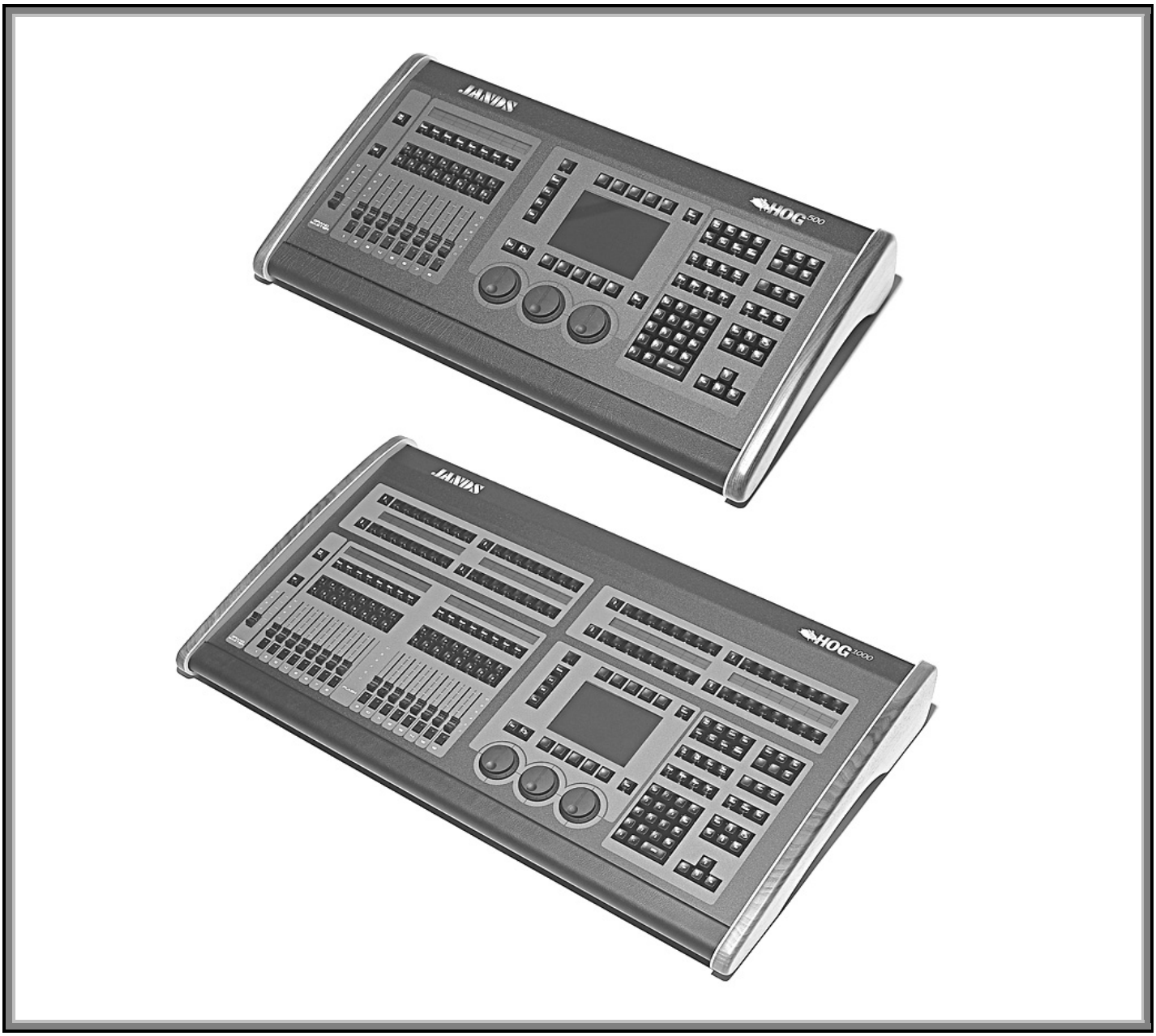
HOG 1000/500
Echelon



Technical Manual

JANDS

EMC COMPLIANCE

This product is approved for use in Europe and Australia/New Zealand and conforms to the following standards:

European Norms	Australian / New Zealand Standards
EN 55103-1	AS/NZS 4251.1
EN 55103-2	AS/NZS 4252.1
EN 60065	AS/NZS 3260

To ensure continued compliance with EMC Directive 89/336 and the Australian Radio communications Act 1992, use only high quality data cables with continuous shield, and connectors with conductive back shells. Examples of such cables are:

DMX, MIDI, Keyboard cables:	Belden 8102	100% Aluminium foil screen, 65% Copper braid.
Video, Printer:	Amtron FR2651	Flat round cable, woven shield.

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1.0 Introduction

This manual covers servicing of the Jands Echelon and HOG 1000/500 lighting control consoles. Both console types are physically and electrically similar. The Echelon 1k has moulded rubber end cheeks and armrest. References to HOG consoles may be assumed to apply to Echelon consoles as well.

The HOG 1000/500 lighting control console is designed for stage, theatre, corporate, and live music applications. It has been designed to control all equipment with a DMX-512 input, however the front panel controls have been optimised for use with moving light fixtures. New fixture types can be added by modifying the fixture library disk if they are not available on the existing release library.

The console has been designed with the capability for users to upgrade the software without removing the base. This is achieved by inserting a diskette with the new operating system, and selecting the appropriate options in the “boot menu”. The boot menu also provides other functions, including console self tests and setups.

Note that static sensitive devices are used throughout the console, and normal handling precautions should be applied during service. Note also that connections should never be made with the power switched on.

Metric fasteners are used throughout the console.

The HOG 1000/500 Operating Manual should be consulted for a description of desk operation.

Jands recommends that all service procedures be performed by a Factory Authorised Service Centre, or that the product be returned to Jands Electronics Service Department.

2.0 Equipment Description

The HOG 1000/500 is constructed using a rolled steel chassis, covered with a reverse screened lexan. The wooden sides are made from plantation timber and the front armrest is covered with soft leather. The Echelon 1k has moulded rubber end cheeks and armrest. A pair of front to back struts reduce flex and ensure front to back spacing is consistent with the base.

A separate assembly is used to hold the PSU and CPU cards. This bracket is removable as a complete pre-wired unit. Backpanel vents adjacent to the CPU card are removable from the inside and will be used to add options when available.

2.0.1 Tools

With the exception of the base screws and D-connector mounting nuts, metric hardware is used throughout the console. The following tools are recommended:

- 7mm nut driver
- 5mm nut driver
- #3 Posidrive screwdriver
- #2 Posidrive screwdriver

2.0.2 Disassembly

Access to the console is through the base. To remove the base place the console face down onto soft padding. Using the #2 posidrive screwdriver remove all (and only) silver screws, leaving the four black screws. The base can then be lifted away.

To remove the PSU/CPU assembly, disconnect all cables to the CPU and PSU, and use the 7mm nut driver to undo:

- three nuts next to the power inlet socket,
- two nuts between the PSU and CPU,
- two nuts adjacent to the MIDI connectors,
- three nuts between the CPU card and the vent/option panel.

The assembly can then be removed by sliding it toward the front until it is clear of the studs, then lifting it out of the chassis.

Note that the CPU card can be removed from the console without removing the complete assembly. The CPU card is mounted on standoffs on the bracket assembly. To remove the CPU card from the assembly:

- Remove all connections to the card;
- Using the 5mm nut driver undo the D-connector nuts;
- Using the posidrive screwdriver, undo the nine screws holding the CPU card to the CPU bracket and lift the card off.

The remaining PCBs may be removed by undoing the relevant screws, however attention should be made to the following points:

- Faders should be pushed to their mid position before their knobs are removed;
- The position of the address jumpers on the menu and playback cards should be noted when they are removed so they can be correctly set during re-assembly.

2.0.3 Re-assembly

Attention should be paid to the following during reassembly:

- LCDs and their windows should be wiped on the inside with a lint-free cloth before assembly.
- Ensure the address jumper on menu and playback cards are set correctly. Note all cards should only ever have one (1) address jumper installed. Refer to section 3.2.1 for further information on the card select jumper settings.
- When fitting the CPU ensure all connectors are properly installed, including the DMX output connector.
- The CPU trim procedure should be followed if either the CPU or power supply have been changed, or if the trim has been inadvertently adjusted. Refer to section 3.1.2.
- Test the console fully before installing the base. This includes the disk drive, desk lamps, back lights, and DMX outputs.
- Double check all flatcable latch connectors are closed before the base is installed.
- Do not overtighten the base screws.

2.1 Precautions and Installation Notes

The HOG 1000/500 should be installed in a position which allows sufficient ventilation around the back panel vents – there should be at least 100mm clear space around the back panel.

The HOG 1000/500 has been manufactured to comply with all FCC/CE/C-Tick regulations, and uses plated panels to ensure minimal radiation emanates from the chassis. In order to maintain compliance:

- all panels and covers should attached using every screw;
- all connections should be made using the recommended cable type;
- all back shells should be connected to the cable shield.

3.0 Circuit Notes

The HOG 1000/500 uses a main CPU to provide all processing functions. The CPU communicates with the front panel PCBs via the front panel card bus. The main LCD is connected directly to the CPU card.

3.1 Processor Card

The major functional blocks are as follows:

Function	IC Number
Core CPU	IC1-8, IC33, IC30, OSC1
Boot EPROM	IC25
FLASH ROM	IC11-13
RAM Bank 1	IC16-19
RAM Bank 2	IC20-23
FDD, RS232, Printer	IC48, IC44, IC47
DMX output	IC53, IC38, IC39, IC50, IC51
MIDI	IC48, IC35, IC52
VGA output	IC6, IC57-60, IC66
Graphics LCD output	IC67, IC61-64, IC55
Reset/power fail/RAM power	IC15
Real time clock	IC31
Front Panel Card bus	IC9, IC10
Expansion bus	IC24, IC26-29

3.1.1 Boot ROM, FLASH, and RAM

The CPU memory consists of a Boot EPROM (IC25), four FLASH ROMs (IC11, IC12, IC13, IC14), and eight static RAMs (IC16-23).

The CPU card has the capacity to be fitted with a maximum of 2MBytes program memory (four x 29F040 devices) and 4MBytes show memory (eight x 512Kbyte devices). However the initial release has 1MByte program (four x 28F020 devices) and 2MByte show memory (four x 512Kbyte devices). DIP switches #1 and #2 set how much SRAM has been fitted to the PCB. Refer to section 4.0.

Only 512Kbyte SRAMs can be used, and four at a time must be installed.

Only AMD brand 28F020 FLASH devices should be used with the present software version.

3.1.2 Trim procedure

The trimpot (T1) on the CPU card adjusts the point where the CPU is informed that power is failing. If a console is dropping its memory, T1 may be out of adjustment and should be adjusted as follows:

1. Save any necessary console information to diskette;
2. Turn T1 fully anticlockwise;
3. Place a shunt across J1;
4. Switch console on and wait until it has completely started up;
5. Slowly adjust T1 until L3 lights;
6. Switch off console;
7. Remove shunt across J1.

This procedure should be performed whenever either a new CPU or PSU is installed.

3.1.3 Battery

The lithium battery should last approximately 5 years **from the date the battery was made** - note that a 4 year life from date of product sale would not be unexpected when delivery and manufacturing times are allowed for. The battery should be considered flat if its terminal voltage measures below 2.9 volts.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the battery manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.

3.1.4 Logic

The logic requirements for the board are contained in two logic devices, IC33 and IC55. These are in-circuit programmable, and are programmed by connecting an appropriate header to CONN3. If it becomes necessary to reprogram these devices in the field, follow the instructions supplied with the kit.

CAUTION

Damage to the main LCD may result if the logic is reprogrammed while the LCD is connected. Disconnect the flat cable from the CPU to the front panel PCBs and LCD before proceeding.

3.1.5 Desk Lamp Dimmer

The desk lamp dimmer circuit consists of a PWM switching circuit protected by a PTC polyswitch. The polyswitch will trip under overload conditions – when it does LED L6 will extinguish. Due to the nature of the polyswitch it is necessary to either disconnect all desk lamps or switch the console off for a minute in order for it to reset.

3.1.6 DMX Outputs

The DMX outputs are not opto-isolated, however a protection network decouples the driver ICs from high voltages which may be applied during external mains faults. After a fault has been removed these devices may take up to a minute to reset, and during this time the output cables should be disconnected or the console switched off.

3.1.7 Keyboard

The console is protected against excessive load current through the keyboard connector by a polyswitch. After a fault has been removed this device may take up to a minute to reset, and during this time the keyboard should be disconnected or the console switched off.

3.1.8 Expansion Bus

The expansion bus is provided to allow for options to be added in the future. The expansion bus is a buffered extension of the system CPU bus. It is **not** compatible with Jandshog, Event, or ESP2 type expansion bus option panels, and **they should not ever** be installed.

3.2 Front Panel Cards

All front panel cards follow a design similar to that of other Jands consoles. A multiplexed 8 bit data/address bus is used to exchange bytes of information between the CPU and the front panel cards. The pin connections however are not compatible and under no circumstances should any Event, ESP2, or Jandshog type front panel circuit boards ever be connected to a HOG 1000/500 CPU card. Damage may result.

Note that the Graphics LCD module on the Program card is connected directly to the main CPU card. Brightness and contrast for this display are controlled from DACs on the Program card.

3.2.1 Card Select Jumpers

A jumper on each menu and playback card selects the address of the card in the system. When replacing cards ensure that the replacement card has its jumper in the same position as the card it is replacing.

The correct jumper position for a menu or playback card is equal to its position from the left, eg. the left-most menu and playback cards have their jumpers set to 0, the next have it set to 1, etc. Program cards have no address jumper.

3.2.2 LCDs

The character LCD modules use a single backlight driver circuit to deliver the high voltage required for all of the electroluminescent (EL) backlights. This is the function of the EL driver board, mounted near the power supply. This board receives its power and an analogue control from the CPU card.

Note that intensity of the character LCD backlights reduces with age. This is normal and to minimise this reduction, the backlights are deactivated if the console hasn't been used

for a preset time. The backlights are immediately reactivated when any front panel button is pressed.

