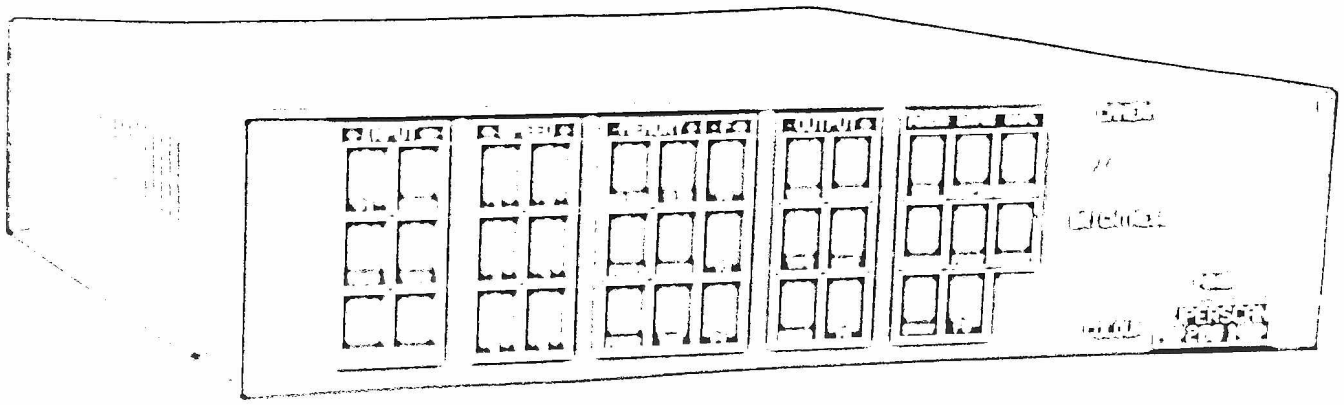
SUPERSCAN 2001



' The ultimate in
stand alone
colour
Slow Scan
TV converters '

JAD BASHOUR 55 Brampton Road London N15 3SX ENGLAND

MARCH 1994
02

SUPERSCAN 2001

JAD BASHOUR, 55 BRAMPTON ROAD, LONDON N15 3SX
TEL. (44) 081 889 0486 - FAX. (44) 081 809 3911
26th March 1995

Mr. John McCulloch (VK7CCC)
UNDP PO Box 1165
Jeddah 21431
Saudi Arabia

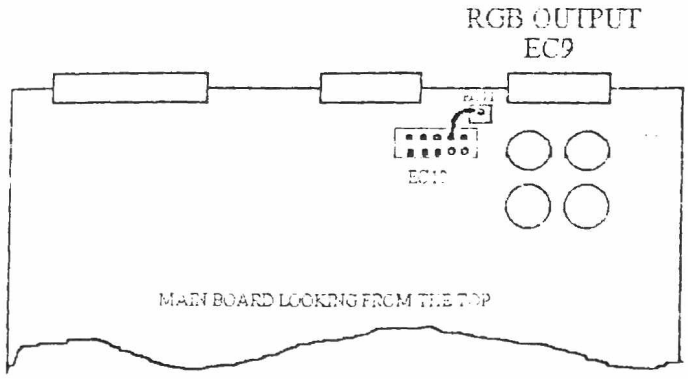
Dear John.
Thank you for your order and the cheque. I am sorry I can't meet you during your holiday in England as I have to be away for the next four to six weeks. I hope you are having a good time any way. Enclosed in this package are the following items.

1 - RGB encoder weird and ready for use.....
2 - Spare 9 pin D_type plug and holder for making a lead .....
3 - Battery backup kit (Battery and Static RAM).....
4 - Interface Board and lead. .....
5 - Atari Mouse.....

A copy of GEST .....

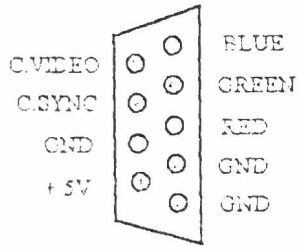
- The encoder is ready to use, I have connected the power supply wire to the flying 9 pin D_type which should be plugged in the SS2001 RGB output. the Power supply to the encode can come from the SS2001 If you solder a link to the main board as shown below , other wise cut this wire from the

flying 9pin D-type and connect to a separate power supply . I must be well regulated and capable of supplying about 100 mA.



The shown pin in EC10 has +5V on it . By connecting it to EC11 which is a via leading to a normally spare pin on the RGB connector EC9 as documented in the manual.

The output from the encoder is a 9pin D_type it carries the following signals:



Output connector configuration

To take composite Video out, use pins 9 and 7 . For RGB if required in the same time, use pins 1,2,3,4,5 & 8 .

- For the Battery Backup, Replace the Static Ram IC 79 near the Battery position with the supplied one and solder the battery in . The Battery needs about 5to 6 hours of normal operation to charge up.

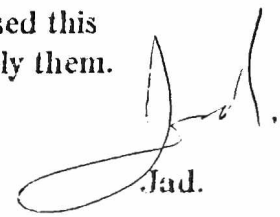
- The interface is ready to plug in any PC or clone .

- GEST is a program which allows you to do quiet a few things including saving of snatched frames and re- displaying them . It is very touchy and it locks the machine very often. when this happen you need to re-boot. to run this program you need to have the complete system, computer with interface plugged in and the SS2001 connected.

copy all files to a directory on the Hard disk call it GEST say . Once done type GEST m cr. It should be on its way. There are some sample programs on the disk . Even though you are running it from the Hard disk It saves and loads from the floppy, I think you can modify that any way.

Once you get the correct EPROM version from Martin, You would need to have some information on how to use the mouse, I have enclosed this information in this package for you because he might not supply them.

Good SSTV and all the best.



Jad.

SUPERSCAN 2001

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SUPERSCAN 2001

GENERAL INFORMATION

&

SPECIFICATION

SUPERSCAN 2001

INTRODUCTION

(SSTV)

SUPERSCAN 2001 is a Slow scan Television **(SSTV)** converter and image processor.

It transmits or receives high quality still colour images over any voice grade communication link such as radio or telephone lines.

The system captures colour or monochrome images from a suitable video camera, it is also capable of storing and retrieving to and from a standard audio cassette recorder or a suitable host computer where image processing is possible.

The system is built around a microprocessor with large memory support that gives it unique flexibility as a self contained system. All current SSTV transmission modes are accommodated by use of specially developed state of the art software.

It will digitise an image from a camera instantly, in **PAL** or **NTSC.** Transmission of a monochrome picture is possible within 8 seconds and a colour picture from 12 seconds to 4 minutes depending on the resolution and mode selected.

The **SUPERSCAN 2001** is operated three ways, by the front panel, by a mouse via the integral mouse interface or by an external computer such as an IBM **PC** or compatibles with a suitable interface card .This allows the use of commercially available software programs such as **GEST** and **HIRES** for video processing.

This system is primarily designed for radio amateurs but it could be used in many other applications such as security or medical systems, distant visual contact for social occasions or in any other situation where a good quality colour picture is needed at the time .

The minimum system required to establish a visual contact between two points is a **SUPERSCAN 2001**, a video camera, a colour monitor at each end and a voice grade communication link.

Figure 1.1 and 1.2 show possible configurations of the system.

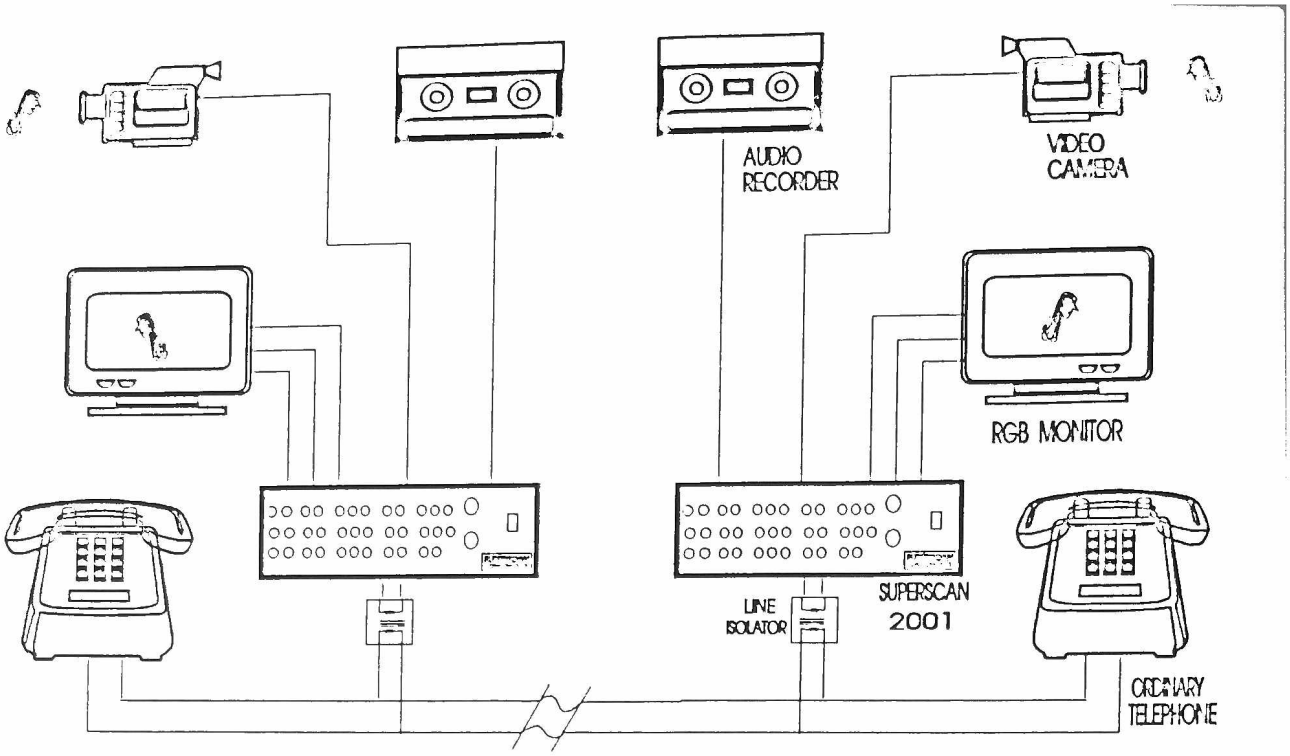


FIG. 1.1 SSTV VIA TELEPHONE LINK

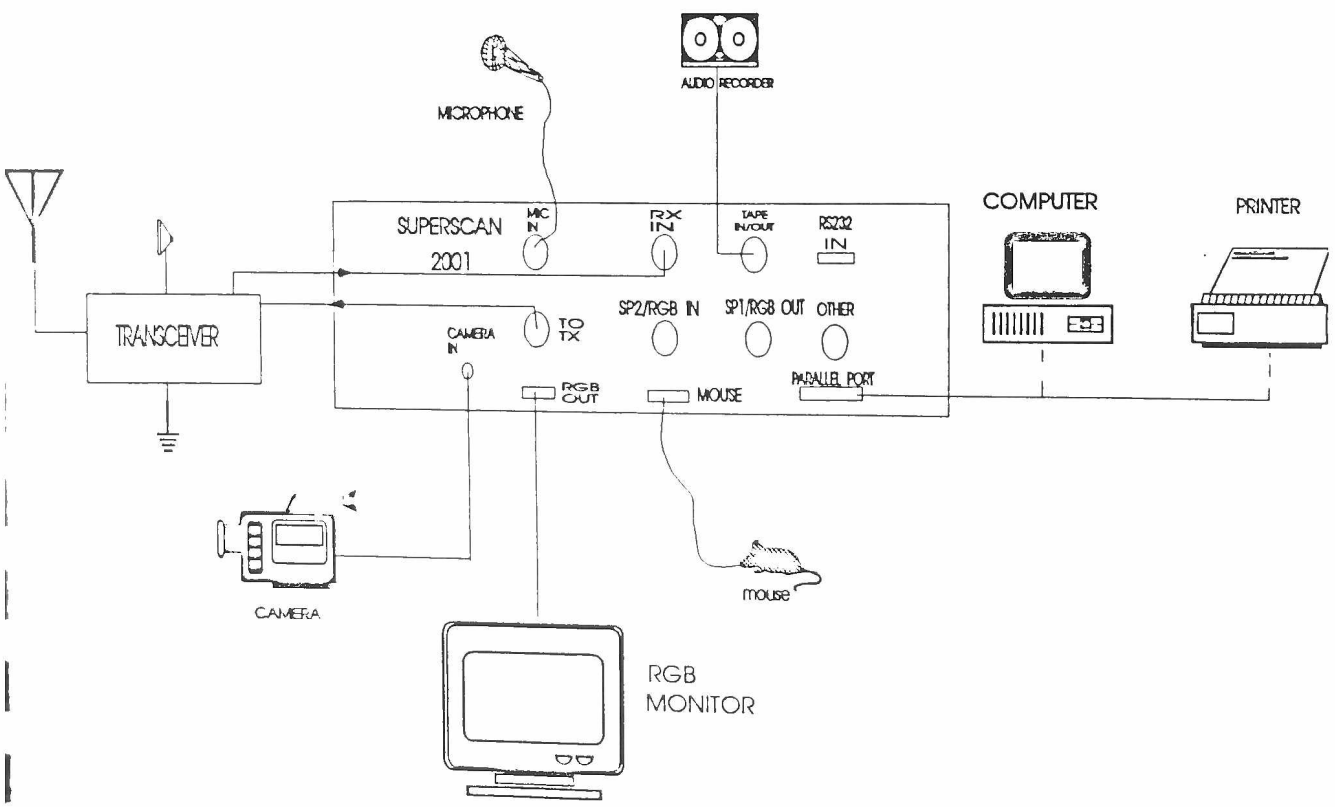


FIG. 1.2 SSTV VIA RADIO LINK

SYSTEM FEATURES

The **SUPERSCAN 2001** is a state of the art SSTV scan converter which is available NOW as a kit, offering the constructor a no compromise design at a fraction of the cost of a similar in performance system. The **SUPERSCAN 2001** has the following exciting features.

1 -Compatibility with all current SSTV systems and modes including FAX, with a specially developed EPROM with software by Martin Emmerson G3OQD.

2 -Four high resolution (256 x 256 pixel) colour displays each capable of displaying 262,144 different colours.

3 -Full PAL decoder with delay lines, for high quality pictures from a colour camera. NTSC operation also available by links on the camera input PCB. A monochrome camera with colour filters may also be used .

4 -Fast parallel computer (and printer) interface, allowing connection to an external computer for picture storage a graphics generation. Also a 4800 baud RS232 interface is provided.

5 -Standard RGB output for direct connection to 625/525 line analogue input colour monitor.

6 -The **SUPERSCAN 2001** has been designed with upgrade ability in mind and can accept a 1 MBit EPROM, allowing compatibility with any new modes for the foreseeable future, with software updates.

7 -Built-in mouse interface as a standard.

8 -Text overlay feature, without loosing stored picture, to provide on screen help messages.

9 -Battery backup of CMOS RAM to store information, such as text screens and set-up parameters, even when the unit is not powered.

10-The front panel keyboard PCB has positions for adding extra keys should any new modes or features be required in the future.

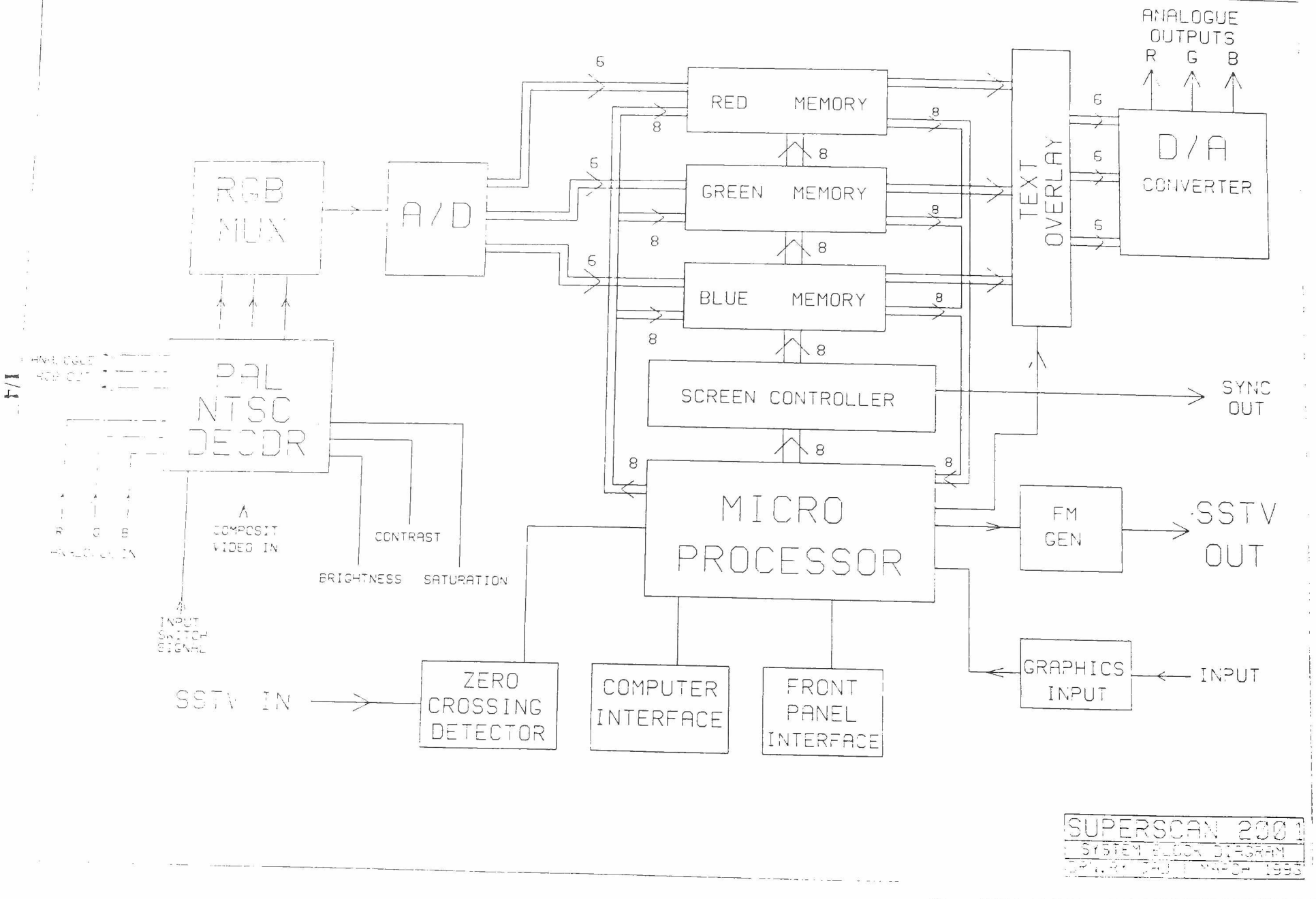
11-As well as standard composite video, the video board accepts external RGB from an external source. It can also provide RGB outputs in order to drive a colour monitor directly.

12-All the components required to build the **SUPERSCAN 2001** are inexpensive and readily available.

13-If the camera input feature is not required, for example, if the **SUPERSCAN 2001** is to be used as a second receive only unit or only to transmit computer loaded images, then, only the main board and the keyboard are required, representing a significant cost saving.

Figure 1.3 shows the system's block diagram

AVAILABILITY: The system is primarily available in kit-form with all the necessary instructions and illustrations to build it. All specialised components are also offered . Built and tested units are also available by special arrangement.


ANALOGUE OUTPUTS
R G B
RED MEMORY
GREEN MEMORY
BLUE MEMORY
TEXT OVERLAY
D/A CONVERTER
RGB MUX
A/D
PAL NTSC DECDR
SCREEN CONTROLLER
SYNC OUT
MICRO PROCESSOR
FM GEN
SSTV OUT
COMPOSIT VIDEO IN
CONTRAST
BRIGHTNESS
SATURATION
INPUT SWITCH SIGNAL
SSTV IN
ZERO CROSSING DETECTOR
COMPUTER INTERFACE
FRONT PANEL INTERFACE
GRAPHICS INPUT
INPUT
SUPERSCAN 2001
SYSTEM BLOCK DIAGRAM

MAIN KIT

Comprises the three essential printed circuit boards , The EPROM and the building instructions.

PCBs: All three PCBs are double sided, plated through holes, solder resist and silk screened. The boards are:

DIGITAL BOARD

285x220mm, contains all the digital and analogue circuits necessary to transmit and receive signals, when controlled from the KEYBOARD. The VIDEO BOARD is not essential for its function if the camera input is not required. The mouse interface is accommodated in this board.

VIDEO BOARD

163x123mm, It interfaces between the camera and the digital board. It takes in a standard composite video signal from a CAMERA, VCR etc. and decodes it to RGB and then converts the decoded RGB into a digital (6bits) signal as required by the digital board. The video board contains a full PAL decoder with LUMA. & CHROMA. delay lines etc. it also operate in NTSC simply by adding a link . The video board is also capable of performing other functions such as driving an RGB monitor directly ,i.e. using a monitor with analogue RGB inputs to display a live VCR picture. The board can also accept an RGB signal at its other input thus allowing switching electronically between composite and RGB inputs allowing insertion of picture in picture , teletext or other video effects.

KEYBOARD

225x64mm, This board manually controls the function of the digital board. it contains 35 tactile push button switches and 35 x 3mm LEDs. designed to accept two types of switches for economy reasons.

EPROM

Specially developed software for the SUPERSCAN 2001 By Martin G3OQD. All EPROMs are personalised with callsign.

ENCLOSURE (CASE)

315x315x73mm, Custom designed case, manufactured ready to use with all the holes. It is made out of aluminium . The shell is finished in grey , the front and back panels are finished in black with all the markings silk screened.

