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Strand Lighting

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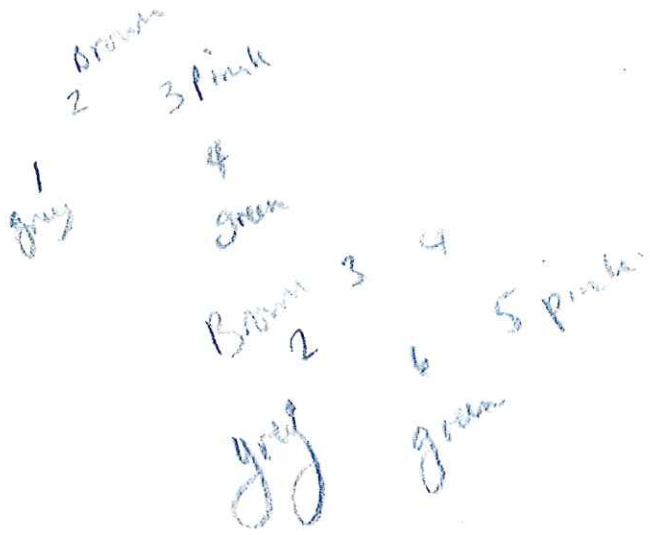
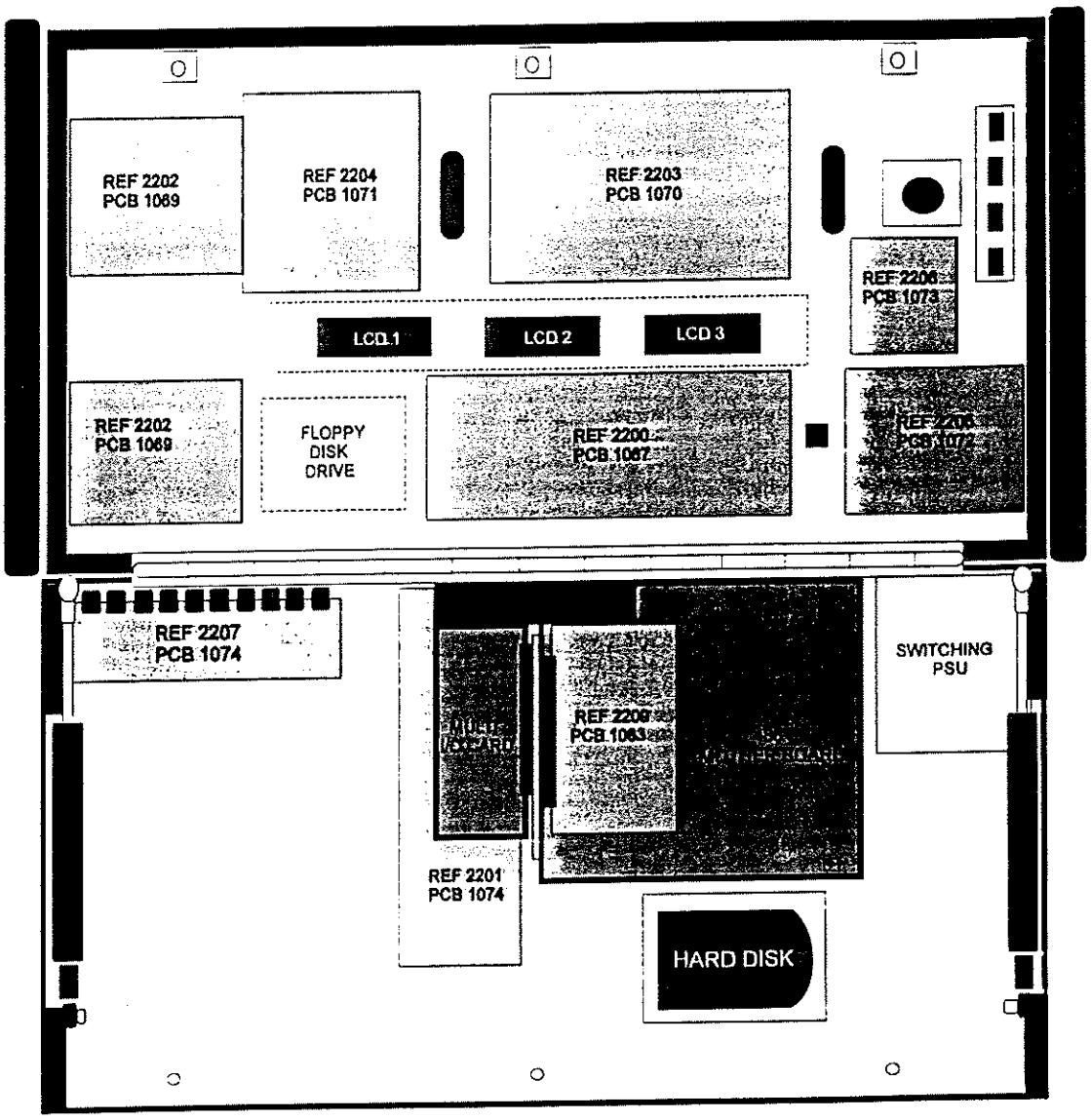
430 / 530 Agents Maintenance