The graphics LCD should maintain its brightness throughout its lifetime. Note also that a faint tone may be audible from the displays when run at or near full brightness.

4.0 DIP Switch Settings for normal operation

NOTE: At present all DIP switches except 1 and 2 should be off for normal console operation.

DIP Switches 1 and 2 are always used to configure the RAM size as fitted to the console as shown below in Table 1:

IC16,17,18,19	IC20,21,22,23	Total RAM	SW2	SW1
Fitted	Not fitted	2M Byte	Off	On
Fitted	Fitted	4M Byte	On	On

Table 1: DIP switch settings for normal operation

Dip SW3 - no function
Dip SW4 - no function
Dip SW5 - no function
Dip SW6 - no function
Dip SW7 - no function
Dip SW8 - Test mode enable

When SW8 is set to ON, the console enters test mode at startup as defined in section 5.

5.0 Boot ROM in-built menu, self tests, setups, etc

The Boot ROM contains software that can be used to test, setup, and configure the console. Note that the software is subject to change depending on the boot software version.

5.1 Entering the Boot Menu

The boot menu is accessed by holding down the “Enter” button on the keypad while turning power on. Release the Enter button when the opening menu is displayed.

5.2 Menu Usage

Each menu offers a number of options. In all menus except the “Auxiliary Tests” menu, an option is selected by typing the number on the left of the text description. Pressing Enter returns to the level above. To activate an Auxiliary Test option, type the number and press enter, or press 0 and then Enter to return to the previous menu.

5.3 Boot Menu

The following menu options are available in the opening menu

1 Clean start;

2 Reload Software;

3 Setup and test.

5.3.1 Clean Start

Use this option to reset the show memory of the console when a new show is to be programmed from scratch. Note that use of this option clears the fixture libraries, and so a diskette with these libraries must be available to use the console.

5.3.2 Reload Software

Pressing “2” on the keypad at the Boot menu initiates the software reload sequence from diskette. Ensure you have a HOG 1000/500 software diskette with the file “JNT2.BIN in the drive and follow the instructions on the LCD. Note that this facility should be used with caution and it is not recommended that software be reloaded at a critical time, eg. just before the start of a show.

5.3.3 Settings and Test

The following menu options are available in the Settings and Test menu:

1 Reload Software

2 Configuration Display

3 Setup Menu

4 Native Menu

5 Auxiliary Tests

6 Full Stress Test

7 Toggle Cache

8 Restart

5.3.3.1 Reload Software

Use this option to reload the operating software in the same way as section 5.3.2

5.3.3.2 Configuration Display

When activated, this option displays the current configuration of the console as seen by the CPU. Use this option to verify that the console is setup as expected, eg. the front panel card jumpers are correct, etc.

5.3.3.3 Setup Menu

Use this option to access system soft setups, including the Real Time clock, individual LCD contrasts, LCD Backlights, and Desklamp intensity. The following menu options are available in the Setup menu:

1 Reset Clock

2 Set Contrast

3 Set Backlight and Desklamp

4 Reset Contrast and Brightness

5 Erase Flash

5.3.3.3.1 Reset Clock

The Real Time clock may require resetting when the battery has gone flat or has been disconnected. When reset, the console time will advance from 12:00.00 1 Jan 1997.

5.3.3.3.2 Set Contrast

The LCD modules may be individually configured with different contrast settings as necessary depending on the display characteristics. The up and down cursor keys are used in conjunction with the wheels to adjust the contrast of the displays. Follow the instructions on the main LCD.

5.3.3.3.3 Set Backlight and Desklamp

The desklamp intensity, the backlighting for the main display, and the backlighting for the character LCDs may be adjusted as required using the wheels. Follow the instructions on the main LCD.

5.3.3.3.4 Reset Contrast and Brightness

Use this function to reset all of the contrast and brightness levels to the factory defaults.

5.3.3.3.5 Erase FLASH

The FLASH devices may be erased to aid in console diagnosis.

5.3.3.4 Native Tests

The Native tests include high level tests that can be used to exercise sections of the console. In general the results of the exercise are shown on the main LCD. The following menu options are available in the Native Tests menu:

1 Keyboard Test

2 Floppy Test

3 MIDI & Mouse Test

4 Polled Printer Test

5 IRQ Printer Test

6 Clock Test

5.3.3.4.1 Keyboard Test

The data received from an external keyboard plugged into the keyboard input is displayed on the main LCD. Pressing and releasing the “ESC” button on the keyboard will result in the following display data:

KBD: dc

KBD: 1f dc

5.3.3.4.2 Floppy test

An attempt is made to read the disk label of the diskette in the floppy drive. If successful the main display shows the label.

5.3.3.4.3 MIDI & Mouse test

This test is in 2 parts. Initially the data is written to and read back from the MIDI and mouse control circuitry. Secondly the MIDI and Mouse interfaces are enabled and the data received is displayed on the main LCD. Pressing and releasing the left hand mouse button will result in the following display data:

Mouse: e0 80 80

Mouse: c0 80 80

Data received from the MIDI port is displayed on the main LCD. Note that the MIDI input should not be plugged into the MIDI output.

5.3.3.4.4 Polled Printer test

A predefined data stream is output from the printer port to a standard parallel printer. When run, the following data should appear on the printer paper:

"ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz()1234567890"

5.3.3.4.5 IRQ Printer test

A predefined data stream is output from the printer port to a standard parallel printer. When run, the following data should repeatedly appear on the printer paper:

"Printer interrupt test – if you can read this then it is working!"

5.3.3.4.6 Clock test

Each second the number of accumulated timer interrupts is displayed. Each second the "Tick Time" should increase by 256 counts.

5.3.3.5 Auxiliary tests

The auxiliary tests are a further set of tests which are used to confirm fundamental operation of the circuitry, and are not available in consoles with serial numbers prior to G98XXX. Menu items are selected by typing the required test number followed by Enter. Each test may be run once or continuously – when run continuously they will halt when an error is detected, or when Enter is pressed. Note that Enter must be pressed and held until it is recognised to terminate correctly. The following menu options are available in the Auxiliary Test menu:

1) Bus Exercise
2) RAM Test
3) FLASH Test
4) Test VGA RAM
5) Test LCD RAM
6) Display Testbars
7) Test DMX1 Output
8) Test DMX2 Output
9) *
10) *
11) Scan Cards
12) Activate Front Panel Cards
13) Test Program Card Switches
14) *

15) *

16) Run Tests 2,3,5,7,8,9

17) DMX Receive

18) Display version

A summary of the tests is shown in Table 2.

Note that these tests may also be run by selecting the DIP switches as shown in Table 2. This is of use when the LCD or front panel card bus is not functional, or a program card is not available to select a test. When run from the DIP switches all tests are run continuously.

Test Number	DIP Switch (87654321)	Title	Time to execute (seconds)
1	100001XX	Bus Exercise	0
2	100010XX	RAM test	120
3	100011XX	FLASH test	50
4	100100XX	Test VGA RAM	17
5	100101XX	Test LCD RAM	17
6	100110XX	Display testbars	2
7	100111XX	Test DMX1 output	3
8	101000XX	Test DMX2 output	3
9	101001XX	Test MIDI output	3
10	101010XX	*	-
11	101011XX	*	-
12	101100XX	Scan Cards	0
13	101101XX	Activate Front Panel Cards	-
14	101110XX	Test Program Card switches	-
15	101111XX	*	-
16	110000XX	*	-
17	110001XX	Run tests 2,3,5,7,8,9	197
18	110010XX	DMX receive	-
19	110011XX	Display version	1

Table 2: Auxiliary Test summary

5.3.3.5.1 Bus Exercise

The Bus exercise is not a test as such, but is used to debug CPU cards that have fundamental faults, such as newly manufactured cards in production.

The CPU has been programmed to output sequences of events that can be seen on a CRO, synchronised to the falling edge of L5. The data can be used to verify the correct operation of the CPU control signals.

The sequence of operations performed during this routine are shown in table 3.

Event	Signals of interest	Comment
Set Green LED on	L5	CRO Synchronisation
Set Green LED off	L5	CRO Synchronisation
Move 01 to 40010004	IC16 pin 29	Write to RAM bank 0 byte 0
Move 02 to 40010005	IC17 pin 29	Write to RAM bank 0 byte 1
Move 04 to 40010006	IC18 pin 29	Write to RAM bank 0 byte 2
Move 08 to 40010007	IC19 pin 29	Write to RAM bank 0 byte 3
Move 40010004 to CPU	IC16-19 pin 24	Read from RAM bank 0
Move 10 to 40200000	IC20 pin 29	Write to RAM bank 1 byte 0
Move 20 to 40200001	IC21 pin 29	Write to RAM bank 1 byte 1
Move 40 to 40200002	IC22 pin 29	Write to RAM bank 1 byte 2
Move 80 to 40200003	IC23 pin 29	Write to RAM bank 1 byte 3
Move 40200004 to CPU	IC20-23 pin 24	Read from RAM bank 1
Set Red LED on	L4	CRO Synchronisation
Set Red LED off	L4	CRO Synchronisation
Move 10 to 20000000	IC13 pin 29	Write to FLASH byte 0
Move 20 to 20000001	IC14 pin 29	Write to FLASH byte 1
Move 40 to 20000002	IC12 pin 29	Write to FLASH byte 2
Move 80 to 20000003	IC11 pin 29	Write to FLASH byte 3
Move 20000004 to CPU	IC11-14 pin 24	Read from FLASH
Move AA to 606A0000	IC65 pin 13	PC Memory Write
Move 606A0000 to CPU	IC65 pin 14	PC Memory Read
Move 55 to 60000000	IC65 pin 50	PC IO Write
Move 60000000 to CPU	IC65 pin 49	PC IO Read

Table 3: Bus exercise event summary

Figure 1 shows the relationship between L5, IC16 WR, and the CPU DACK signals as measured while running this test.

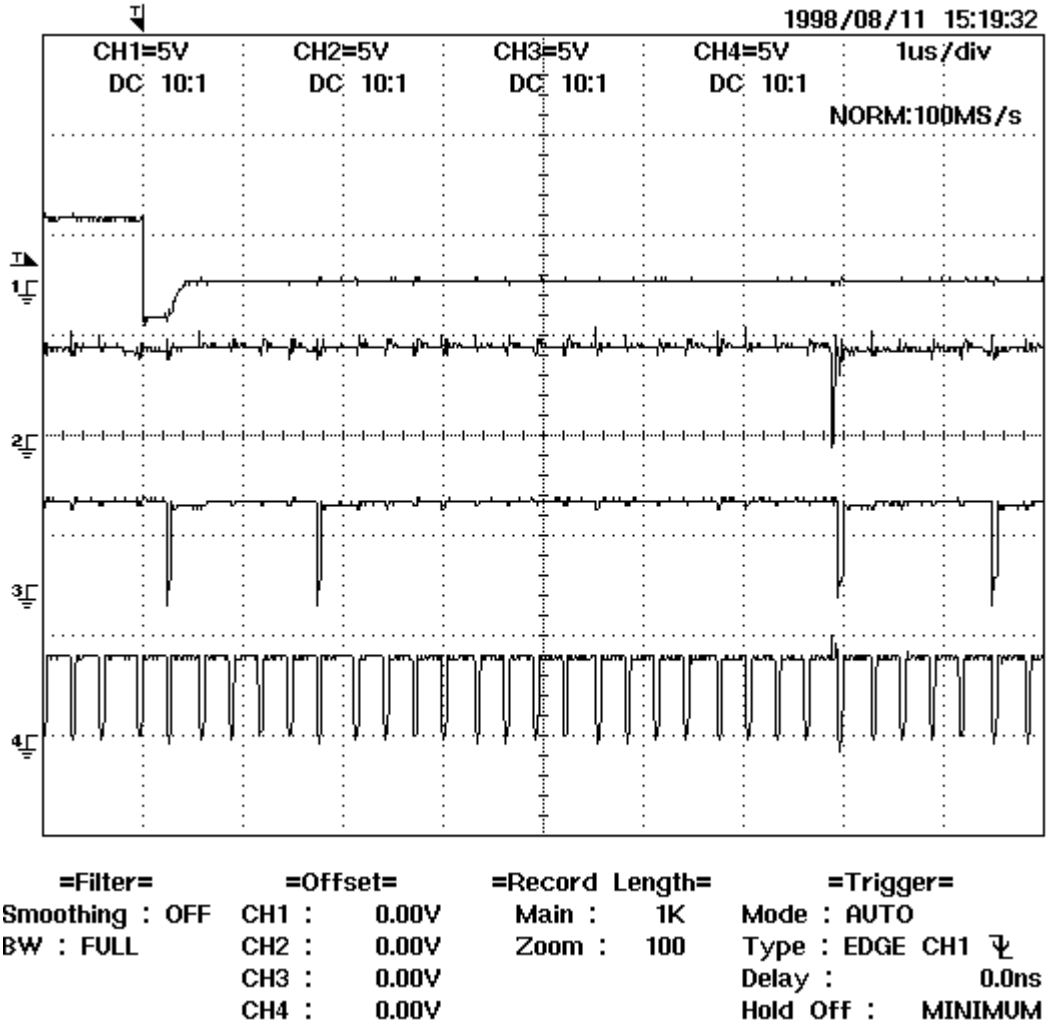


Figure 1: Sample waveform during Bus Exercise

Trace #1: L5

Trace #2: IC16 Pin 29 (WR)

Trace #3: IC1 pin 44 (DACK1)

Trace #4: IC1 pin 43 (DACK0)

5.3.3.5.2 Test System RAM

The system RAM is checked for correct operation. This test requires approximately 2 minutes to execute when fitted with 2MBytes of RAM, ie. IC20-23 not fitted.

5.3.3.5.3 FLASH Test

The system FLASH is checked for correct operation. This test requires approximately 50 seconds to execute when fitted with 1MByte of FLASH, ie. IC11-14 fitted with 28F020 devices. Note that due to the limited number of write cycles available in FLASH devices, it is not recommended that this test be run continuously.

5.3.3.5.4 Test VGA RAM

The VGA controller is initialised and a memory test is performed on its RAM. This test takes approximately 17 seconds to execute and during execution a VGA monitor will show the memory test patterns.

