes and functions are as described in the V4.0, V4.2 and V4.2A instructions.

HQ mode speed selection.

To select the HQ modes with the receive picture **sharpening enabled** (preferred), press the **S24/36** key to select **HQ 1** (90 Sec.), press the **S36/72** key, to select **HQ 2** (112 Sec.), for use when conditions are noisy.

To select the HQ modes with the receive picture **sharpening disabled** , press the **S8/12** key to select **HQ 1** (90 Sec.), press the **S12/24** key, to select **HQ 2** (112 Sec.). Note:- disable sharpening under noisy reception conditions.

Note:- the picture sharpening has no effect on the transmitted picture. Automatic start from VIS, or automatic mode selection will switch to the correct speed (HQ 1 or HQ 2) but will not change the sharpening on/off.

When receiving the HQ modes, reception may be **terminated** by pressing "**Standby**" which is the **only** active key during HQ receive.

Automatic mode selection.

The new HQ mode is fully supported by the automatic mode select feature which will correctly select either HQ 1 or HQ 2.

Note:- to avoid false reception starts, it is best, not to leave the automatic mode selection running whilst noise or speech is being received.

EPROM V4.2A OPERATING INSTRUCTIONS (SUPPLEMENT TO V4.0)

Introduction:-

1.0) The V4.2A EPROM is an upgrade to V4.0 and must be installed as described in the V4.0 instructions.

The new features are as follows:-

1.1) The DX mode, for long distance working, is now included.
1.2) The Wraase SC-2 high resolution modes, have been added.
1.3) An oscilloscope tuning aid, with four calibrated sweep speeds and frequency calibration lines at 1.2KHz, 1.5KHz, 1.9KHz and 2.3KHz.
1.4) Alignment test tone generator with choice of ten useful frequencies including 1200Hz.
1.5) Automatic speed selection facility without relying on the VIS code.
1.6) A much improved sync lock up system for all Synchronous (Free Run) New modes including the SC-2 modes, eliminating colour shifted images.

Automatic speed selection:-

2.0) If the VIS code was received incorrectly or when receiving SSTV from a station not using a VIS code, it is now possible to automatically set the 1200c to the correct line rate.
2.1) This is done by pressing the **"Receive"** key when in automatic (Standby LED flashing), this will cause the receive LED to flash every time a line sync pulse is correctly received. After two, or more under noisy conditions, similar sync pulses have been received consecutively, the 1200c will automatically switch to the correct speed and start receiving.
2.2) The more popular colour modes will be completely selected, but some other modes may require the resolution (120/128 lines or 240/256 lines) and colour/monochrome to be selected manually if not already set correctly for the mode currently being received.
2.3) If unsure about the mode being received it is best to preselect the Robot 72Sec. colour mode before activating the automatic speed select mode.
The automatic mode will detect all SSTV mode speeds except for the AVT modes and the SC-2 60Sec. mode, when in doubt use the built in SCOPE facility which is available from the **"SPECIAL FUNCTIONS MENU"**, see section 5.0.
2.4) When the automatic speed selection has been selected only two front panel keys are active. Pressing "Receive" again starts reception in the currently selected mode, pressing the "Standby" key will abort the automatic mode. A VIS code will also be recognised and start the 1200c as normal.
Note:- If left in the automatic mode, receiving noise or speech, the 1200c will probably startup eventually when the noise simulates a particular mode.

Selecting the DX mode:-

3.0) The **"DX"** mode is selected/deselected from within the "S" modes, by pressing the **"Output select Colour Bars"** key, and all colour LED's will flash.
The "DX" mode must be pre-selected before a VIS signal will be recognised to automatically start reception in the "DX" mode. This is because the "DX" mode shares the same VIS code with the "AVT 188Sec." mode which will automatically be selected if any mode other than "DX" is currently selected. However, the automatic speed selection function described in section 2.1 will completely select the "DX" mode irrespective of the currently selected mode.