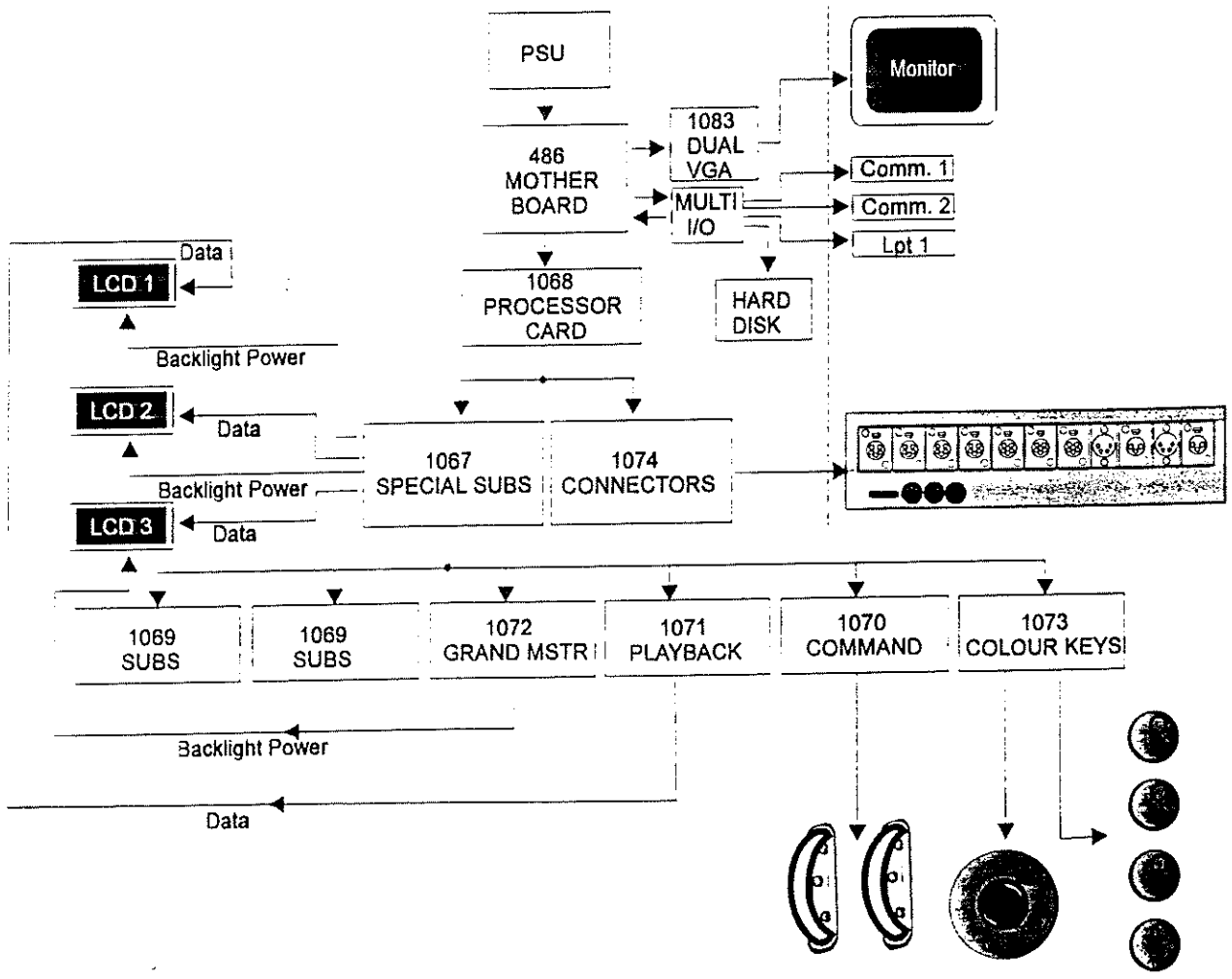


PCB Layout

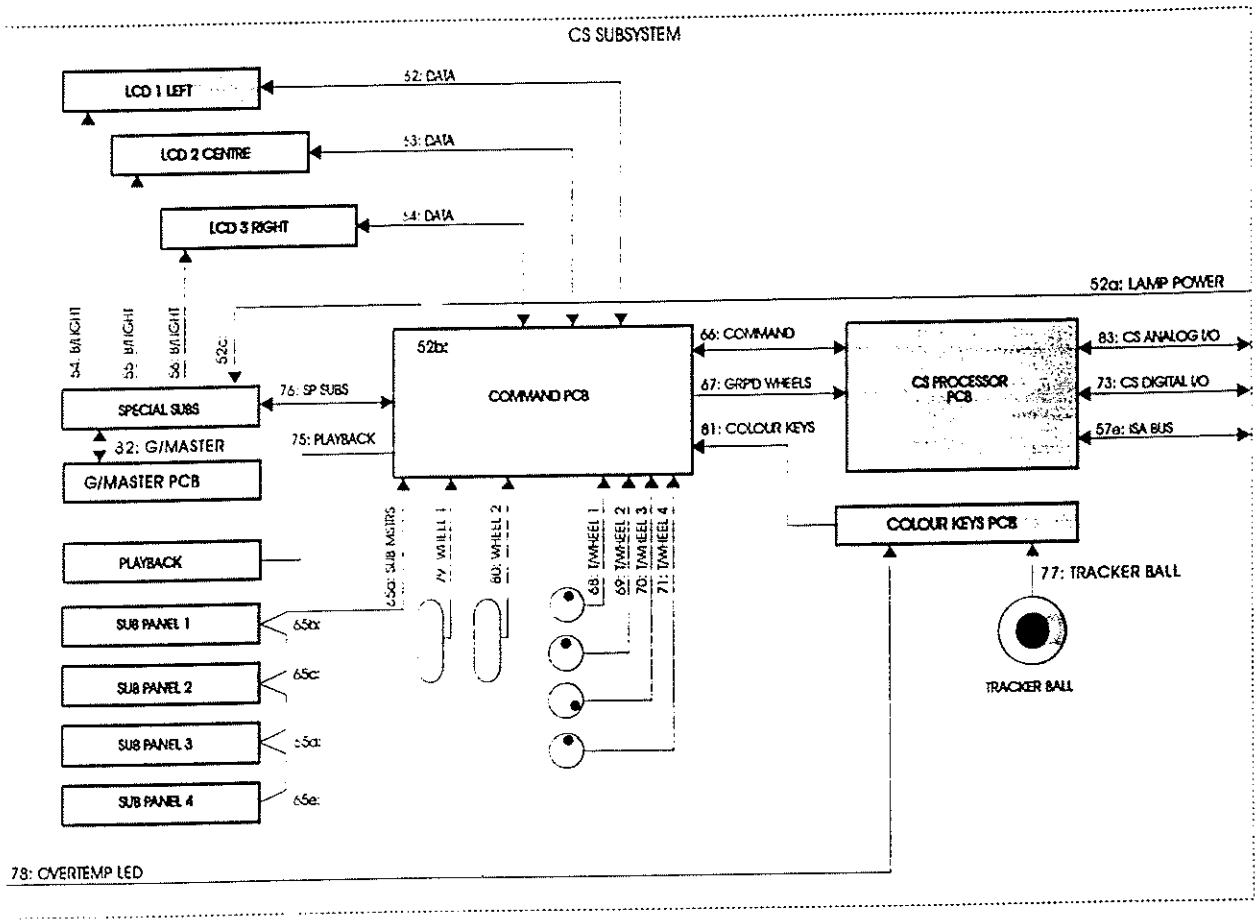


PCB	REF. NO.	PCB TYPE
1069	2202	SUBMASTERS
1071	2204	PLAYBACK
1070	2203	COMMAND
1073	2206	COLOUR KEYS
1083	2209	DUAL VGA
1067	2200	SPECIAL SUBMASTERS
1072	2205	GRAND MASTER
1074	2207	CONNECTORS
1068	2201	CS PROCESSOR CARD

Control Signal Flow



Interconnections



5 430/530 DIAGNOSTICS/TROUBLESHOOTING.

CONTENTS

5.1 Overview

Most of the electronic components used in the 430/530 lighting desk are surface mount (SMT). This, and the increased reliability of today's ICs, means that the Strand circuit boards are predicted to be highly reliable. It is assumed that, because of this reliability, and because of the difficulties with SMT repair, diagnosis will be undertaken to board level (possibly with the exception of changing faders and switches).

Some other components used in the 430/530 lighting desk are wheels, a tracker ball, LCD's, a fan, a floppy disk drive, a hard disk, and several cables.

A description of the board and cable names and positions are given with disassembly instructions in section ??

The troubleshooting information is given in two main areas. Firstly, the "Power On Sequence and Operational Error Codes" is aimed at diagnosing faults that prevent the desk from powering up and running the operational software or cause the operational software to halt. Secondly, the "Control Surface Diagnostics" section is aimed at diagnosing faults that prevent "proper" use of the desk once the operational software is running.

Note: The following diagnostic information includes some information relevant to PC components. It has not been attempted to provide a complete diagnostic text on PC troubleshooting, but only an overview of the most likely problems and causes. It is advisable that engineers should enhance their knowledge of PC operation and fault finding. A recommended method would be studying the text of references ? and ? (Upgrading and repairing PCs - Que (ISBN 0-88022-856-3), and Inside the IBM PC and PS/2 - Norton (ISBN 0-13-465634-2)).

Note: In order to run the diagnostic software, a PC AT style keyboard is required. The keyboard is optional for the user, and hence may not be available on site.

5.2 Power On Sequence and Operational Error Codes.

On applying power the following sequence of events occurs.

Event	Description of Expected Event	Possible Faults if Expected Event does not occur	Diagnostic Information
1	Power on. (LCD Backlights and monitor come on).	PSU or switch faulty. Supply short on a PCB causing PSU shutdown.	Check all connections are correctly plugged in, including mains wall socket. The monitor power out of the PSU is a feed through from the mains. If this is suspect then try plugging the monitor directly into a mains outlet. If the secondary PSU output(s) are suspected try disconnecting supply connections to boards (to check for supply shorts on the boards) until the PSU works (PSU fan comes on). Note: the fan is quiet. Otherwise try an alternative supply. Note: the PSU requires a load (usually the motherboard plus one disk drive) before it will power up. The orange wire (P8-1) going to the motherboard is a "Power OK" indicator from the PSU which gives between 2.4 and 5.4 VDC when the supply rails inside the PSU are up and within specification.

2	BIOS Boot (single short beep and BIOS name and version number written to the screen).	Motherboard faulty or not receiving power. Fault on adapter card in the ISA slots. Battery backed CMOS memory problem.	If no beep occurs check PSU connection to motherboard (two 6-way connectors, 4 black wires go together in the middle) and for foreign objects (screws, washers etc.) lying on the motherboard. Also check for cards not correctly inserted into the ISA adapter slots. If necessary remove the ISA extender card, plug the IDE and Video cards directly into the motherboard ISA slots and check whether it will then boot up successfully. This will require removal of the screws securing the Processor tray to the base, so that it can slide forward. A blank screen and no activity from floppy or hard disks may be due to BIOS battery backed CMOS memory corruption. If suspected, see the motherboard data sheet for how to clear (usually with a jumper on the motherboard near the battery). The notes in section 5.7 may be followed to reconfigure the BIOS set-up. If the LCD's come up with the expected operational display but no video display, check the monitor and VGA cable. Check the VGA cable is in the VGA 1 position (nearest 15 pin D-type to the ISA connector) (especially if single VGA had been previously selected). Otherwise change the Dual VGA card. The PC may produce 8 short beeps if the Dual VGA Board memory is inaccessible.

3	BIOS POST (power on self test errors).	Motherboard fault. adapter card fault. ISA interface connection problem. Hard disk corruption (loss of DOS/application software).	There are many possible faults with the motherboard and adapters cards. Mechanical parts are most prone to failure (e.g. Floppy disk. Hard disk). An error message or code is often displayed on the monitor. The messages are self explanatory, the codes are detailed in the appendix of reference 1. Systematic changing of hardware under the guidance of the error messages should find a solution. A possible problem may be BIOS battery backed CMOS memory corruption. If suspected. the notes in section 5.7 may be followed to inspect/correct the BIOS set-up. If the error message from the BIOS POST is that it cannot find an operating system, the system should be booted off a floppy disk (bootable copy of DOS) and diagnostic software (e.g. Check-it Pro) should be run to identify and correct the cause of the problem. Then DOS will then have to be re-loaded following the instructions in section 5.6. If there are further problems the application software may also need to be reloaded as this may also be corrupted. Reloading will not be achieved if the Hard Disk is faulty.
4	Strand Lighting Logo displayed on the monitor	CS Processor or its peripherals at fault.	If there is a serious fault with the hardware that prevents the software from running, the software will halt at this point giving an "assert" message on the monitor. To diagnose the problem, run the "220test" software as described in section 5.3.1, which will provide proper error messages as it tries to boot up.

5	Application screen.	Control surface and unit I/O faults operation	If a failure occurs during the application an error statement will occur on the video display. It will name a particular file which indicates a particular fault: (a) "cs.h 2" /* Adc overrun detected */ (fault: CS Processor, or its interface to the extender card). (b) "cs.h 4" /* I2C DAC/EEprom not present */ (fault: CS Processor, or its interface to the extender card). (c) "iocfg.h3" /* Invalid id returned from security chip */ (fault: CS Processor, or its interface to the extender card). (d) iocfg.h4 /* No response from security chip */ (fault: CS Processor, or its interface to the extender card (security device not fitted/broken)). (e) iocfg.h5 /* CRC checksum failure from security chip */ (fault: CS Processor, or its interface to the extender card). (f) iolcd.h6 /* LCD device(s) not responding */ (fault: LCD, LCD flexi cables 62,63,64, Playback Board, cable 78, Special Subs board, cable 66, CS Processor, or its interface to the extender card). (h) ioled.h3 /* 8279 not responding */ (Special Subs board, cable 66, CS Processor, or its interface to the extender card) (i) iowheel.h3 /* Upp not responding */ (fault: CS Processor, or its interface to the extender card).