5.3.3.5.5 Test LCD RAM

The Graphics LCD controller is initialised and a memory test is performed on its RAM. This test takes approximately 17 seconds to execute and during execution the graphics LCD will show the memory test patterns.

5.3.3.5.6 Display testbars

Test bars are displayed on the VGA and LCD screens for the purpose of checking colour (VGA) and grey scaling (LCD). Press Enter to return to the normal menu when the screen results have been viewed.

5.3.3.5.7 Test DMX 1 Output

The DMX1 output is connected to the MIDI input via the adaptor cable shown in Appendix D, or the combiner circuit shown in Appendix E. When the test is run the DMX1 output is exercised and the results read back into the MIDI input. The test takes about 3 seconds to complete.

5.3.3.5.8 Test DMX2 Output

The DMX2 output is connected to the MIDI input via the adaptor cable shown in Appendix D, or the combiner circuit shown in Appendix E. When the test is run the DMX2 output is exercised and the results read back into the MIDI input. The test takes about 3 seconds to complete.

5.3.3.5.9 Test MIDI output

The MIDI output is connected to the MIDI input via a standard MIDI link cable. When the test is run the MIDI output is exercised and the results read back into the MIDI input. The test takes about 3 seconds to complete.

5.3.3.5.10 *

This test not currently implemented.

5.3.3.5.11 *

This test not currently implemented.

5.3.3.5.12 Scan Cards

This test scans the front panel card bus and displays the cards found on the VDU. When run continuously this test will activate the front panel card bus and the signals can be used to repair faulty PCBs.

5.3.3.5.13 Activate front Panel Cards

When run continuously, this test activates the front panel card bus as shown in Table 4. It can be used to verify correct operation of the majority of the front panel controls. The program switches in general are not activated by this test, but can be verified using the separated "Test Program Card Switches" test 14 described in section 5.3.3.5.14.

In general a pressed switch is indicated by its associated LED or LCD, and fader values are displayed on the associated LCD. Note that any brightness and contrast changes that are made are not permanent and will be reset to their previous values when the console is re-started.

This test is terminated by pressing Enter.

Card	Type	Indication
Menu	Palette select	Associated LED
Menu	up arrow	"T" in associated LCD
Menu	Down arrow	"B" in associated LCD
Playback	"DBO", "Choose", go, pause, "Flash"	Associated LED
Playback	"Next Page"	"B" in associated LCD
Playback	Fader levels	Associated LCD
Playback	LCD contrast	Controlled by Fader #1
Program	"Try Cue, "Highlight", "Blind", "Clear Restore", "Group", "Position", "Colour", "Beam", "Effect", "Monitor", "Menus", "Setup", spare	Associated LED
Program	Left Wheel	Main LCD contrast
Program	Middle Wheel	Main LCD brightness
Program	Right Wheel	Desklamp brightness

Table 4: Front panel activation responses

5.3.3.5.14 Test Program Card Switches

This test is used to verify the correct operation of the program card switches. Once activated the user must press all switches on the program card (in any order) to terminate the test. The number of switch presses remaining is displayed on the VDU.

5.3.3.5.15 *

This test not currently implemented.

5.3.3.5.16 *

This test not currently implemented.

5.3.3.5.17 Run tests 2, 3, 5, 7, 8, 9

The test numbers as listed are run automatically, with the results being displayed on the VDU. Note that in order to test the DMX1, DMX2, and MIDI outputs a signal combiner circuit must be used as shown in Appendix E.

5.3.3.5.18 Receive DMX

DMX signal from an external source is connected to the MIDI input using the adaptor cable detailed in Appendix D. The DMX signal present is displayed on the VDU. Note that both DMX outputs transmit a test data pattern that can be used to feed into the input, however only one should be plugged into the MIDI input. Note also that the data pattern changes each time the test is run.

Press Enter to terminate the test.

5.3.3.5.19 Display version (?)

The software version of the test routines is output to L4 and L5 in flashes. The green LED (L5) flashes once at the start of the test. The version is then displayed in red LED (L4) flashes. The version is also displayed at the end of the title, ie.?, and for this reason this test is mainly for use when no program card is available.

5.3.3.6 Full Stress test

The console CPU is run with everything activated as a full test on the system. While this test is running the following occurs:

- Changing any fader setting, wheel setting, or pushing any button on the front panel results in an indication of the event in the main LCD;
- Moving the mouse (if connected), pressing a button on the external keyboard (if connected), or providing some MIDI input will result in the event being displayed on the main LCD;
- The LEDs on the front panel cards flash in sequence;
- The VDU scrolls through the 16 programmed colours;
- The system RAM is continuously tested.

Note that system is very busy during this test and can take some time to respond to inputs. To exit, press and hold Enter until the system responds.

5.3.3.7 Toggle Cache

The cache is toggled on or off.

5.3.3.8 Restart

The console is restarted. This is generally used when use of the self tests has been completed and it is desired to start the main operating software. Holding the Enter button down immediately after activating this option allows re-entry to the self tests and setups.

6.0 Fault Finding Table

Symptom	Possible Cause	Remedy
Console won't run	Show memory corrupt	Clean start
	Program memory corrupt	Reload program
	Mains fuse blown	Replace fuse in power inlet
Front panel config error on start up	Flat cable disconnected	Check that all flat cable connectors are locked closed
	Faulty flatcable	Replace flatcable
	Circuit board not working	Replace card
Console crash with message "Sorry I've Croaked" etc	Software Bug	Write down message and forward to Jands, then try clean start or program reload
	Insufficient memory	Install more memory or delete some unnecessary data
Console drops its memory	Flat battery	Replace battery
	Power fail circuit out of adjustment	Re-trim T1 as per section 3.1.2
Console always shows error	Software bug	Write down message and forward to Jands, then try clean start or program reload
Console won't write or read diskette	Disk not DOS format	Format on a PC compatible computer (DOS 3.0 and above)
	Diskette damaged	Replace diskette
	Poor quality diskette	Use quality diskette
	Diskette drive damaged	Replace diskette drive
Fixture not available for patching	Fixture library in console not up to date or corrupted	Load new library from library diskette.
No DMX output	Incorrect patch	Check patch
	Incorrect receiver address	Check receiver
	Faulty DMX cable	Repair / replace cable
	No line termination	Terminate DMX line
	Blown DMX driver	Replace driver
		Patch to other DMX output
Desk Lamp off	Short circuit lamp	Remove short circuit
	Blown fuse	Replace fuse
	Level turned down	Adjust level
	Blown bulb	Replace bulb
Radio Interference	Unearthed power cable	Use earthed cable/outlet
	Poor quality cables	Use quality shielded cables
No intensity control from console	Grand Master down	Adjust Grand Master
DMX	Blind button active	Press blind button
VGA monitor not working	Monitor not turned on	Check power connection
		Press power switch
	Monitor not plugged into console	Check VGA connection to console
	Screen output not selected	Select output in setup menu

7.0 Maintenance

If a console should start to misbehave or operate erratically, the problems encountered can usually be attributed to one of two causes:

- normal wear and tear, eg. switches failing and becoming intermittent;
- physical abuse, eg. transit damage, spilt drinks, shorted cables.

Parts most likely to wear out in time with normal use include the following:

- switches;
- faders;
- LCD backlights;
- digital encoders.

These are generally easy to spot and there is little that can prevent such wear from occurring, however careful use will maximise their life. Almost all parts of the console can be damaged by physical abuse, however there are a number of things that can be done to prevent this kind of damage:

- Cover the console when not in use, eg. before, after and between sets.
- ALWAYS insert a diskette into the floppy disk drive when the console is to be transported. This prevents damage to the drive mechanism.
- Do not use spare audio lines for DMX cable. If so, there is a danger that the connector will get plugged into the wrong signal.
- Do not smoke over the console.
- Do not obstruct the rear ventilation holes.
- When cleaning, do not use solvents and never allow the entry of liquids into the console. Use only a damp soft cloth for cleaning.

8.0 Technical Data and Specifications

HOG 1000/500 Specifications	
Mains Supply:	90-265VAC, 47-63Hz, 40 watts max.
Mains Fuse:	2A, M205 delay type
Temperature:	40°C maximum ambient
Outputs:	DMX Out 1 & 2, MIDI Thru, MIDI Out, Two Desk Lamps, Printer, VGA, RS232
Inputs:	Keyboard (AT type), MIDI In
Control channels:	1000
Data Protocol:	USITT DMX-512/1990, electrically conforms to RS485A.
Memory capacity:	2Mbytes standard, 4Mbytes maximum
Printer Port:	IBM compatible, parallel only
Disk Drive:	IBM format DOS 3.0 and above, 1.44MB high density
Mouse Port:	Microsoft compatible 9 pin “D” connector
Desk Lamps:	12 volt 5 watt x 2, maximum output 10W total
Construction:	All steel chassis with lexan/polycarbonate covered control surface
Dimensions:	L: 945mm W: 530mm H: 110mm
	L: 945mm W: 530mm H: 110mm
Weight:	19 kg net / 24.5 kg shipping
	19 kg net / 24.5 kg shipping
Ingress protection:	IP20

9.0 Glossary of Terms

Abbreviation	Term	Explanation
BOOT	BOOT	System startup
CE	Chip enable	A select pin provided on a device to enable it to be used in conjunction with a CS line
CE	Compliance mark	Equipment marked as such complies with the European safety/EMC regulations
C-Tick	Compliance mark	Equipment marked as such complies with the Australian EMC regulations
CPU	Central Processing Unit	The heart of a microprocessor or computer
CS	Chip Select	A connection that goes true under certain circumstances to select a particular device
DIP	Dual In-line Package	A device package format with 2 parallel rows of pins
EL	Electroluminescent	A type of backlight that uses high voltage
EPROM	Erasable Programmable Read Only Memory	A type of memory that is not intended to be re-programmed in circuit
FLASH	Flash RAM	A type of memory very much like EPROM but which is designed to be re-programmed in-system enabling program updates
Jumper	Shunt, Link	A jumper is used to configure a system by shorting a pair of pins together
LED	Light Emitting Diode	A diode that is optimised to radiate light
LCD	Liquid Crystal Display	A type of display that uses a liquid to prevent the transmission of light
PSU	Power Supply Unit	The power supply converts incoming mains to voltages usable by the electronics
PWM	Pulse Width Modulation	A cyclic technique of digital power control where a load is switched fully on for a period of time dependant upon the required output power
RAM	Random Access Memory	Memory in which the data contained within can be accessed in any order. The term RAM generally refers to memory that can be read and written to by the system
ROM	Read Only Memory	Memory that cannot be changed by the system
SRAM	Static RAM	A form of RAM that uses static memory cells to store information.

Appendix A History of Modifications

ECHELON 1k

Serial Number	Modification
D98591	First consoles made with: Operating software V2.3(30) Boot ROM version 1.15 Menu card version MLCMENU1 Playback card version ECHPBAK1 Program card version ECHPROG2 CPU card version COLDCPU2 Backlight driver card version BAKLITE3
F98141	Change menu card to ECHMENU2, change desk lamp dimmer frequency to 15KHz, change program card LCD backlight dimmer transistor Q3 to higher power MJE350.
G98540 onwards	Boot ROM updated to V1.17, operating software updated to V2.3(32).
H98XXX onwards	Add 1M resistor to power fail circuit to eliminate startup problems Add Auxiliary tests to boot ROM
I98XXX onwards	Operating software updated to V2.3(34), Boot ROM updated to V1.17-2
J98XXX onwards	Change program card to ECHPROG3 Change playback card to ECHPBAK2
K98XXX onwards	Operating software updated to V3.1, Q3 changed to BCP53
K98571 onwards	Boot ROM V1.18
F99XXX onwards	CPU card changed to COLDCPU4, Boot ROM V1.18-3
H99XXX onwards	Operating software V3.2(122)B

HOG 1000

I99553 onwards	HOG 1000 Lexan starts
K99591 onwards	Change program card to ECHPROG4
K99601 onwards	Operating software V3.2(130)
B00565 onwards	CPU card changed to COLDCPU6, Playback card ECHPBAK1
C00155 onwards	33MHz CPU, Operating software V3.2(133), Boot ROM V1.20-4

ECHELON 500

Serial Number	Modification
F99130	First consoles made with: Operating software V3.2(122)B Boot ROM version 1.20-3 Playback card version ECHPBAK2 Program card version ECHPROG3 CPU card version COLDCPU4 Backlight driver card version BKLTSML2

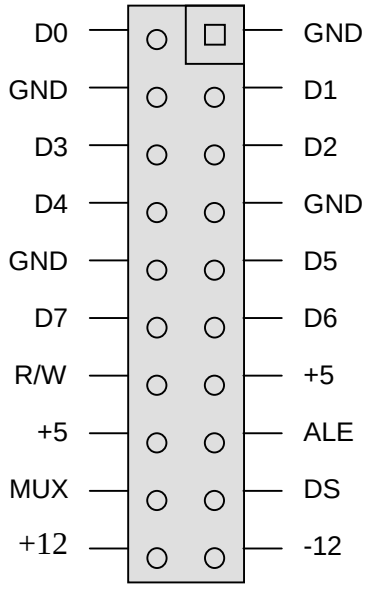
HOG 500

K99555 onwards	Operating software V3.2(130), Program card version ECHPROG4
B00539 onwards	CPU card version COLDCPU6, Playback card ECHPBAK1
C00145 onwards	33MHz CPU, Operating software V3.2(133), Boot ROM V1.20-4

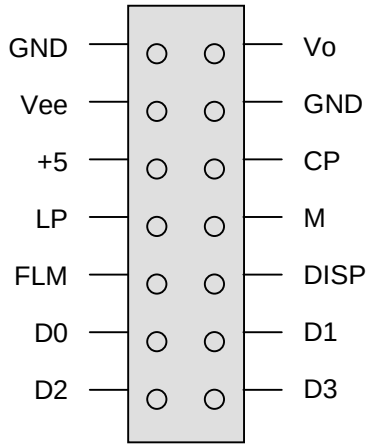
Appendix B Connector Pinouts

Front Panel Card Bus Connector (View from component side)