POWER SUPPLY **(FOR SYSTEMS BUILT WITH CMOS ICs ONLY)**

The power supply is of the linear type, designed specially for the SUPERSCAN 2001 with customised mains transformer. Assembled, tested and fitted with an output connector. The specifications are as follows: Mains input range: 120/240 V AC -15%+8% at 22 deg.C ambnt. DC outputs: +5V @ 1.2A, +12V @ 300mA, -12V @ 100 mA.

SYSTEM'S SPECIFICATIONS

AC POWER.

These specifications refer to the linear power supply designed for the system.
Input : 110 / 240 Volts AC +8% - 15 % internally switchable, 50 ~ 60 Hz, about 10 watts
Output: +5 Volts @ 1.2 Amps , + 12 Volts @ 300 mA, - 12 Volts @ 100 mA.

INPUTS.

Camera: Standard composite video 1 Volt peak to peak across 75 Ohm black and white or colour in PAL or NTSC (by links) .

From receiver, Other & tape: Accept SSTV audio signals of between 20 mV and 1 Volt peak to peak at a minimum signal to noise ratio of 6 dB.

Graphics Input: RS 232 control input for serial commands from a compatable keyboard such as the 800C super terminal or a host computer.

Video Display: Image field composed of 61440 pixels in an arrangement of 256 pixels per line and 240/256 lines screen on each of 4 selectable pages at an aspect ratio of 4x3. 262144 colour combination are available.

Parallel I/O port: Input/output for control and data from a host computer , 8 data bits , STROBEB & BUSY. Also it is a port for driving an EPSON & compatable printers. signals are at TTL levels.

OUTPUTS.

RGB Video: RED,GREEN,BLUE video outputs with composit sync on each. Separate vertical and composit syncs with selectable polarity are also available.

SSTV: 20 mV to 1 Volt manualy variable by LEVEL control on rear panel . Nominal 500 mV TO TAPE & OTHER

Parallele I/O: As in the above.

OVERLAY. 63 colour text & graphics picture non_distructive overlay.

DESIGN TECHNOLOGY:

8031 Microprocessor based system. 64 KBytes ROM , 16 KBytes RAM

BRIEF TECHNICAL DESCRIPTION

MAIN BOARD

The main board contain most of the digital functions of the system as well as the analogue filters and I/O multiplexers which makes it a self contained board . This board is capable of transmitting and receiving multiple pictures without the video board. The only requirement is a power supply and one of three control sources such as the system front panel, a mouse or an IBM PC or compatibles with a suitable interface and software.

The system is designed around the **8031** microprocessor (IC69) supported by **8k** or a max. of **32k** bytes of RAM (IC79) and a **32k** or. of **64k** bytes (IC75) of EPROM selected by links L3 and L2 respectively. The EPROM size can be up to **128k bytes (1Mbits)**. This size EPROM fits in the existing 32 pins sockets (no cuts & no straps), all what is required is the link (L2) in the 64k position . Access accomplished paging facility implemented in the hardware.

The processor has 16 address lines, the upper eight A8 to A15 are generated directly by the chip where the lower eight are multiplexed with the DATA . IC72 extracts and latches the lower eight, A0 to A7.

KEYBOARD FUNCTIONS:

The keyboard switches and LED functions are managed by (IC74) **8279** and (IC76) **74145** where the switches and LEDs are strobed sequentially and the current drive to the LEDs are supplied by the transistors (TR5) to (TR10) **BC327** or equivalent.

PARALLEL I/O:

The parallel I/O facility is realised by (IC80) **8255** an 8 bit bi-directional interface, it drives a parallel centronics printer or interfaces with a computer.

SCREEN DISPLAY:

The screen display is handled by (IC1) **HD6845SP**. This IC generates the synchronisation pulses to the monitor as well as reading the RGB memories, (ICs 2 &3) **HCT374** latch on the dynamic address during this operation and during refresh.

Video memory

The (ICs 12,13&14) **HCT374** latch the data to be written into the RAM, And (ICs 7,8 & 9) latch the data during reading, both operations could be instigated either by the controller or by the microprocessor in which case the address will also be generated by the microprocessor and latched on by (ICs 10&11). The microprocessor accesses the RAM during blanking period.

The video data, whether originated from the computer or from the video board during snatching frame, is stored in the RGB RAMs in digital form and converted back to analogue before it leaves the system to be displayed on an analogue RGB monitor. This operation is achieved during the READ operation of the screen controller where all the, RED, GREEN and BLUE, signals are converted simultaneously using a weighted resistor network on each of the colours. Vertical and horizontal syncs are inserted after the conversion using (IC 68) **7407** and D2 through to D7. Each of the outputs is then buffered by an emitter follower transistor (TR1,2&3) **BC337** giving a standard signal amplitude of **1 volt p/p across 75 Ohms load.**

Display of live video

Composite video is decoded to RGB and digitised at 6 bits resolution per colour on the video board. Digitisation is performed at 256 pixels per line , RED and BLUE in one field and GREEN in the next. The converted live video is not stored in the video RAM . The RGB live digital data is fead through (C51) 74HCT244 in a multiplexed fashion to the output latches (ICs 65,66,67). In this case ICs 59,60,61,63 and 64 outputs are in tri-stare condition .The multiplexing signals are generated by (IC62) 74LS399 via RCLK, GCLK and BCLK.

Display of a single colour memory.

When the contents of a single colour RAM is displayed on the screen, (by pressing either of the RED GREEN or BLUE buttons when in memory mode) . The display appears in black and white. The reason for that is the contents of the relevant section of the RAM appears on all three output simultaneously. In this condition IC53 and IC64 are ON shorting all outputs together.

Overlay

The upper two bits of every colour (b6 and b7) are used to store the overlay information. When it is required to store overlay information ,The microprocessor reads the contents of the addressed location (8 bits but only the lower 6 are used) and adds to it the overlay information in the upper two bits and rewrite the 8 bits back in the memory. The overlay information is displayed when all 6 overlay bits are high where the grating combination of ICs 20,24 and 27 enable IC58 and the overlay data is displayed.

INPUTS & OUTPUT SELECTION:

Various inputs and outputs are selected using analogue switches (ICs 83 & 83) **HCT4051** under microprocessor control instigated by either the front panel , mouse or a host computer . IC 82 selects one of three inputs namely **Tape**, **Other** & **Receiver** .

A fourth selection is available called Filter it is intended for future use either an input through an improved or active filter. The selection control is done by the 2 inputs IN0 & IN1 decoded by IC73, **74HCT138.** The selected input is then filtered and amplified by IC36 and TR11 and subsequently pulse shaped by (IC84) 74HCT86 before it is fed to the timer chip IC71 82C54 for detection.

Microphone and modulation outputs are selected by (IC83) **74HCT4051** by the two control lines OUT0 & OUT2 decoded by IC 77. The relay is wired across IC83 so that when the system is switched off the microphone is directed to the transmitter input , this way the microphone will be connected to the transmitter at all times except when transmitting SSTV.

Modulation:

The FM transmission data is initiated by the microprocessor where the value of each pixel is converted by a look-up table into a time duration by the controlling the mode of the timer (IC71) 82C54. The result is a square wave frequency modulated signal, synthesised at the accuracy of the microprocessor crystal frequency and varying between 1200 Hz and 2300 Hz . This output from the timer is then fed to a frequency doubler (IC42) 74HCT86 followed by a pulse stretcher (IC37) 74HCT14 and then IC81 which is a simple square to sine wave converter, it converts the square wave FM SSTV signal to a sine wave and in the same time divides the frequency back so that it lies within the stated range, subsequently filtered and amplified by IC35 before it leaves the system to the transmitter.

RS232 GRAPHICS INPUT:

This is an input from another system for text graphics and control. Transistor TR4 interfaces between the microprocessor and the outside world.

MOUSE INTERFACE:
It is designed to work with any ATARI compatible mouse through a standard 9 pin **D** -type plug. The mouse movement information is coupled to the Data Bus by IC28 **74HCT240** a tri-state octal buffer.

INDIVIDUAL IC FUNCTIONS.

IC70, IC73 Are used for various IC selections

IC77 Is used for I/O selection , memory page selection and RESET.

IC78 Used for RGB memory read and write and EPROM size selection

IC40 Generates the live video line and line fly-back duration.

IC41 Selects live or memory video , internal/external syncs and transmission cursor

IC17 controls the snatch enable and writing the slow scan pixels to the memory

IC26 Is a divider synchronised to the CRT controller blanking signal via the INTHSB.

IC45, IC44 Generates all the timing signals to the dynamic RAM

IC46 Generates fast column address and fast row address for normal display speed Also generates the slow scan inputs timing signals for entering information to the RAM during blanking period.

IC47 Generates MA8 address line No 8 which does the page switching during the column and the row switching conditions giving the option of selecting one of four pages.

THE VIDEO BOARD

The video board can be divided into three functional blocks, the syncs generator (IC1) **TDA2595,** the **PAL/NTSC** decoder (IC2) **TDA3565** and finally the digitiser (IC3) **CA3306.**

The sync generator.
This integrated circuit was originally designed by PHILIPS for Television . It is adapted here to work for the SUPERSCAN 2001 .

The internal functional description of this IC can be found in MULLARD/PHILIPS video ICs publications. It takes in standard composite video or composite sync and produces Horizontal sync, composite sync and above all the super 'Sand Castle'. Unfortunately these syncs are not of the required specifications hence the additional external circuitry.
The super 'Sand Castle' pulse is called so because it has an extra level in the field fly back region, this level is used by the decoder for internal clamping of the video signal and without it does not work.
The extra level in the 'Sand Castle' pulse is generated externally by extracting the Field sync from the composite sync CS using R51,C34,D2,D3 AND R60, basically a low pass filter . The monostable made from TR4 and TR5 triggered by the extracted field pulse present at TP9 produces a new field sync pulse with the required width of about 1.3 mS present at TP7. The new field pulse is inserted in the ordinary Sand castle produced by the IC using D1 and R13.
The width of the line sync is corrected using the naturally generated line sync, which is much wider than what is required, to trigger the monostable made from TR1 and TR2. This monostable produces the required 12 micro seconds width present at TP5. The output from the monostable is fead back to the IC pin2 . The corrected composite sync is then converted to standard TTL level present at TP6 this output is then fed to the main board .

The PAL/NTSC decoder.

The basic function is to convert a standard composite video signal to the RED, GREEN, BLUE outputs.

The standard composite video signal is split into two paths, luminance and chrominance , using the appropriate filtering , R6,L4 and C14 constitute the chroma filter and the combination of R5,R12,C16,L1,DL1,R26 and R29 are the chroma trap and luma delay line. The chroma trap removes the colour contents from the luminance path. The luma delay line is used to compensate for the delay that the chroma signal incurs during processing.

DL2 is the chroma delay line , it delays the colour information for a full line period to allow the IC to work correctly during the PAL decoding operation. This delay line is not required for the NTSC operation.

PAL and NTSC decoding to RGB is a standard operation, the description of which is available in most relevant text books.
R40,R48,R43,R54,R55,R56 and R57 are used for DC levels biasing at all outputs. VR7 is used for black level adjustment. VR2 selects between PAL and NTSC operations by setting the voltage to the correct value, see set-up. External RGB signal could be fed to the IC via SC1 and selected by applying a switching signal to pin 9.

Super VHS signals

High proportion of currently available Camcorders are equipped with luminance and chrominance outputs. Feeding these signals to the SUPERSCAN 2001 instead of the composite video give a distinct advantage in terms of picture quality.
VHS signal could not be applied directly to the decoder, however it is possible to do so with a minor modification to the way the signal is applied.
If the system is already set-up to work with composite video and required to work with VHS either temporarily or permanently , the following is recommended.

1- Lift one side only of C13 , this isolates the chroma input .
2- Lift one end of C16 , this isolate the colour trap.
3- apply the luma part of the VHS to the normal composite video input .
4- apply the chroma signal via a 10 nF capacitor to TP4.

Insure that the composite sync is reaching IC1. If the video board is going to be driven from a VHS signal permanently then there is no need to fit the following components C16,L1,L4,C14 and C13.
The system was originally designed for a composite video input hence a single BNC socket is provided. In order to feed a VHS signal an alternative way of connection is required.
This method was recommended by one of the users, it hasn't been tested by me personally yet.

The digitiser CA3306.

This part of the circuit functions by alternately selecting the RGB analogue signals, provided by TR6,TR7 and TR8, using R GATE and G GATE. The selected colour is applied to the Analogue to digital converter input pin 11. The CA3306 is a Flash 6 bits converter driven by FLO which is the clock provided by the main board.

SUPERSCAN 2001

GENERAL INTRODUCTION TO THE SYSTEM AND SUGGESTIONS FOR ASSEMBLY

the **SUPERSCAN 2001** consists of four printed circuit boards **(PCB)** namely:

1- The main board.
2- The video board.
3- The keyboard.
4- The power supply board.

The power supply is still in the development phase, it is expected to be completed toward the end of this year 1992. It will be supplied built , tested and mounted in the especially customised system case.

It is recommended that the boards are assembled in the following sequence. 3 , 1 and then 2. refer to the relevant section for the assembly of each PCB.

The following are general assembly instructions apply mainly to the main board and the video board PCBs.

COMPONENTS INSERTION AND SOLDERING

It is recommended that the components are inserted and soldered in the following order.

Resistors.
Diodes.
Capacitors.
Other discrete components
And then ICs.

TOOLS REQUIRED

ESSENTIAL TOOLS

Digital or Analogue voltmeter
Tweezers
Long nose pliers
Side cutters
A set of screw drivers
Soldering iron
Solder sucker
Soldering braid
A suitable magnifying glass

COMPLIMENTARY TOOLS

Oscilloscope
Video signal generator
Printed circuit board holder
Tooth brush

RESISTORS

A_____Take the resistors out of the packaging one set of values at a time, starting with the first value on the parts list. Measure the value of every resistor using a DVM or alike. individual values should be within 5% of that specified.

B_____Crop both ends of each resistor leaving about 20mm on either side.

C_____Using a long nose pliers, bend both ends of each resistor at 90 degrees . Make use of the width of the long nose pliers to give you a distance X on either side of the resistor so that it drops freely in the PCB. Mark that position on resistors . ONE SET OF VALUES A TIME.

D_____Position the board horizontally by a pair of fixing clamps with the silk screen facing upwards and in such a way that your hands can go underneath.

E_____Using the location column on the parts list, DROP EACH RESISTOR IN ITS CORRECT POSITION and each time bend the leads SLIGHTLY from underneath the board so that resistors don't fall out when the board is turned upside down.

F_____Repeat steps A to E for each set of values.

When all resistors are inserted, gently remove the board from the clamps and turn it upside down on piece of sponge so that all resistors are pushed upwards.

SOLDERING

Apply the soldering iron gently on the edge of the plated through holes and component leads simultaneously for about HALF A SECOND THEN APPLY THE SOLDER SUFFICIENTLY FOR ABOUT ONE SECOND, KEEP THE IRON ON THE JOINT FOR ABOUT HALF A SECOND ONLY. This should give a nice shiny joint. Joints with thick tracks will require a longer heating time.

Using side cutters, crop all the excess leads without exerting any destructive force on the plated though holes.

Use this technique for all other components except ICs.

INSERTION OF ICS

Correct handling of ICs is vitally important especially with regards to destruction by STATIC CHARGE. So please before handling any of the ICs take the necessary precautions to insure the dispersal of any electrostatic charges by grounding your self electrically via a ONE MEG OHM RESISTOR to a good ground.

Electrostatic precautions are less important should you opt to build the unit in TTL.

It is recommended that some of the ICs are socketed, so please insert and solder these first. If you decide to use sockets for all of the ICs, which is perfectly acceptable and in fact it makes repairs much easier, on both the main and the video boards, then insert the sockets and solder as you go. Fit the ICs in the sockets last, alternatively insert the ICs in the board one type at a time.

Place a flat sponge over the ICs together with a rigid flat piece of cardboard on top of the sponge.

Press the cardboard down on to the sponge and tape it to the PCB so that all the ICs are pressed down well.

Turn the board over and solder all the IC pins. The same method can be applied with regard to all other sockets and components.

IC REPLACEMENT

In the event of having to replace an already soldered IC, the following steps are strongly recommended.

1- Cut all the pins of the IC close to the body and remove it.

2- Using pointed tweezers and soldering iron , heat and gently pull out each pin.

3- Clear the holes of solder with the aid of a soldering iron and either solder braid or a solder sucker.

CAUTION. IN THE CASE OF USING A SOLDER SUCKER, REMOVE THE IRON AWAY BEFORE RELEASING THE PISTON OF THE SUCKER.

SUPERSCAN 2001

MAIN BOARD

ASSEMBLY INSTRUCTIONS

PARTS LIST

&

CIRCUIT DIAGRAM

SECTION 2 INTRODUCTION

The main board contains all of the digital and analogue circuits necessary to transmit and receive pictures on its own when controlled by any one of three means such as the front panel, the mouse (ATARI compatible) or a host computer with the appropriate interface.

The video board is not essential for its function unless an image capture from a live picture is required.

MOUSE CONTROL.

The software for mouse control is currently under development by G3OQD and the unit is supplied without this software facility, non the less the hardware is accommodated. On the other hand if you already own SCOTTIE mouse interface, G3OQD is prepared to add this software to your EPROM at a minimal cost of reprogramming it . This is an interim solution until development is completed.

BATTERY BACK-UP.

The system uses an 8/32 kb (selectable) static CMOS RAM (32kb required for mouse operation) . In stand-by, this RAM draws about 2 micro amps from the battery.

Battery back-up is not essential for the systems operation, however it is useful if you want to store and keep text typed in from the keyboard in this RAM while the system is switched off . (R73,D11,D22,D10&D9 are not needed if battery is not used, D9 must be replaced with a strap to insure 5 volt suppy to the RAM)

IC 43 pin 11 controls the output enable of the RAM . In some cases and depending on the make, IC43 draws excessive current from the battery (about 0.5mA) when the system is off which causes a rapid discharge and hence corruption to the stored text. As a result if you press MEMORY button twice corrupted overlay appears on the screen .

To prevent this from happening, Don't insert the battery until the main board is built and tested. With the system switched off, remove IC 43 (assuming ICs are in sockets). Using a volt meter, measure the battery voltage, it should be about 3.6 volts.

Insert the battery in the PCB and solder ONE SIDE ONLY. Lift the unsoldered pin from the PCB. Using the meter in current measurement mode, connect it between the loos pin of the battery and the plated through hole where this pin should normally go and measure the current , it should be around 2micro amp or less. Insert IC 43 and measure the current again , there should be no change, if so, solder the battery permanently and back-up should be OK.

If more current is drawn, then you need to change IC43 to a different make (same type). LS00 made by national and 7400 were found OK .

If you feel that the battery function is not all that important to your usage then don't fit it at all. Ready built units will not have the battery fitted unless specifically requested before hand.

section 2 introduction cont.

Relay

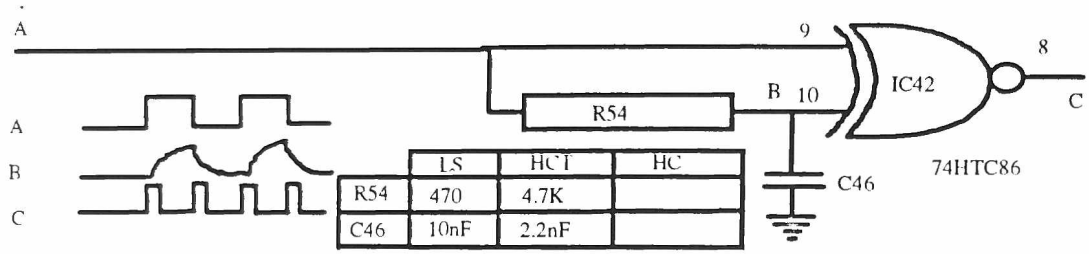
The main board contain a miniature **5 Volts** relay. Its function is to divert the microphone signal to the transmitter when the unit is off. If this function is not required then the relay could be left out.

critical timing

There are two fault conditions that could occur due to the wrong choice of components , these two conditions have occurred more than once which makes it worth while mentioning just in case .

Condition 1

Break in the line structure during transmission only , this appears in the form horizontal streaks on the screen at the receiving end. This is due to time constant error in **IC 42** .



	LS	HCT	HC
R54	470	4.7K	
C46	10nF	2.2nF	

If the value of **R54** and **C46** are not chosen correctly then the B wave form is either too small or too high for **IC42** to work and produce the C wave form. The shown approximate values have always worked so far . As a first attempt to cure the problem make sure that the value of R54 is correct and then increase the value of C46 by say 15 to 20 % . If an oscilloscope is available then adjust this time constant (C 46 and R 54) until these wave forms are obtained.

Condition 2

Horizontal streaks appearing on the screen when the overlay menu is activated (by pressing **MEMORY** followed by **MENU**)
If this condition occurs ,then the simplest cure will be to solder a 30 to 47 pF capacitor across pins **2** and **7** of **IC 16** on the copper side of the board.

12 MHz high stability crystal.

The **12 MHz crystal** is a **5 parts per million** specially cut for the SUPERSCAN 2001 by IQD . It is recommended as it is the simplest way of insuring accuracy and preventing sloping pictures. Using this crystal means that there is no need for packaged oscillator .It is available from **JAD**.

FURTHER CLARIFICATIONS TO THE PARTS LIST

MAIN BOARD

C46	2.2 nF Shown as electrolytic on the boards silk screen. It should be 2.2nF non electrolytic 5% tol. polypropylene. 5mm pitch.
C53	The same as in C46
C9 & C23	Shown on the board as non electrolytic they should be 1micro Farad electrolytic inserted in the board with the positives at the inside.
R57	The approximate value of this resistor is 82k Ohm for 74LS123 and 75k Ohm for 74HCT123.
R58	The approximate value is 27 k for LS , 8K2 for HCT. The value of these resistor controls the width of the raster Mount these resistoprs on temporary basis.

refer to main board setup.instructions

R106	330 Ohm used to adjust the phase of the clock to the A/D converter . optimising this value could improve the conversion quality. Normally no adjustment is required

Refer to main board set-up instructions

IC79 Is a 32K x 8 STATIC CMOS RAM about 100 nS.