5.3 Control Surface Diagnostics

Once the desk can power up correctly and load the operational software, fault diagnosis can be carried out using the resident diagnostic software. The diagnostic analysis will point to the function at fault. The table in section 5.3 can be used to identify the hardware responsible for that function.

5.3.1 Running the diagnostic software

To run the resident diagnostic software follow the procedure:

(a) Power up the desk as normal

(b) During the PC boot up, when the memory manager "HIMEM" is being installed (as indicated on the display) repeatedly press "control c" or "control break". This will cause an exit into DOS.

(c) Run the diagnostic software by typing "220test" (this is in the \220os directory).

If this fails to boot up (arriving at the menu described in 5.3.2) a error message will appear as follows:

Boot: Time-out during load	CS card didn't respond. CS Processor Board. ISA interface or connection problem.
Boot: Illegal command	Dual port ram corruption. CS Processor Board. ISA interface or connection problem.
Boot: start address error -	Dual port ram corruption. CS Processor Board. ISA interface or connection problem.
Boot: length error	Dual port ram corruption. CS Processor Board. ISA interface or connection problem.
Boot: code outside allowed map	CS Processor Board/ISA Bus corruption.
Boot: can't write to code memory	CS can't write into its code RAM chips. CS Processor Board problem.
Boot: ABORTED BY KEYBOARD	User aborted load.
Boot: checksum of code in CS failed	CS code ram corrupted. CS Processor Board problem (possible loosing battery back-up).
Boot: Bad S-Record in file	CS code file corrupted on hard disk
Boot: Bad S-Record type	CS code file corrupted on hard disk
Boot: Bad S-Record checksum	CS code file corrupted on hard disk
Boot: CS code file missing	CS code file missing on hard disk
Boot: TNT can't map CS Dual Port Ram	Software problem

5.3.2 The diagnostic menus

The diagnostic software is a menu driven system. where "up arrow" and "down arrow" keys take you through the choices in a menu. **Return** selects a choice. and **Escape** takes you back to the previous menu level.

5.3.2.1 The top menu encountered gives three choices

(a) Factory Verification

(b) Test Sub-System

(c) Heat Soak Tests

Factory Verification and Heat Soak Tests are used by the factory for production testing. These options will only run properly if a full set of "factory test loop-back connectors" (as defined in section 5.5) are connected. and the "Check-it Pro (Test and Tools)" software is installed in the "\220os\checkit" directory on the hard disk. Also. a blank formatted high density disk is required in the floppy disk drive.

However. the "Test Sub-system" option provides all the functionality of the other choices but in a more useful way for fault diagnosis. "Test Sub-system" should be chosen.

5.3.2.2 Having chosen "Test Sub-system". the 2nd level menu shows:

(a) Test PC sub-system only

"Test PC sub-system" runs a complete sequence of tests on the PC sub-system. In order to run. a copy of "Check-it Pro (Test and Tools)" must be installed.

To install Checkit Pro exit the program using ECS until the DOS prompt appears.
Insert Checkit Pro volume 2 disk 1 and type **A:INSTALL** <return>.
Using the arrow keys select option 2 **Volume 2 Tests & Tools** and press <return>.
On the setup screen the lower right box tells the user what information to type in.
Type the serial number of the software. the user name. the company name. and leave the source drive as A. Press <return> after each line.
When the screen asks for the destination press <Delete> until the word C:\CKTEST has been removed. Now type **C:\220os\checkit** <return>.
Press <return> again to start the installation. Insert disk 2 when asked.
Do not read the README file when it asks.
Do not start the program using the command CKTEST.

Finally return to the main directory by typing **CD\220os** <return> and start the test program again by typing **220test** <return>. All PC tests can now be run.

If the 430 / 530 says that it can not find one or more of the Checkit program files then the desk may only have version 1.0 test software. Version 1.1 test software should be obtained from Strand Lighting Engineering Service. Please note that this software will only be supplied to engineers who have a licenced copy of Checkit Pro.

NOTE: It is illegal to leave the "Check-it Pro (Test and Tools)" files installed on the hard disk after use. After use all files must be deleted. Make sure that you are in the "\220os\checkit" directory. and type **del *.*** <return>. DOS will prompt **Are you sure y/n**. Type **y** <return>.

To run "Test PC sub-system" you will also need to apply the PC loop back connectors to the parallel and serial ports as described in section 5.5.1, and a blank, formatted, high density floppy disk in the disk drive.

The results of this test are stored in an Error log file. Pressing ESC during the test displays the error log file. Pressing ESC again gives you the option to continue the tests.

(b) Test CS sub-system only

"Test CS sub-system only" requires a full set of "factory test loop-back connectors" (as defined in section 5.5) . It is used in the factory for testing each individual PCB.

(c) PC Utilities Menu

"PC Utilities Menu" runs the same tests as "Test PC sub-system" but not in a continuous sequence. Each test can be chosen individually and executed once by pressing "**return**" or continuously by pressing "c". It is advisable to only use "c" because if not run continuously, the words "pass" or "fail" only appear for an instant, and are hard to see. If run continuously, the test will keep running (you can observe each iteration) until it fails. When/if it fails it returns to the menu.

In order to run, a copy of "Check-it Pro (Test and Tools)" must be available. All files ending in ".exe" must have been copied into a directory called "\220os\checkit" on the hard disk. This directory should already be there.

NOTE: It is illegal to leave the "Check-it Pro (Test and Tools)" files installed on the hard disk after use. All files must be deleted. Make sure that you are in the "\220os\checkit" directory, and type **del *.*** <return>. DOS will prompt **Are you sure y/n**. Type y <return>.

To run "Test PC sub-system" you will also need to apply the PC loop back connectors to the parallel and serial ports as described in section 5.5.1 and a blank, formatted, high density floppy disk in the disk drive.

NOTE: Comm2 has two parallel outputs on the rear of the unit. The usual 25 way D-Type connector and the AUX1 XLR (rx and tx only). In order to test correctly the diode must be between pins 6 and 5 of the AUX1 XLR as shown in the main test jig diagram in section 5.5.2.

(d) CS Utilities Menu

"CS Utilities Menu" allows you to test all the control surface functions, desk input/output and other PCB functions.

The menu options are:

(a) Fader Tests

Gives a choice of which fader group to test. A graphic display of the fader set appears with a flashing border around the first fader to test, and an LED(s) lights by that fader on the desk. To test the fader, simply move it to its max. position and back to its min position. If the fader achieved max. and min outputs, the flashing border moves to the next fader on the monitor and the indicator LED moves to the next fader on the desk.

(b) Test CS CPU I/O

Allows testing of all the desks input/output functions:

Midi

Midi Thru / Audio

DMX

AUX

D54/AMX

Test Ext. Zero Volts

Test Ext. AUX PSU

Test RS232 port (CS card)

Test Lamp Device

Check PC Ram (on CS card)

Full check PC Ram (on CS card)

System checksum

Calibrate D54 /AMX

Test External Audio

Test Audio Freq. Response

D54/AMX Test Static

MUX Test Static

All these tests require a set of loop back connectors (as shown in section 5.5.2), with the exception of "Check PC Ram", "Full check PC Ram", "System Checksum" which require no loop backs, and "Test Audio Freq. Response" which requires a test link applied between pins 12 and 13 of CON 1. on the CS Processor PCB.

The RS232 connector on the CS card is not used. The loopback connector can be ignored and all errors when running the test "Test RS232 port (CS card)" can also be ignored.

NOTE: It may be impractical to carry a set of loop backs around. The functions needing them may also be tested by practical means (driving a luminare, for instance).

(c) Control Surface Keys

This allows testing of a any set of keys on a particular board, or all the desk keys. When testing all the keys using "Key Test (visual)", note that some of the key positions are not implemented, so there are natural gaps in the matrix. All keys should fill in a matrix point.

(d) Wheel Tests

This allows the wheels, thumbwheels and tracker ball to be tested. A graphic representation of the wheel levels appears, and the wheels must be operated in turn, to achieve max. and min positions.

(e) LCD Brightness/Contrast

This tests that the LCD brightness and contrast functions are working. The test operation is prompted from the monitor.

(f) LCD Calibration

If the brightness or contrast between the LCD's differs due to ageing or replacement of an LCD module, they may be balanced using this function. The balancing is done using a set of faders as prompted by the software. It is important to balance them at the lowest possible level to allow the user more scope in the operational set-up screen.

(g) LCD Displays (visual)

Writes data to the displays to confirm operation.

(h) All Panel Voltage/Checks

This is an extremely useful function which monitors the supply voltage levels on each board, reporting whether they are within specification (present) or not (not present).

There are options for 24 or 48 subs. 430 and 530 have 24 subs. 48 subs is for possible future expansion. There are options to "check" or "show" the panel voltages. "Check" reports "present" or "not present" only displaying levels if "not present". "Show" displays the levels.

"Pause" can be used to halt the reported values as they scroll up.