Menu, Playback, Program Cards

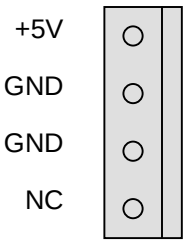


Graphics LCD Connector (View from component side at CPU Card)

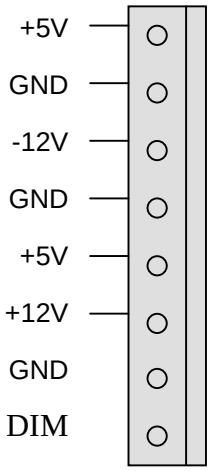


(View from component side)

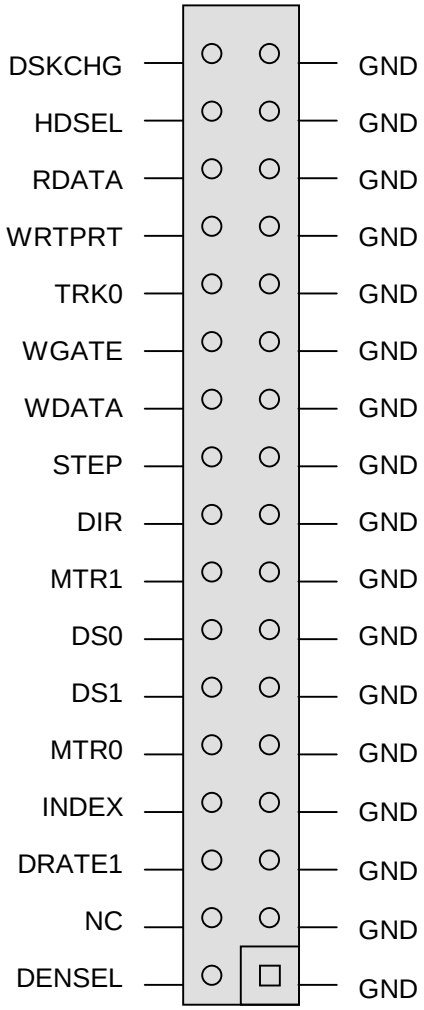
FDD Power Connector



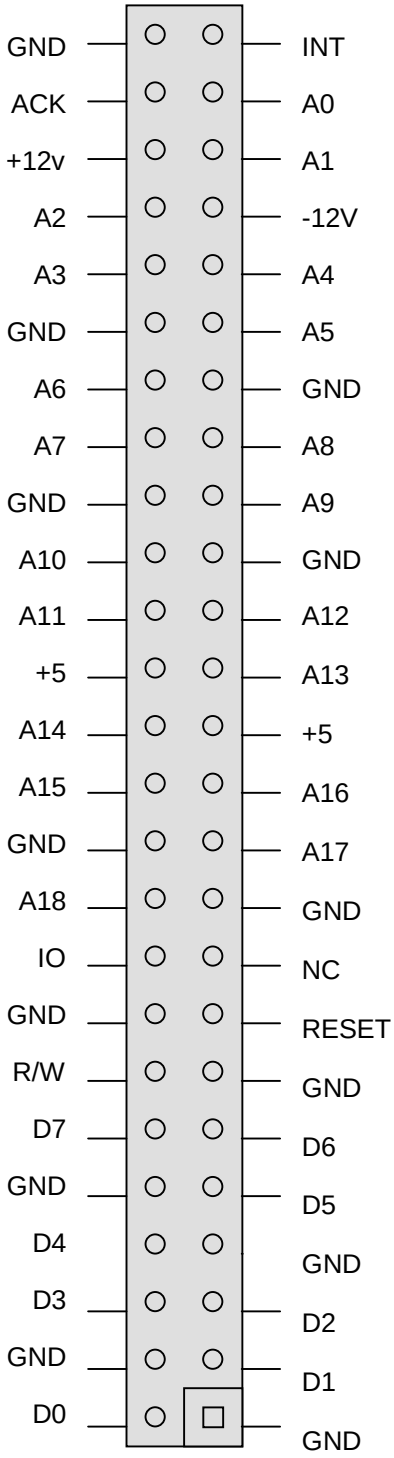
Main Power Connector (CONN8)



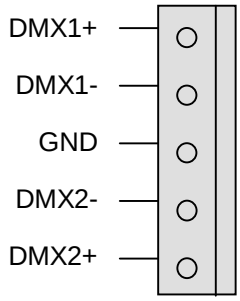
FDD Connector (CONN6)

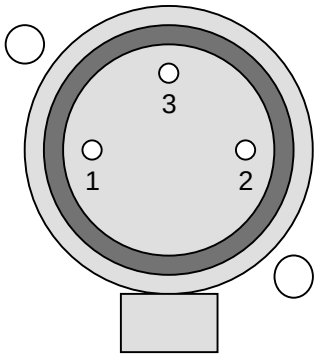


Expansion bus Connector (CONN2)



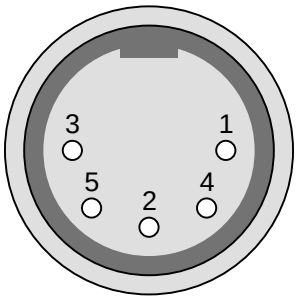
DMX CONNECTOR (Conn19)





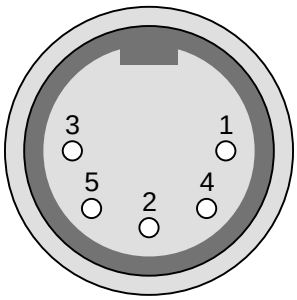
DESK LAMP CONNECTOR

DESK LAMP CONNECTIONS	
PIN No.	**FUNCTION**
1	NC
2	GND
3	V+



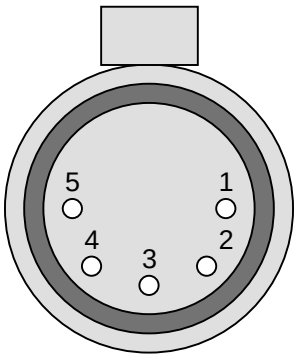
MIDI CONNECTOR

MIDI CONNECTIONS			
PIN No.	**FUNCTION**		
	IN	**OUT**	**THRU**
1	NC	NC	NC
2	NC	SHIELD	SHIELD
3	NC	NC	NC
4	IN+	OUT+	OUT+
5	IN-	OUT-	OUT-



KEYBOARD CONNECTOR

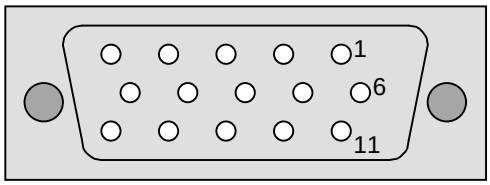
KEYBOARD CONNECTIONS	
PIN No.	**FUNCTION**
1	KCLK
2	KDATA
3	NC
4	GND
5	+5V



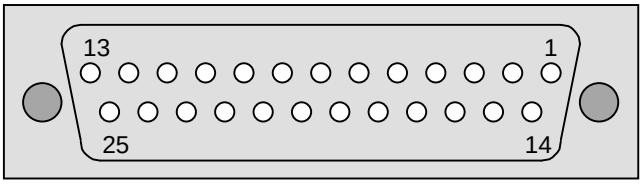
DMX CONNECTOR

DMX CONNECTIONS	
PIN No.	**FUNCTION**
1	SHIELD
2	SIGNAL-
3	SIGNAL+
4	NC
5	NC

VGA CONNECTIONS	
PIN No.	**FUNCTION**
1	RED
2	GREEN
3	BLUE
4	NC
5	NC
6	RED RETURN
7	GREEN RETURN
8	BLUE RETURN
9	NC
10	GND
11	NC
12	NC
13	HSYNC
14	VSYNC
15	NC



VGA CONNECTOR



PRINTER CONNECTOR

PRINTER CONNECTIONS			
PIN No.	**FUNCTION**	**PIN No.**	**FUNCTION**
1	STROBE	13	SELECT
2	D0	14	AUTOFEED
3	D1	15	ERROR
4	D2	16	INIT
5	D3	17	SELECT IN
6	D4	18	GND
7	D5	19	GND
8	D6	20	GND
9	D7	21	GND
10	ACK	22	GND
11	BUSY	23	GND
12	PAPER	24	GND
	END	25	GND

Appendix C Spare Parts

The following spare parts for HOG 1000/500 consoles are available from the JANDS Service Department:

ITEM	PART No.
Switching power supply NFS40-7608	ZSX020
Fuse M205 2 amp fast blow (mains)	ZEF215
3.5” Disk drive	ZZA144
Desklamp socket AXR-3-31PB	ZPG038
DMX out socket AXR-5-21PB	ZPG210
Fader 10K 60mm (Alps)	ZRS010
Fader knob black/white line	ZZK035
Encoder HRPG	ZRP045
Encoder knob	ZZK121
Switch (Schadow) SERU	ZSW045
Switchcap SRKL (Schadow)	ZSC005
Switch (Cherry) MX1A-A1NW	ZSW150
Switchcap (Cherry) no LED window	ZSC050
Switchcap (Cherry) with LED window	ZSC055
Lithium Battery 6126 CR (CPU)	ZDC010
75176 / DS3695 (DMX driver)	ZIC101
IC H11N1	ZIC017
Backlite driver card complete	YPC326
Menu card complete	YPC320
Playback card complete	YPC324
Program card complete	YPC322
CPU card complete	YPC330

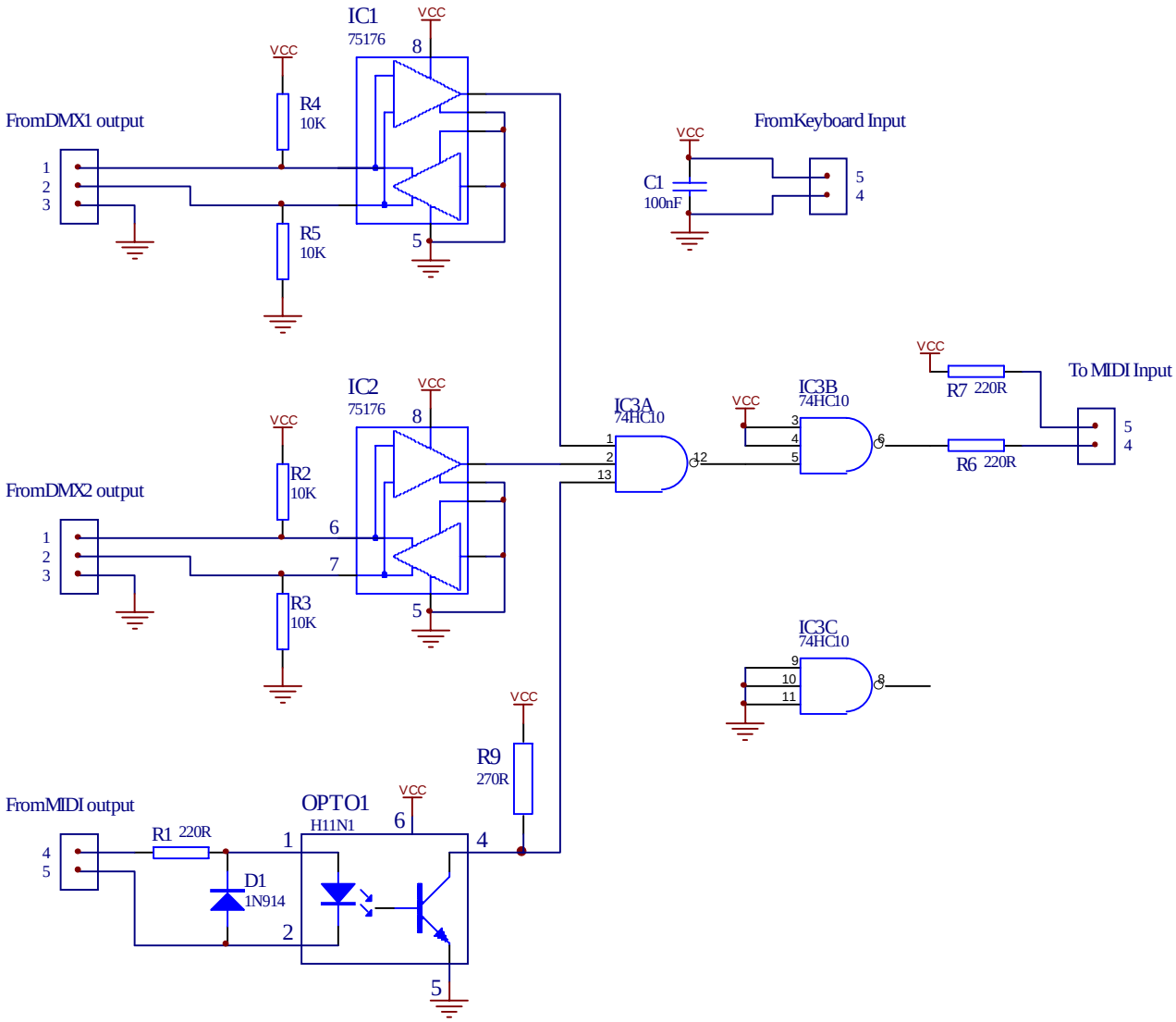
Appendix D DMX to MIDI adaptor

A DMX to MIDI adaptor cable is required to run some of the Auxiliary tests contained in the Boot ROM. The adaptor should be wired as shown:

DMX pin	MIDI pin	Detail
3	5	connect with 220R 0.25W 5% resistor
2	4	direct connection
1	2	direct connection