ICs 52 to 57 All are 534256 or 514256 256k x 4 dynamic RAMs about 100 ns.

IC68	MUST be a TTL device 7407 or 7417 (neither S nor LS)
IC1	MUST be either HD6845S , MC6845S , MC68A45S OR MC68B45S. The speed is about 2.5 MHz or better for plastic package the number is usually shown as 6845SP .

For power saving it is recommended that the following ICs are used in CMOS .

IC71	8254	use	82C54	speed is	8MHz	or better.
IC74	8279	//	82C79	//	2MHz	//
IC80	8255	//	82C55	//	5MHz	//
IC69	8031 or 80C31 , 12MHz device.					

IC62	74399	If difficult to obtain in HCT use 74LS399 instead

CP	**It is only required if CV1 is not large enoph to tune the crystal to 12MHz.** If required it should be 27pF close toll. 2% or better such as Silver Mica type. should be soldered across the trim capacitor CV1.on the under side for versions 1and 2 main boards .For versions 3 and 4 mount in the two un marked holes between CV1 and TR4.

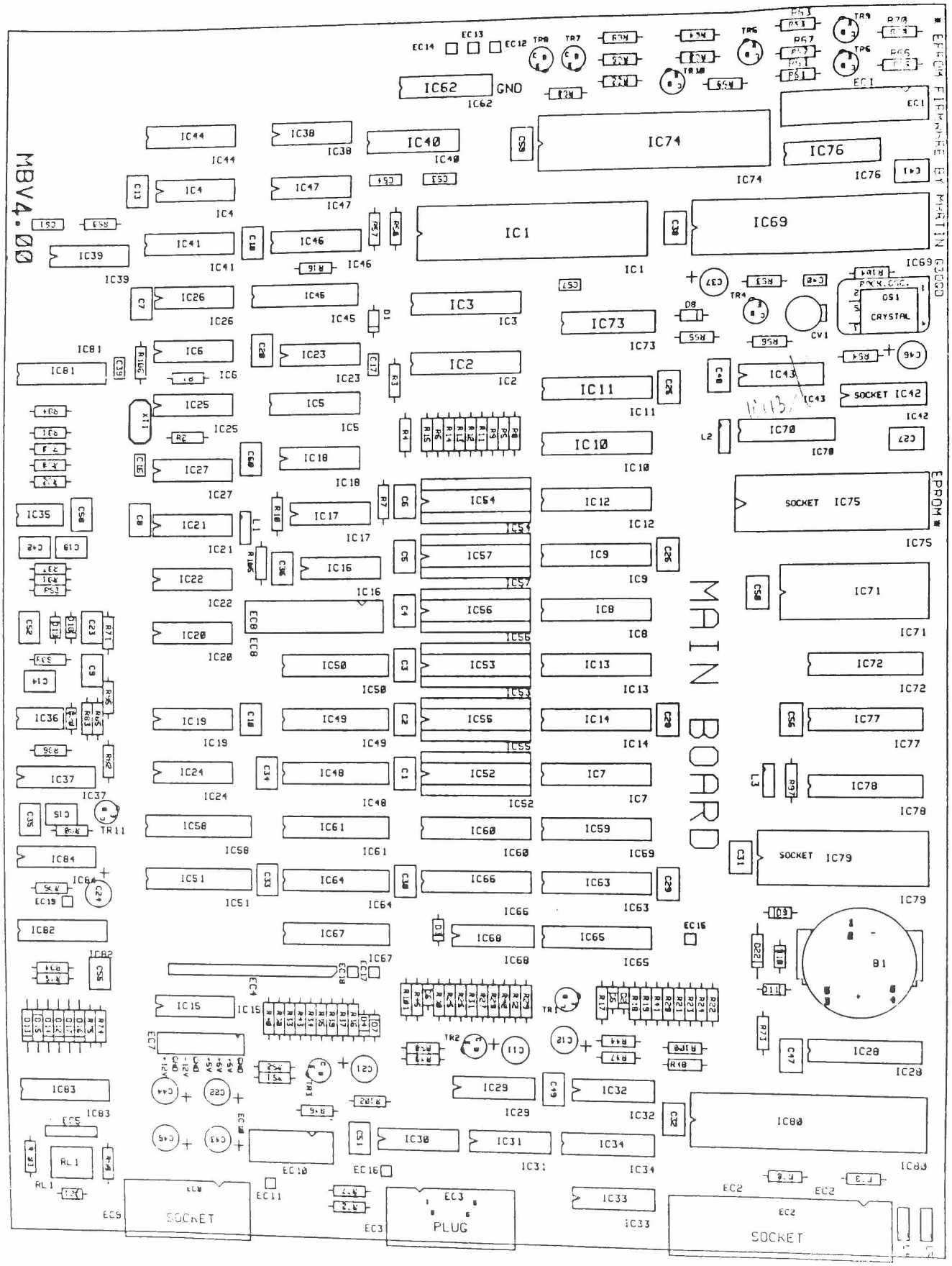
IC25	Should be either 7404 or 74F04 or 74S04 (74LS04 and 74HCT04 are not suitable)

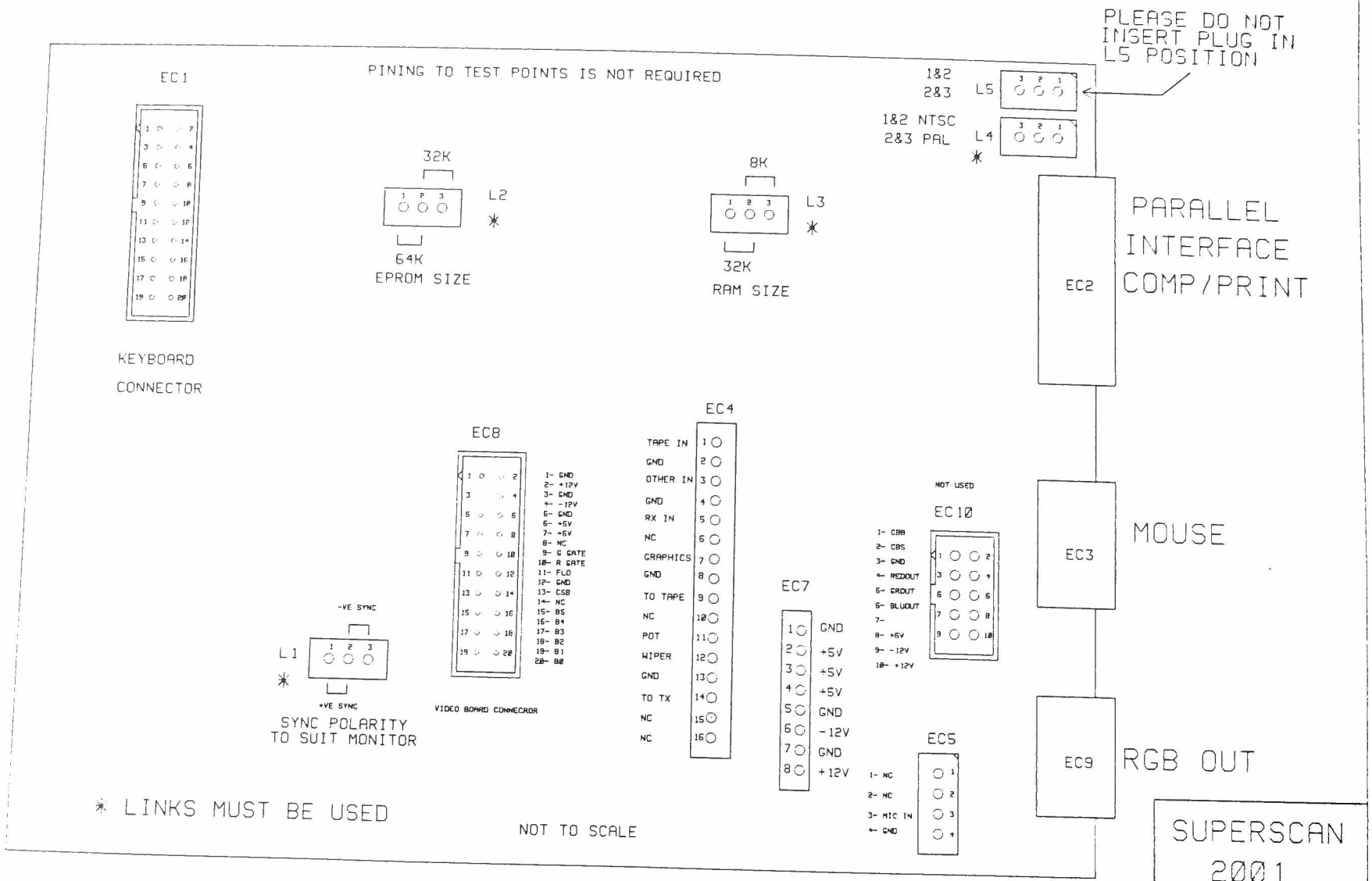
D-TYPE CONNECTORS

Choice of the D-type connectors on the main board is critical.

It seems that the D-type connectors 25 & 9 pins differ slightly from one manufacturer to another.Some protrude forward from the edge of the board by about 3mm This will cause miss alignment between the mounting holes on the PCB and those of the case. If you haven't got them yet order them either from me or from MAPLIN.

If you have fitted them already and they are not flush with the edge of the board. Please don't de-solder them from the board, enlarging the holes in the case is safer .


MBV4.00
MAIN BOARD
EPROM
SOCKET IC75
SOCKET IC42
SOCKET IC79
CRYSTAL
SOCKET
PLUG
SOCKET



MAIN BOARD CONNECTOR IDENTIFICATION AND JUMPERS

SUPERSCAN 2001 PARTS LIST	MAIN BOARD	SHEET 1 OF 6
COMPONENT GROUP: SEMI-CODUCTORS	VER.: MBV4.00	DATE: AUG. 1993

IT IS RECOMMENDED THAT ALL 74 SERIES ICs ARE CHOSEN FROM THE TTL COMPATABLE CMOS 74HCT... SERIES UNLESS STATED OTHERWISE. IF IT IS NOT POSSIBLE TO USE THE 74HCT.. SERIES THEN 74LS.. IS THE SECOND PREFARED CHOICE.

COMP.TYPE	QNTY	DESCRIPTION	OTLN	LOCATION	COMMENTS
74HCT374	20		DIL	IC2 IC3 IC7 IC8 IC9 IC10 IC11 IC12 IC13 IC14 IC49 IC50 IC58 IC59 IC60 IC61 IC65 IC66 IC67 IC48	
74HCT04	1		/	IC22	
74HCT00	6		/	IC4 IC15 IC18 IC24 IC32 IC33	
7400	1	ORDINARY TTL	/	IC43 MUST NOT LOAD BACKUP BATTERY	
74HCT175	2		/	IC5 IC81	
74HCT32	1		/	IC16	
74HCT74	6		/	IC17 IC26 IC27 IC29 IC30 IC39	
74HCT10	1		/	IC19	
74HCT27	1		/	IC20	
74HCT86	4		/	IC6 IC21 IC42 IC84	
7404 OR 74F04	2		/	IC25 (NITHER LS04 NOR HCT04)	
74HCT14	2		/	IC23 IC37	
74HCT244	1		/	IC51	
74HCT21	1		/	IC31	
74HCT139	1		/	IC34	
74HCT02	1		/	IC38	
74HCT123	1		/	IC40	
74HCT157	2		/	IC41 IC46	
74HCT163	1		/	IC44	
74HCT377	3		/	IC45 IC77 IC78	
74HCT125	1		/	IC47	
74HCT245	2		/	IC63 IC64	
7407 OR 7417	1		/	IC68 MUST BE ORDINARY TTL	

SUPERSCAN 2001 PARTS LIST		MAIN BOARD			SHEET 2 OF 6
COMPONENT GROUP:		SEMI-CONDUCTORS		VER.: MBV4.00	DATE: AUG. 1993
COMP.TYPE	QNTY	DESCRIPTION	OTLN	LOCATION	COMMENTS
74HCT138	2		DIL	IC70 IC73	
74HCT373	1		/	IC72	
74145	1		/	IC76 MUST BE ORDINARY TTL 74145	
74LS399	1		/	IC62	TTL LS
74HCT240	1		/	IC28	
MC4051	2	ANALG. SWITCH	/	IC82 IC83	
TL072	2	OP. AMP	/	IC35 IC36 OR TL082	
534256 OR 514256	6	256K X 4 DRAM	/	IC52 IC53 IC54 IC55 IC56 IC57	AROUND 100nS
8254 OR 82C54	1		/	IC71	8MHz
8279 OR 82C79	1		/	IC74	2MHz
27256 - 27101	1	EPROM	/	IC75	SUPLD. WITH KIT
62256LP	1	32K SRAM	/	IC79 ABOUT 100nS LOW POWER LP	
8255 OR 82C55	1		/	IC80	5MHz
HD6845S	1	VDU CONTROLER	/	IC1 OR MC6845SP	2.5MHz
8031/80C31	1	PROCESSOR	/	IC69	12MHz
BC337	3	NPN TRANSISTOR	EBC	TR1 TR2 TR3	
BC327	6	PNP //	EBC	TR5 TR6 TR7 TR8 TR9 TR10	
BC237	2	NPN //	EBC	TR4 TR11	
IN4148	15	SILCN.SIG.DIODE		D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D18 D19 D20 D21	
ZENER DIODES	6	5.1V, 400mW		D12 D13 D14 D15 D16 D17	
	1	8.2V, 400mW		D22	

SUPERSCAN 2001 PARTS LIST		MAIN BOARD		SHEET 3 OF 6
COMPONENT GROUP:		RESISTORS	VER.: MBV4.00	DATE: AUG. 1993
COMP.TYPE	QNTY	DESCRIPTION	LOCATION	COMMENTS
10 OHM	4	MET/CARB FILM	R100 R101 R102 R98	0.25W 5%TOL.
27 //	6	//	R66 R67 R68 R69 R70 R99	// //
33 //	11	//	R4 R5 R6 R7 R8 R9 R11 R12 R13 R14 R15	// //
47 //	1	//	R103	// //
68 //	3	//	R51 R49 R47	// //
390 //	1		R10	// //
470 //	5	//	R1 R2 R97 R71 , R54 *	// //
680 //	3	//	R41 R42 R43	// //
1 KOHM	5	//	R3 R74 R75 R76 R90	// //
1.2 //	6	//	R23 R28 R37 R24 R30 R38	// //
1.8 //	1	//	R87	// //
2.2 //	10	//	R50 R52 R48 R72 R89 R22 R96 R77 R32 R40	// //
2.4 //	3	//	R21 R31 R36	// //
3.3 //	6	//	R60 R61 R62 R63 R64 R65	// //
4.7 //	10	//	R44 R45 R46 R55 R56 R59 R78 R79 R94 R105	// //
5.6 //	2	//	R88 R92	// //
6.8 //	2	//	R83 R86	// //
8.2 //	2	//	R53 R73	// //
10 //	4	//	R19 R27 R35 R95	// //
20 //	3	//	R18 R26 R34	// //
22 //	4	//	R82 R85 R91 R93	// //
* SELECT ON TEST, MOUNT THESE SO THAT THEY ARE EASEY TO REPLACE IF REQUIRED				
5.1 //	3	//	R20 R29 R39	// //
330 OHM *	1	//	R106	// //

COMPONENT GROUP: RESISTORS VER.: MBV4.00 DATE: AUG. 1993

COMP.TYPE	QNTY	DESCRIPTION	OTLN	LOCATION	COMMENTS
27 KOHM	1	MET/CARB FILM	R58 (27K FOR LS,22K CMOS)		0.25W 5%TOL.
33 //	1	//		R84	// //
39 //	3	//		R25 R33 R17	// //
47 //	2	//		R80 R81	// //
82 //	1	//		R57 (82K FOR 74LS, 68K FOR CMOS SOT)	
R57 & R58 ADJUSTS THE RASTER, INSERT WITH PROVISION TO REPLACE IF NECESSARY					
100 //	1	//		R16	0.25W 5%TOL
2.2 MOHM	1	//		R104	// //
470 OHM VARIABLE LINEAR POT	1	VARIABLE RESISTOR USED TO CONTROL THE OUTPUT LEVEL, MOUNTED ON THE BACK PLANE, STANDARD SHAFT, FITTED WITH A SUITABLE KNOB OR A GROOVE FOR SCREW DRIVER ADJUSTMENT			

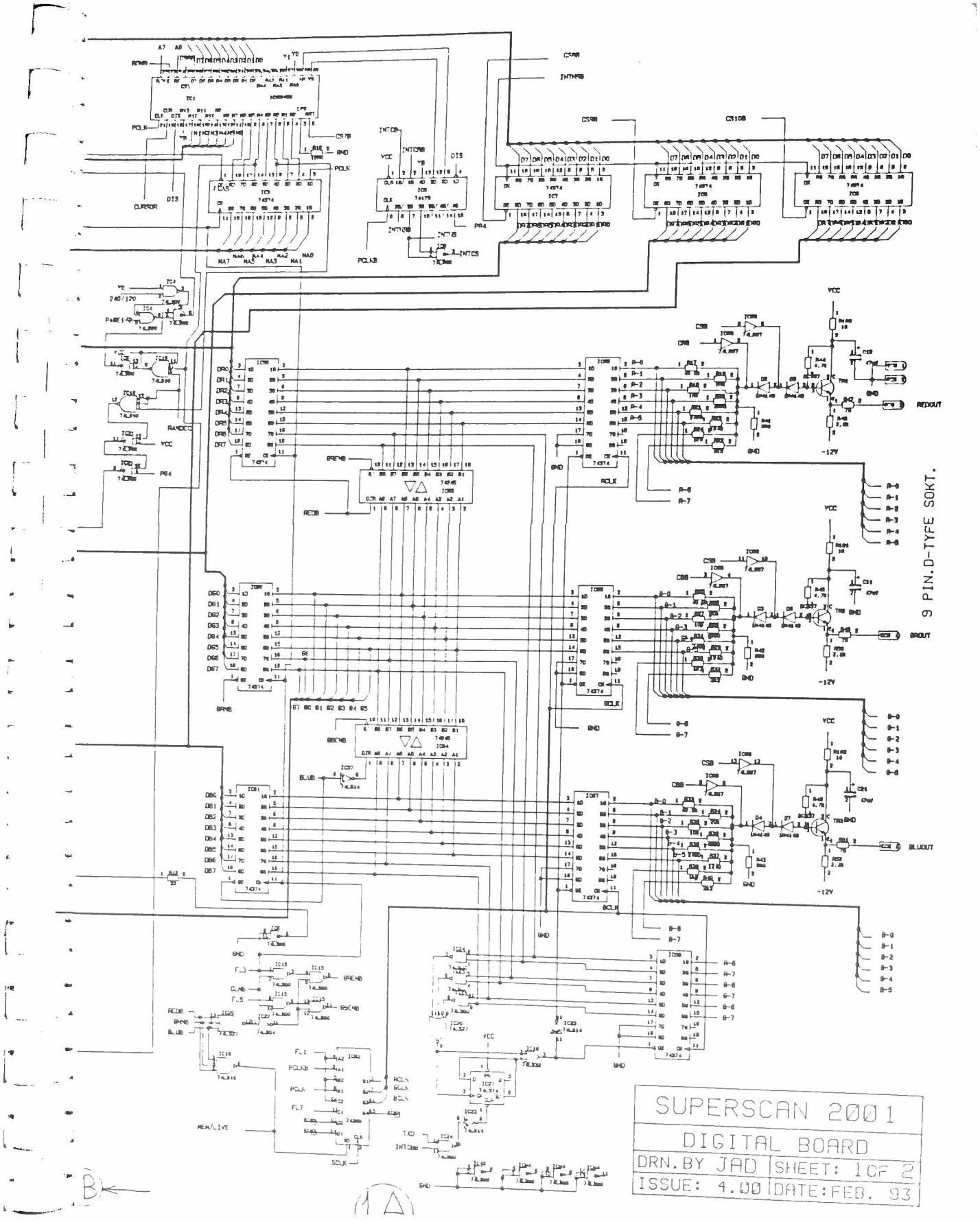
COMPONENT GROUP: CAPACITORS VER.: MBV4.00 DATE: AUG. 1993

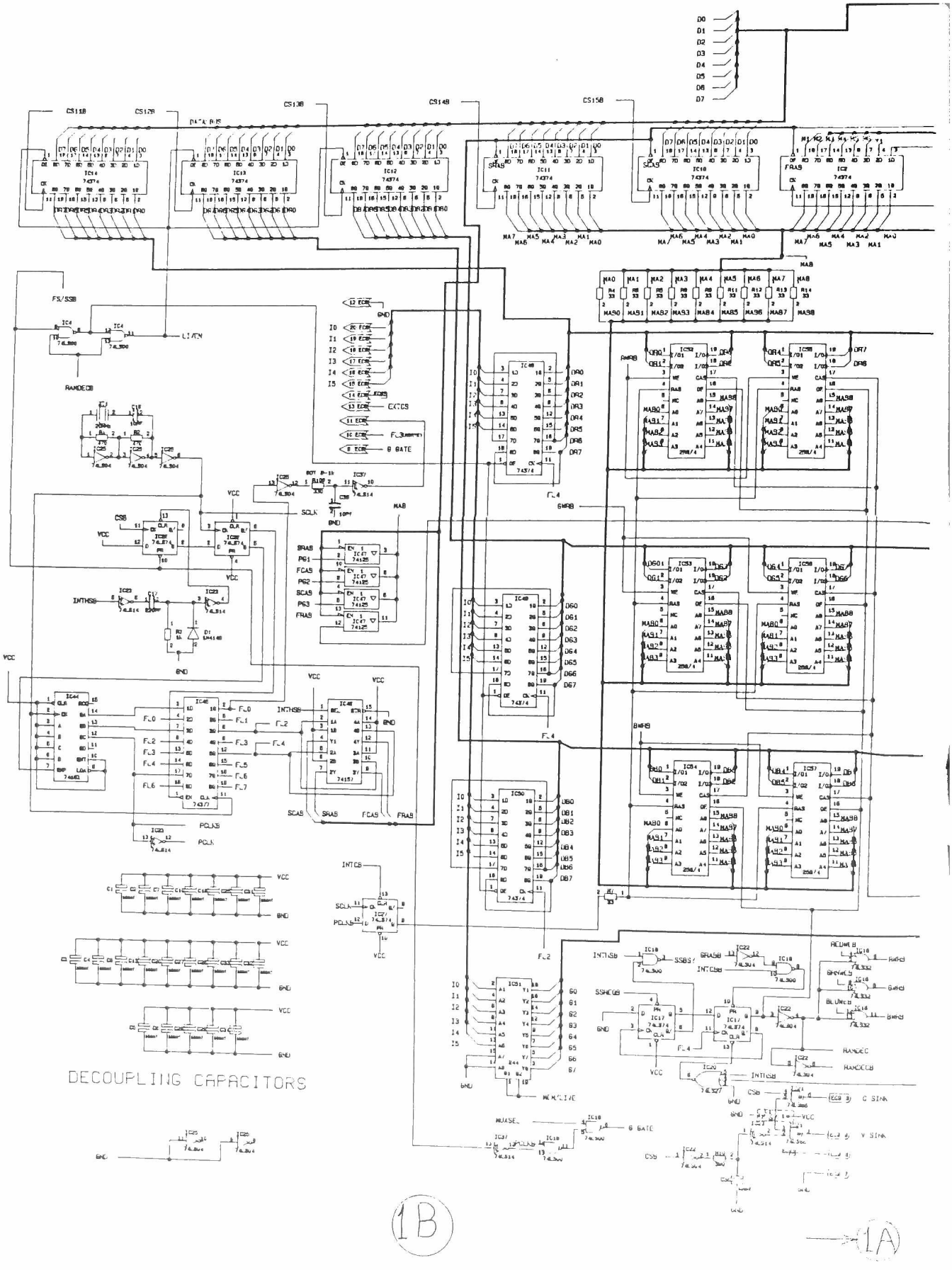
ALL CAPACITORS ARE 0.2 INCH / 5mm PITCH 63V WORKING VOLTAGE 10% TOL. UNLESS STATED OTHERWISE.