They value reported is a 10 bit digitised value of 5V (1024 = 5V, 512 = 2.5V etc.). NOTE: A 5V supply signal will not display an output equivalent to 5V, because they are reduced to known levels by resistor networks on the PCBs. The actual expected value ranges are displayed by the software.

This test also provides an option to read the unit security number.

(i) Panel Voltage/Checks

This provides the same facility as (h), but for a selection of individual boards.

5.3.3 "Fault to Responsible Hardware" Table.

REF	FAULT SYMPTOMS	RESPONSIBLE HARDWARE	DIAGNOSTIC INFORMATION
1	Fader/bumps fault (All)	Special Subs, Cable 67, CS Processor.	Run "Check PCB Voltages". If ALL are "not present" then the CS Processor is at fault. Otherwise order of priority: CS Processor, cable 67, Special Subs.
2	Fader/bumps fault (Submaster 1)	Submaster 1, (Submaster 2 selector switch position conflict), Cable 65, Special Subs, Cable 67, CS Processor.	If not all faders/bump buttons on Submaster 1 are faulty, and Submaster 2 is OK, then fault is Submaster 1 Board or Cable 65 connection to Submaster 1. Otherwise order of priority: Submaster 1 (can use Submaster 2 to check, using selector switch), CS Processor, Cables, Special Subs Board.
3	Fader/bumps fault (Submaster 2)	Submaster 2, (Submaster 1 selector switch position conflict), Cable 65, Special Subs, Cable 67, CS Processor.	If not all faders/bump buttons on Submaster 2 are faulty, and Submaster 1 is OK, then fault is Submaster 2 Board or Cable 65 connection to Submaster 2. Otherwise order of priority: Submaster 2 (can use Submaster 1 to check, using selector switch), CS Processor, Cables, Special Subs Board.
4	Fader/bumps fault (Playback)	Playback Board, Cable 75, Special Subs, Cable 67, CS Processor.	If not all faders/bump buttons on Playback Board are faulty, and Submaster Board faders are OK, then fault is on the Playback Board or Cable 75 connection to the Playback Board. Otherwise order of priority: Playback, CS Processor, cables, Special Submaster Board.
5	Fader/bumps fault (Grand Master)	Grand Master Board, Cable 81, Special Subs, Cable 67, CS Processor.	The Grand Master faders and voltage reference are multiplexed together on the Special Submaster Board, so any singular fault could be caused by either board or cable 81 connecting them. Otherwise order of priority: Special Submaster Board, Grand master, CS Processor, cables,
6	Fader/bumps fault (Special Subs)	Special Subs, Cable 67, CS Processor.	If not all faders/bump buttons on Special Submaster Board are faulty, and all other desk faders are OK, then fault is on the Special Submaster Board. Otherwise order of priority: Special Submaster Board, CS Processor, Cables 67.

7	Keys (All)	Special Subs, Cable 67, CS Processor.	If LCD's work, and all keys do not, then the fault is likely to lie with the Special Submaster Board (being controlled by the same bus from the CS Processor). There is a possibility that one board is corrupting the control lines and preventing operation of the other boards. Systematic disconnection of boards with keys on will indicate which board is the problem. Otherwise, order of priority: CS Processor, Cables 67, Special Submaster.
8	Keys (Special Subs)	Special Subs	If only Special Submaster Board keys (one or more) do not work, then the fault lies with the Special Submaster Board.
9	Keys (Grand Master)	Grand Master, Cable 81, Special Submaster.	If only Grand Master Board keys (one or more) do not work, then the fault lies with the Grand Master Board. If there are key faults on several boards then order of priority is Special Submaster Board, other board/cable involved.
10	Keys (Playback)	Playback Board, Cable 75, Special Submaster.	If only Playback Board keys (one or more) do not work, then the fault lies with the Playback Board. If there are key faults on several boards then order of priority is Special Submaster Board, other board/cable involved.
11	Keys (Colour Keys)	Colour Keys, Cable 81, Special Submaster.	If only Colour Keys Board keys (one or more) do not work, then the fault lies with the Colour Keys Board. If there are key faults on several boards then order of priority is Special Submaster Board, other board/cable involved.
12	Wheels	CS Processor, Cable 67, Special Submaster, Cable 76, Command Board, wheel cable, wheel.	Wheels/cables can be swapped to decide whether it is the wheel or the circuit boards. The Command Board is only a simple signal router, hence after inspection it is an unlikely fault.
13	Thumb Wheels	CS Processor, Cable 67, Special Submaster, Cable 81, Colour Keys Board, wheel cable, wheel.	Thumbwheels/cables can be swapped to decide whether it is the thumbwheel or the circuit boards. The Colour Keys Board is only a simple signal router, hence after inspection it is an unlikely fault.
14	Trackerball	CS Processor, Cable 67, Special Submaster, Cable 81, Colour Keys Board, wheel cable, wheel.	Trackerball/cable can be swapped to decide whether it is the trackerball or the circuit boards. The Colour Keys Board is only a simple signal router, hence after inspection it is an unlikely fault.

15	LED's (All)	Special Subs, Cable 67, CS Processor.	If LCD's work, and all LED's do not, then the fault lies with the Special Submaster Board (being controlled by the same bus from the CS Processor).There is a possibility that one board is corrupting the control lines and preventing operation of the other boards. Systematic disconnection of boards with LED's on will indicate which board is the problem. Otherwise, order of priority: CS Processor, Cables 67, Special Submaster.
16	LED's (Submaster 1)	Submaster 1, Cable 65, Special Submaster Board.	If all other boards' LED's are OK then the fault is more likely to be the Submaster 1 Board or Cable 65, although it is still possible to be the Special Submaster Board.
17	LED's (Submaster 2)	Submaster 2, Cable 65, Special Submaster Board.	If all other boards' LED's are OK then the fault is more likely to be the Submaster 2 Board or Cable 65, although it is still possible to be the Special Submaster Board.
18	LED's (Special Subs)	Special Submaster Board.	If only Special Submaster Board LED's (one or more) do not work, then the fault lies with the Special Submaster Board.
19	LED's (Grand master)	Grand Master, Cable 81, Special Submaster.	If all other boards' LED's are OK then the fault is more likely to be the Grand Master Board or Cable 81, although it is still possible to be the Special Submaster Board.
20	LED's (Playback)	Playback Board, Cable 75, Special Submaster.	If all other boards' LED's are OK then the fault is more likely to be the Playback Board or Cable 75, although it is still possible to be the Special Submaster Board.
21	LCD Backlight (LCD 1 and 2)	LCD, Special Submaster Board, Cable 66, CS Processor.	**WARNING: Backlight circuitry produces high voltage.** If backlight is off, fault is with Special Submaster Board or LCD module. If backlight is on, but has no control, fault is on Special Submaster Board, Cable 66, or CS Processor.
22	LCD Backlight (LCD 3)	LCD, Grand Master, Cable 81, Special Submaster Board, Cable 66, CS Processor.	**WARNING: Backlight circuitry produces high voltage.** If backlight is off, fault is with Grand Master Board or LCD module. If backlight is on, but has no control, the order of priority is: Special Submaster Board, CS Processor, Cable 66, Cable 81, Grand Master Board.

23	LCD Data/Contrast (LCD 1)	LCD, LCD flexi-cable, Playback Board, Cable 78, Special Submaster Board, Cable 66, CS Processor.	If the contrast circuitry on the Special Submaster Board is faulty or looses its +/-12V supply, then the contrast voltage will be out of range resulting in a blank display. Note: the +/-12V supply comes from the CS Processor Board, which takes the ISA +/-12V supply, decouples it and current-limits it through a 4R7 resistor. If a fault has occurred or a bad connection made, the 4R7 resistors could have been damaged. If all three LCD's are faulty, then the order of priority is: CS Processor, Cable 66, Special Submaster. If two LCD's are faulty and the other one is not, then the fault is with the Special Submaster Board. If LCD1 is faulty on its own, the order of priority is: LCD1, Special Submaster Board, Cable 78, LCD flexi cable.
24	LCD Data/Contrast (LCD 2 and 3)	LCD, LCD flexi-cable, Special Submaster Board, Cable 66, CS Processor.	If the contrast circuitry on the Special Submaster Board is faulty or looses its +/-12V supply, then the contrast voltage will be out of range resulting in a blank display. Note: the +/-12V supply comes from the CS Processor Board, which takes the ISA +/-12V supply, decouples it and current-limits it through a 4R7 resistor. If a fault has occurred or a bad connection made, the 4R7 resistors could have been damaged. If all three LCD's are faulty, then the order of priority is: CS Processor, Cable 66, Special Submaster. If two LCD's are faulty and the other one is not, then the fault is with the Special Submaster Board. If LCD2 or LCD3 is faulty on its own, the order of priority is: LCD, Special Submaster Board, LCD flexi cable.
25	LCD's initially power up with white line(s) across them, but then operate correctly.	LCD, LCD flexi-cable, Special Submaster Board.	If all 3 LCD's have white lines/bars across them, then the fault is on the Special Submaster Board.