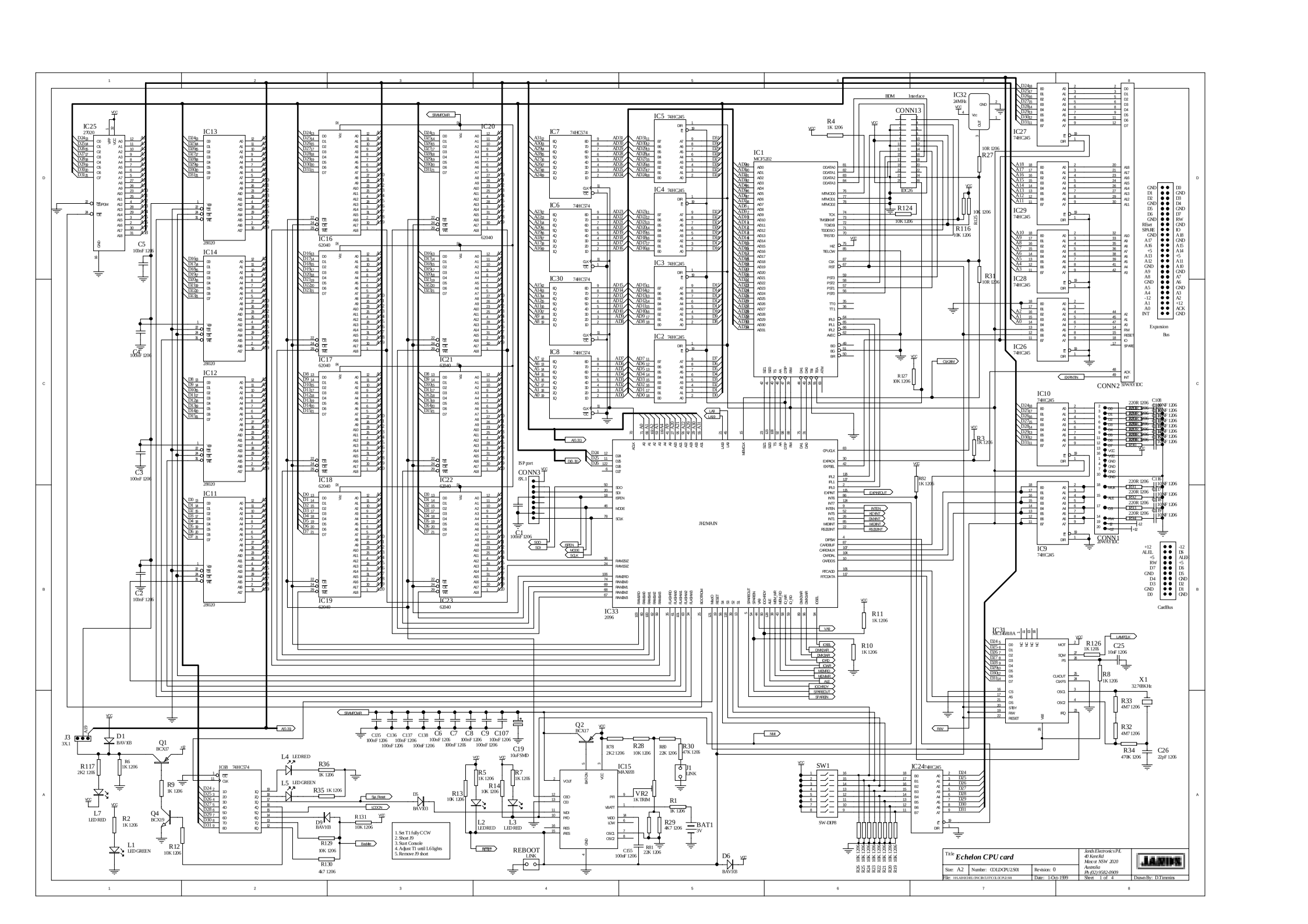
2 x DMX, MIDI signal combiner

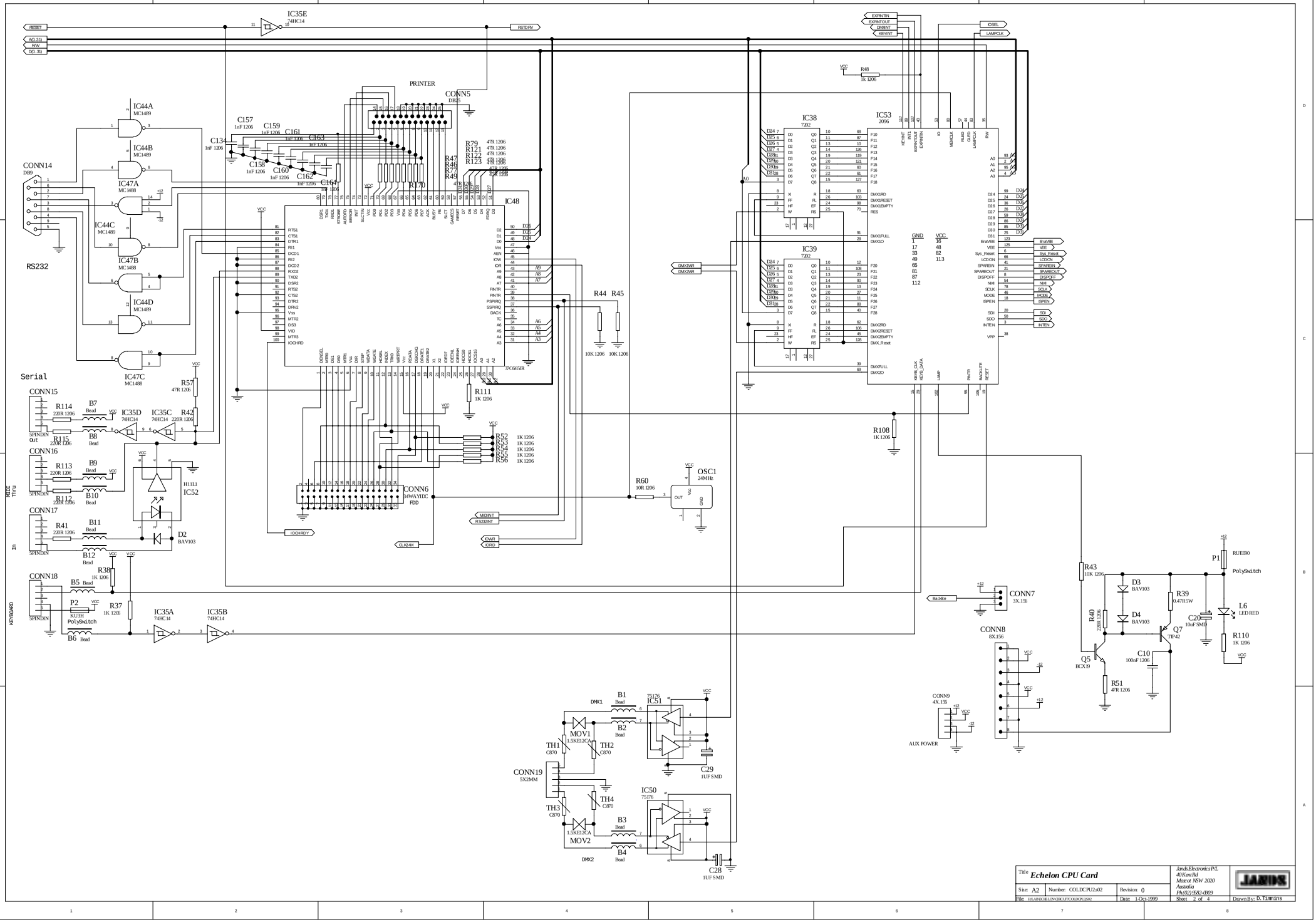
A DMX /MIDI combiner circuit is required to run some of the Auxiliary tests contained in the Boot ROM. Refer to sections 5.3.3.5.7, 5.3.3.5.8, 5.3.3.5.17.

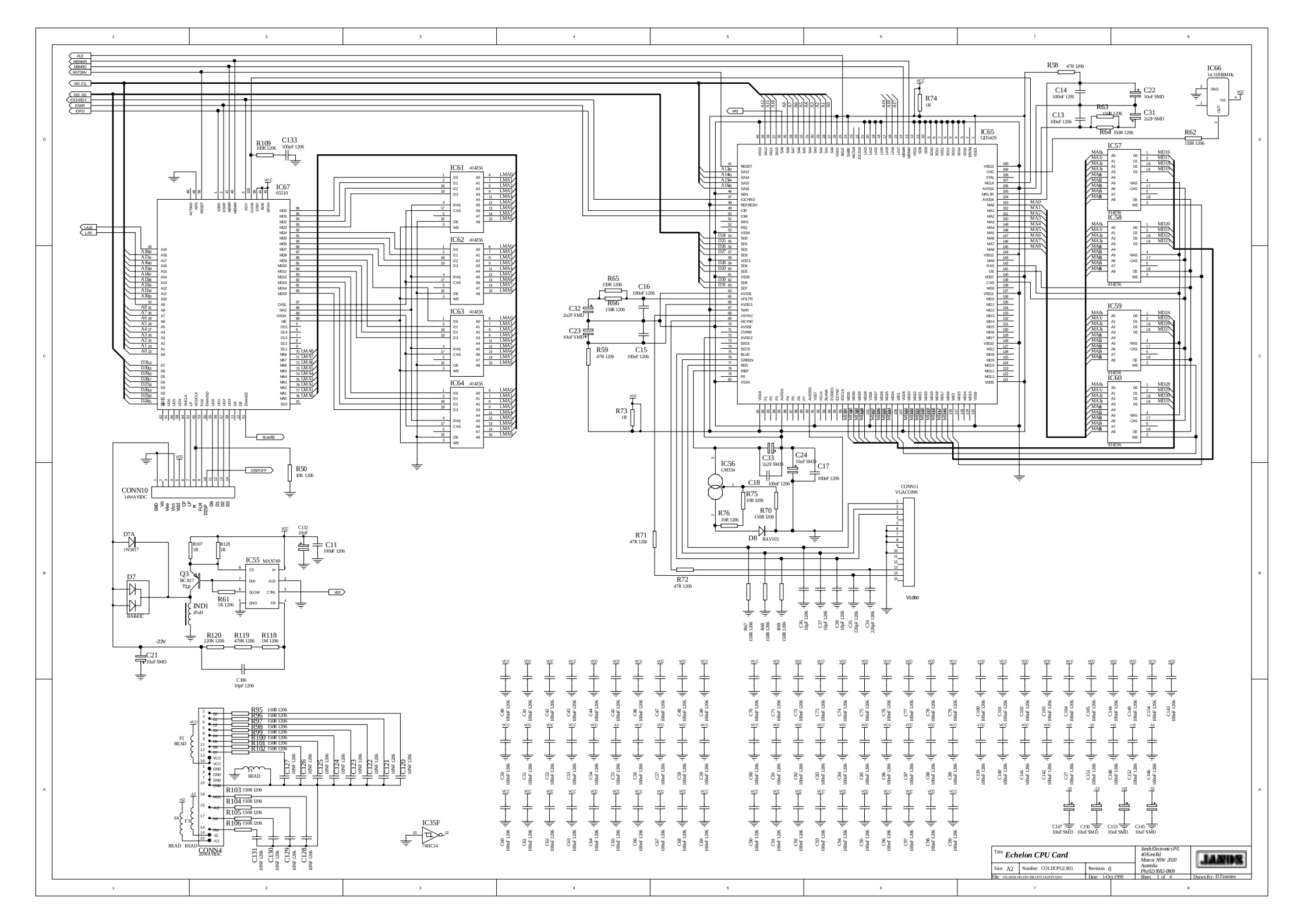


Appendix E Circuit diagrams and overlays

COLDCPU2 Circuit diagrams and overlay

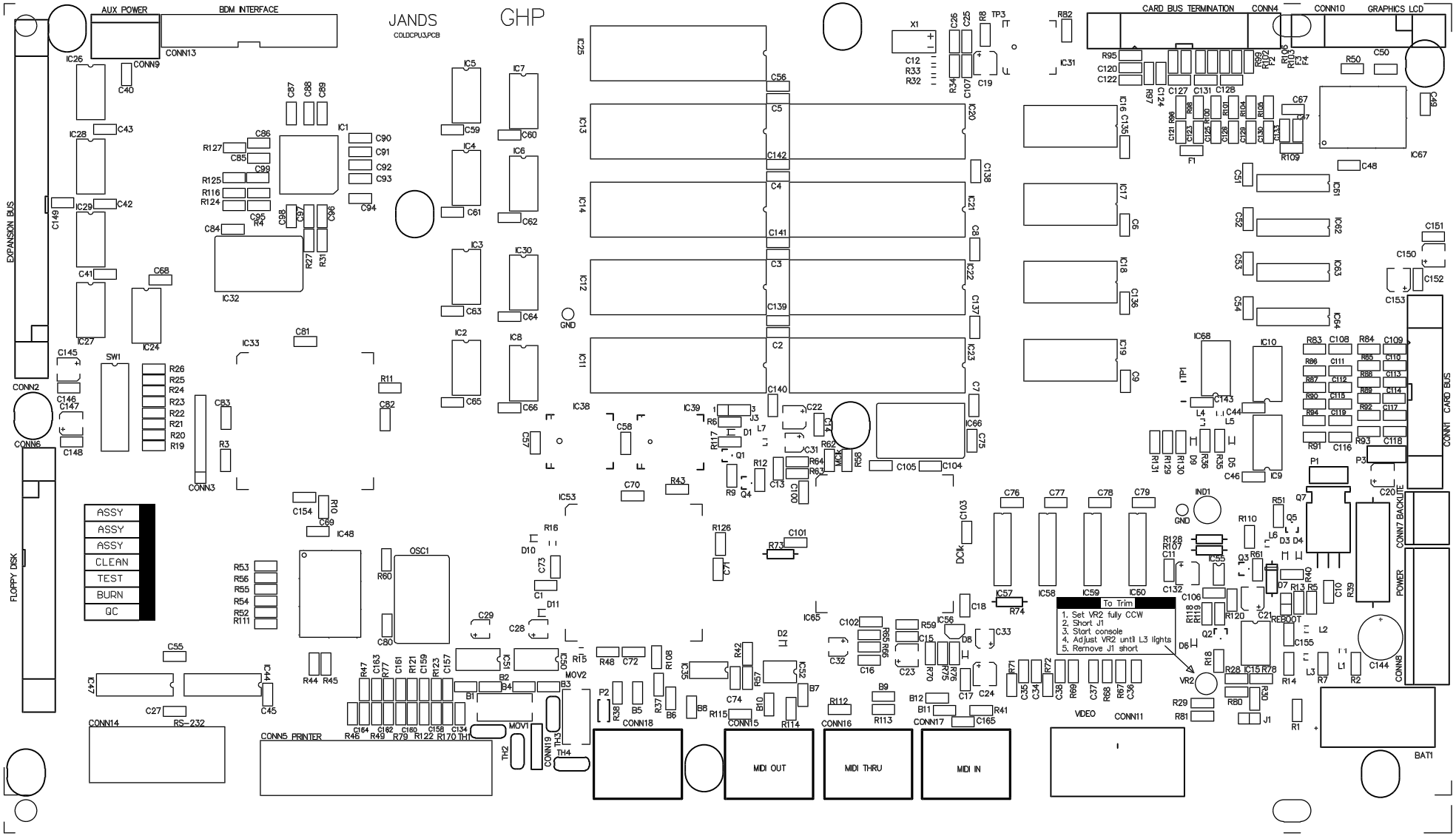

IC25 Z0020
IC13
IC14
IC12
IC11
IC16 62040
IC17 62040
IC18 62040
IC19 62040
IC20 62040
IC21 62040
IC22 62040
IC23 62040
IC5 74HC245
IC4 74HC245
IC3 74HC245
IC2 74HC245
IC7 74HC574
IC6 74HC574
IC30 74HC574
IC8 74HC574
IC1 MCF5202
IC33 2096
IC32 24MHz
IC27 74HC245
IC29 74HC245
IC28 74HC245
IC26 74HC245
IC10 74HC245
IC9 74HC245
IC31 ICT668BA
IC24 74HC245
IC15 MAX809
CONN13 BDM Interface
CONN2 50WAY IDC
CONN1 50WAY IDC
Expansion Bus
CardBus
ISP port
JTEMAIN
SW1
SW-DIP8
REBOOT LINK
Echelon CPU card
Jaycar Electronics P/L
40 Kent Rd
Mascot NSW 2020
Australia
Ph (02) 9582-0909
Sheet 1 of 4
Drawn By: D.Timmins
Number: OLDCPU2.SCH
Revision: 0
Date: 14-Oct-1999
1. Set T1 fully CCW
2. Shoot J9
3. Start Console
4. Adjust T1 until L6 lights
5. Remove J9 short