3.1) The "Martin", "S" and "DX" modes are all synchronous modes and use a special startup system to allow them to free run once line sync has been established. Note: Use **"Input Tape"** for non-synchronous operation.

3.2) Either manual or automatic selection of the new synchronous modes will cause the sync search mode to be started which is indicated by the receive LED flashing in response to every line sync pulse received. Only lines having a valid line sync pulse will be written to the screen during phasing.

Once line sync has been established, normally within one or two lines but longer under noisy conditions, the receive LED will stay on, and the received picture written continuously to the screen. Once in this condition, reception will continue until the bottom of the screen is reached and then stop.

3.3) If the SSTV signal stops early, it is necessary to reset the unit back to standby before another picture can be received. If necessary the unit can be re-synchronised by pressing the "Memory Composite" key which will reset to the top of the frame and put the unit back into the sync search mode.

3.4) Whilst in the sync search mode the unit will respond to any valid VIS received, so it is possible to leave the unit running in this mode whilst waiting for a signal so that reception will be initiated by either a VIS or a signal from a station using a system not using VIS.

Selecting the SC-2 modes:-

4.0) The **"SC-2"** modes are selected/deselected, from the SC-1 mode by pressing the **"Output Select Colour Bars"** key. The Red and Blue LED's will be on and the Green LED will be off indicating the SC-2 colour mode is operating.

4.1) The SC-2 speeds are as follows:-

S36/72 = 180Sec., S24/36 = 120Sec., S12/24 = 60Sec. and **S8/12 = 30Sec.**

4.2) To add the special grey scale/colour bars at the top of frame, press the already selected speed key twice.

4.3) Under adverse conditions of heavy interference, or especially bad phase distortion, it is possible to get pictures with a slight horizontal colour mis-registration. This problem is inherent in the SC-2 mode itself, except for the 180Sec. speed, but the problem can normally be cured by just pressing the "Memory Composite" key until perfect registration is established.

Oscilloscope selection:-

5.0) The **"OSCILLOSCOPE MENU"**, Available from the **"SPECIAL FUNCTIONS MENU"**, allows an SSTV signal to be accurately tuned even if the station has not previously been heard on speech.

5.1) The receiver should be tuned until the video part of the signal is between the calibration lines of 1.5KHz (black) and 2.3KHz (white) the sync pulses should extend down to 1.2KHz. When conditions are very noisy the display will more difficult to interpret but changing the scan speed to match the expected mode will help as the scope will trigger on the 1.2KHz sync signal when correctly tuned so that the sync will appear at the "0" calibration point on the time scale.

5.2) The default "interpolated" display will give a clearer display but the non-interpolated display has a faster refresh rate. The scope display can be stored and used to send back to the station being received if required.

Alignment tone generator:-

6.0) The **"ALIGNMENT TONES MENU"**, is selected from the **"SPECIAL FUNCTIONS MENU"**, and allows ten different useful tones (on when selected) which can, in conjunction with the Scope used by the receiving station, be used to obtain perfect alignment between SSTV stations.

6.1 The 1200Hz frequency is probably best used for alignment purposes as it establishes the correct sync frequency.

OPERATING INSTRUCTIONS FOR ROBOT 1200C EPROM V4.0 (AVT MODE)

1) Installation:-

The new EPROM should be installed at U66 in place of the existing EPROM, taking care to observe handling procedures for static sensitive devices. The arrow on the EPROM should point away from the edge of the PCB. It is also necessary to swap over the position of link J5 (this is just next to the circle marked "BR1"), the link should now be in the position closest to the edge of the main PCB.

The oscillator should be installed by removing U71 on the main PCB, and plugging the oscillator module into the vacant socket. The oscillator module should extend towards the rear of the 1200c from the U71 socket. The removed IC should now be inserted into the empty socket on the oscillator module, keeping the orientation the same as when the IC was plugged in directly, as a check the notch on the package should be at the same end as all other IC's on the board.

Some 1200'c, unfortunately, have U71 soldered directly into the PCB, in this case it will be necessary to remove the IC and fit a 14 pin socket. If the removed IC pins are cleaned it should be usable.