26	DMX fault	CS Processor. Cable 73. Connector Board. DMX XLR assy.	Use DMX loop back (as described in 5.5.2) to check that fault is with the desk. Check Connector Board 5V voltage references (+5VDETA, +5VDETB) using diagnostic software. to ensure power to connector board. Inspect the DMX XLR cable assy. Otherwise. the order of priority is: CS Processor. Cable 73, Connector Board. DMX XLR assy.
27	AUX EIA485 fault	CS Processor. Cable 73. Connector Board. AUX XLR assy.	Use AUX loop back (as described in 5.5.2) to check that fault is with the desk. Check Connector Board 5V voltage references (+5VDETA. +5VDETB) using diagnostic software. to ensure power to connector board. Inspect the AUX XLR cable assy. Otherwise. the order of priority is: CS Processor. Cable 73. Connector Board. AUX XLR assy.
28	D54 or AMX fault	CS Processor. Cable 73. Connector Board. D54 or AMX XLR assy.	Use D54 and AMX loop backs (as described in 5.5.2) to check that fault is with the desk. Inspect the D54 or AMX XLR cable assys. Otherwise. the order of priority is: CS Processor. Cable 73. Connector Board. D54 or AMX XLR assy.
29	Audio Input fault	CS Processor. Cable 83. Connector Board. Audio XLR assy.	Use Audio/MIDI loop back (as described in 5.5.2) to check that fault is with the desk. Inspect the Audio XLR cable assy. Otherwise, the order of priority is: CS Processor. Cable 83. Connector Board. Audio XLR assy.
30	MIDI fault	CS Processor. Cable 73. Connector Board. MIDI 5-pin DIN assy.	Use MIDI loop back (as described in 5.5.2) to check that fault is with the desk. Inspect the MIDI 5-pin DIN cable assy. Otherwise. the order of priority is: CS Processor. Cable 73, Connector Board. MIDI 5-pin DIN assy.
31	RS232 (remote) fault. From AUX1 XLR.	PC IDE card. Comm 2 cable assy (D-Type and XLR)	Apply PC loop-backs (5.5.1). Note: required diode on AUX1 XLR as described in 5.3.2.1 (c). Testing Comm1 port could indicate a IDE card failure.

32	Remote Analogue fault	CS Processor, Cable 83, Connector Board.	Use loop back (as shown in 5.5.2) to check that fault is with the desk. To test all the Remote Analogue channels the gooseneck loop back connections have to be applied to the gooseneck outputs on the Special Submaster Board. Run the "Connector Board Test" from menu "Test CS subsystem only". If the remote analogue channels are OK then D54/AMX, Test_zero_volts, Test_AUX _Power, and Goosenecks will all pass. This test will also indicate if the remote 10V supply is present on the Connector Board. The order of priority is: CS Processor, Cable 83, Connector Board.
33	Serial Number	CS Processor	The Serial Number test routine can be run to confirm hardware fault.
34	CS battery back-up failure	CS Processor	Either the battery/battery circuit or Secure Reset start-up circuitry are faulty (all on CS Processor Board).
35	Fan	Special Submaster Board, fan, fan cable, PSU Power cable to the Special Submaster Board.	Ensure fan cable orientation is correct. If the LCD backlights are also faulty (i.e. not on at all), then there is a problem with the supply of +12V_LAMPS on the PSU power cable to the Special Submaster Board, or a bad connection on the board itself. The +12V is routed directly to the Fan connector. The connector and cable can be separately tested with a +12V DC supply (e.g. the other PSU secondary power output cables (+12V is yellow, 0V is black).
36	Overtemp LED	Overtemp XLR cable assy, Colour Keys Board.	The Overtemp LED circuit is a simple LED/resistor indicator. To check apply 12V DC to pins 1 and 3 of the Overtemp connector (PL8), directly on the board (pin 1 is +ve).

5.4 Circuit Board Functional Description

5.4.1 Special Submaster Board (ref2200 PCB1067)

Supply Rail	Source	Cable
+5V	CS Processor Board	66/67
GND	CS Processor Board	66/67
+12V	CS Processor Board	66
-12V	CS Processor Board	66
+5V_ANL	CS Processor Board	66/67
0V (ANL)	CS Processor Board	66/67
+5V_LAMPS	PSU	PSU Spur
+12V_LAMPS	PSU	PSU Spur
0V_LAMPS	PSU	PSU Spur

The Special Submaster Board is the signal distribution point to the control surface boards from the CS Processor. This means that all signals between the CS Processor board and the control surface boards pass through this board, some of them being processed (see below).

The functions performed by this board are:

LCD decoding. Using the peripheral bus signals that come from the CS Processor on cable 66, the 'select' signals are produced to define which LCD module is being read/written to.

Provides a simple reset control circuit for the LCD's that stops them displaying untidy white bars on power-up, until the application software runs.

Provides the circuits for the control of LCD contrast levels and font select for all 3 LCD's, and backlight levels for LCD's 1 and 2 (numbered from the left). LCD 3 backlight is controlled between this board and the Grand Master Board. The software controls this circuitry for these functions from the CS Processor (via cable 66), done through a 2 signal serial bus called I2C (I2CDAT and I2CCLK).

Provides the detailed electronics for controlling the LED's and keys (not bump-buttons). This interfaces to the processor on the CS Processor board, for software control, via the peripheral bus on cable 66.

Besides providing the routing to the CS Processor of all the Control Surface analogues (fader levels, bump buttons, voltage references), the Grand Master faders, and voltage references for the Grand Master Board, Command Board, and Colour Keys Board are multiplexed onto a single signal to go to the CS Processor (on cable 67). Also multiplexed onto the same signal are the faders and bump buttons on this board, the voltage references for this board (+5V lamps and +/-12V detect), and a temperature signal from a Thermister on this board.

5.4.2 Control Surface Processor Board (ref2201 PCB1068)

Supply Rail	Source	From
+5V	ISA Bus	Extender Card
GND	ISA Bus	Extender Card
+12V	ISA Bus	Extender Card
-12V	ISA Bus	Extender Card
+5V_ANL	CS Processor Board	Produced internally from +5V
0V (ANL)	CS Processor Board	Produced internally from GND

The Control Surface Processor (CS Processor) board controls all the functions on the desk surface and input/output from the XLR panel on the rear of the desk.

The board resides in a PC motherboards ISA bus slots. Extra ISA slots, besides those directly on the motherboard are provided by the extender card. The CS Processor card resides in one of these. A good solid connection to this ISA slot is imperative for the system to function reliably.

The CS Processor uses a Siemens SAB80C166 processor. There is no program code stored on the board. The program code is downloaded to the CS Processor, over the ISA bus, at power-up, by the PC. This downloading is complex process performed through a Dual Port Ram accessible to both the PC (via the ISA bus) and the SAB80C166. Communication between the PC and the CS Processor occurs throughout operation using an interrupt system and passing data/messages across this dual port ram.

There are 3 DIL switches on this board:

SW1 - PC Ram address switch.

PC RAM ADDR SWITCH BIT	COMPARED PC ADDRESS BIT Open = 1	DEFAULT SETTING BASE ADDR = E0 0000h
1	LA23	Open
2	LA22	Open
3	LA21	Open
4	LA20	Closed
5	LA19	Closed
6	LA18	Closed
7	LA17	Closed
8	Not used	Closed

SW2 - PC interface address switch (Dual Port Ram and Reset Reg).

PC_ADDR SWITCH BIT	COMPARED PC ADDRESS BIT Open = 1	DEFAULT SETTING BASE ADDR = F0 0000h
1	LA23	Open MSB
2	LA22	Open
3	LA21	Open
4	LA20	Open
5	Not used	Closed
6	Not used	Closed
7	Not used	Closed
8	Not used	Closed

SW2 - PC interrupt select switch.

SWITCH BIT	PC INTERRUPT SELECT SWITCH BIT USAGE. (Only one of 0-5 should be closed i.e. not OPEN)	DEFAULT SETTING IRQ 11
8	General purpose test switch. TESTSW 1	OPEN
7	General purpose test switch. TESTSW 0	OPEN
6	Set to CLOSED to select PC interrupt request IRQ15	OPEN
5	Set to CLOSED to select PC interrupt request IRQ12	OPEN
4	Set to CLOSED to select PC interrupt request IRQ11	CLOSED
3	Set to CLOSED to select PC interrupt request IRQ10	OPEN
2	Set to CLOSED to select PC interrupt request IRQ9	OPEN
1	Set to CLOSED to select PC interrupt request IRQ5	OPEN

Functions provided by the CS Processor Board:

Random Access Memory. Besides the dual port ram mentioned above, there are two memory areas on the CS Processor, which are both battery backed by a rechargeable NICAD battery on the board. This provides data retention for at least 30 days after the unit is switched off. The battery recharges automatically when the unit is switched on. The first memory area is the CS Ram, 256Kbytes, which is the SAB80C166 program and data memory. The second is the PC Ram, 1 Mbyte, which is only accessible by the PC across the ISA interface. This is used for storage of important code or data (e.g. the cues for a show) which required battery backup to protect from mains power failures.

EEProm. This small, non-volatile, electrically erasable prom, is used to store system variables. Presently these are LCD calibration levels (backlight and contrast), password information, D54 calibration data, and SAB80C166 internal UART information.

Serial number. This is a unique 48 bit number stored in a 3 pin device.

Analogue multiplexer control. The multiplexing of all the analogue signals (faders, bump buttons, voltage references) are controlled by a counter on this board. The output of the counter goes to the Special Submaster board via cable 67, and then to the Submaster Boards (cable 65) and Playback Board (cable 75) where it controls the multiplexing of the analogues onto single signals. The multiplexing also occurs on the Special Submaster Board and the CS Processor itself. The clock signal for the counter is a special signal originating on the Special Submaster Board in order to avoid interference from LED switching noise when sampling analogues.