IC35E 74HC14
RESET
RSTDRV
A0..3(1)
R/W
D0..3(1)
PRINTER
CONN5 DB25
IC44A MC1489
IC44B MC1489
IC44C MC1489
IC44D MC1489
IC47A MC1488
IC47B MC1488
IC47C MC1488
CONN14 DB9
RS232
C157 1nF 1206
C159 1nF 1206
C161 1nF 1206
C163 1nF 1206
C134 1nF 1206
C158 1nF 1206
C160 1nF 1206
C162 1nF 1206
C164 1nF 1206
R79 47R 1206
R121 47R 1206
R122 47R 1206
R123 47R 1206
R47 47R 1206
R46 47R 1206
R77 47R 1206
R49 47R 1206
R170
IC48
37C665JR
R44 10K 1206
R45 10K 1206
R111 1K 1206
R57 47R 1206
Serial
CONN15
CONN16
CONN17
CONN18
R114 220R 1206
R115 220R 1206
R113 220R 1206
R112 220R 1206
R41 220R 1206
R38 1K 1206
R37 1K 1206
B7 Bead
B8 Bead
B9 Bead
B10 Bead
B11 Bead
B12 Bead
B5 Bead
B6 Bead
P2 KU3H PolySwitch
IC35D 74HC14
IC35C 74HC14
IC35A 74HC14
IC35B 74HC14
H11L1
IC52
D2 BAV103
MIDI Thru
MIDI In
KEYBOARD
R52 1K 1206
R53 1K 1206
R54 1K 1206
R55 1K 1206
R56 1K 1206
CONN6 34WAY1DC FDD
OSC1 24MHz
R60 10R 1206
MDINT
RS232INT
IOWR
IORD
IOCHRDY
CLK24M
R108 1K 1206
IC38 7202
IC39 7202
IC53 2096
DMX1AR
DMX2AR
DMX1FULL
DMX1IO
DMX2FULL
DMX2IO
DMX1RD
DMX1RESET
DMX1EMPTY
DMX1RES
DMX2RD
DMX2RESET
DMX2EMPTY
DMX_Reset
R48 1k 1206
EXPINTIN
EXPINTOUT
DMXINT
KEYINT
IOSEL
LAMPOUT
EnaVEE
VEE
Sys_Reset
LCDON
SPAREIN
SPAREOUT
DISPOFF
NMI
SCLK
MODE
ISPEN
SDI
SDO
INTEN
VPP
KEYB_CLK
KEYB_DATA
LAMP
PINTR
BACKLITE
RESET
CONN7 3X.156
Backlite
CONN8 8X.156
CONN9 4X.156
AUX POWER
R43 10K 1206
D3 BAV103
D4 BAV103
R39 0.47R5W
C20 10uF SMD
Q7 TIP42
R40 220R 1206
Q5 BCX19
C10 100nF 1206
R51 47R 1206
P1 RUE090 PolySwitch
L6 LED RED
R110 1K 1206
CONN19 5X2MM
B1 Bead
B2 Bead
B3 Bead
B4 Bead
MOV1 1.5KE12CA
MOV2 1.5KE12CA
TH1 C870
TH2 C870
TH3 C870
TH4 C870
IC51 75176
IC50 75176
C29 1UF SMD
C28 1UF SMD
DMK1
DMK2
Title Echelon CPU Card
Size A2
Number COLDCPU2.s02
Revision 0
Date 1-Oct-1999
Sheet 2 of 4
File H:\ALAB\ECHELON\CIRCUITS\COLDCPU2.SCH
Drawn By: D. Timms
Jands Electronics P/L
40 Kent Rd
Marcot NSW 2020
Australia
Ph/(02) 9502-0909
JANDS

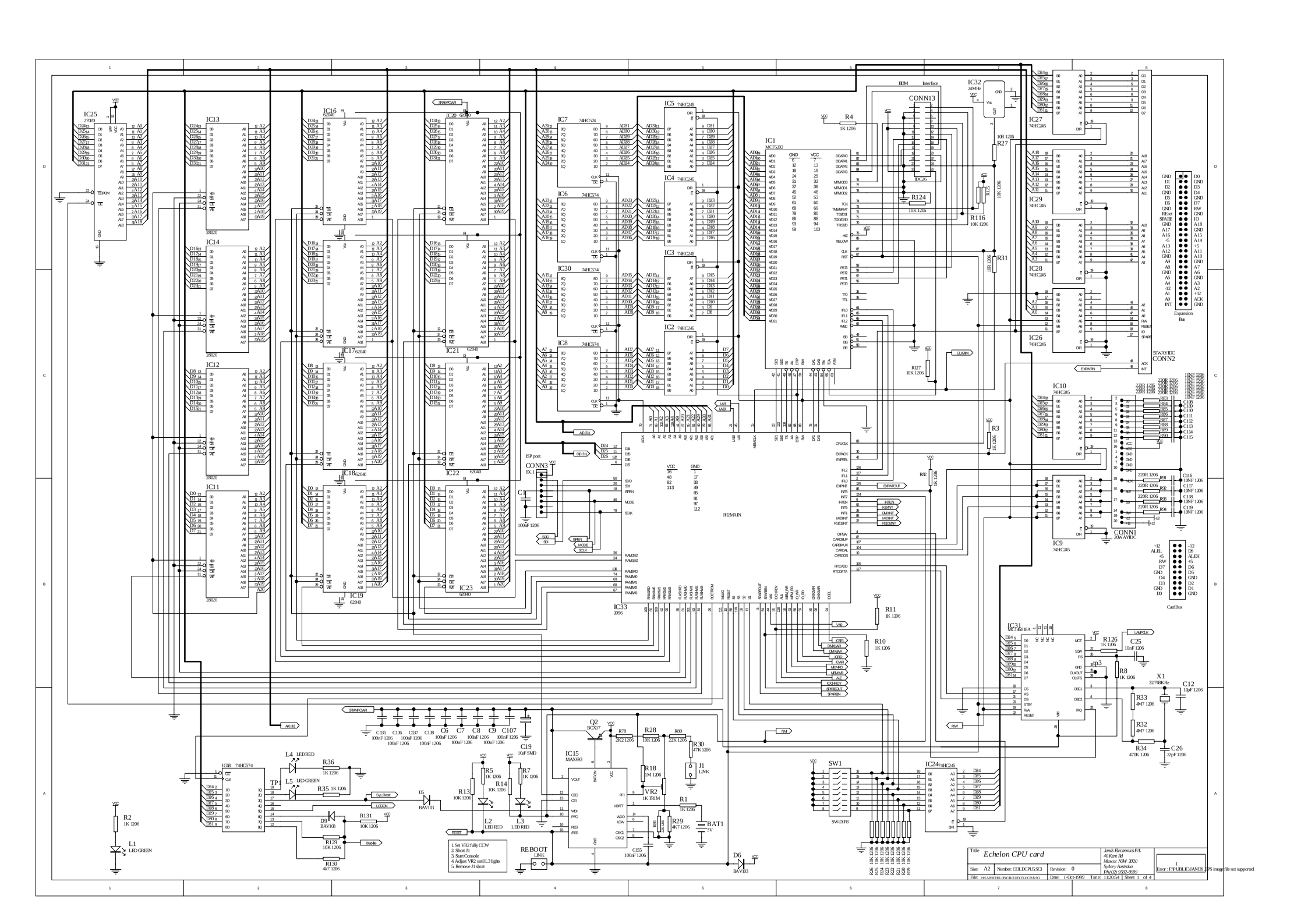


Title	**Echelon CPU Card**
Size: A2	Number: COLDCPU2.S03
Revision: 0	
File: H:\LAB\ECHELON\CIRCUITS\COLDCPU2S03	Date: 1-Oct-1999
Sheet 3 of 4	Drawn By: D.Timmins

Jands Electronics P/L
40 Kent Rd
Marcot NSW 2020
Australia
Ph/(02) 9502-1909


JANDS
GHP
COLDCPU3.PCB
AUX POWER
BDM INTERFACE
CONN13
CONN9
EXPANSION BUS
FLOPPY DISK
CONN2
CONN6
CONN3
CONN14
RS-232
CONN5 PRINTER
CONN18
CONN15
CONN16
CONN17
CONN19
MIDI OUT
MIDI THRU
MIDI IN
VIDEO
CONN11
CARD BUS TERMINATION
CONN4
CONN10
GRAPHICS LCD
CONN1 CARD BUS
CONN7 BACKLITE
POWER
CONN8
BAT1
ASSY
ASSY
ASSY
CLEAN
TEST
BURN
QC
To Trim
1. Set VR2 fully CCW
2. Short J1
3. Start console
4. Adjust VR2 until L3 lights
5. Remove J1 short
REBOOT
GND
DClk