When powered up the 1200c should, after a short pause, display a test card with your callsign placed in a box at the top of the screen.

Adjust the monitor so that the 'B' on the black square of the grey scale and a 'W' in the white square are both just visible. This will only be possible on high quality monitors, as it sets a very exacting standard. Subdued lighting is most likely to give satisfactory results.

2) Operation:-

2.1) **AVT modes,** are selected/deselected by pressing the **"Output select Colour Bars"**. The screen will display speed and mode when the AVT system is in operation.

The speed is selected using the normal Robot speed keys, the corresponding AVT speed being indicated at the top of the screen.

To toggle the **"Narrow"** mode press the **"Memory Composite"** key and when monochrome is selected press the selected "Colour Memory" key.

Note:- that in monochrome only the 125Sec. speed is available (AVT standard), if the speed keys are pressed they will change to indicate the speed that will be selected when returning to colour.

To toggle the **"QRM"** mode press the already selected **"Output Select"** key (probably "Voice")

The AVT mode is only selected from Robot mode, selecting any other mode will override AVT but the LED on "Output colour bars" will remain lit. This allows rapid switching from any of the other modes to either AVT or Robot depending on the state of the AVT indicating LED.

2.2) **Receiving** AVT mode can be either automatic (the preferred method) or manual. When using the automatic mode, as indicated by the "Standby" LED flashing, the correct speed and mode of operation will normally be selected by reception of one of the three VIS signals, which is followed by a 5 second header, before the picture starts.

However, if conditions are poor or there is QRM present, causing all three VIS signals to be missed, it is still possible to receive the AVT picture correctly. To do this simply push the "Receive" key once to push the 1200C into receive, picture reception should then start as soon as the digital header (sounds similar to RTTY) has finished. If the picture fails to start, you must press the "receive" key again to manually start reception, but now it will be necessary to shift the picture to the correct position on the screen and to correct the colour sequence.

This is achieved by using the "Green" key to toggle the colour sequence to give the correct colours over the largest complete area of picture. Now, the picture can be shifted either left or right by pressing "Red" or "Blue" respectively, as many times as necessary.

When conditions are poor it is better to preselect the AVT mode being received, if possible, as the AVT header only contains limited information about the following picture and will not select/deselect either "QRM" or "Narrow" and does not distinguish between 94Sec. and 188Sec.

If you have missed both the VIS signals and the digital header you should use manual receive (Standby LED not flashing) which will go immediately to receive, allowing you to change speed as well as set up the picture phasing as described above.

To avoid problems with AVT mode manual reception, the "quad receive" mode has been omitted from the AVT mode only.

2.3) **Transmitting** in **AVT** mode is the same as for other modes, but it is necessary to carefully select the correct mode and speed before pressing "Transmit", as there is a 5 second lockout, while the digital header is being sent, before it is possible to abort the transmission by pressing the front panel "Standby" key (but not via computer).

There is no continuous transmit function in AVT so repeatedly pressing "transmit" will have no effect.

The displayed picture will show only the part of the picture that will be sent in the particular AVT speed selected, this should be considered when composing pictures for transmission in AVT mode.

2.4) **SC-1** modes are selected/deselected, from Robot mode, (the condition at power up) by pressing the already selected speed key.

The three colour LED's will flash alternately at line rate indicating that SC-1 colour mode is operating.

When in SC-1 mode the Robot speeds, change as follows:- 8/12 = 24 sec. 128 line colour, 8 sec. monochrome. 12/24 = 48 sec. 128 line quasi colour, 16 sec. monochrome. 24/36 = 48 sec. 256 normal colour, 16 sec. monochrome. 36/72 = 96 sec. 256 line quasi colour, 32 sec. monochrome. Monochrome is selected by pressing either "Red", "Green" or "Blue" memory keys.

A 16 level narrow grey scale can be added to the top of any SC-1 format picture by pressing "Output Select Colour Bars" twice.