Wheel Interface. The wheels, thumbwheels and trackerball are optical encoders, each producing two clock signals. These signals are monitored by a pulse processing IC on this board. The signals for the two main wheels are routed through the Command Board and Special Submaster Board. The signals for the thumbwheels and trackerball are routed through the Colour Keys Board and Special Submaster Board.

Desk input/output signals are transmitted or received by this board:

DMX. Routed by Cable 73 to the Connector Board.

AUX. Routed by Cable 73 to the Connector Board.

MIDI. Routed by Cable 73 to the Connector Board.

D54. Routed by Cable 73 to the Connector Board.

AMX. Routed by Cable 73 to the Connector Board.

AUDIO IN. Routed by Cable 83 to the Connector Board. The balanced differential audio signal is processed on this board. It has a software controllable sensitivity adjustment.

REMOTE ANALOGUES. Routed by Cable 83 to the Connector Board. These 12 analogue (0V to 10V) signals are multiplexed onto a single signal on this board.

Voltage reference signals. These are multiplexed onto the same signal as the remote analogues. They are:

+12V, -12V, Test_Vbat (battery indicator), D54OUT (D54 calibration), DACREF (D54 calibration), AUXDET (Connector Board AUX 10V), 10VDET (Connector Board Remote 10V), 5VDETA (Connector Board 5V), 5VDETB (Connector Board 5V), Audio_anl (audio circuit test signal), Bassbeat_ref (audio sensitivity monitor).

5.4.3 Submaster Board (ref2202 PCB1069)

Supply Rail	Source	Cable
+5V	Special Submaster	65
GND	Special Submaster	65
+12V	Special Submaster	65
-12V	Special Submaster	65
+5V_ANL	Special Submaster	65
0V (ANL)	Special Submaster	65
+5V_LAMPS	Special Submaster	65
+12V_LAMPS	Special Submaster	65
0V_LAMPS	Special Submaster	65

This board provides a set of faders and bump buttons with indicator LED's.

The multiplexer counter bus is received from the CS Processor Board via the Special Submaster Board. The fader levels, bump button levels and voltage references are multiplexed onto one analogue signal.

The voltage references are +5V (5V digital), +5V_ANL (5V analogue), +5V_LAMPS (5V for the LED's), and +/-12V.

A 4-position slider switch allows up to four Submaster Boards to work together in one desk. This is achieved by switching the single multiplexed analogue signal to a different pin on the Cable 65 interface. Position 1 gives submasters 1 to 12, position 2 gives 13 to 24 etc.

The LED's are scanned by the 8279 chips on the Special Submaster Board via Cable 65.

5.4.4 Command Board (ref2203 PCB1070)

Supply Rail	Source	Cable
+5V	Special Submaster	76

GND	Special Submaster	76

The Command Board provides the main command key matrix. These keys are scanned by the 8279 ICs on the Special Submaster Board via Cable 75.

The 2 wheels interface directly to this board. The wheel signal is not processed, but routed to the Special Submaster Board via Cable 76. The wheels receive +5V and GND from this board.

The voltage reference from this board (Command Detect) is passed directly to the Special Submaster Board (Cable 76) where it is multiplexed onto an analogue signal.

5.4.5 Playback Board (ref2204 PCB1071)

Supply Rail	Source	Cable
+5V	Special Submaster	75
GND	Special Submaster	75
+12V	Special Submaster	75
-12V	Special Submaster	75
+5V_ANL	Special Submaster	75
0V (ANL)	Special Submaster	75
+5V_LAMPS	Special Submaster	75
+12V_LAMPS	Special Submaster	75
0V_LAMPS	Special Submaster	75

The Playback board provides the playback faders, keys and indicator LED's. It also provides a routing to LCD 1 for the LCD data bus and contrast signal.

The faders and voltage references are multiplexed onto a single analogue signal on this board. This is passed to the Special Submaster Board via Cable 75.

The voltage references are +5V (5V digital), +5V_ANL (5V analogue), +5V_LAMPS (5V for the LED's), and +/-12V.

The keys and LED's are scanned by the 8279 ICs on the Special Submaster Board via Cable 75.

5.4.6 Grand Master Board (ref2205 PCB1072)

Supply Rail	Source	Cable
+5V	Special Submaster	81
GND	Special Submaster	81
+5V_ANL	Special Submaster	81
0V (ANL)	Special Submaster	81
+5V_LAMPS	PSU	PSU Spur
+12V_LAMPS	PSU	PSU Spur
0V_LAMPS	PSU	PSU Spur

The Grand Master Board provides 2 grand master faders, indicator LED's, 8 keys, and a circuit supplying the backlight to LCD 3.

The faders and voltage reference (GMDET) are passed to the Special Submaster Board (via Cable 81) where they are multiplexed onto one of the analogue signals. GMDET is combined with the Colour Keys Board voltage reference (CKDET) to form GM/CKDET on the Special Submaster Board, before it is multiplexed onto the analogue signal.

The keys and LED's are scanned by the 8279 ICs on the Special Submaster Board via Cable 81.

The control signal for the backlight circuit comes from the Special Submaster Board via Cable 81. The backlight power goes to LCD 3 on Cable 56.

5.4.7 Colour Keys Board (ref2206 PCB1073)

Supply Rail	Source	Cable
+5V	Special Submaster	81
GND	Special Submaster	81
+5V_ANL	Special Submaster	81
0V (ANL)	Special Submaster	81

The Colour Keys Board provides 3 keys, an interface for the 4 thumb wheels and the trackerball, and a Dimmer Overtemp LED.

The 3 keys are scanned by the 8279 ICs on the Special Submaster Board via Cable 81.

The thumb wheels and tracker ball signals are routed to the Special Submaster Board via Cable 81.

The thumb wheels and tracker ball receive +5V and GND from this board.

The Overtemp LED connects (Cable 22) to an XLR on the back of the desk, and requires a 12V DC input.

The voltage reference for this board (CKDET) is passed to the Special Submaster Board via Cable 81, where it is combined with the Grand Master Board voltage reference (GMDET) to form GM/CKDET, which is multiplexed onto an analogue signal.

5.4.8 Connector Board (ref2207 PCB1074)

Supply Rail	Source	Cable
+5V	CS Processor Board	73
GND	CS Processor Board	73.83.59
+12V	CS Processor Board	73
0V (ANL)	CS Processor Board	73

The Connector Board provides signal routing (with possible termination and protection) for the rear panel I/O signals to the CS Processor Board. It also provides an Auxiliary 10V supply, a Remote Analogue 10V supply, and a route for the floppy disk signals from the PC IDE card.

The rear panel I/O signals are:

DMX. Routed by Cable 73 to/from the CS Processor Board.

AUX. Routed by Cable 73 to/from the CS Processor Board. A 10V supply is derived on this board for the AUX interfaces.

MIDI. Routed by Cable 73 to/from the CS Processor Board.

D54. Routed by Cable 73 from the CS Processor Board.

AMX. Routed by Cable 73 from the CS Processor Board.

AUDIO IN. Routed by Cable 83 to the CS Processor Board. The balanced differential audio signal is processed on this board. It has a software controllable sensitivity adjustment.

REMOTE ANALOGUES. Routed by Cable 83 to the CS Processor Board. A 10V supply is derived on this board for the Remote interface.

5.4.9 Dual VGA board (ref2209 PCB1083)

Supply Rail	Source	From
+5V	ISA Bus	Extender Card
GND	ISA Bus	Extender Card
+12V	ISA Bus	Extender Card
-12V	ISA Bus	Extender Card

The Dual VGA Board interfaces to the PC ISA bus, providing two simultaneous VGA outputs. The software can select VGA1 or VGA2 and direct the display images to either monitor.

There are two switches provided on the board. These provide the future facility for having up to four Dual VGA cards present simultaneously, providing up to 8 VGA channels. However, these switches must be correctly set for operation with one Dual VGA card.

SW02 (4-position slider switch) is set to position 1. This is the board ident number.

DIP switch SW01 is set as follows:-

ADDRESS SETTINGS

ADDRESS SWITCH BIT	COMPARED VGA ADDRESS BIT	SETTING OPEN=1 CLOSED=0
1	SA1	Open
2	SA2	Closed
3	SA3	Closed
4	SA4	Open
5	SA5	Open
6	SA6	Open
7	SA7	Open
8	SA8	Closed