COLDCPU4 Circuit diagrams and overlay


IC25 27020
IC13 62040
IC14 62040
IC12 62040
IC11 62040
IC16 62040
IC17 62040
IC18 62040
IC19 62040
IC20 62040
IC21 62040
IC22 62040
IC23 62040
IC7 74HC574
IC6 74HC574
IC30 74HC574
IC8 74HC574
IC5 74HC245
IC4 74HC245
IC3 74HC245
IC2 74HC245
IC1 MCF5202
IC32 24MHz
IC27 74HC245
IC29 74HC245
IC28 74HC245
IC26 74HC245
IC10 74HC245
IC9 74HC245
IC33 2096
IC15 MAX813
IC24 74HC245
IC31 MC1468188A
CONN13
CONN3
CONN2
CONN1
SW1
SW-DIP8
X1 32.768KHz
Expansion Bus
CardBus
ISP port
JHDMAIN
REBOOT LINK
1.Set VR2 fully CCW
2. Short J1
3. Start Console
4. Adjust VR2 until L3 lights
5. Remove J1 short
Title Echelon CPU card
Size: A2
Number: COLDCPU5SC1
Revision: 0
Date: 1-Oct-1999
Time: 11:20:54
Sheet 1 of 4
Jands Electronics P/L
40 Kent Rd
Mascot NSW 2020
Sydney Australia
Ph:(02) 9382-0909
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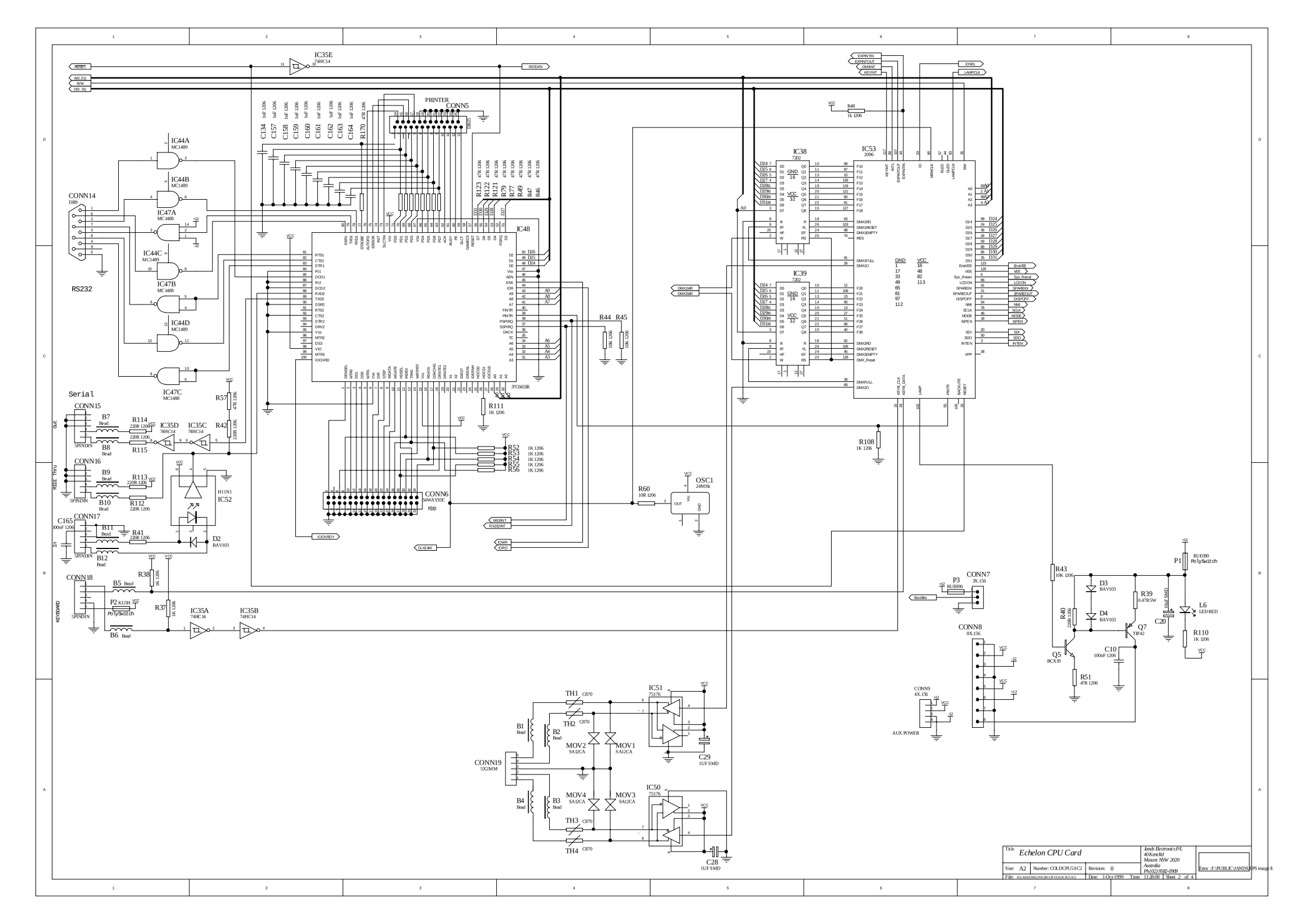
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74HC14
RESET
RSTDRV
A0..31
R/W
D0..31
PRINTER
CONN5
DB25
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C157 1nF 1206
C158 1nF 1206
C159 1nF 1206
C160 1nF 1206
C161 1nF 1206
C162 1nF 1206
C163 1nF 1206
C164 1nF 1206
R170 47R 1206
R123 47R 1206
R122 47R 1206
R121 47R 1206
R79 47R 1206
R77 47R 1206
R49 47R 1206
R47 47R 1206
R46 47R 1206
IC44A MC1489
IC44B MC1489
IC47A MC1488
IC44C MC1489
IC47B MC1488
IC44D MC1489
IC47C MC1488
CONN14
DB9
RS232
IC48
37C665IR
R44 10K 1206
R45 10K 1206
R111 1K 1206
R57 47R 1206
Serial
CONN15
B7 Bead
B8 Bead
R114 220R 1206
R115 220R 1206
IC35D 74HC14
IC35C 74HC14
R42 240R 1206
OUT
5PINDIN
CONN16
B9 Bead
B10 Bead
R113 220R 1206
R112 220R 1206
MIDI THRU
H11N1
IC52
C165 100nF 1206
CONN17
B11 Bead
B12 Bead
R41 220R 1206
D2 BAV103
IN
CONN18
B5 Bead
B6 Bead
P2 KUSH
Poly Switch
R38 1K 1206
R37 1K 1206
IC35A 74HC14
IC35B 74HC14
KEYBOARD
CONN6
34WAYIDC
FDD
IOCHRDY
CLK24M
MIDINT
RS232INT
IOWR
IORD
R52 1K 1206
R53 1K 1206
R54 1K 1206
R55 1K 1206
R56 1K 1206
R60 10R 1206
OSC1
24MHz
R108 1K 1206
EXPINTIN
EXPINTOUT
DMAINT
KEYINT
IOSEL
LAMPCLK
R48 1k 1206
IC38
7202
IC39
7202
IC53
2090
DMAIOR
DMAOWR
DMAIFULL
DMAIO
DMAOFULL
DMAIO
DMAIRD
DMAIRESET
DMAIEMPTY
RES
DMAORD
DMAORESET
DMAOEMPTY
DMA_Reset
KEYB_CLK
KEYB_DATA
LAMP
PRNTR
BACKLITE
RESET
EnaVEE
VEE
Sys_Reset
LCDON
SPAREIN
SPAREOUT
DISPOFF
NMI
SCLK
MODE
ISPEN
SDI
SDO
INTEN
VPP
P3
CONN7
3X.156
Backlite
P1
RUE090
Poly Switch
R43 10K 1206
D3 BAV103
D4 BAV103
R40 240R 1206
R39 0.47R5W
C20 10uF SMD
L6 LED RED
R110 1K 1206
Q7 TIP42
C10 100nF 1206
Q5 BCX19
R51 47R 1206
CONN8
8X.156
CONN9
4X.156
AUX POWER
TH1 C870
TH2 C870
TH3 C870
TH4 C870
B1 Bead
B2 Bead
B3 Bead
B4 Bead
MOV1 SA12CA
MOV2 SA12CA
MOV3 SA12CA
MOV4 SA12CA
IC51 75176
IC50 75176
C29 1UF SMD
C28 1UF SMD
CONN19
5X2MM
Title Echelon CPU Card
Size: A2
Number: COLDCPU5.SC2
Revision: 0
Date: 1-Oct-1999
Time: 11:28:08
Sheet 2 of 4
File: H:\LARGE\ECHELON\CPU\COLDCPU5.SC2
Jands Electronics P/L
40 Kent Rd
Mascot NSW 2020
Australia
Ph:(02) 9582-0800
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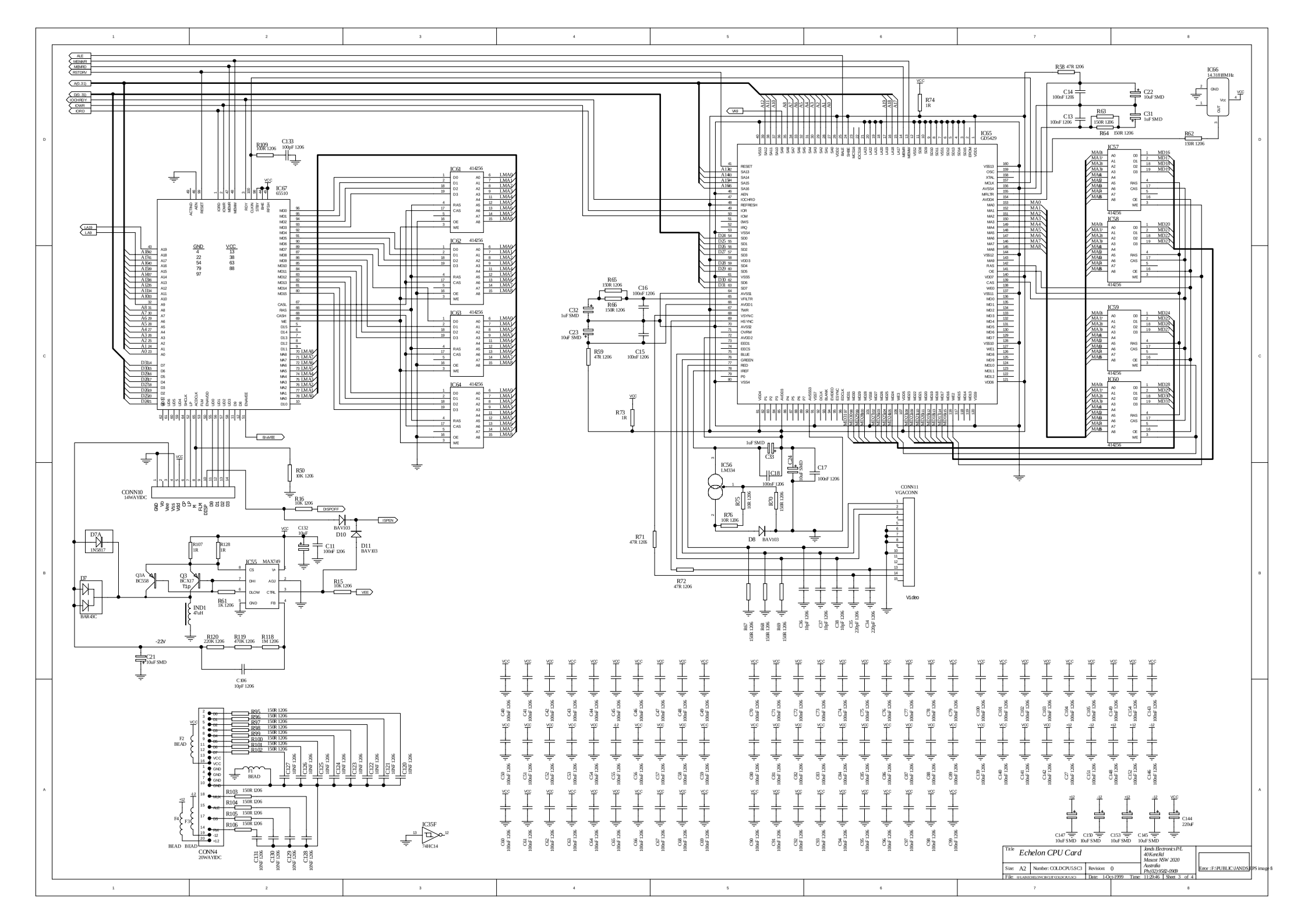
IC65 GD5429
IC66 14.31818MHz
IC67 65510
IC61 414256
IC62 414256
IC63 414256
IC64 414256
IC57 414256
IC58 414256
IC59 414256
IC60 414256
IC56 LM334
IC55 MAX749
IC35F 74HC14
CONN10 14WAYIDC
CONN4 20WAYIDC
CONN11 VGACONN
Video
Echelon CPU Card
Jands Electronics PTY. 40 Kent Rd Mascot NSW 2020 Australia Ph:(02) 9582-0909
Size: A2
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Revision: 0
Date: 1-Oct-1999
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Sheet 3 of 4
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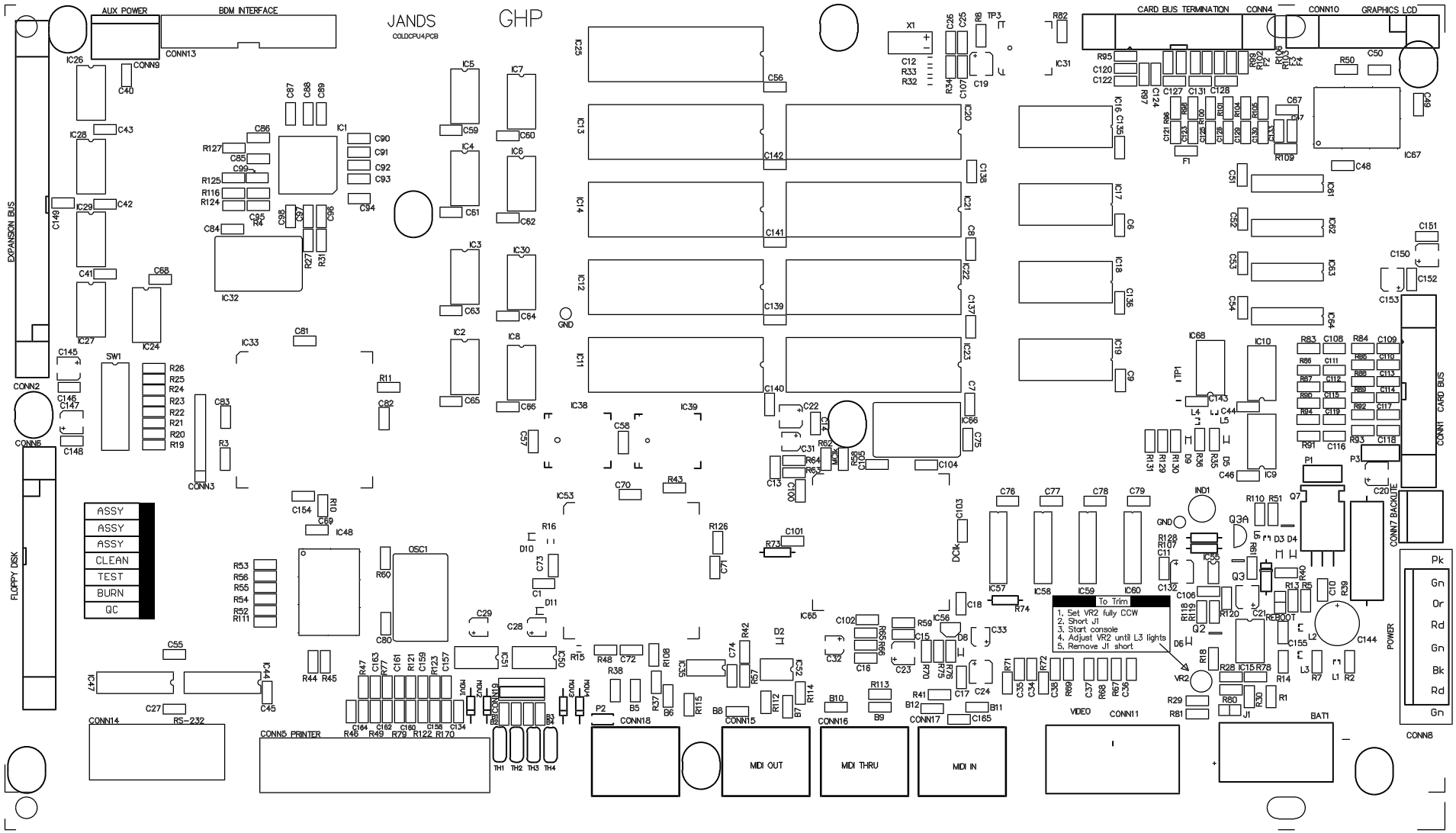
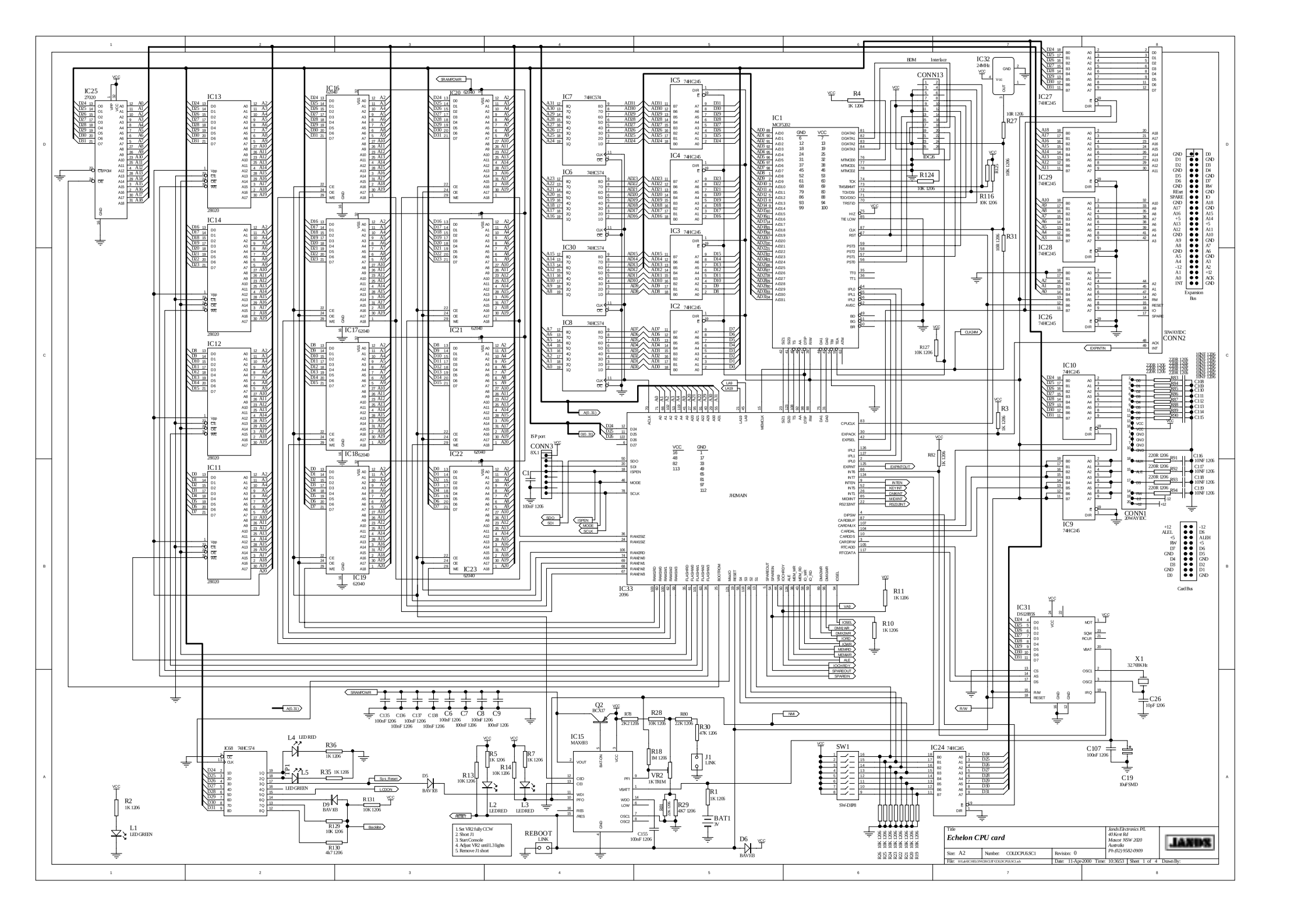