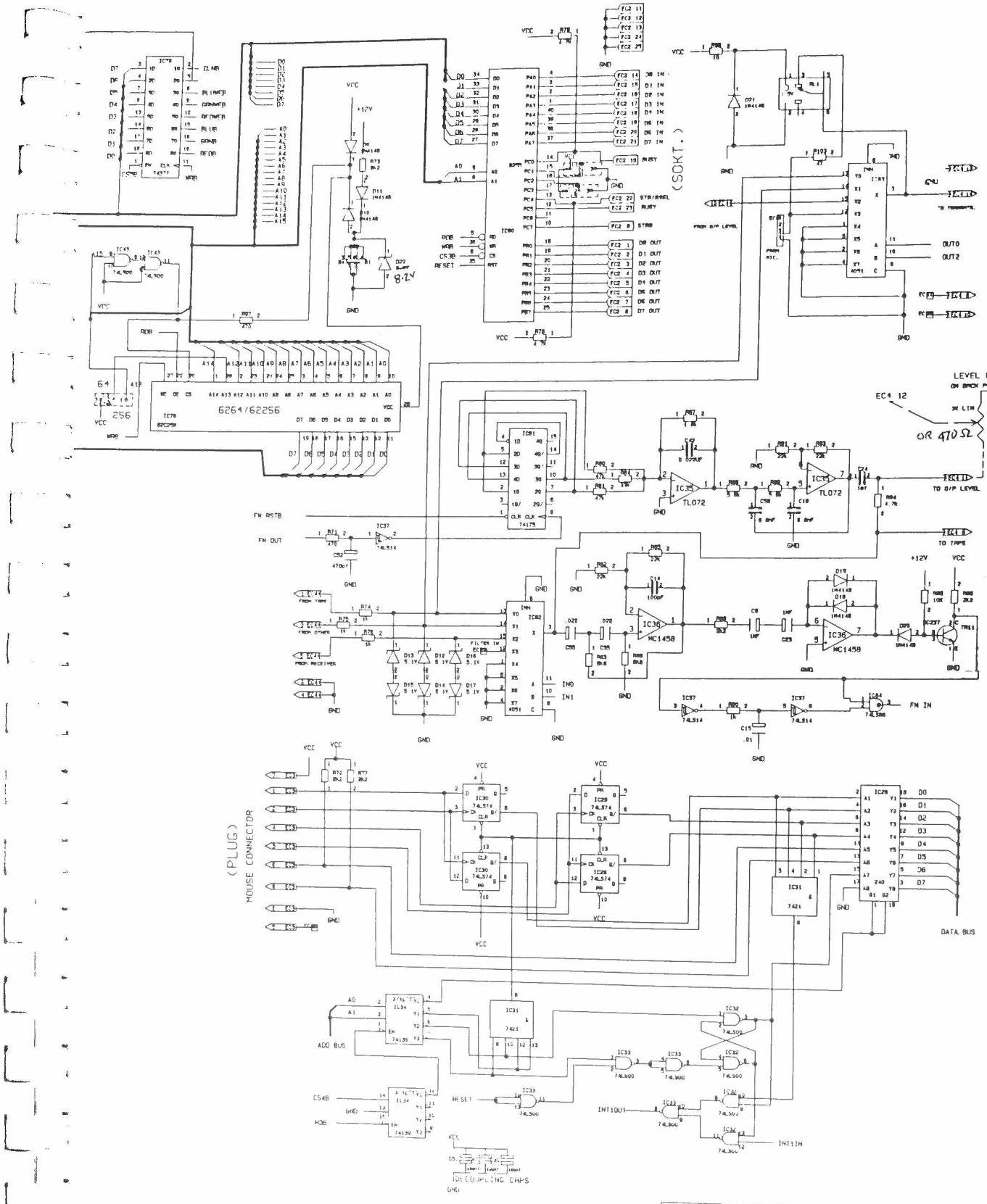
COMP. TYPE	QNTY	DESCRIPTION	OTLN	LOCATION	COMMENTS
10 PF	2	CERAMIC	VERT	C16 C39	
33 //	1	//	//	C40	
220 //	1	//	//	C17	
330 //	1	//	//	C57	
470 //	1	//	//	C52	
27 //	1	CP PADDING CAPCTR. MUST BE 2% TOL,FOR mP CRYSTAL,SEE TEXT			
1 nF	5	C54*, CX1 CX2 CX3 CX4		ALL CX CAPS ARE MOUNTED ON THE BACKPLANE.	
2.2 //	2		//	C46* , C53*	
6.8 //	2		//	C19 C58	
100 pF	1		//	C14	
10 nF	4		//	C15 C61, CX5 CX6	
22 //	3		//	C35 C42 C55	
100 //	33	CERAMIC	//	C1 C2 C3 C4 C5 C6 C7 C8 C10 C13 C18 C20 C25 C26 C27 C28 C29 C30 C31 C32 C33 C34 C36 C38 C41 C47 C48 C49 C50 C51 C56 C59 C60	MAINLY DECOUPLING
1 UF	3		CIL	C9 C23 C24	ELECTROLITIC
10 //	1		//	C37	//
47 //	3		//	C11 C12 C21	//
100 //	1		//	C44	//
220 //	1		//	C45	//
470 //	2		//	C22 C43	16 VOLTS //

* TIMING CAPACITORS MUST BE HIGH STABILITI (NOT CERAMIC)

SUPERSCAN 2001 PARTS LIST		MAIN BOARD			SHEET 6 OF 6
COMPONENT GROUP: MISCELLANEOUS			VER.: MBV4.00		DATE: AUG. 1993
COMP.TYPE	QNTY	DESCRIPTION	OTLN	LOCATION	COMMENTS
20 PIN IDC PL	2	NON LOCKING		EC1 EC8	
25 PIN D TYPE	1	90 DEG.SOCKT.		EC2	
9 // //	1	//		EC9	
9 // //	1	90 DEG PLG.		EC3	
16 PIN SIL	1	2.5mm PIT PLG.		EC4	
4 PIN SIL	1	//		EC5	
8 PIN SIL	1	//		EC7	POLARISED
3 PIN SIL	5	//		L1 L2 L3 L4 L5	
10 PIN IDC 1 PIN PLG	1 8	NON LOCKIG		EC10 NOT REQ.FOR BASIC SYS OPERATION EC11 EC12 EC13 // EC14 EC15 EC16 // EC17 EC18	
RELAY	1	5V SUB-MINIAT.		RL1 (FUJITSU FBR21D/H), Farnell	
TRIM CAP	1	4 - 40 PF		CV1	
BACK BATTERY	1	3.6V , 100 mA		B1 NICAD (RECHARGABLE)	
CRYSTAL	1	20MHz HC33U		XT1	
XT/OSC	1	12MHz HC33U OR A PACKAGED OSCILATOR			10 PPM OR BETER
TRIM CAP IS NOT REQUIRED WITH PACKAGED OSCILLATOR					
PCB	1	MBV4.00 OR LOWER MAIN BOARD PCB			
16 WAY SOKET	1	16 WAY SIL SHELL AND PIN TO FIT EC4 CONNECTING TO THE BACK PLANE VIA CRIMPED OR SOLDERED WIRES. PINS 15 & 16 ARE NOT USED, 14 PIN CONNECTOR MAY BE USED			
40 PIN DIL	4	40 PIN DIL SOCKETS USED FOR IC1 IC74 IC69 AND IC80			
20 PIN DIL	6	20 PIN DIL SOCKETS USED FOR IC52 IC53 IC54 IC55 IC56 IC57			
32 PIN DIL	1	32 PIN DIL SOCKET USED FOR IC75			
28 PIN DIL	1	28 PIN DIL SOCKET USED FOR IC79			
24 PIN DIL	1	24 PIN DIL SOCKET USED FOR IC 71			


9 PIN.D-TYPE SOKT.
REDOUT
GROUT
BLUOUT
-12V
VCC
GND
SUPERSCAN 2001
DIGITAL BOARD
DRN.BY JAD
SHEET: 1 OF 2
ISSUE: 4.00
DATE: FEB. 93


DECOUPLING CAPACITORS
1B
1A



2B

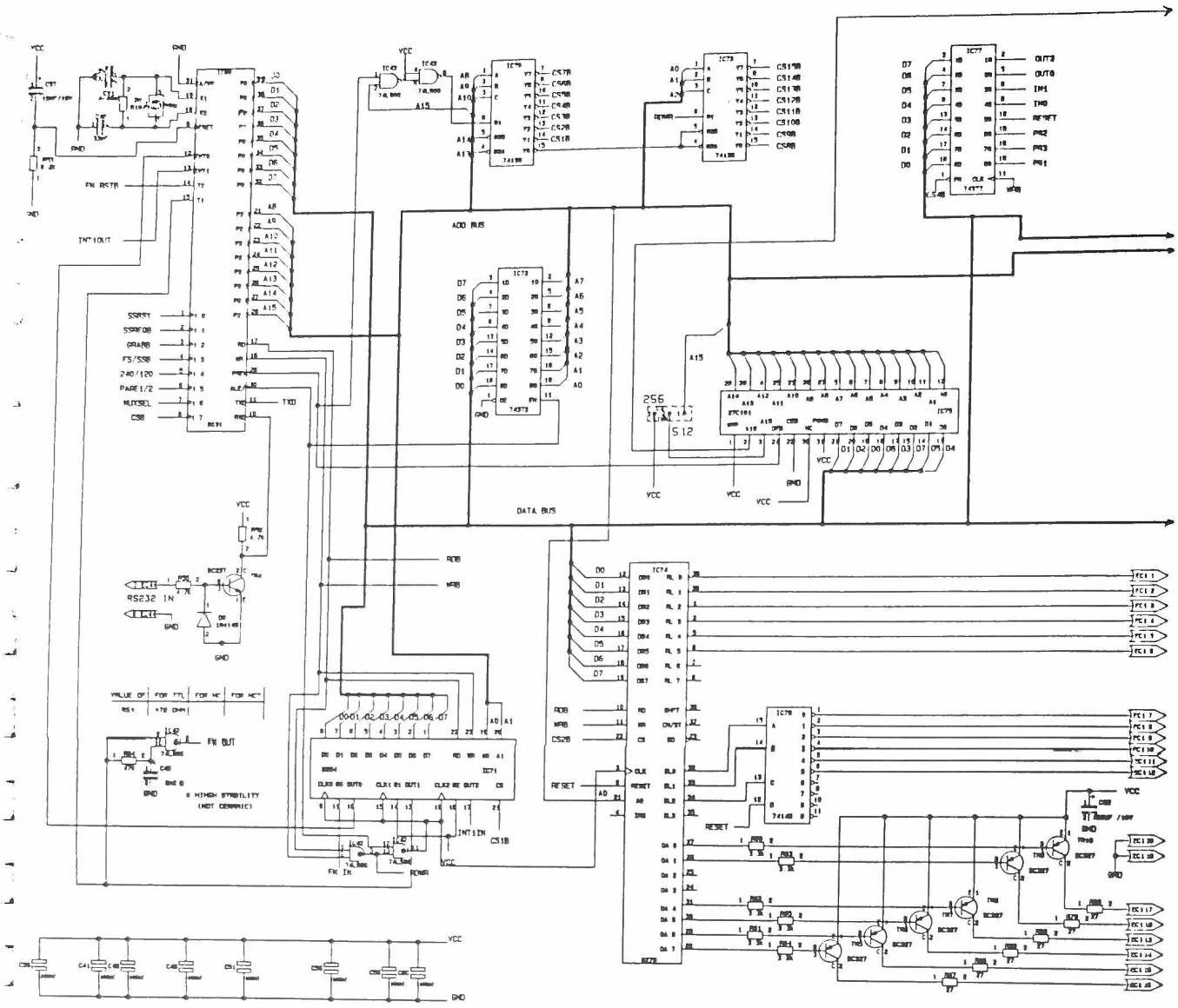
2A

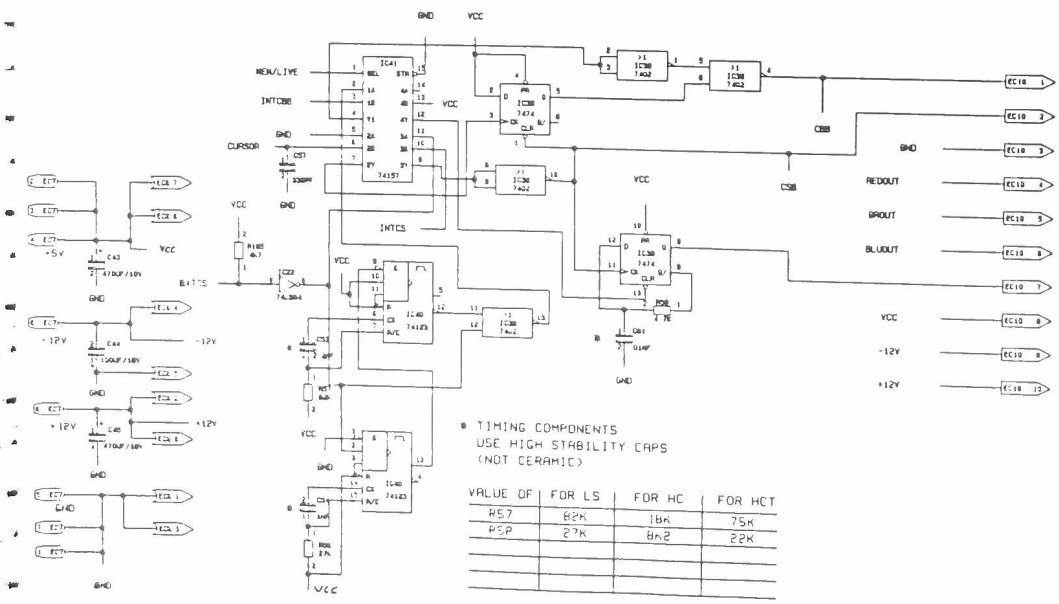
SUPERSCAN 2001

DIGITAL BOARD

DRN. BY JAD | SHEET: 2 OF 2

ISSUE: 4.V1 | DATE: FEB. 97





VALUE OF	FOR LS	FOR HC	FOR HCT
R57	82K	18K	75K
R59	27K	8K2	22K

SUPERSCAN 2001

VIDEO BOARD

ASSEMBLY INSTRUCTIONS

PARTS LIST

&

CIRCUIT DIAGRAM

SECTION 3 INTRODUCTION

The video board interfaces between the analogue video source and the main board. It is designed to receive either a standard analogue video signal (1 Volt across 75 Ohm) in either **PAL** or **NTSC** and decodes this signal to analogue **RGB** available as an option for driving an **RGB** analogue monitor directly. In the same time it generates a **6 bit** digital **RGB** signals for the main board.
The video board can also accepts an analogue **RGB** video signal and converts it to digital as in the above.
Multiplexing between the two input signals (RGB & composite) is possible dynamically which gives an added versatility to this board such as picture in picture and TELETEXT insertion.

HINTS FOR ASSEMBLY.

Before starting the assembly of this board please read the general assembly instructions in section one as well as page **3/2** in this section.
The board contain three specialised integrated circuits and care should be taken to insure that the correct components are used in order to avoid any damage on switch on.
these components are:

TDA3566 - PAL/NTSC decoder made by Philips

TDA2595 - It generates the Super SANDCASTLE sync. for the TDA3566 and the composite syncs for the CRT display when the SUPERSCAN 2001 is displaying live video.

CA3306 - 6 bit A/D converter , a replacement MP7682KN made by Micro power could be used without modification to the circuit. IC 4&IC5 are used for gating signals emanating from the main board to the A/D converter.

There are other specialised components on this board such as the delay lines and the coils, so please read the mentioned instructions.
the most mechanically delicate component is the chroma delay line **DL2** (not used for NTSC) so please don't solder it in until the end.

Please don't solder **VR4** & **VR6** on the board these are pots located on the front panel for controlling the camera brightness and colour saturation. control wires are connected via **EC6** & **EC7** , refer to sheet 3/3 which shows the position of all connectors and adjustable components.

- For set-up of the Video board refer to section **6.**
- Parts list and circuit diagram are shown at the end of this section.

XT1	Subcarrier crystal 8.867238MHz for PAL (UK) otherwise it is twice the subcarrier frequency for any other system within PAL or NTSC.
C6	4700 PF (4.7nF) should be a good quality type such as 5 % tol. polypropylene 5mm pitch 30 volts. it is not electrolytic as the ident shows on the PCB.

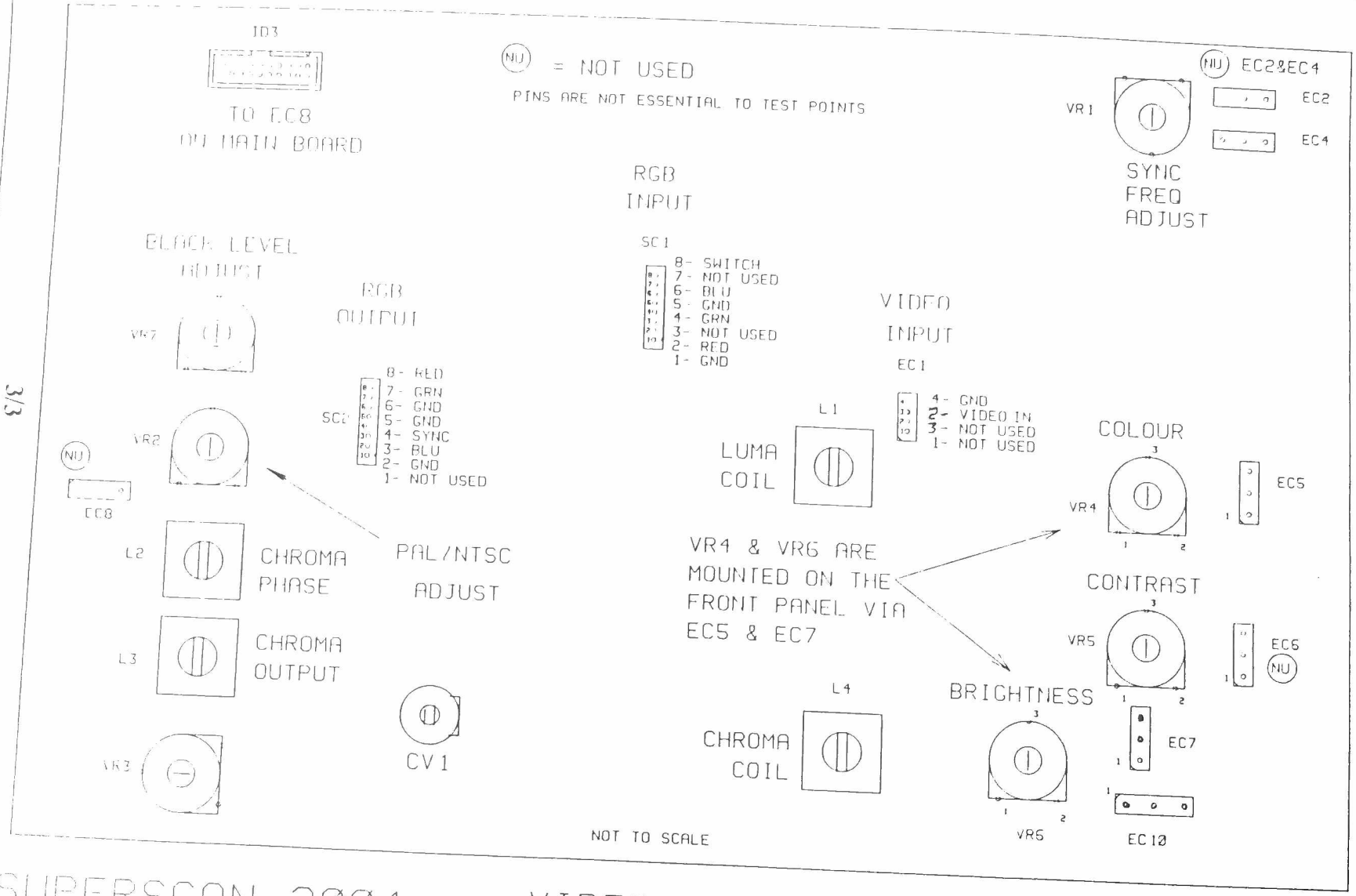
VIDEO BOARD COILS.