2.5) To select **New Modes**, simply press the already selected "Input select" key, (LED on) once, all three colour memory LED's should glow, and flicker occasionally if an input signal is present.

To return to the Robot modes just repeat above procedure. To select the alternative New Mode press the currently selected speed key once and it will start to flash to indicate the alternate new mode is selected (press it again to return to standard New Mode). If you were in SC-1 before selecting New Mode then you will go directly into the alternate new mode.

An additional feature, is the ability to re-sync a New Mode picture once it has started (if necessary), just press the colour key, this may be repeated as necessary, but once line sync is achieved no further intervention is required until the next frame.

To add a 16 level grey scale to the top of either New Mode picture just press the "Output Select Colour Bars" key twice.

2.6) **Fax receive** is selected when either of the New Modes are active by pressing the "Red" colour key.

FAX speeds are as follows:- **S8/12 = 240rpm, S12/24 = 120 rpm, S24/36 = 90rpm** and **S36/72 = 60rpm.** The most popular speed is 120rpm and is used by most amateur Fax.

FAX reception will initially be in **Low resolution of 256x256** pixels, but by pressing **"Receive"** a second time, the **High resolution 1024x768** pixels will be selected with the picture now using all the display memory.

You can scan horizontally through the four display memories while receiving FAX, using the two "Page" memory keys, but it is necessary to wait till the end of reception to scan vertically using the three colour memory keys. The monitor display becomes a movable window into the high resolution FAX image displaying one twelth of the image at a time.

Phasing of a FAX transmission is possible during reception (preferably in the Low Resolution mode), by pressing the "Computer" key to shift the picture left, and the "Printer" key to shift right.

Note:- the "Computer" and "Printer" keys only provide phasing during FAX reception, otherwise they have their normal functions.

Phasing will be maintained provided that reception is not interrupted by pressing the "Standby" key until end of transmission.

3) **New memory selection:-**

To switch over to one of the other high resolution memories (see "Hardware Modifications for Four High Resolution Frames"), from the power up memory, press either "Page 1" or "Page 2" keys. In the high resolution mode (both Page 1 and Page 2 LED's on), pressing "Page 1" will cause the active memory to increment from memory 1 to memory 2 and pressing again will increment to memory 3 then memory 4 and then finally back to 1. Pressing "Page 2" will have a similar effect but this time the displayed memory will be decrement.

When in low resolution (only Page 1 or Page 2 LED on), there are eight memories available, four are selected by pressing "Page 1" and the other four by pressing "Page 2". Note:- initially the extra memories will have some kind of pattern depending on the type of IC used.

4) <u>Graphics operation:-</u>

Graphics are selected by pressing **"Input Select Colour Bars"**, which will now cause a Menu to be displayed (representing the 1200c front panel), pressing any key not on the Menu will just write colour bars to the screen, and return to normal operation.

Text screens can be produced by choosing "CHARACTER GENERATOR" which allows the default screen to be edited, or erased and a new text screen created. The Character Generator is fully menu driven, and will soon be mastered, with a little practice.

The text display screen can display 8 characters/line and 8 lines but only the first 6 lines (or 3 if large characters are selected), will be display, except when writing to the screen in SC-1 mode where the text format is 8x8 (8x4, large characters) on a square format as appropriate to the SC-1 mode, but the smaller square format text can also be used for other SSTV modes, providing the SC-1 mode is selected at the time of writing the prepared text to the screen.

To finish an editing session, press QUIT, which will clear the screen and display the text just created, if necessary the "CHARACTER GENERATOR" can be selected again for further editing.

Once a text screen has been created it can be written onto any displayed image, at any time by simply pressing the "Display Memory" key. The text message will remain in memory while the 1200C is powered up, but may also be down loaded from an external computer and edited if necessary.

The LED panel status indicators are not relevant when in the Graphic modes, they simply indicate the current status the 1200C, has been left in, and will return to when leaving the Graphics mode.

ROBOT 1200C HARDWARE MODIFICATIONS FOR FOUR HIGH RESOLUTION FRAMES

The following hardware changes must be made before the new V2.2 EPROM for the Robot 1200C can be used to select four high resolution frames.