5.4.10 Passive Extender Board (ref1984 PCB1060)

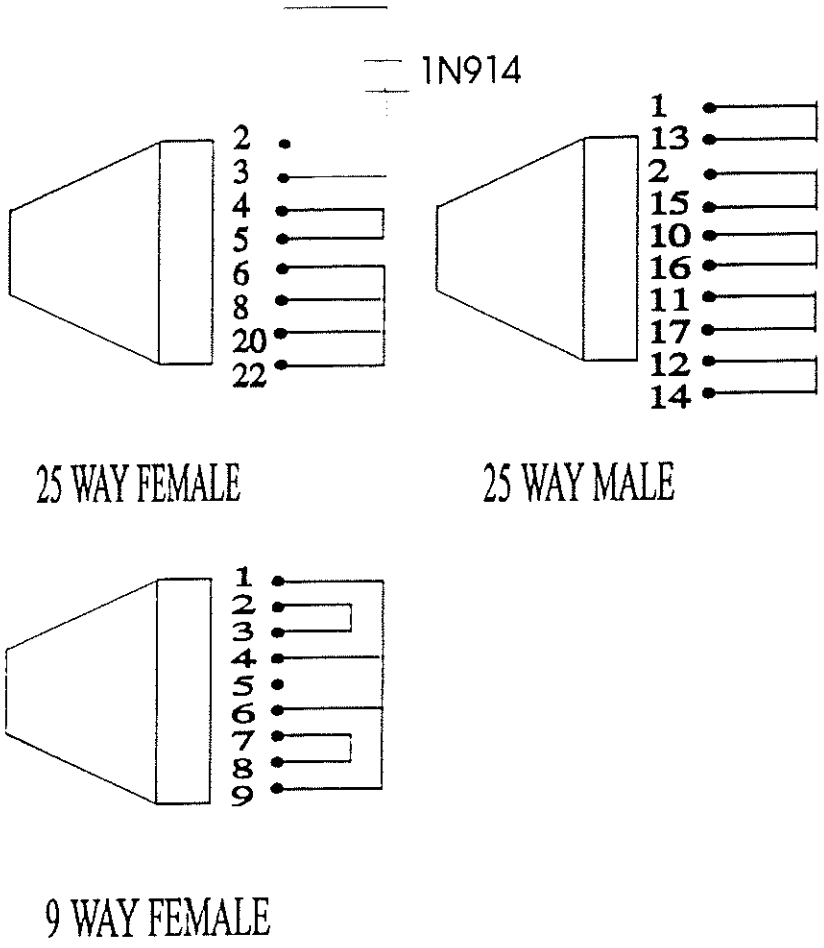
This board provides an extension to the available ISA slots. It stands at 90 degrees to the PC motherboard and connects to the motherboard's end ISA slot via a flexi cables.

It requires good ground connections to the motherboard chassis at 3 screw locations, and a power connection to the PSU, to ensure reliable operation.

It is not truly "passive", because there is an IC present. This is used to drive the ISA read and write command signals, and is required for reliable operation.

5.5 Test Loop Back Descriptions

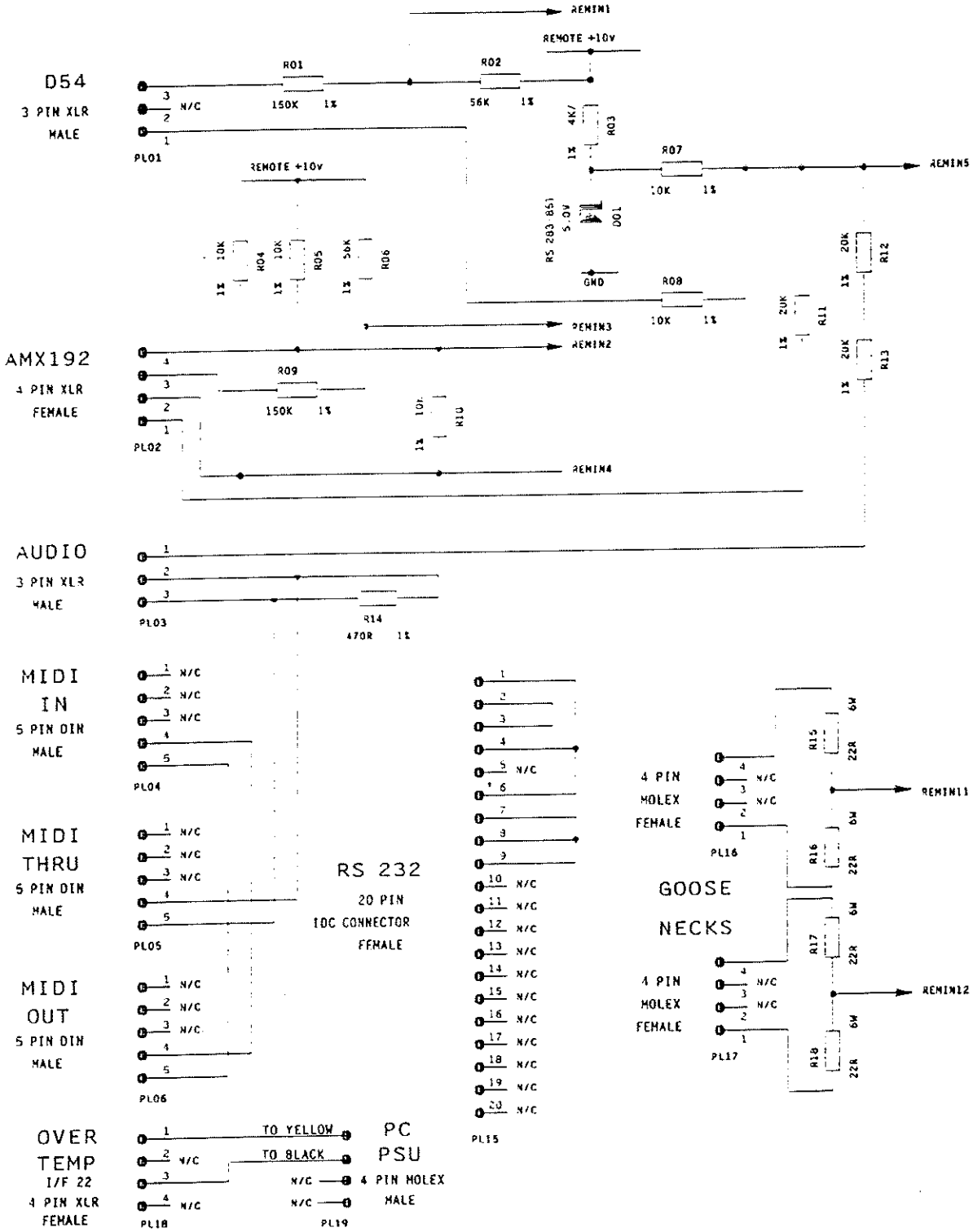
5.5.1 PC Test Loop back Connectors.

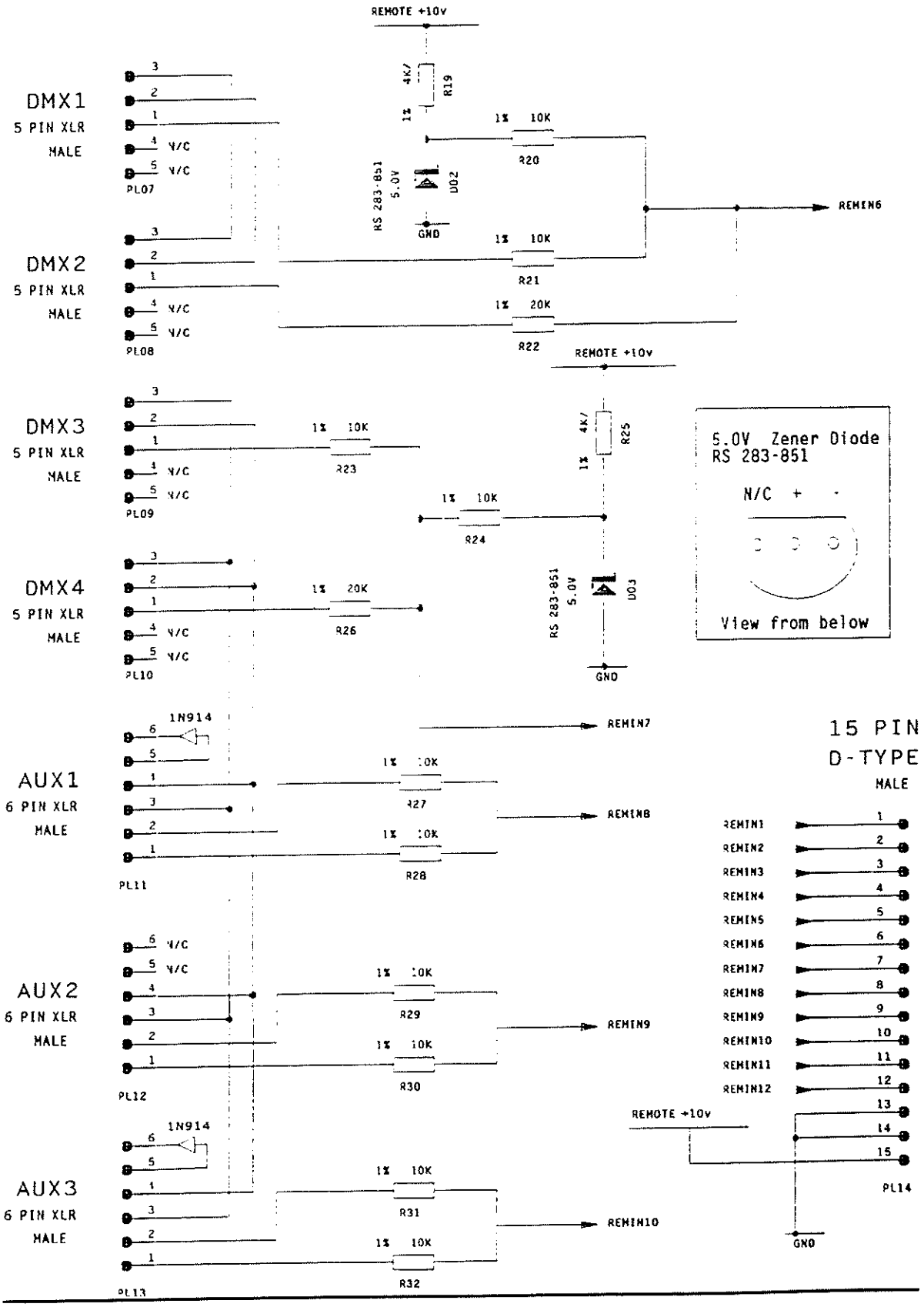


Note: The 1N914 diode must also be present between pins 5 and 6 of the AUX1 XLR loop back, as shown in section 5.5.2, for the Comm 2 test to pass.