All four coils are adjustable made by **TOKO 10E** or **10EZ** style.

L1	adjustable	50.0	to	160	micro Henry
L2	//	7.5	to	13	//
L3	//	7.0	to	12	// (centre tapped)
L4	//	7.5	to	13	//

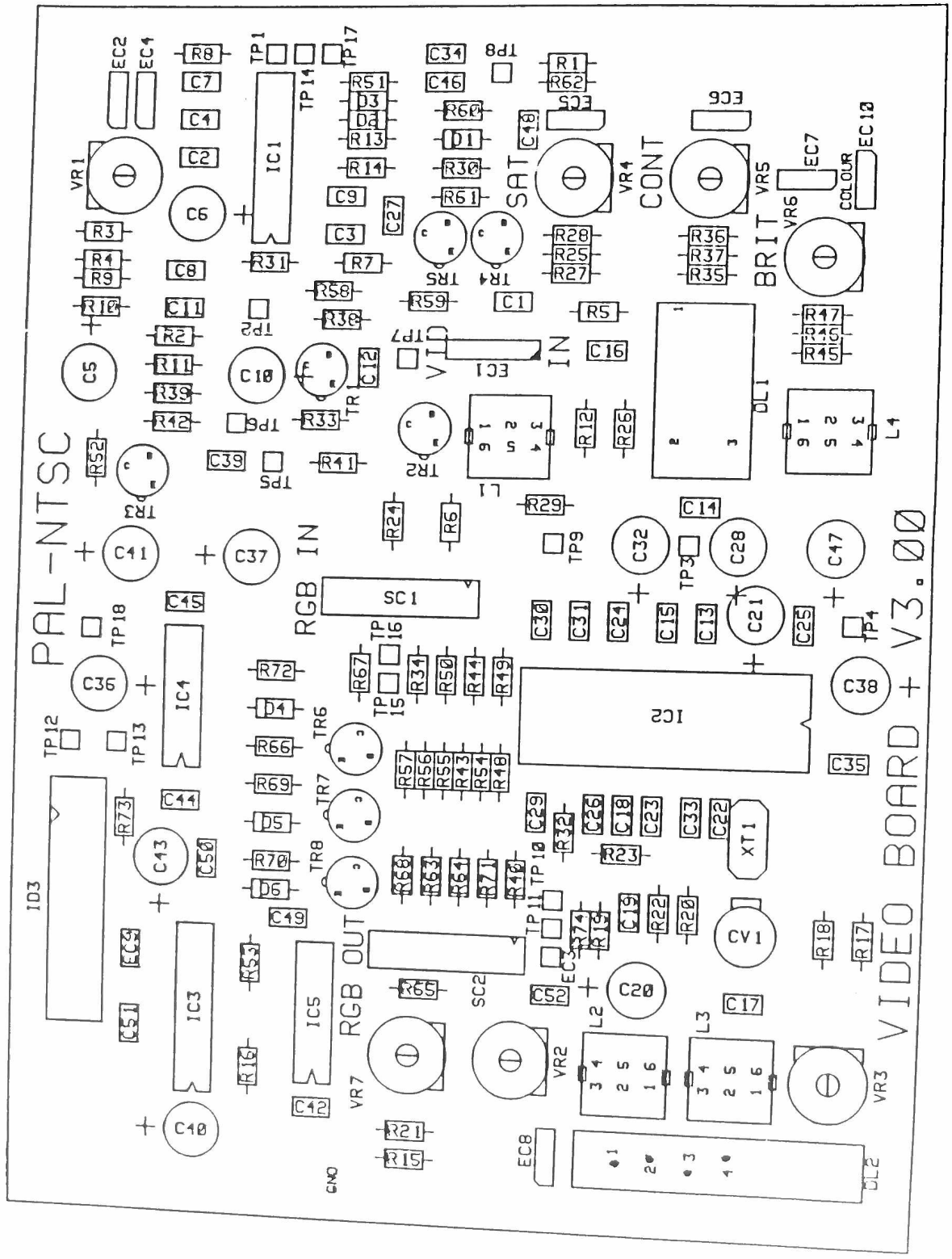
METHOD OF INSERTION IN THE PCB

Mechanically , the coils can slot in the PCB in two ways but only one way is electrically correct. Using a magnifying glass check the pins of each coil prior to insertion in order to locate the ends of the winding as they are wrapped and soldered to two of the pins (three pins in the case of the centre tapped coil) . Align the active coil pins with the holes in the PCB where there are tracks and solder these pins only. Later on when it is proven that the coils are inseted correctly , the coil case flat pins should be solderd



3/3

SUPERSCAN 2001 VIDEO BOARD CONNECTORS AND PRESETS


PAL-NTSC
VIDEO BOARD + V3.00
RGB IN
RGB OUT
VIDEO IN
SAT
CONT
BRIT
COLOUR
IC1
IC2
IC3
IC4
IC5
SC1
SC2
CL1
CL2
L1
L2
L3
XT1
CV1
VR1
VR2
VR3
VR4
VR5
VR6
VR7
TR1
TR2
TR3
TR4
TR5
TR6
TR7
TR8
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
GND

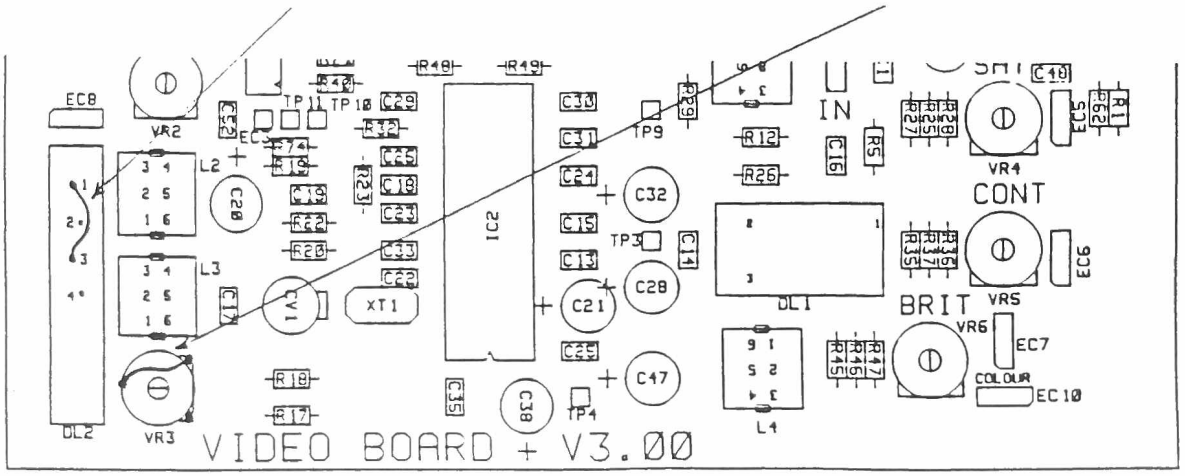
The video board can operate in one of two modes, **PAL** or **NTSC** . For **PAL** all the components shown on the parts list are required. but for **NTSC** the following components are **not** required:

DL2 Chroma delay line
L2 Coil
R17 Resistor
VR3 Variable resistor.

In addition the following straps are required:

DL2 strap pin 1 to pin 3

VR3 strap pin 2 to pin 3



Adjustments for Hanover bars are not required as in the case of **PAL**.

VIDEO BOARD STRAPS FOR NTSC

SUPERSCAN 2001 PARTS LIST	VIDEO BOARD	SHEET 1 OF 4
COMPONENT GROUP: RESISTORS	VER.:VBV3.00	DATE: AUG. 1993

VALUE	QNTY	RATNG	LOCATION	COMMENTS
68 //	3	//	R63 R64 R65	METAL FILM 5%
82 //	4	//	R34 R44 R49 R50	//
220 //	4	//	R15 R66 R69 R70	//
270 //	1	//	R53	//
330 //	8	//	R12 R31 R41 R58 R62 R67 R68 R71	//
390 //	1	//	R18	//
470 //	1	//	R23	//
560 //	1	//	R16	//
100 //	1	//	R24	//
680 //	6	//	R11 R13 R42 R52 R26 R29	//
820 //	1	//	R9	//
1.0 KOHM	7	//	R1 R5 R14 R22 R55 R56 R57	//
1.2 //	1	//	R17	//
1.8 //	1	//	R38	//
2.7 //	1	//	R32	//
3.3 //	3	//	R39 R72 R73	//
3.9 //	1	//	R6	//
4.7 //	1	//	R10	//
5.6 //	3	//	R7 R30 R51	//
6.8 //	3	//	R21 R40 R47	//
10.0 //	6	//	R19 R20 R33 R43 R48 R54	//
12.0 //	1	//	R4	//
15.0 //	1	//	R8	//
				//
18.0 //	1	//	R61	//
8.2 //	1	//	R74	//

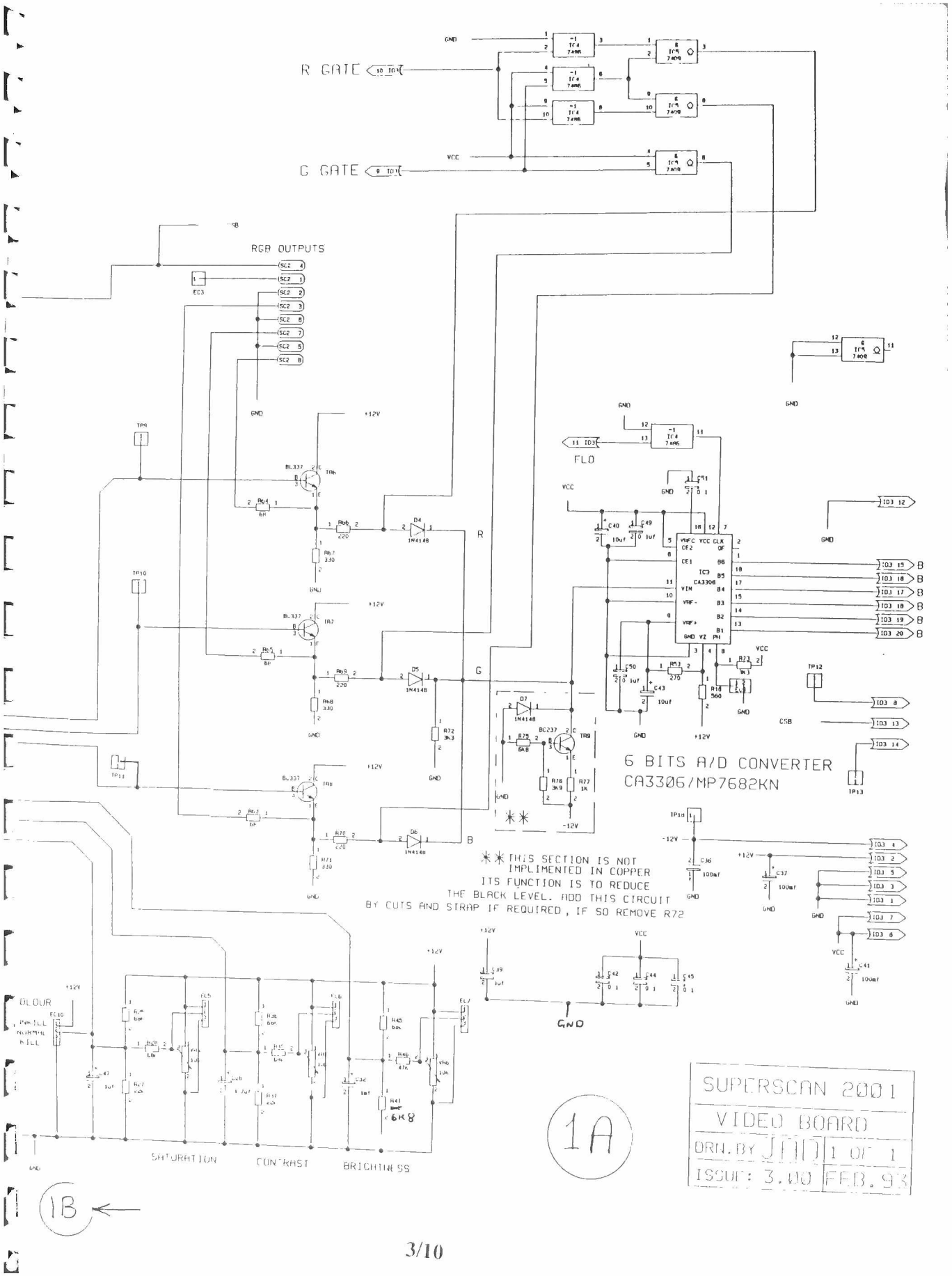
SUPERSCAN 2001 PARTS LIST	VIDEO BOARD	SHEET 2 OF 4

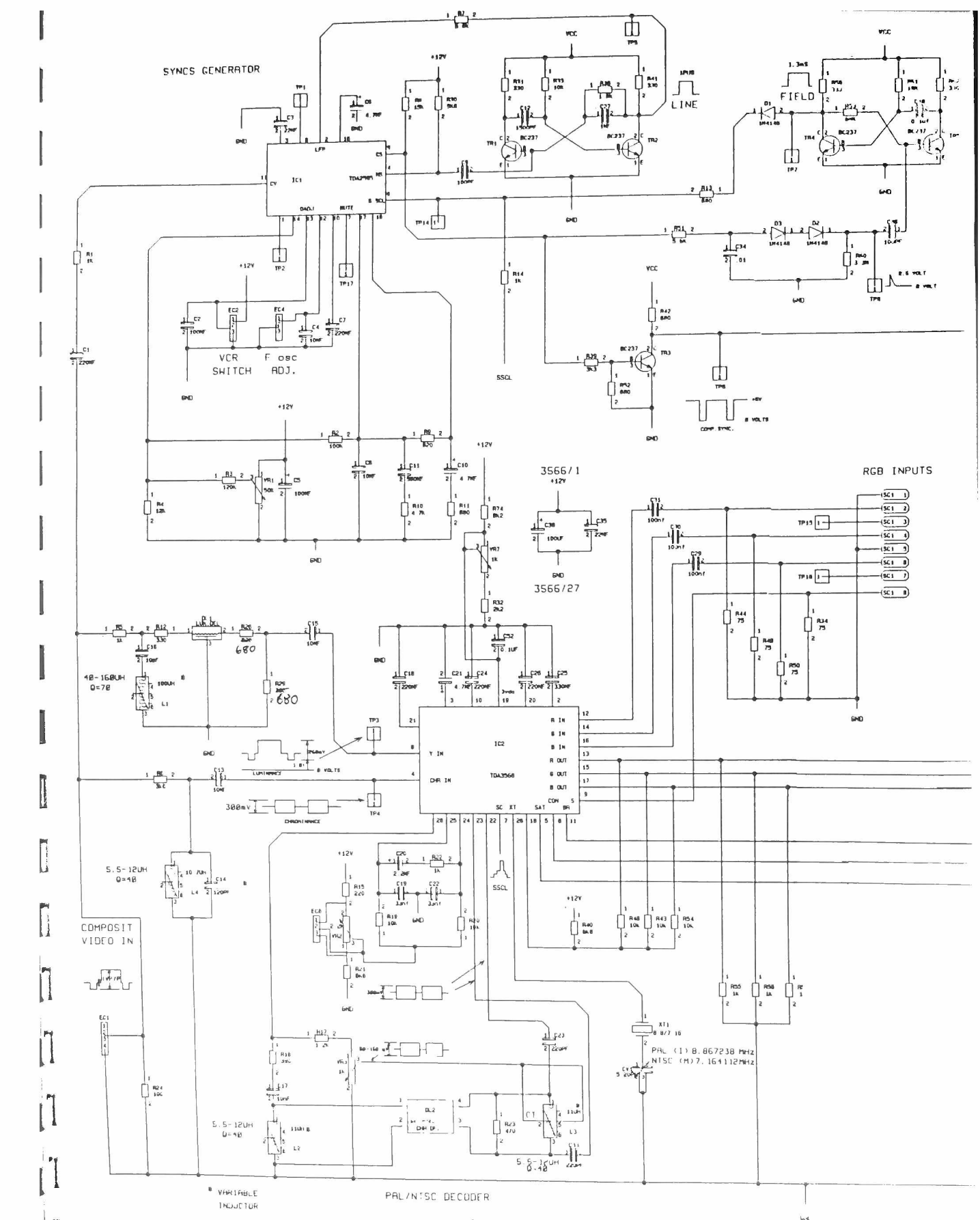
COMPONENT GROUP: RESISTORS	VER.:VBV3.00	DATE: NOV. 1992

VALUE	QNTY	RATNG	LOCATION	COMMENTS
22.0 KOHM	2	0.25W	R27 R37	METAL FILM 5%
47.0 //	1	//	R46	//
68.0 //	~~5~~ 5	//	R25 ~~R28~~ R35 R36 R45 R59	//
100.0 //	1	//	R2	//
120.0 //	1	//	R3	//
3.3 MOHM	1	//	R60	//
56 KOHM	1	//	R28	
2.2 KOHM	1	0.25W	VR2 HORIS. SING. TRN. POT. LINEAR	
47.0 //	1	//	VR1 //	
1.0 //	2	//	VR3 VR7 // VR3 IS NOT REQUIRED FOR NTSC	
10.0 //	3	//	VR4 VR5 VR6 // VR4 AND VR6 ARE USED FOR CONTROLLING COLOUR AND BRIGHTNESS RESPECTIVELY , PLEASE DONT FIT ON PCB THEY ARE TO BE FITTED ON THE FRONT PANEL AS STANDARD LINEAR POTS WITH SUITABLE KNOBS.WIRED VIA 3PIN SILs.	

SUPERSCAN 2001 PARTS LIST			VIDEO BOARD	SHEET 3 OF 4
COMPONENT GROUP: CAPPACITORS			VER.:VBV3.00	DATE: AUG. 1993
VALUE	QNTY	RATNG	LOCATION	COMMENTS
10 PF	1	16V	C16 NON-ELECTROLITICS	5mm PITCH
100 //	2	//	C9 C46 //	//
120 //	1	//	C14 //	//
220 //	2	//	C23 C33 //	//
1.0 nF	1	//	C27	
1.5 //	1	//	C12 NON ELECTROLITIC	5mm PITCH
4.7 //	1	//	C6 //	//
10.0 //	6	//	C4 C8 C13 C15 C17 C34	
22.0 //	2	//	C3 C35 NON ELECTROLITIC	5mm PITCH
33.0 //	2	//	C19 C22 //	//
100 //	13	//	C2 C29 C30 C31 C39 C42 C44 C45 C48 C49 C50 C51 C52	//
220 //	5	//	C1 C7 C18 C24 C26 //	//
330 //	1	//	C25 //	//
470 //	1	//	C11 (NOT CERAMIC) //	//
1.0 UF	2	//	C32 C47 ELECTROLITICS	//
2.2 //	1	//	C20 //	//
4.7 //	3	//	C10 C21 C28 //	//
10.0 //	2	//	C40 C43 //	//
100 //	5	//	C5 C36 C37 C38 C41 //	//
				//

SUPERSCAN 2001 PARTS LIST			VIDEO BOARD	SHEET 4 OF 4
COMPONENT GROUP:		SEMICOND & OTHERS	VER.:VBV3.00	DATE: AUG. 1993
VALUE	QNTY	RATNG	LOCATION	COMMENTS
TDA2595	1	18PIN	IC1 (SOCKETED) TV SYNCS. GENERATOR	MULLARD
TDA3566	1	28PIN	IC2 (SOCKETED) PAL/NTSC DECODER	MULLARD
CA3306	1	18PIN	IC3 (SOCKETED) A/D CONVERTER	
74LS86	1	14PIN	IC4 XOR GATES	
74LS09	1	14PIN	IC5 AND GATES O/C	
BC237	5	NPN	TR1 TR2 TR3 TR4 TR5	TRANSISTORS
BC337	3	NPN	TR6 TR7 TR8	//
IN4148	6	SILIC	D1 D2 D3 D4 D5 D6	SIGNAL DIODES
8.8/7.16	1		XT1 EITHER PAL OR NTSC TWICE SUB. CAR. CRYSTAL	
5 - 20 PF	1	3PIN	VC1 VARIABLE CAPACITOR	
T9006A	1		DL1 LUMA DELAY LINE	TDK
DL700	1		DL2 CHROM. DEL. LINE (PAL ONLY)	MULLARD/GTE
50 TO 160 UH	1		L1	VARIABLE COIL
7 TO 13 //	2		L2 L4 (L2 NOT REQ. FOR NTSC)	//
7 TO 12 //	1		L3 CENTRE TAPED	//
18 PIN DIL	2		IC SOCKETS	
28 PIN DIL	1		IC SOCKET	
SIL3		3PIN	EC2 EC4 EC5 EC6 EC7 EC8 EC10	
SIL4	1	4PIN	EC1 2.5 mm SIL PLG	
SIL8	2	8PIN	SC1 SC2 2.5 mm SIL PLG	
IDC20	1	20PIN	ID3 IDC PLUG	
IDC20S	2	20PIN	20 WAY RIB. CABLE 10cm LONG TERM. WITH 2 IDC SOCKETS	
PCB	1		VIDEO BOARD PCB	


R GATE
G GATE
RGB OUTPUTS
FLD
6 BITS A/D CONVERTER
CA3306/MP7682KN
** THIS SECTION IS NOT IMPLIMENTED IN COPPER ITS FUNCTION IS TO REDUCE THE BLACK LEVEL. ADD THIS CIRCUIT BY CUTS AND STRAP IF REQUIRED, IF SO REMOVE R72
COLOUR
SATURATION
CONTRAST
BRIGHTNESS
SUPERSCAN 2001
VIDEO BOARD
DRN. BY JH
1 OF 1
ISSUE: 3.00
FEB. 93


SYNCS GENERATOR
FIELD
LINE
VCR F osc
SWITCH ADJ.
3566/1
3566/27
RGB INPUTS
COMPOSIT
VIDEO IN
PAL/NTSC DECODER
PAL (I) 8.867238 MHz
NTSC (M) 7.164112MHz
VARIABLE
INDUCTOR
SSCL
680
680
1B
1A

SUPERSCAN 2001

KEYBOARD

ASSEMBLY INSTRUCTIONS

PARTS LIST

&

CIRCUIT DIAGRAM

SECTION 4 INTRODUCTION

The front keyboard is one of three facilities by which the SUPERSCAN 2001 could be controlled, this is in addition to its own mouse and a host computer such as a PC with the right interface.