As this modification requires some fairly extensive changes to the main PCB, it should NOT be attempted by anyone, without some previous experience of working on complex digital boards.

Before starting work, note the following points:- the IC's used in the 1200C are liable to damage from static discharges so observe handling precautions (see EPROM installation instructions). All the IC's are orientated in the same direction, so ensure that all replaced or added IC's have the notch at the end of the package, facing in the same directions as all other IC's - see layout diagrams in Instruction Book.

WARNING !! Check all work before applying power to the Robot 1200C as no responcibility can be accepted for any loss or damage caused.

1) First completely disconnect the 1200C and take off the top cover by removing the six fixing screws (three each side).

2) To gain access to the main PCB remove the small analogue board by carefully pulling off connectors E and F, then lifting the PCB off the four mounting posts.

3) Next, the main PCB must be removed, to do this, first pull off the keyboard connector (A) and the power supply connector (B), noting their orientation. Next unscrew the retaining posts holding the "D type" connectors to the rear panel. This will allow the main PCB to be lifted off its four mounting posts and removed from the 1200C chassis.

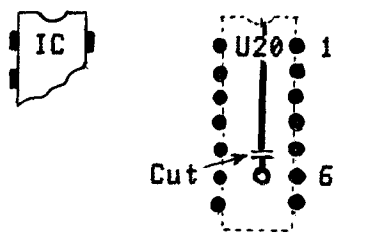
4) Remove all eighteen 64k DRAM'S U7 to U12, U26 to U31 and U42 to U47, and store in antistatic foam (or aluminium cooking foil).

5) Solder in a 14 pin socket in the vacant U25 position.

6) Only one track needs to be cut, it is the connection between Pin 6 on U20 and Pin 3 on U4. This can conveniently be done by cutting the track, under U20, at the plated through hole adjacent to pin 6 on U20.

7) Using thin hookup wire (wire wrap wire is ideal), make the following new connections:-

		Tick when completed.
a)	From Pin 8 on U22 to Pin 3 on U68	( )
b)	From Pin 6 on U68 to Pin 2 on U69	( )
c)	From Pin 3 on U55 to Pin 1 on U69	( )
d)	From Pin 13 on U69 to Pin 7 on U69	( )
e)	From Pin 12 on U69 to Pin 13 on U1	( )
f)	From Pin 6 on U20 to Pin 12 on U1	( )
g)	From Pin 11 on U1 to Pin 3 on U4	( )
h)	From Pin 4 on U68 to Pin 14 on U68	( )
i)	From Pin 5 on U68 to Pin 14 on U69	( )



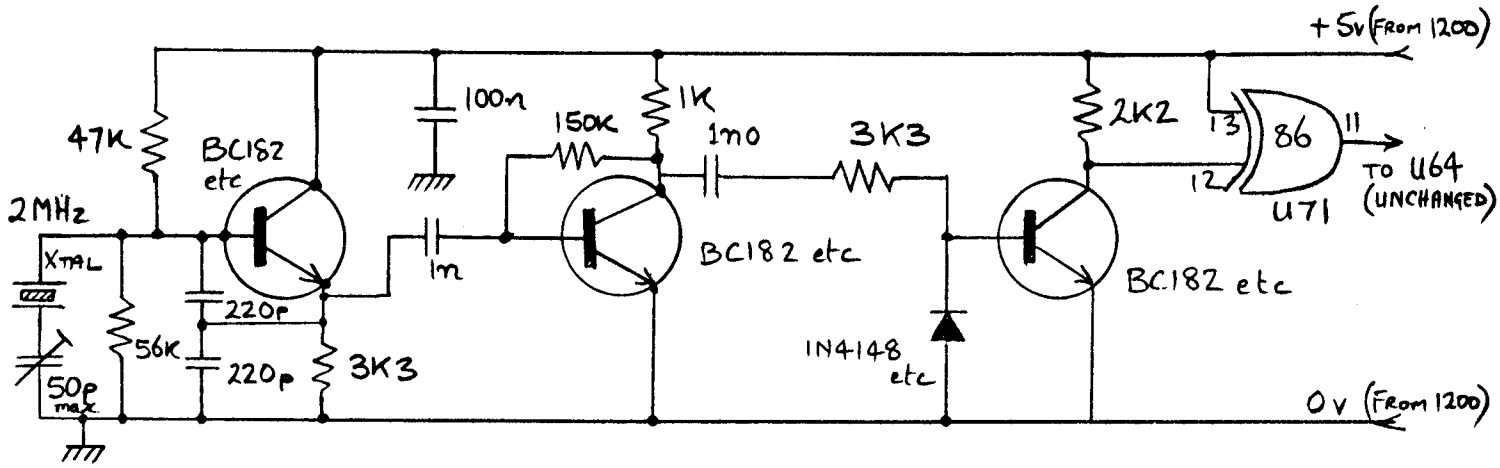
8) Plug a 74LS125 into the new socket at location U25, and eighteen 256k 150ns DRAM's, into the empty sockets at U7 to U12, U26 to U31 and U42 to U47.