5.5.2 220 MAIN TEST JIG.

Note: The Gooseneck, Overtemp and RS232 sections need not be connected for diagnostics. It is only required if full board testing of the CS Processor Board, Special Submaster or Connector Board using the "Test CS Sub-system only" menu option. If used the RS232 loop back is applied to the CS Processor Board, PL1.




REMOTE +10v
DMX1
5 PIN XLR
MALE
PL07
DMX2
5 PIN XLR
MALE
PL08
DMX3
5 PIN XLR
MALE
PL09
DMX4
5 PIN XLR
MALE
PL10
N/C
4K7
R19
1%
10K
R20
R21
20K
R22
R23
R24
R25
R26
RS 283-851
5.0V
D02
D03
GND
REMIN6
5.0V Zener Diode
RS 283-851
N/C + -
View from below
1N914
AUX1
6 PIN XLR
MALE
PL11
AUX2
6 PIN XLR
MALE
PL12
AUX3
6 PIN XLR
MALE
PL13
R27
R28
R29
R30
R31
R32
REMIN7
REMIN8
REMIN9
REMIN10
15 PIN
D-TYPE
MALE
REMIN1
REMIN2
REMIN3
REMIN4
REMIN5
REMIN6
REMIN7
REMIN8
REMIN9
REMIN10
REMIN11
REMIN12
PL14
GND

5.6 Software loading procedure.

5.6.1 Introduction.

There are various levels of software to be loaded. The methods used to load the software are detailed in the following sections.

Firstly, there is the PC operating system, DOS. This is loaded in the factory. It will only need to be reloaded if the Hard Disk is corrupt or has to be renewed.

Secondly, there is the Strand 430/530 Test and Operating software. This is also loaded in the factory. It may need to be reloaded if it is being replaced with a new version. This will most likely take place as an up-grade of operational software only (not test).

Finally, there is the Application software. This gives the system its "personality" (e.g. Genius Plus or Light palette), and the number of channels etc. This is usually loaded off a disk by the user when the desk is new, giving a 21 day countdown during which the user must register the desk/software purchase with the factory, and obtain a password. This password will enable the system to use the software that the user has purchased, for ever. Further upgrades require the purchase of more software and the application for a further password before it can be used.

5.6.2 Loading of DOS and Application to a new or corrupt system.

This is loaded in the factory. It will only need to be reloaded if the Hard Disk is corrupt or has to be renewed. You will need a copy of the latest DOS installation disks (presently V6.2), and a copy of the latest 430/530 test/operational software (disks 1 and 2).

1. Switch on the supply to the desk.

2. Insert the first of the latest set of DOS disks into the floppy drive and press ENTER.

3. The DOS installation program will then run, follow the prompts given on the VGA display and select the options applicable to the system under test.

4. Once DOS is installed onto the C: drive, insert the first of the two Strand System installation /test disks and type:-

    A : <ENTER>

    INSTALL <ENTER>

5. Follow the prompts to load the software.

6. The prompt "PRESS ANY KEY TO CONTINUE" will be displayed. This will initiate a series of lengthy factory tests that require test adapters and additional software. Each time the unit is switched on it will automatically enter this test mode. They following steps will modify the start-up, so that the desk will enter operational mode as usual.

7. Respond to the above prompt by pressing any key.

8. Press ESC and select END TEST. An error log will be displayed. This will indicate a failure, but this is only because of the test abortion.

9. Press ESC. The message "DO YOU WANT TO CONTINUE TESTS" appears. Choose N. This will exit the program to DOS.

10. You will be in a directory called 220OS. Type COPY AUTOEXEC.NRM \AUTOEXEC.BAT

11. Power cycle the desk. It will enter operational mode on power up. There will be no "personality" and only one channel enabled. You must now load the application (section 5.6.4).

5.6.3. Loading the Latest Operational Software.

Even though there is operational software present from the factory, the user will be instructed to load the operational software on receiving the desk, to ensure the latest version is loaded. The procedure is the same for a general operational software update installation. No new passwords are required for a new operational software upgrade, providing the application remains the same.

NOTE: The process of installing a new version of operating system will delete any shows being worked on. The shows should be saved first.

To load the operational software, insert the floppy disk and using the desk keys:

1. Archive

2. Soft (softkey)

3. Oper (softkey)

This will take a couple of minutes and then it is loaded.

5.6.4. Loading the Application Software.

The user will load the purchased application off a disk(s) when the desk is new, giving a 21 day countdown during which the user must register the desk/software purchase with the factory, and obtain a password. This password will enable the system to use the software for ever.

Further upgrades require the purchase of more software and the application for a further password before it can be used.

If the software is being reloaded after a fault, this stage should be omitted. The user's password should be entered as described in 5.6.5. This will enable all the application functions without loading them from disk.

To load the Application software, insert the floppy disk and using the desk keys:

1. Archive

2. Soft (softkey)

3. App (softkey)

This will take a couple of minutes and then it is loaded.

5.6.5. Loading the Password.

The password is loaded using the desk keys:

1. Archive

2. Soft (softkey)

3. Pass (softkey)

4. Enter password.

This will take a couple of minutes and then it is loaded.

5.7 PC BIOS set-up

BIOS set-up screens vary from BIOS to BIOS. However, the overall functions to be controlled remain much the same. The exact details for setting up the "AMI" BIOS are detailed below. However, this information can be adapted to allow any BIOS to be configured.

Note: Certain "green" BIOS's are becoming popular, which have "power save" features. These "power save" features must be disabled as they can cause the PC to automatically power down is no activity is seen for a defined period of time.

1. Switch on the supply to the desk.

2. Wait for the message "Hit <DEL> If you want to run SET-UP." to appear on the VGA display then press **<DEL>**

NOTE The keys to select and edit the various parameters within the BIOS set-up vary with different BIOS's, however they are defined at the bottom of the screen.

3. Once the BIOS set-up menu has been entered, select the "Standard CMOS set-up menu."

4. Set the date and time.

5. Set the hard disk type to that which is fitted in the PC sub-system being configured and set the appropriate parameters. (See the manufacturers data sheet.)

6. Set hard disk drive D: to "Not installed."

7. Set floppy drive A: to "1.44MB 3.5."

8. Set floppy drive B: to "Not installed."

9. Set primary display to "VGA, PGA, EGA."

10. Set keyboard to "Not Installed." (This may be found in the "Halt on errors" option".

11. Quit the CMOS set-up menu and enter the Advanced CMOS set-up menu.

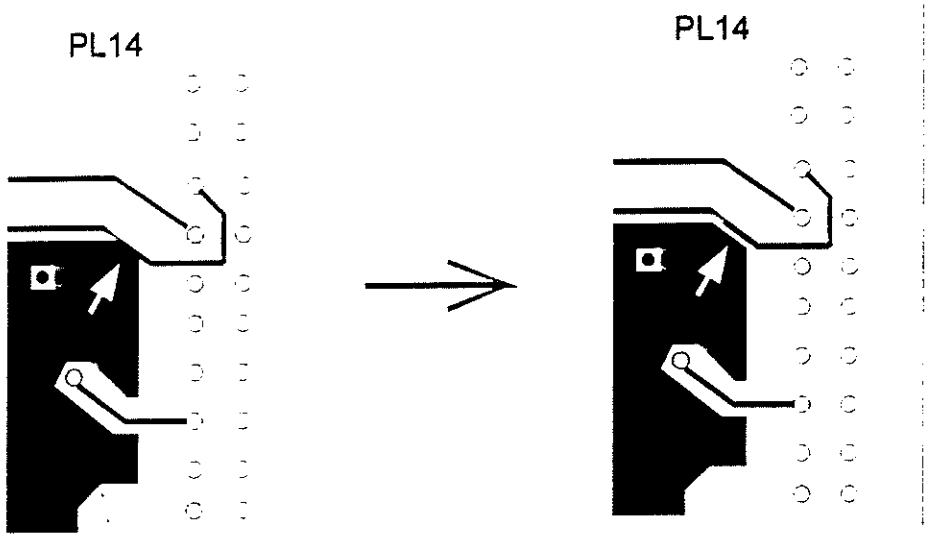
12. Set the floppy drive seek at boot option to "Enabled."

13. Set the system boot up sequence to "C:,A:."

14. Quit the Advanced CMOS set-up menu, select the "Write to CMOS and exit" option.

430/530 Connector card. PCB 1074/1 Ref 2207

(R&D Change note E13312)



This fault on the 430 / 530 connector card will short DMX 4 data to ground. The short is on the component side of the PCB and the 10 way IDC connector must be removed before the track can be cut.

CS Processor Mk1.

If the CS Processor Ref 2201 PCB 1068/1 is fitted then DMX3 and DMX4 can not be used. The only fault will be on the 430/530 test software. The desk will fail the AUX test on the CS Processor menu of the test software. To pass this test without making the modifications remove the DMX4 loop back connector before running this test.

CS Processor Mk2.

This card is due for release in mid 1995.

If the CS Processor Ref 2201 PCB 1068/2 is supplied by the factory in a 430 / 530 then this modification to the connector card will already be done.

If a CS Processor MK1 is replaced by a Mk2 then this modification MUST BE DONE. Also an extra cable must be fitted between the CS Processor and the Connector card.