It is made-up from a matrix of 35 push button switches with LEDs, six of which are designated for future use. The PCB is designed to take two types of switches but in practice one type is preferred and hence the front panel is designed for the common type as it is cheep, easily available and has a good tactile feel , description and picture of this switch are in the parts list on page **4/5**.

The front panel is made out of aluminium with 70 holes for the switches and LEDs, it also supports two 10k Ohm linear pots for brightness and colour control as well as the ON/OFF switch.

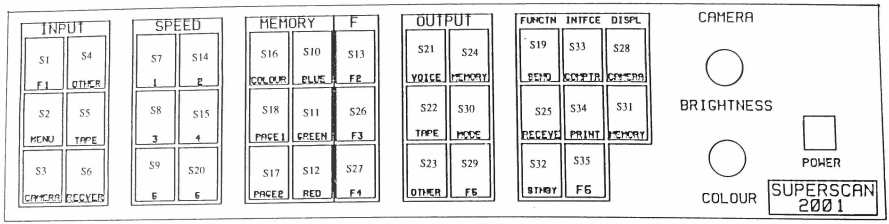
The recommended method of assembly is to fit the ON/OFF switch and the two pots and knobs to the front panel and then assemble the PCB according to the instructions shown on sheet **4/3**.

Description of the front panel controls is on page **4/2** and the circuit diagram in on page **4/4**.

Caution!

The front panel is fixed to the case via two fused threaded studs , care must be taken not to over-tighten the fixing nuts as this could cause detachment of these studs.

SUPERSCAN 2001 FRONT PANEL LAYOUT AND SWITCH FUNCTIONS



S1 FOR FUTURE USE

S2 MENU

S3 SNATCH FRAME

S4 INPUT OTHER

S5 INPUT TAPE

S6 INPUT RECEIVER

S7 SPEED 1 (slowest)

S8 SPEED 3

S9 SPEED 5

for further info. on speeds see instructions.

S10 DISPLAY **BLUE** MEMORY

S11 DISPLAY **GREEN** MEMORY

S12 DISPLAY **RED** MEMORY

S13 FOR FUTURE USE

S14 SPEED **2**

S15 SPEED *4*

S16 DISPLAY **COLOUR** MEMORY

S17 DISPLAY MEMORY **PAGE 2**

S18 DISPLAY MEMORY **PAGE 1**

S19 **TRANSMIT**

S20 SPEED **6** (fastest)

S21 OUTPUT **VOICE**

S22 OUTPUT **TAPE**

S23 OUTPUT **OTHER**

S24 OUTPUT **MEMORY**

S25 **RECEIVE**

S26 FOR FUTURE USE

S27 FOR FUTURE USE

S28 DISPLAY **CAMERA**

S29 FOR FUTURE USE

S30 **MODE** SELECTION

S31 DISPLAY **MEMORY**

S32 **STAND-BY**

S33 **COMPUTER**

S34 **PRINTER**

S35 FOR FUTURE USE

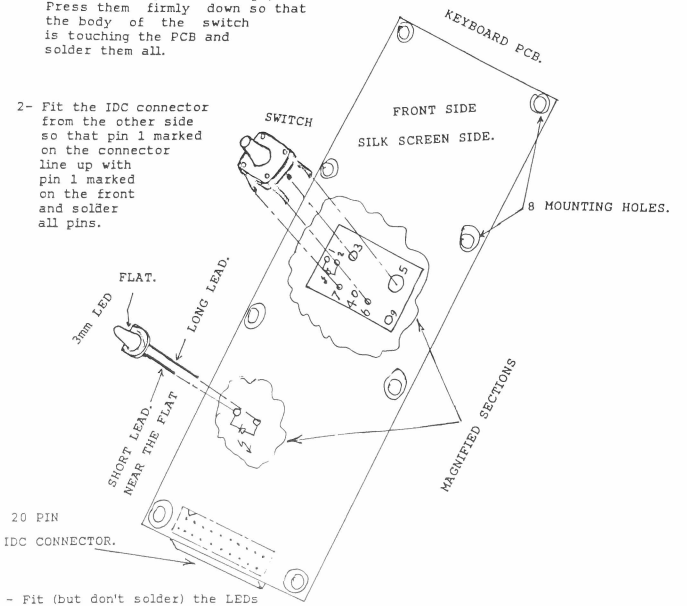
'S' LOCATION IS REFERENCED TO THE FRONT PANEL CIRCUIT DIAGRAM

SUPERSCAN 2001 KEYBOARD ASSEMBLY INSTRUCTIONS

Please note that the switches and the LEDs are fitted on the front side of PCB (the front side is the side with silk screen markings). The IDC connector is fitted on the other side.

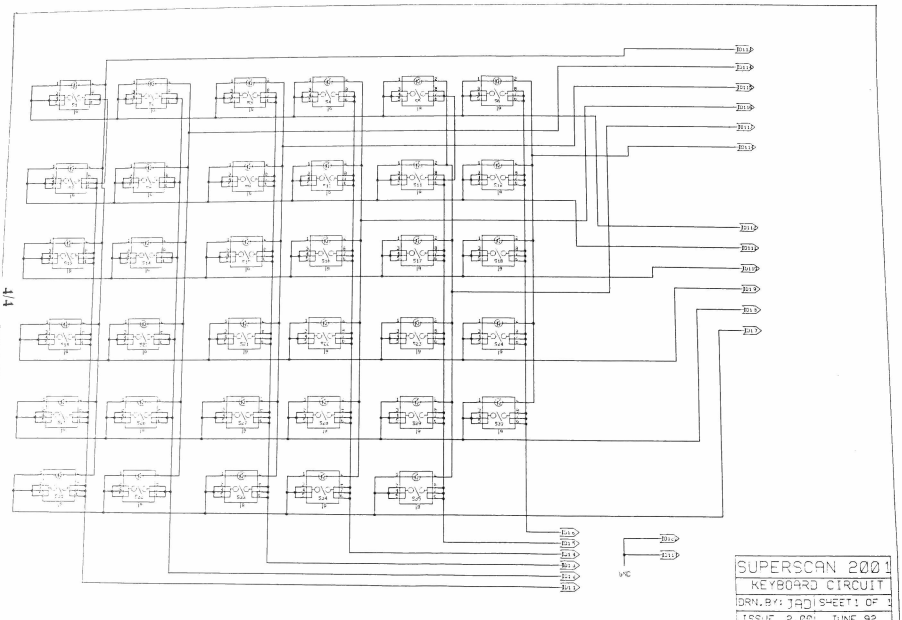
1- Fit all 35 switches as shown in the sketch. Switches can go in two ways, either is OK. Press them firmly down so that the body of the switch is touching the PCB and solder them all.

2- Fit the IDC connector from the other side so that pin 1 marked on the connector line up with pin 1 marked on the front and solder all pins.



- Fit (but don't solder) the LEDs as indicated in the sketch Fit the keyboard to the front panel and push the LEDs through the holes . Adjust the nuts (one on either side of the PCB) so that the front of the PCB is 6 mm away from the front panel all round. Tighten the nuts. Operate the switches and judge for yourself if they feel OK, if not adjust the distance to suit you. Support the key board horizontally, push the LEDs down as much as they can go and solder. Crop excess leads.

SUPERSCAN 2001	
KEYBOARD ASSEMBLY DIAGRAM	
DRN. BY JAD	DATE. NOV. 91


SUPERSCAN 2001
KEYBOARD CIRCUIT
DRN.BY: JADI SHEET 1 OF 1
ISSUE 2.00: JUNE 92

SUPERSCAN 2001 PARTS LIST	KEYBOARD BOARD			SHEET 1 OF 1
COMPONENT GROUP:	ALL COMPONENTS		VER.:KBV2.00	DATE: NOV. 1992
VALUE	QNTY	RATNG	LOCATION	COMMENTS
COMBSW	35	/	S1 TO S35 SUB.MIN. TACT.SWITCH AS SHOWNE 	AVAILABLE FROM MAPLIN CODE JR89W
RED LED	35	/	3mm RED LED	
IDC20V	1	20PIN	ID1 20 PIN IDC PLUG	
CABLE	1	/	20 WAY RIBBON CABLE, 15cm LONG TERMINATED WITH 20 PIN IDC SOCKETS AT BOTH ENDS.	
PCB	1	/	KEYBOARD PCB	

SUPERSCAN 2001

POWER SUPPLY

ASSEMBLY INSTRUCTIONS, SPECIFICATION

PARTS LIST

&

CIRCUIT DIAGRAM

SECTION 5 INTRODUCTION

The system will operate from either linear or switch mode power supplies. The power requirements of the system depends on whether it is built using **TTL** or **CMOS** components. The only constraint when using TTL is the higher power and heat dissipation. If TTL is adopted a higher efficiency power supply is recommended i.e. a switch mode power supply.

It is therefore favourable to adopt CMOS logic to minimise power demand and heat generation.

Power requirements of the system are detailed on page **5/2 .**

The available power supply Is customised for CMOS logic only. It is of the **linear type**, designed specially for the SUPERSCAN 2001. It is an optional item and not part of the main kit, comes assembled , tested and ready to use (unless agreed otherwise) .

The power supply is assembled on an L shaped bracket as shown in the freehand sketch on page **5/3.** The L bracket also acts as a heat sink . Circuit diagram and the parts list are provided on page **5/4** & **55** respectively.

POWER SUPPLY SPECIFICATIONS.

Mains input : 120/240 Volts (Switchable) -15 % + 8 %, 50/60 Hz, at 20°C ambient temperature.

Output : + 5 V DC @ 1.2 Amps regulated.
+ 12 V DC @ 250 mAmps regulated.
- 12 V DC @ 100 mAmps regulated

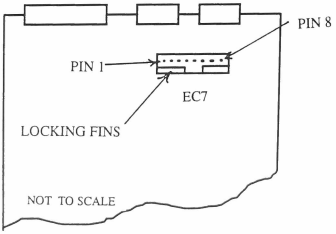
SUPERSCAN 2001 POWER REQUIREMENTS

Power is supplied to the system through one connector situated on the main board (EC7). All voltages are dc and from a stabilised source such as a switch-mode or linear power supplies.

Voltage	Current mA for CMOS ICS	Current mA For LSTTL ICs
+ 5 V	1200	2200
+ 12 V	250	250
- 12 V	50	50

1 . GND
2 . +5 V
3 . +5 V
4 . +5 V
5 . GND
6 . -12 V
7 . GND
8 . +12 V

POWER CONNECTOR EC7
ON THE MAIN BOARD



MAIN BOARD VIEWED FROM THE TOP

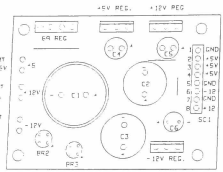
ORIENTATION OF THE POWER CONNECTOR

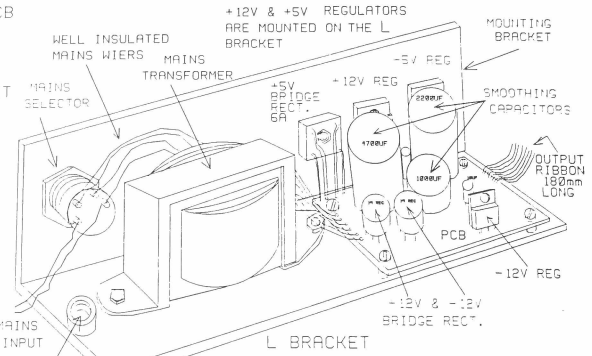
EC7 CONSTITUENTS

MAY 93

1- FIT AND SOLDER ALL COMPONENTS TO THE PCB

2- FIT THE TRANSFORMER AND THE SELECTOR SWITCH TO THE BRACKET





3- FIT THE PCB TO THE BRACKET TEMPORARELY

4- FIT THE 6A BRIDGE AND THE +5V & +12V REGULATORS TO THE L BRACKET TEMPORARILY AND INSERT THROUGH THE PCB

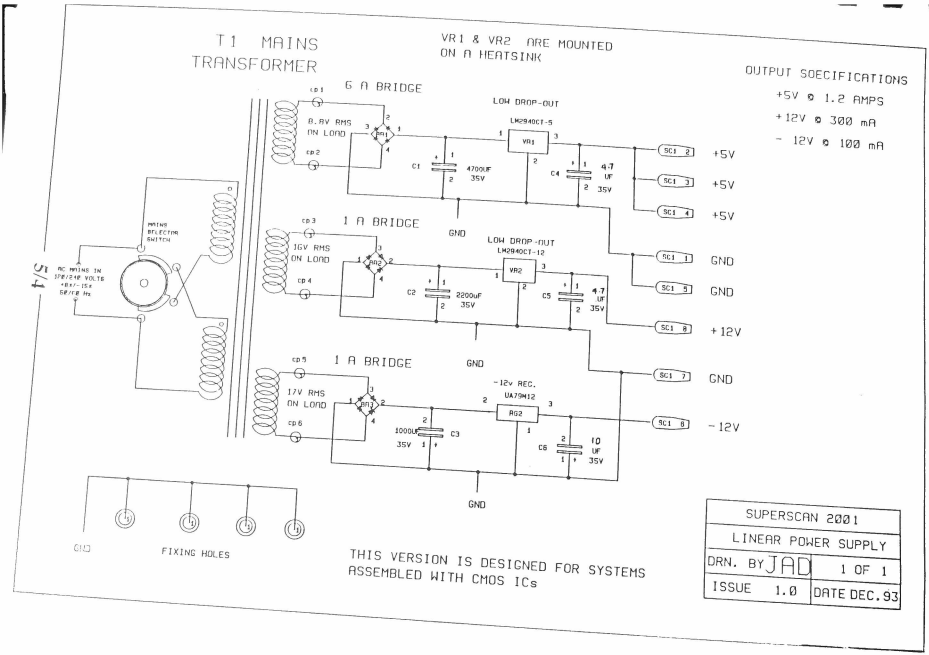
5- MARK THE POSITION FOR SOLDERING REMOVE ALL IN 3 & 4 OFF BRACKET

6- SOLDER THE THREE COMPONENTS IN THE PCB AT THE MARKED HIGHT & FIT/SOLDER RIBBON

7- FIT PERMANENTLY, THE PCB AND SCREW THE REGS AND BRIDGE TO THE BRACKET

8- WIRE UP, SELECT WORKING VOLTAGE & TEST

SUPERSCAN 2001 POWER SUPPLY ASSEMBLY AND INSRUCTIONS DRN BY JAD


T1 MAINS TRANSFORMER
VR1 & VR2 ARE MOUNTED ON A HEATSINK
OUTPUT SOECIFICATIONS
+5V @ 1.2 AMPS
+12V @ 300 mA
- 12V @ 100 mA
6 A BRIDGE
8.8V RMS ON LOAD
LOW DROP-OUT
LM2940CT-5
VR1
C1 4700UF 35V
C4 4.7 UF 35V
+5V
+5V
+5V
GND
1 A BRIDGE
16V RMS ON LOAD
LOW DROP-OUT
LM2940CT-12
VR2
C2 2200uF 35V
C5 4.7 UF 35V
GND
GND
+12V
1 A BRIDGE
GND
12V RMS ON LOAD
-12v REG.
UA79M12
RG2
1000U C3 35V
C6 10 UF 35V
GND
- 12V
GND
FIXING HOLES
THIS VERSION IS DESIGNED FOR SYSTEMS ASSEMBLED WITH CMOS ICs
SUPERSCAN 2001
LINEAR POWER SUPPLY
DRN. BY JAD
1 OF 1
ISSUE 1.0
DATE DEC.93

SUPERSCAN 2001 PARTS LIST		POWER SUPPLY		SHEET 1 OF 1
COMPONENT GROUP:		ALL COMPONENTS	VER.:PSV2.00	DATE: AUG. 1993
VALUE	QNTY	RATNG	LOCATION	COMMENTS
AC MAINS TRANSFORMER	1	50VA	T1	CUSTOM WOWND MAINS TRANSFORMER INPUT WORKING RANGE AND OUTPUT VOLTAGES ARE SELECTED FOR MINIMUM HEAT DISSIPATION. INPUT: 120/240 +8-16% V SWITCHABLE, 50/60Hz ON LOAD RMS OUTPUTS: 8.8V @ 2AMPS,16V @ 300mA 17V @ 100mA
MAINS SELECTOR SWITCH	1	1Amp	S1	ROTARY MAINS 120/240 V SELECTOR SWITCH MOUNTED ON THE L BRACKET.
BRIDGE RECTIFIERS	1	6Amp	BR1	SQUARE CONSTRUCTION WITH MOUNTING HOLE, MOUNTED ON THE SIDE OF THE L BRACKET FOR MAX HEAT DESIP
50V MIN.	2	1Amp	BR2,BR3	ROUND STRUCTURE MOUNTED ON PCB WITH CLEARANCE
4700 UF	1	35V	C1	5V RAIL SMOOTHING CAPACITOR (for 1.2Amp version)
10000 UF	1	35V	C1	5V RAIL SMOOTHING CAPACITOR(for 2.2amp version)
2200 UF	1	35V	C2	+12V RAIL SMOOTHING CAPACITOR
1000 UF	1	35V	C3	-12V RAIL SMOOTHING CAPACITOR
LM2940CT-5	1	1A	VR1	+5V REGULATR 0.5V DROP-OUT , (for 1.2A version)
NOT AVAILABLE	1	2A		+5V REGULATOR , (for 2.2A version)
LM2940CT-12	1	1A	VR2	+12V REGULATOR 0.5V DROP-OUT , NATIONAL
UA79M12	1	0.5A	RG2	-12V REGULATOR.
4.7 UF	2	35V	C4,C5	ELECTROLITIC CAPACITORS
8 WAY RIBBON CABLE	1	/		180 mm LONG TERMINATED AT ONE END WITH AN 8 WAY SOKETT
8 WAY SKT AND 8 PINS	1	/		POLARISED 8 PIN SKT SHELL WITH 8 CRIMPING OR SOLDERING PINS.
10 UF	1	/	C6	ELECTROLITIC CAPACITOR
VARIOUS				WIRES AND HEAT SHRINK SLEEVES
PCB	1	/		PRINTED CIRCUIT BOARD
L BRACKET	1	/		ALUMIN. L SHAPED PRACKET FOR MOUNTING TRANSFORMER AND AND PCB ALSO ACTS AS A HEAT SINK.
8 WAY RIBBON	1			200 mm LONG RIBBON CABLE.
SCREWS	4	/		4x3mm screws 6mm LONG FOR MOUNTING THE PCB.
	2	/		2X4mm screws 6mm LONG FOR MOUNTING THE L BRACKET

SUPERSCAN 2001

ENCLOSURE

ASSEMBLY INSTRUCTIONS

&

SYSTEM SET-UP

SECTION 6 INTRODUCTION

This section contains the necessary information on how to wire and put the system together after assembling the boards. It also describes the setting-up procedure for the system. It is assumed that you have already assembled the keyboard and fitted it to the front panel, as described in section **4**.

THE CASE. Page **6/3** shows a sketch and overall dimensions of the case. It is provided to give a general idea for the benefit of those who prefer to make their own. A parts list is shown on page **6/13**

ASSEMBLY STEPS

Before putting the boards together it is more convenient to fit the back panel with all the components and wire it according to the diagram shown on page 6/5

Make the connectors as recommended on page **6/4** keeping roughly to the provided dimensions.

Fit all the connectors and the **1k** pot to the back panel. Fit an earth tag to a 4mm x15mm screw and insert it through the hole (from the inside to the outside) marked **GND**. Fit an anti shake washer, fit a nut and tighten very firmly. Fit another nut and hand tighten . The last nut is to be used for securing the ground wire between the SUPERSCAN 2001 and the rest of the set-up.

Wire the back panel according to the diagram on page **6/5** using the leads you have made. Use a reasonably thick wire for **ground connections.**

Fit the capacitors and tidy up the wires by either using tie-wraps or a lacing cord.

Sheet 6/6 is a wiring option for analogue **RGB** inputs and outputs. This option could be implemented at a later stage, preferably after completion and test. A suitable hole must be drilled in the back panel to accommodate the switch, if not present.

IDC CONNECTORS. Make the 20 way IDC connectors with ribbon leads cut to the dimensions shown on sheet **6/7.**

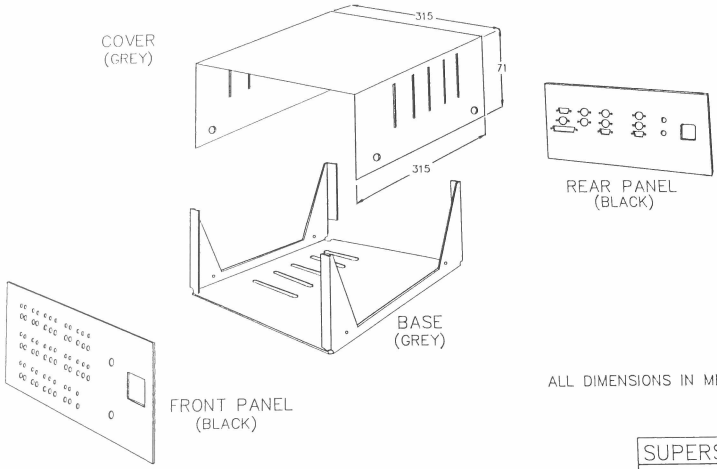
POWER SUPPLY. *Fit* the power supply to the base of the case. If using the SUPERSCAN 2001 power supply, then it will align with the holes existing in the base plate.