9) Exchange the EPROM at U66 for the new supplied R1200C V2.2 EPROM.

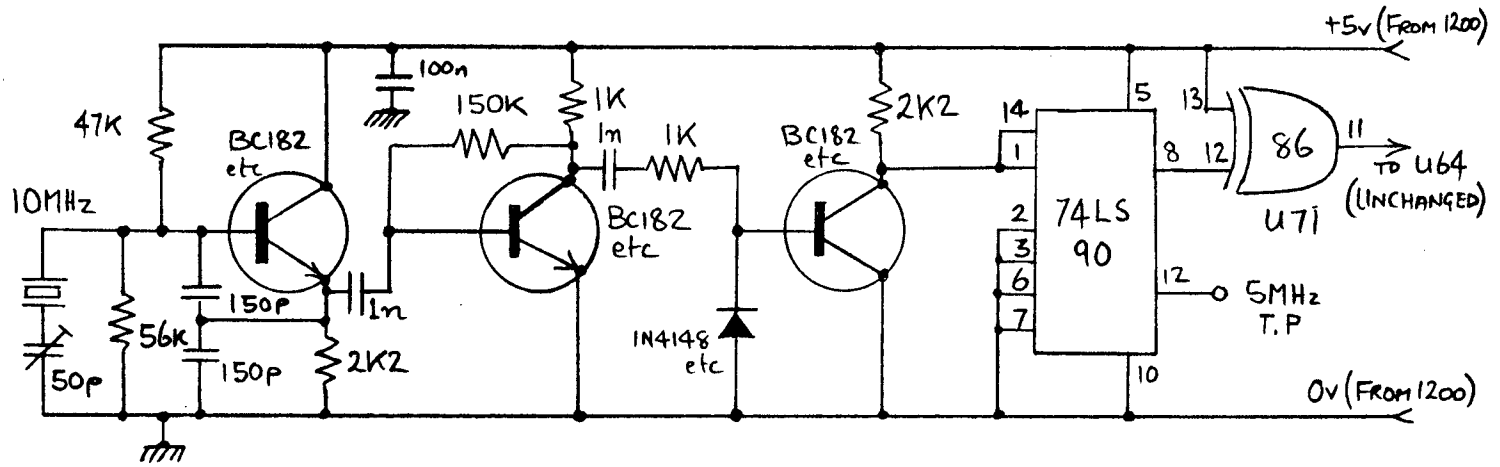
10) Replace the main PCB, followed by the small analogue PCB, and reconnect all removed connectors. Finally replace the top cover.

SUITABLE 2MHz OSCILLATORS FOR G3OQD "NEW MODE"

2MHz CRYSTAL OSCILLATOR (TYPE I)



10MHz CRYSTAL OSCILLATOR (TYPE II)



8MHz TCXO OSCILLATOR (TYPE III)