Fit the mains inlet socket to the back panel and insure that a **1Amp fuse** is inserted.

Fit the **ON/OFF** switch to the front panel.

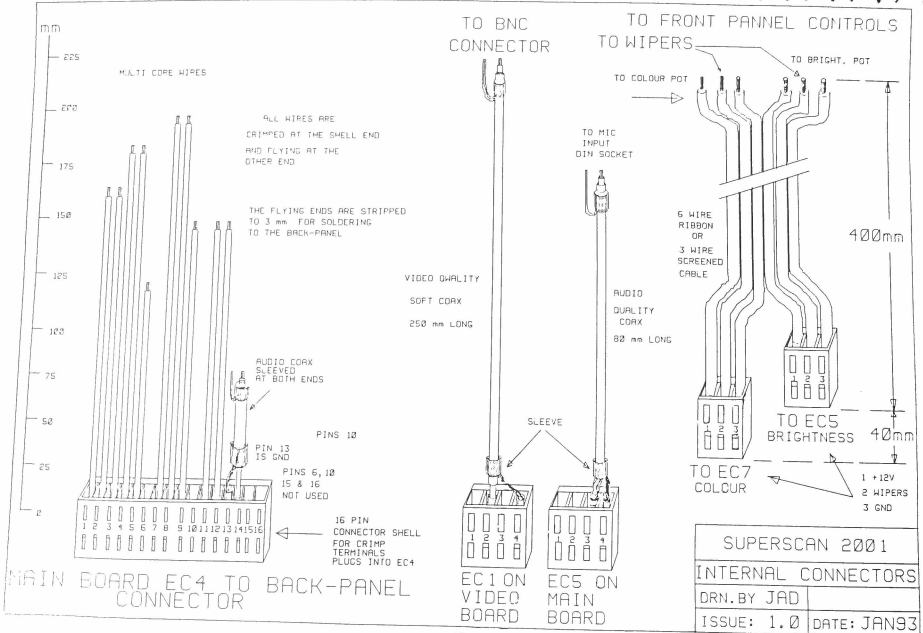
Assemble the boards inside the case following the instructions on sheet **6/9** onwards

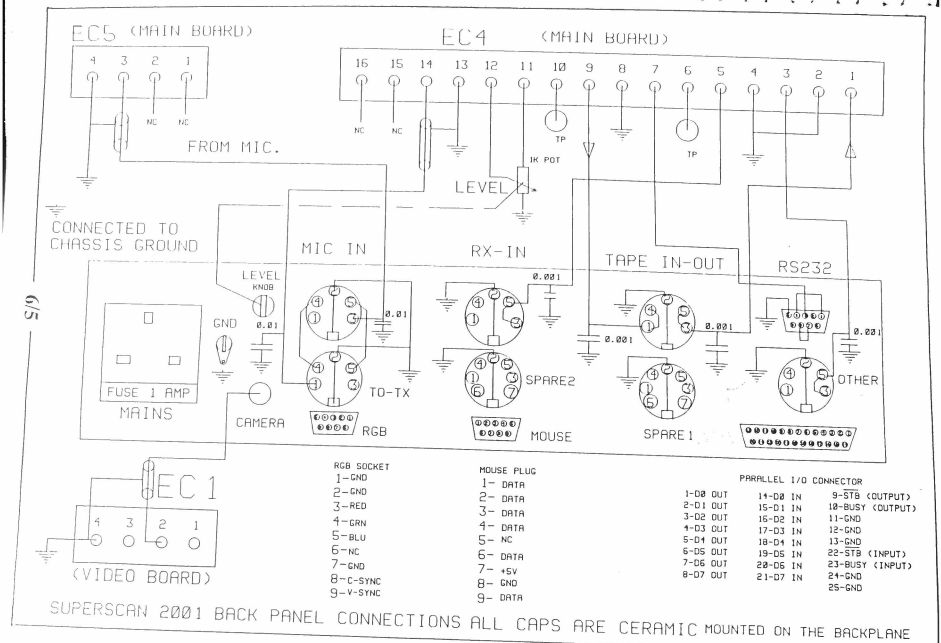
SYSTEM SET-UP. Please follow the instructions on sheet **6/14** onwards.



ALL DIMENSIONS IN MILLIMETRES.

SUPERSCAN 2001	
ENCLOSURE	
DWN: DRS	1 OF 2
ISSUE 1.00	JUL'92


mm
225
200
175
150
125
100
75
50
25
0
MULTI CORE WIRES
ALL WIRES ARE
CRIMPED AT THE SHELL END
AND FLYING AT THE
OTHER END
THE FLYING ENDS ARE STRIPPED
TO 3 mm FOR SOLDERING
TO THE BACK-PANEL
AUDIO COAX
SLEEVED
AT BOTH ENDS
PINS 10
PIN 13
IS GND
PINS 6, 10
15 & 16
NOT USED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
16 PIN
CONNECTOR SHELL
FOR CRIMP
TERMINALS
PLUGS INTO EC4
MAIN BOARD EC4 TO BACK-PANEL
CONNECTOR
TO BNC
CONNECTOR
VIDEO QWALITY
SOFT COAX
250 mm LONG
SLEEVE
1 2 3 4
EC1 ON
VIDEO
BOARD
1 2 3 4
EC5 ON
MAIN
BOARD
TO FRONT PANNEL CONTROLS
TO WIPERS
TO BRIGHT. POT
TO COLOUR POT
TO MIC
INPUT
DIN SOCKET
AUDIO
QUALITY
COAX
80 mm LONG
6 WIRE
RIBBON
OR
3 WIRE
SCREENED
CABLE
400mm
1 2 3
TO EC5
BRIGHTNESS
40mm
1 2 3
TO EC7
COLOUR
1 +12V
2 WIPERS
3 GND
SUPERSCAN 2001
INTERNAL CONNECTORS
DRN.BY JAD
ISSUE: 1.0
DATE: JAN93



SUPERSCAN 2001 BACK PANEL CONNECTIONS ALL CAPS ARE CERAMIC MOUNTED ON THE BACKPLANE

ANALOGUE RGB IN/OUT OPTION

OPERATION

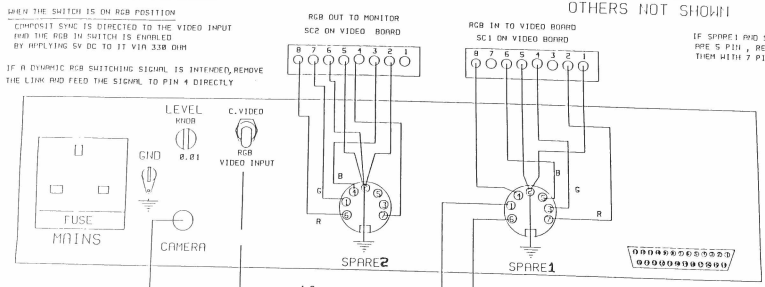
WHEN THE SWITCH IS ON C.VIDEO POSITION
COMPOSIT VIDEO IS DIRECTED TO THE INPUT OF THE VIDEO BOARD
AND THE RGB SWITCHING SIGNAL IS DISABLED

WHEN THE SWITCH IS ON RGB POSITION
COMPOSIT SYNC IS DIRECTED TO THE VIDEO INPUT
AND THE RGB IN SWITCH IS ENABLED
BY APPLYING 5V DC TO IT VIA 330 OHM

IF A DYNAMIC RGB SWITCHING SIGNAL IS INTENDED, REMOVE
THE LINK AND FEED THE SIGNAL TO PIN 4 DIRECTLY

ONLY SPARE1 AND SPARE2
ARE AFFECTED
OTHERS NOT SHOWN

IF SPARE1 AND SPARE2
ARE 5 PIN , REPLACE
THEM WITH 7 PIN



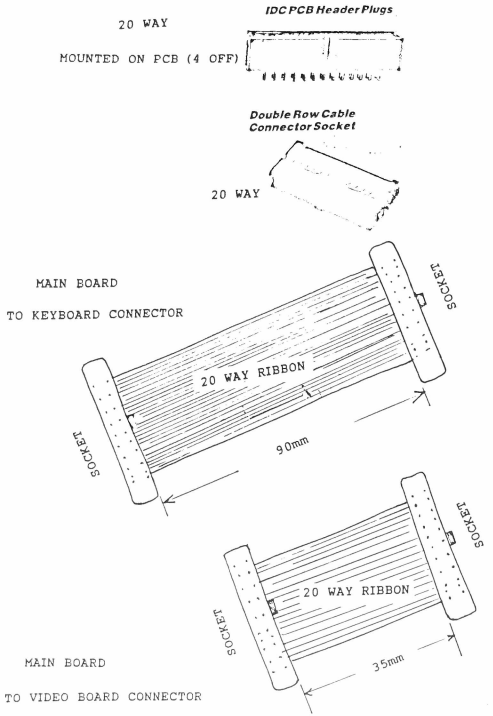
SOT RESISTOR

REQUIRED ONLY IF EXTERNAL SYNC IS
HIGHER THAN ONE VOLT
SELECT SOT SO THAT SYNC
AMPLITUDE IS BETWEEN 0.5 AND 1.0 V

SUPERSCAN 2001
BACK PLANE

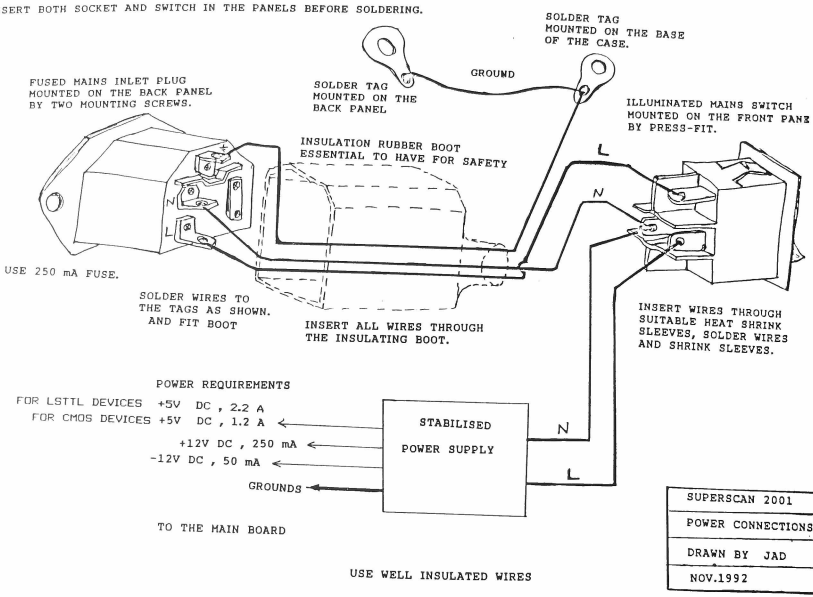
SUPERSCAN 2001	
ANAL. RGB IN/OUT	
DRN. BY JAD	OPTIONAL CIRCUIT
VER. 1.0	DATE JAN 93

0.05in. INSULATION DISPLACEMENT CONNECTORS (IDC)



ENSURE THAT GUIDES ( ) ARE FACING AS SHOWN

SUPERSCAN 2001 IDC CONNECTORS


INSERT BOTH SOCKET AND SWITCH IN THE PANELS BEFORE SOLDERING.
SOLDER TAG MOUNTED ON THE BASE OF THE CASE.
GROUND
FUSED MAINS INLET PLUG MOUNTED ON THE BACK PANEL BY TWO MOUNTING SCREWS.
SOLDER TAG MOUNTED ON THE BACK PANEL
ILLUMINATED MAINS SWITCH MOUNTED ON THE FRONT PANEL BY PRESS-FIT.
INSULATION RUBBER BOOT ESSENTIAL TO HAVE FOR SAFETY
L
N
USE 250 mA FUSE.
SOLDER WIRES TO THE TAGS AS SHOWN. AND FIT BOOT
INSERT ALL WIRES THROUGH THE INSULATING BOOT.
INSERT WIRES THROUGH SUITABLE HEAT SHRINK SLEEVES, SOLDER WIRES AND SHRINK SLEEVES.
POWER REQUIREMENTS
FOR LSTTL DEVICES +5V DC , 2.2 A
FOR CMOS DEVICES +5V DC , 1.2 A
+12V DC , 250 mA
-12V DC , 50 mA
GROUNDS
STABILISED POWER SUPPLY
N
L
TO THE MAIN BOARD
USE WELL INSULATED WIRES
SUPERSCAN 2001
POWER CONNECTIONS
DRAWN BY JAD
NOV.1992

SYSTEM ASSEMBLY

1- *Remove* the case cover and put safely aside together with the fixing screws.

2-*Fit* 2x10 mm spacers in the two holes near the front of the case by inserting two 3.5x6mm screws fitted with anti shake washers from the outside of the case, do not tighten hard. Similarly, fit the second 2x10 mm spacers (with threaded studs at one end) in the middle two holes, refer to diagram **6/12**.

3- **Remove** the panel fixing posts from the D-type connectors and fit the back panel to the main board and tighten moderately.

4- *Move* the main board & panel assembly and fit to the base of the case by aligning the main board holes with the 10mm spacers. Fit the back panel screws and tighten slightly.

The holes for the 10 mm spacers in the base are made larger than the screw for the purpose of taking up any misalignment. Loosen the screw on each spacer in turn and align with each hole in the main board so that the spacer is in the middle of the hole and tighten permanently.

5- *Undo* the back-panel and remove the assembly. Separate the main board and put aside.

6- *Loosely* fit the back panel and the front panel to the base (with keyboard and power switch already permanently fixed in position) and wire the power connections as shown on the power connection diagram **6/8**.

7- Make up the DC power connector (between the power supply and the main board) so that it is ready to plug in . Insure that all mains carrying conductors are well insulated and a 1 Amp fuse is in the mains inlet socket. Connect the system to the mains and switch on, the power switch should illuminate. Using a **voltmeter,** make absolutely sure that the voltages are correct and on the intended pins of the connector . Switch off and disconnect from the mains.

8- *Fit* 2x25 mm spacers to the main board, on the component's side in the two fixing holes closest to the **D-type** connectors. Use crinkle washers on the underside and permanently tighten the screws.

9-*Moderately* tighten the fixing nuts of the front panel such that the panel is permanently fixed in position.

10- *Remove* the fixing screws from the back panel and re-fit the main board to it, fit and tighten all the fixing posts to the **D-type** connectors.

11- *Fit* the assembly to the base, Permanently, tighten the back-panel screws, this time make sure to use anti-shake washers, this is important for a good earth contact. Fit two screws with crinkle washers to the two front fixing holes. Fit 2x25 mm spacers with crinkle washers over the studs emerging via the ma inboard from the base.

12- *Fit* the 16 pin back panel connector to **EC4** on the main board .

13- *Fit* the microphone connector to **EC5** .

14- *Fit* the power supply connector to **EC7.**

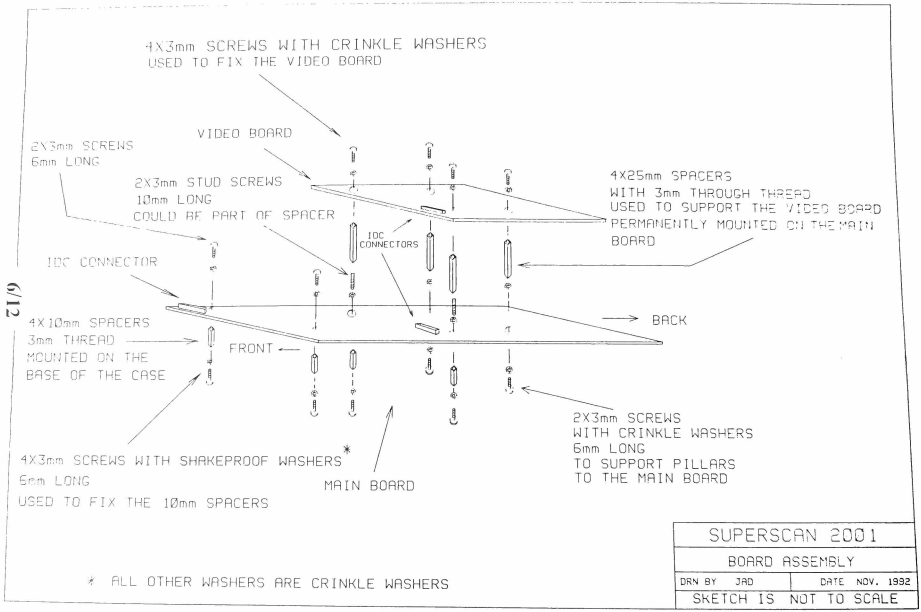
15- *Do not fit the video board yet.*

16- *Connect* the IDC connector between the main board and the keyboard .

17- *The* system is now ready to be switched on (without the video board). Attach the peripherals such as the monitor, mouse if implemented in the software and switch mains supply **ON**. Colour test card should appear on the screen. If it does not work, please carry out visual checks on the board checking the values of components, solder joints and track integrity. Failing any success contact JAD or Martin .

18- *If* the board appears to work, follow the operating instructions in section 7 . You should now be able to transmit and receive pictures (without the video board).

19- *If* you are convinced that the main board is working, switch the system off. Fit and connect the video board, insure that all pots on it are set at half way initially .


4X3mm SCREWS WITH CRINKLE WASHERS
USED TO FIX THE VIDEO BOARD
VIDEO BOARD
2X3mm SCREWS
6mm LONG
2X3mm STUD SCREWS
10mm LONG
COULD BE PART OF SPACER
4X25mm SPACERS
WITH 3mm THROUGH THREAD
USED TO SUPPORT THE VIDEO BOARD
PERMANENTLY MOUNTED ON THE MAIN
BOARD
IDC CONNECTORS
IDC CONNECTOR
4X10mm SPACERS
3mm THREAD
MOUNTED ON THE
BASE OF THE CASE
BACK
FRONT
2X3mm SCREWS
WITH CRINKLE WASHERS
6mm LONG
TO SUPPORT PILLARS
TO THE MAIN BOARD
4X3mm SCREWS WITH SHAKEPROOF WASHERS *
6mm LONG
USED TO FIX THE 10mm SPACERS
MAIN BOARD
* ALL OTHER WASHERS ARE CRINKLE WASHERS
SUPERSCAN 2001
BOARD ASSEMBLY
DRN BY JAD
DATE NOV. 1992
SKETCH IS NOT TO SCALE

SUPERSCAN 2001 PARTS LIST		SHEET 1 OF 1
COMPONENT GROUP:	ENCLOSURE VER.: 1.00	DATE: AUG. 1993
COMP.TYPE	QNTY	DISCRIPTION
BASE COVER	1 1	BASE MADE OUT OF ALUMINIUM 14 SWG AND PAINTED GRAY. HANK BUSHED FOR FIXING THE BACK-PANEL,COVER AND FEET. SIMILAR TO THE BASE EXCEPT 16 SWG.
FRONT PANEL BACK PANEL	1 1	MADE OUT OF ALUMINIUM 14 SWG ALL HOLES PUNCHED FOR LEDs, SWITCHES , CAMERA CONTROLS AND ON/OFF SWITCH.BOTH PANELS FINISHED IN BLACK AND FUNCTIONS ARE SILK SCREENED IN WHITE
RUBBER FEET	4	RUBBER FEETS WITH CENTRAL 4mm FIXING SCREWS
FIXING SCREWS	20	3mm DIA. 6mm LONG FIXING SCREWS
3mm WASHERS: CRINKLE SHAKEPROOF	 8 12	STEEL WASHERS TO FIT 3mm SCREWS FOR FIXING 10mm SPACERS,UNDERSIDE OF CASE AND BACK PANEL FOR FIXING COVER AND PCBs ON SPACERS.
KNOBS	2	KNOBS TO FIT STANDARD POTENTIOMETER SHAFTS USED TO CONTROL THE CAMERA LEVELS. BLACK OR SILVER COLOUR.
10mm SPACERS:	 2 2	 10mm METAL SPACERS FULLY THREADED INNER TO TAKE 3mm SCREWS 10mm METAL SPACERS,ONE SIDE WITH 3mm THREADED STUD 6mm LNG
25mm SPACERS	4	25mm METAL SPACERS THREADED AT BOTH ENDS TO TAKE 3mm SCREWS THESE SPACERS ARE USED TO FIX THE VIDEO BOARD TO THE MAIN BOARD.
NUTS	2 2	4mm METAL NUTS USED TO FIX THE FRONT PANEL TO THE BASE. 4mm WASHERS
BNC	1	BNC SOCKETT , THREADED TYPE. USED FOR THE CAMERA INPUT AND FIXED ON THE BACK PLANE.
DIN	7	5 X 5 PIN AND 2 X 7 PINS PANEL MOUNT DIN TYPE SOCKETS
D-TYPE	1	9 PIN SOCKETT , USED FOR THE GRAPHICS INPUT .
NUTS & BOLTS	18	18 SETS OF 3mm SCREWS NUTS & WASHERS FOR FIXING THE DIN AND D-TYPE CONNECTORS TO THE BACK PANEL.
1/2 NUTS	16	3mm 1/2 NUTS USED TO FIX THE KEYBOARD TO THE FRONT PANEL
MAINS INLET	1	SCREW MOUNT MAINS INLET PLUG.
ON/OFF SWITCH	1	ILLUMINATED PUSH_FIT MAINS SWITCH
4mm NUT&BOLT	1	4mm BOLT 10mm LONG WITH 2 CRINKLE WASHERS FOR EARTH TAGS ON THE BACK PLANE
EARTH TAGS	5	MOUNTED ON THE BACKPLANE INSIDE AND OUTSIDE, CASE BASE, THE TOP OF THE VIDEO BOARD AND THE KEYBOARD.

SUPERSCAN 2001

VIDEO BOARD SET-UP

The video board is set-up after assembly by connecting it directly to an **RGB** monitor via the edge connector **SC2**, while feeding a test signal to it via the video input connector **EC1**. Configuration of connectors is shown on the video board connectors and pre-sets diagram. In this case a separate 12 volts 250mA stabilised supply required. Or **preferably** through the system if the main board is operational.

Connect the video board in either of the ways mentioned above. Set all pots to half way .

Set-up for NTSC
Connect either an NTSC video signal generator or an off air test card signal source to the input and switch on and go to * .

Set-up for PAL
Connect an off air test card signal, or if a TV signal generator such as Philips PM5509 is available, use the DEM output function, to the input of the video board and switch on. Better still use your own camera; the one you intend to use with the system, by focusing it on to a colour rich still picture. Please read the caution at the end of these instructions.

* **Connect a** Volt meter between ground terminal on the video board and pin 25 of the **TDA3566** IC. Adjust VR2 to give about 10 volts for **PAL** systems and 8.5 volts for **NTSC**. Seal this pot with a sticker. You don't need to touch it any more.

Move the Volt meter probe from pin 25 to pin 19 of the same IC and adjust **VR7** to give 3 volts on this pin. If the sync generator IC **TDA2595** and the video decoder **TDA3566** are working you should start seeing video on the monitor if you haven't already . The voltage on this pin controls the black level, the picture disappears altogether if it is too low. Seal this pot with a sticker.

IF AN OSCILLOSCOPE (DUAL BEAM, 20 MHz OR BETTER) IS AVAILABLE GO TO THE SCOPE METHOD OF SETTING UP OTHERWISE GO TO SIMPLE METHOD.

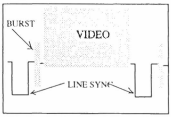
SCOPE METHOD OF SETTING-UP.

Connect one of the scope channels to the following test points and verify that the synchronisation signals are present on all of them according to the shown specifications. If not, check the components' type and values around the TDA2595 and also check the tracks for any break or short. You must get these write before you continue with the set-up.

TP5 has a 5 volt, 12 microseconds + VE line sync
TP7 has a 5 volt, 1.3 milliseconds +VE field sync
TP6 has a 5 volt -ve composite sync.
TP14 has a 12 volt high Sandcastle pulse.

Adjust VR1 so that the sync generated at the above test points are locked on to the incoming video signal .

Connect the scope to test point TP3 on the video board and trigger at line rate, adjust the time base so that the line sync & sub carrier burst are clear and stationary on the screen. Adjust L1 slowly in an attempt to null out the burst. It should be possible to go through the null point. Adjust for burst null and seal L1 with a sticker.



Attach the second scope probe to test point TP4. This channel should display the burst and the colour contents in the signal. Adjust L4 to give maximum burst amplitude. It should be possible to pass through the maximum point. Seal L4 with a sticker. Remove both scope probes.

In both of the above steps the coil cores remain within the coil can.

Adjust VR3 on the video board to half way, (**VR3** is not present for **NTSC**)

Adjust CV1 to mid point of the tuning range through which colour is sustained by marking both points on **CV1** where colour drops off .

Adjust the contrast **VR5** to suit.

This concludes the setting-up of the video board for NTSC, More to be done for PAL.

HANOVER BARS SET-UP.

Link pins 1&2 of EC10 (this puts +12V on pin 5 of the TDA3566, colour unkill)

Apply a short across R23 using crocodile clips or any safe mean. Adjust CV1 to give the lowest beet frequency of colour interference pattern on the monitor screen then remove this short and remove the link on EC10. (This was to tune the sub-carrier crystal to the test signal sub-carrier exactly).

Connect a scope probe to one of the colour outputs on SC2 such as pin3 (Blue) and trigger the scope on video line rate. The scope will show the direct and the delayed lines alternately. The Phase & amplitude difference between these lines is the Hanover Bars effect. The combination of VR3, L2 & L3 helps to minimise the difference between the direct and delayed signals. Adjust these three components to get the closest results on the scope screen. Good adjustment requires some knack and practice, Good luck.

These conclude the set-up of the video board.

SIMPLE METHOD.

Set VR1 to half way and adjust it slowly until synchronisation lock is established and any running pattern on the video has disappeared, this is assuming an output is already established on your monitor. If not, check the components' values and the tracks around the TDA2595 and TDA3566 ICs. A signal must be present on the monitor before you can continue. .

Make sure that VR3 is at halfway and adjust CV1 until colour signal is obtained.

Adjust L1 while monitoring the screen closely. The noise level on the screen should change from good to bad or the other way. Adjust so that the noise is at its lowest.

Slowly adjust L4 to give highest colour saturation. This adjustment should also pass through a peak.

Adjust the contrast VR5 to suit.

This concludes setting-up for NTSC, **(continue for PAL)**

Hanover bars set-up

The combination of CV1, VR3, L2 & L3 is responsible for this effect.

Link pins 1&2 of EC10 (this puts +12V on pin 5 of the TDA3566, colour unkill)

Apply a short across R23 using crocodile clips or any safe mean. Adjust CV1 to give the lowest frequency colour interference pattern on the monitor screen then remove this short and remove the link on EC10. (This was to tune the sub-carrier crystal to the test signal sub-carrier exactly.)

Adjust L2, L3 & VR3 to give minimum Hanover bars effect.

This conclude the video board simple set-up

Test for the presence of Hanover Bars could be performed by snatching a frame with RGB colour content while in speed 1. Press speed 3 and then alternately press page 1 and page 2 both memories should display the same frame. The difference in intensity or colour contents is a measure of the amount of Hanover Bars.

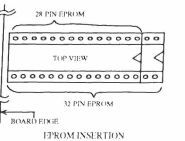
CAUTION If you set the Hanover Bars on your system using a particular signal source and then you use a different source where the sub carrier frequency is slightly different then you will get Hanover Bars . The way out of this is to make sure that the sub carrier frequency of the signal source you normally use for your pictures is equal to the one you used during set-up.

SUPERSCAN 2001

THE MAIN BOARD SET-UP.

EPROM INSERTION

Insert the **EPROM** in **IC 75** position on the main board according the diagram shown.



EPROM INSERTION

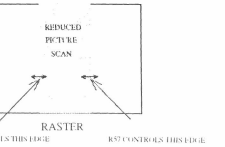
OSCILLATOR SET-UP

If you are using one of the high accuracy crystals (±5 ppm) from JAD or any other source, adjust CV1 to obtain exactly 2MHz at pin 11 of IC42 (74HCT86) using a frequency counter with an accuracy of better than ± 5ppm.

If you are using a packaged oscillator or ready built and aligned unit available from Martin G3OQD, you still need a standard quality 12 MHz crystal for the micro processor. No adjustment is required and CV1 must be replaced with a fixed 33pF capacitor.

RASTER WIDTH SET-UP

This section requires a working video board. Connect two 100k pots on temporary basis in place of R57 and R58 and set both to half way. With the SUPERSCAN 2001 set to display camera, and a video signal connected to the camera input. Adjust both pots if necessary to obtain an under scanned display as shown in the following diagram:



Adjust the pot in R58 position so that the left-hand side of the picture just disappears on the left side of the screen.

Adjust R57 until the right hand side of the picture disappears on the right hand side of the screen. The whole of the picture should now be visible.

Snatch a colour frame from a still camera picture and flick between snatched and original frames, if there is any difference in brightness do a fine adjustment to the pot in R58 position while snatching and comparing frames until the difference in brightness is acceptable.

Carefully remove each pot, measure and replace it with an equal value resistor in the relevant position. It is possible that you might have to use two resistors in series or parallel in order to get the correct value.

PICTURE QUALITY SET-UP

It is possible in some cases, depending on total delays in the clock path leading to the A/D converter on the video board, to improve the quality of the picture from the camera by adjusting the clock phase.

This is done by temporarily replacing R106 with a 500 Ohm pot. Adjust the pot to about half way, switch on and display a live picture on the screen.

Adjust the pot while monitoring the quality of the picture and select the best position while pins 1&2 of EC9 on the video board are either linked or left open circuit. Remove the pot, measure and replace with an equivalent value resister. If the best quality obtained is when EC9 is liked, then leave the link in, otherwise let it open.

The purpose of EC9 is to allow the inversion of the clock signal to the A/D converter. It is not possible to predict the best clock polarity/phase delay other than by trial and error.

THIS CONCLUDES THE SET-UP OF THE MAIN BOARD.

SUPERSCAN 2001

TEST & OPERATING

INSTRUCTIONS

SuperScan EPROM V1.6 with HQ mode, Instructions supplement

New features.

1) Introduction of two new High Quality (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 V 4.6 EPROM is installed in exactly the same way as the earlier V1.0, V1.2 and V1.2A EPROM's. Note:- the V1.6 EPROM is not a direct replacement for the V1.1, V1.3 and V1.3A EPROM's as does not have support for the mouse, but does contain all other features of these EPROM's.

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

WARNING - if the V1.6 EPROM is reversed in the socket it will be destroyed the moment that the 2001 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 **"MODE"** 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 V 4.0, V 4.2 and V 4.2A instructions.

HQ mode speed selection.

To select the HQ modes with the receive picture sharpening enabled (preferred), press the **"2"** speed key to select **HQ 1** (90 Sec.), press the **"1"** speed 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 **"4"** speed key to select **HQ 1** (90 Sec.), press the **"3"** speed 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.

SECTION 7 INTRODUCTION

Weather the unit was purchased built and tasted or as a kit , Its function is defined by the software program residing in the EPROM . The program is specially developed for the **SUPERSCAN 2001** by **Martin G30QD**.

The first **EPROM** produced was version **I** followed by updates up to the current status of issue **1.3** at
the time of writing this introduction. Software development is an ongoing thing and there will be software updates from time to time to cover all the new modes and perhaps introduce some new ones and more importantly exploit the high potential of circuit design embedded in the system, such as the mouse interface and the text overlay. The current software supports all of the modes in current use.

The latest issue EPROM is always supplied with the system (kit or fully built) at the time of purchase. Acquiring subsequent EPROM updates is a private arrangement between the user and G30QD.

The instructions in this section cover all the information to operate the system. Please read them carefully while applying them to the unit. If you discover any software fault or If you have any querie or comment please direct them to **Martin** or to me **JAD.**

Please enjoy using the **SUPERSCAN 2001** and in the course of using it you come up with **any new idea for future development** I appreciated very much if you let me know about it.

OPERATING INSTRUCTIONS FOR SUPERSCAN 2001 EPROM V1.2A

INSTALLATION:-

1.0) The EPROM should be installed with the arrow pointing away from the edge of the PCB, and with the end pins closest to the PCB edge. The link "L2" should be put closest to the EPROM.

1.1) When powered up the 2001 should, after a short pause, display a test card with your callsign in a box at the top of the screen.
Adjust the monitor so that the 'B' on the black square on the grey scale and a 'W' in the white square are both just visible.

RECEIVING SSTV

OPERATION:-

2.0) Receiving can be either manual or automatic. The manual mode is the default power up state and is indicated by the "stnby" LED being continually on. Pressing the "Receve" key will enable reception in the currently selected mode.

2.1) The automatic reception mode is selected/deselected by pressing the "stnby" key, which will cause the LED to flash when in the automatic mode.
When in automatic, the S2001 will automatically switch to receive in the correct mode when a Vertical Interval Signal has been received from another S2001 or compatible system.

2.3) If the VIS was received incorrectly or when receiving SSTV from a station not using VIS, it is still possible to automatically set the S2001 to the correct line rate.
This is done by pressing the "Receve" key when in automatic, 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 S2001 will switch to the correct speed and start receiving.

2.4) 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.
If unsure about the mode being received it is best to pre-select the Robot 72Sec. colour mode before selecting automatic mode.
The automatic mode will detect all SSTV mode speeds except for the AVT modes, so if in doubt use the built in SCOPE facility which is available in the special function "Menu".
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 and the Standby key will abort.

2.5) To obtain "Quad" mode (four pictures on one frame) reception press the receive key a second time once a picture is has started being received, this will also de-select the Quad mode if previously selected.

3.0) To transmit the SSTV picture displayed on the monitor screen, press the "Send" key, which will cause one frame to be transmitted in the selected mode. To send one frame after another press the send key a second time whilst the send LED is still on, to stop the continuous frame send function, hit the send key one more, then after completing sending the current frame the unit will return to standby.
Pictures may be generated by either a colour camera using the "INPUT Camera" key ("DISPL Camera" enables previewing), or by down loading from a computer using the "INTFCE Comptr" key.

3.1) A monochrome camera can also be used to produce colour pictures by using colour filters (Wratten Red No. 25, Green No. 58 and Blue No. 47B) in front of the lens and snatching frames sequentially into the "Red", "Green" and "Blue" Memories.

MODE SELECTION

4.0) When first powered up the 2001 will be in the Robot 72 Sec. colour mode by default.
The speeds are selected as follows: 1 = 36/72Sec., 2 = 24/36Sec., 3 = 12/24Sec, and 4 = 8/12Sec. Note- the first figure is monochrome, selected by pressing either "Red", "Green" or "Blue" keys, and the second figure is colour frame times.

4.1) To select/deselect "Martin" colour modes press the already selected "INPUT" key (LED on) once, all three colour memory LED's will be light when New Modes are active. The speeds are as follows: 1 = M1, 2 = M2, 3 = M3 and 4 = M4.

4.2) To select/deselect the "S" (Scottie) colour modes press the currently selected Speed key (LED on) once, which will cause the Speed LED to flash when the "S" modes are selected. The speeds are as follows: 1 = S1, 2 = S2, 3 = S3 and 4 = S4.

4.3) The "DX" mode is selected/deselected from within the "S" mode described in 4.2 above, by pressing the "Mode" key.
The "DX" mode must be pre-selected before the VIS signal will be recognised to automatically start reception in the "DX" mode. This is because the "DX" mode shares the same VIS code as 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 2.3 will completely select the "DX" mode.

4.4) The "Martin", "S" and "DX" modes are New synchronous modes and use a special start up system to allow them to free run once line sync has been established. Note: Use "INPUT Tape" for non-synchronous.
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. Once line sync has been established, normally within one or two lines but longer under noisy conditions, the receive LED will be continuously on, and the received picture written to the screen. Once in this condition reception will continue until the bottom of the screen is reached and then stop, so that if the SSTV signal stops 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 "Colour" key which will reset the frame to the top of the picture and put the unit into the sync search mode.

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.

4.5) The "SC-1" modes are selected/deselected, from the Robot mode by pressing the already selected Speed key. The three colour LED's will flash alternately to indicate the SC-1 colour mode is operating.
The SC-1 speeds are as follows:- 1 = 32/96Sec., 2 = 16/48Sec., 3 = 16/48Sec. and 4 = 8/24Sec. Note:- the 48Sec. speed on speed 3 is 128 line and is sometimes called "quasi 48Sec" to distinguish it from the normal 48Sec 256 line mode on speed 2.
The SC-1 mode uses a not too reliable system for maintaining colour sync, if loss of colour sync occurs, press MEMORY "Colour" as necessary to obtain correct colour sync.

4.6) The "SC-2" modes are selected/de-selected, from the SC-1 mode by pressing the "MODE" key. The Memory Red and Blue LED's will be on and the Green LED will be off indicating the SC-2 colour mode is operating.
The SC-2 speeds are as follows:-1 = 180Sec., 2 = 120Sec., 3 = 60Sec., and 4 = 30Sec.
To add the special grey scale/colour bars at the top of frame, press the already selected speed key twice.
The Superscan 2001 will start automaticaly when receiving an SC-2 signal from another Superscan 2001 or a Robot compatible syatems having the SC-2 mode fitted, but will need to be started manually or by using the automatic speed selection feature, when receiving signals from the Wraase SC-2 scan convertor.

4.7) AVT modes, are selected/deselected by pressing the "MODE" select key. The screen will display speed and mode when the AVT system is in operation.
The speed is selected by using the normal "SPEED" keys, the corresponding AVT speed being indicated at the top of the screen.
To toggle the "Narrow" mode press the "MEMORY colour" 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" 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 on. This allows rapid switching from any of the other modes to either AVT or Robot depending on the state of the AVT indicating LED.

4.8) 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 codes, which is followed by a 5 second header, before the picture starts.
However, if signals are weak or is QRM present, causing all three VIS's 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 pre-select the AVT mode being sent, if possible, as the AVT header only contains limited information about the 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.

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

The displayed picture will show just 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.

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

FAX speeds are as follows:- 1 = 60 rpm, 2 = 90 rpm 3 = 120 rpm and 4 = 240 rpm. The most popular speed is 120 rpm 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, High resolution 1024 x 768 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 "Page" memory keys, but it is necessary to wait till the end of reception to scan vertically through the three colour memories. The monitor display becomes a movable window into the high resolution FAX image displaying one sixth of the image at a time.

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

Note:- the "Comptr" and "Print" keys only provide phasing during FAX reception, otherwise they have their normal functions. Phasing will be maintained provided that the reception is not interrupted by pressing the "Stnby" key until end of transmission.

SPECIAL FUNCTIONS MENU :-

5.0) Pressing the "Menu" key will open up the menu window which makes many special features available. The menu will overlay the displayed picture non-destructively, except for certain functions, and will disappear revealing the original picture after use.

5.1) The functions available from the overlay menu, which has a layout that mirrors the actual front panel, are as follows:- Test patterns - Grey scale, Resolution bars, Test card and Colour Bars, all of which will erase the original picture !

5.2) The Scope function allows an SSTV signal to be accurately tuned even if the station has not previously been heard on speech.

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 1.2KHz5. 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.

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.

5.3) *Coupled to the Scope is the Alignment Tone generator which can be used to produce a ten different useful tones (on when selected) which can, in conjunction with the Scope, if used by the receiving station, be used to obtain perfect alignment between SSTV stations.*

5.4) *Text screens can be produced by choosing the "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 overlay 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 by simply pressing the "DISPL Memory" key.

The text message will remain in memory while the 1200C is powered up, or permanently if the battery backup is fitted, and may also be down loaded from an external computer and edited if necessary.

MEMORY SELECTION:-

6.0) *The 2001 contains four high resolution display memories, which are selected by pressing 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 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 just display mid grey until overwritten.

1) **Introduction:-**

The V1.3A EPROM combines all the functions of the V1.2A EPROM and those of the latest mouse controlled Eprom. The features of the mouse controlled Eprom are **ONLY available with an ATARI mouse connected to the Superscan 2001 otherwise the V1.3A EPROM will work exactly the same as the V1.2A EPROM.**

2) **Installation:-**

The V1.3A is a direct plug in replacement for the V1.0 EPROM, but the link L2, on the main PCB must be moved to the position furthest from the EPROM. Also the stactic RAM at IC79 must be a 32K byte device, for example a HYUNDAI HY62256ALP-10 or equivalent.

3) **Operation:-**

3.1) These instructions only describe the new features of V1.3A, and should therefore be read in conjunction with the instructions for the V1.2A EPROM and those supplied with your latest mouse controlled Eprom.

3.2) To keep operation of V1.3A as simple as possible, five separate SSTV systems are selectable from the mouse. To select the required SSTV system, simply click on the SSTV system "LOGO". Clicking on the left hand side increments the SSTV system and on the right hand side decrements the SSTV system in use. Thus no more than two clicks will ever be required to switch from any mode to any other.

Within each SSTV system the corresponding speeds and modes available for that particular system may be selected from the mouse.

3.3) The available SSTV systems are as follows:-

1)ROBOT - Speeds - 8/12, 12/24, 24/36* and 36/72*
Modes - Monochrome/Colour, (R, IR* and SIR*).

2)**MARTIN - Mode MM - Speeds - M1, M2, M3 and M4.**
Mode SM - Speeds - S1, S2, S3 and S4.
Mode DX - Speeds - D1
Mode FA(x) (select monochrome - either R, G or B)
Speeds - F1=60rpm, F2=90rpm, F3=120 and F4=240rpm.

3)**AMIGA - Modes NO=Normal, QR=QRM, NA=Narrow, QN=Narrow and QRM**
Speeds A1=188sec, A2=94sec, A3=90sec and A4=24sec.

4)**WRAASE - Mode SC-1 - Speeds - 8/24, 16/48, 16/48 (256 line) and 32/96.**
Modes - Monochrome/Colour.
Modes SC-2 - Speeds - C1=180sec., C2=120sec., C3=60sec. and C1=30sec.

5)SCOTTIE - **Mode SM - Speeds - S1*, S2*, S3 and S4 (R, IR*, SIR*)**
Mode DX - Speeds - D1 (R, IR or SIR).

4) Notes:- **The IR and SIR modes are special to the mouse controlled EPROM modes and Robot modes. Only speeds marked with a "*" can use IR or SIR. Other New modes, including AVT, use the more reliable "Fully Synchronous" system, so do not require either IR or SIR.**

The "DX" mode must be selected prior to automatic reception of a DX mode signal. This is necessary, because, unfortunately the DX mode uses the same VIS code as the AVT 188 sec. therefore if an AVT 188 sec. signal is received rather than the expected DX, the S2001 will not receive correctly, but any other mode will be received correctly.

The "S" and "DX" modes can be received Fully Synchronously, in the MARTIN system, or received using SIR, IR or just R in the SCOTTIE system.

20- ***switch*** the system on and set the video board up using the video board set-up instructions at the end of this section. If scan lines appear on either side of the picture or if the picture does not fill the monitor screen don't get alarmed because the main board is not set-up yet .

21- ***Proceed*** with the main board setting-up instructions till the end.

22- **Go** through the operating instructions once more with the video board connected, the system should then be fully operational . Congratulations

23- ***Replace*** the cover and tighten the four screws using anti-shake washers . Always insure that ventilation is not obstructed during system operation.

END OF ASSEMBLY INSTRUCTIONS