JANDS
COLDCPU4.PCB
GHP
AUX POWER
BDM INTERFACE
CONN13
CONN9
CARD BUS TERMINATION
CONN4
CONN10
GRAPHICS LCD
EXPANSION BUS
FLOPPY DISK
CONN2
CONN6
CONN3
CONN14
RS-232
CONN5 PRINTER
CONN18
CONN15
CONN16
CONN17
CONN11
VIDEO
BAT1
CONN8
POWER
CONN7 BACKLITE
CONN1 CARD BUS
MIDI OUT
MIDI THRU
MIDI IN
ASSY
ASSY
ASSY
CLEAN
TEST
BURN
QC
To Trim
1. Set VR2 fully CCW
2. Short J1
3. Start console
4. Adjust VR2 until L3 lights
5. Remove J1 short
REBOOT
Pk
Gn
Or
Rd
Gn
Bk
Rd
Gn

COLDCPU6 Circuit diagrams and overlay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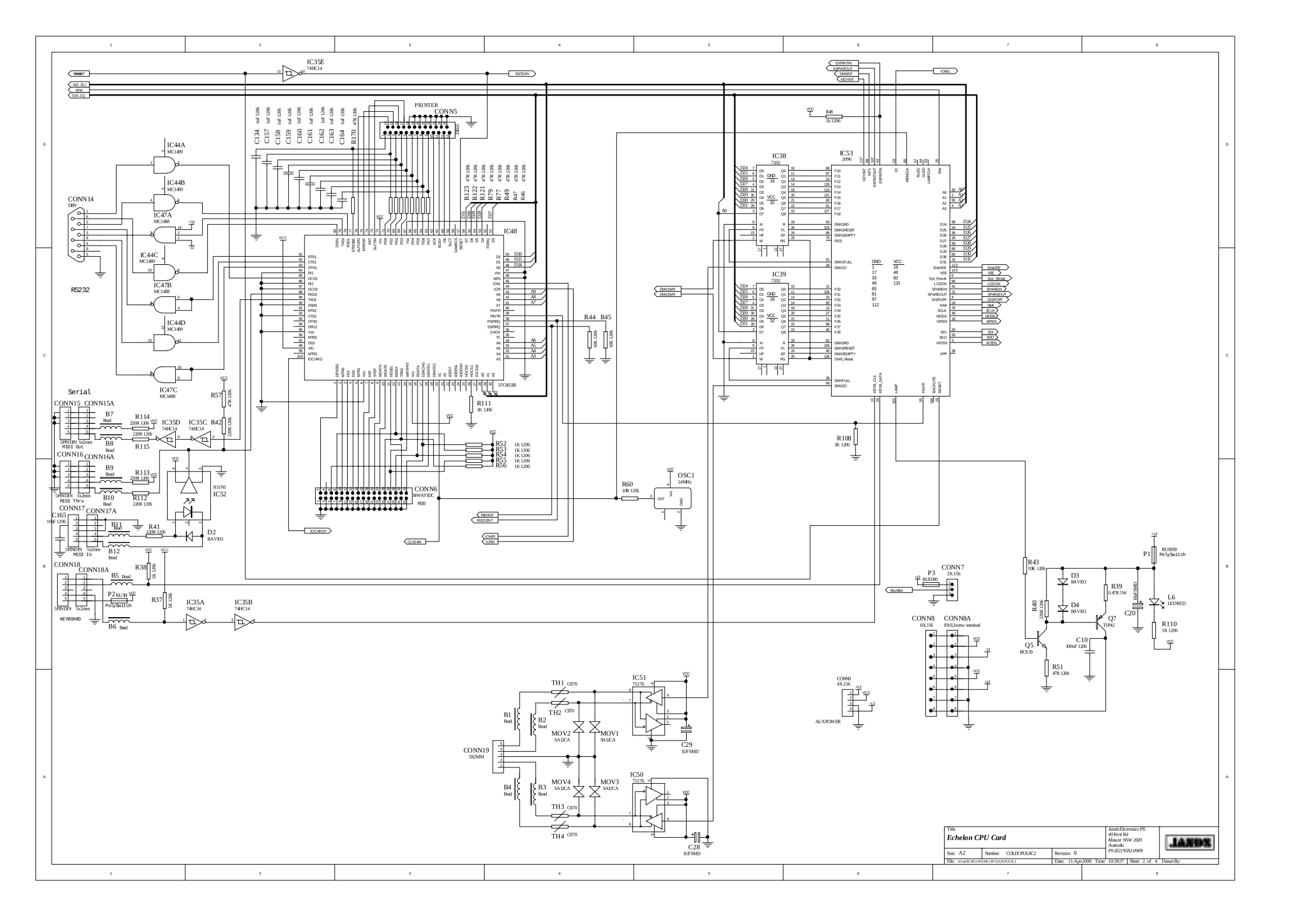
IC13
IC14
IC12
IC11
IC16
62040
IC17
IC18
IC19
IC20
IC21
IC22
IC23
IC7
74HCT574
IC6
IC30
IC8
IC5
74HC245
IC4
IC3
IC2
IC1
MCF5202
IC33
2096
JHDMAIN
IC32
24MHz
IC27
74HC245
IC29
IC28
IC26
IC10
IC9
IC31
DS12885S
IC24
74HC245
IC68
74HC574
IC15
MAX693
CONN13
BDM Interface
CONN2
50WAYIDC
Expansion Bus
CONN1
20WAYIDC
Card Bus
CONN3
8X1
ISP port
R4
1K 1206
R27
10R 1206
R116
10K 1206
R124
10K 1206
R31
100R 1206
R3
1K 1206
R82
1K 1206
R11
1K 1206
R10
1K 1206
R125
10K 1206
R127
10K 1206
R2
1K 1206
R36
1K 1206
R35
1K 1206
R5
1K 1206
R7
1K 1206
R14
10K 1206
R13
10K 1206
R78
2K2 1206
R28
10K 1206
R80
22K 1206
R30
47K 1206
R18
1M 1206
R29
4K7 1206
R1
1K 1206
R129
10K 1206
R130
4K7 1206
R131
10K 1206
R25
10K 1206
R24
10K 1206
R23
10K 1206
R22
10K 1206
R21
10K 1206
R20
10K 1206
R19
10K 1206
C1
100nF 1206
C6
C7
C8
C9
100nF 1206
C135
C136
C137
C138
100nF 1206
C155
100nF 1206
C107
100nF 1206
C19
10uFSMD
C26
10pF 1206
C116
10NF 1206
C117
10NF 1206
C118
10NF 1206
C119
10NF 1206
X1
32.768KHz
SW1
SW-DIP8
L1
LED GREEN
L2
LEDRED
L3
LEDRED
L4
LED RED
L5
LED GREEN
D5
BAV103
D6
BAV103
D9
BAV103
BAT1
3V
J1
LINK
REBOOT
LINK
Q2
BCX17
VR2
1K TRIM
LP1
Sys.Reset
LGOOK
Backlite
1. Set VR2 fully CCW
2. Shoot J1
3. Start Console
4. Adjust VR2 until L3 lights
5. Remove J1 shoot
Title
Echelon CPU card
Jands Electronics PTL
40 Kent Rd
Mascot NSW 2020
Australia
Ph (02) 9582-0909
JANDS
Size: A2
Number: COLDCPU6.SC1
Revision: 0
File: H:\ds\HCHELON\DRAFT\COLDCPU6.SCH
Date: 11-Apr-2000 Time: 10:36:53 Sheet 1 of 4 Drawn By:


IC35E
74HC14
RESET
RSTDRV
A(0..31)
R/W
D(0..31)
PRINTER
CONN5
DB25
C134 1uF 1206
C157 1uF 1206
C158 1uF 1206
C159 1uF 1206
C160 1uF 1206
C161 1uF 1206
C162 1uF 1206
C163 1uF 1206
C164 1uF 1206
R170 47R 1206
R123 47R 1206
R122 47R 1206
R121 47R 1206
R79 47R 1206
R77 47R 1206
R49 47R 1206
R47 47R 1206
R46 47R 1206
IC44A MC1489
IC44B MC1489
IC47A MC1488
IC44C MC1489
IC47B MC1488
IC44D MC1489
IC47C MC1488
CONN14
DB9
RS232
IC48
37C665IR
R111 1K 1206
R44 10R 1206
R45 10R 1206
R57 47R 1206
R42 220R 1206
Serial
CONN15 CONN15A
5PINDIN 5x2mm
MIDI Out
CONN16 CONN16A
5PINDIN 5x2mm
MIDI Thru
CONN17 CONN17A
5PINDIN 5x2mm
MIDI In
CONN18 CONN18A
5PINDIN 5x2mm
KEYBOARD
B7 Bead
B8 Bead
B9 Bead
B10 Bead
B11 Bead
B12 Bead
B5 Bead
B6 Bead
R114 220R 1206
R115 220R 1206
R113 220R 1206
R112 220R 1206
R41 220R 1206
R38 1K 1206
R37 1K 1206
P2 KU3H
PolySwitch
IC35D 74HC14
IC35C 74HC14
IC35A 74HC14
IC35B 74HC14
H11N1
IC52
D2 BAV103
C165 10nF 1206
R52 1K 1206
R53 1K 1206
R54 1K 1206
R55 1K 1206
R56 1K 1206
CONN6
9WAYIDC
FDD
R60 10R 1206
OSC1
24MHz
MIDIINT
RS232INT
IOWR
IORD
IOCHRDY
CLK24M
IC38
7202
IC39
7202
IC53
2096
R48 1K 1206
R108 1K 1206
DMX1WR
DMX2WR
EXPINTIN
EXPINTOUT
DMAINT
KEYINT
IOSEL
EnvVEE
VEE
Sys_Reset
LCDON
SPARBIN
SPAREOUT
DISPOFF
NMI
SCLK
MODE
ISPEN
SDI
SDO
INTEN
CONN19
SX2MM
TH1 C870
TH2 C870
TH3 C870
TH4 C870
B1 Bead
B2 Bead
B3 Bead
B4 Bead
MOV1 SA1CA
MOV2 SA1CA
MOV3 SA12CA
MOV4 SA12CA
IC51
75176
IC50
75176
C29 1UFSMD
C28 1UFSMD
CONN9
4X.156
AUXPOWER
P3 RUE000
Backlite
CONN7
3X.156
CONN8 8X.156
CONN8A 8X02screw terminal
R43 10K 1206
R40 220R 1206
R39 0.47R 5W
R51 47R 1206
D3 BAV103
D4 BAV103
Q5 BCX19
Q7 TIP42
C10 100nF 1206
C20 10nF5MD
P1 RUE050
PolySwitch
L6 LEDRED
R110 1K 1206
Title
Echelon CPU Card
Size: A2
Number: COLDCPU6.SC2
Revision: 0
File: H:\ech\ECHELON.DIR\CPU\COLDCPU6.VC2
Date: 11-Apr-2000 Time: 10:39:37
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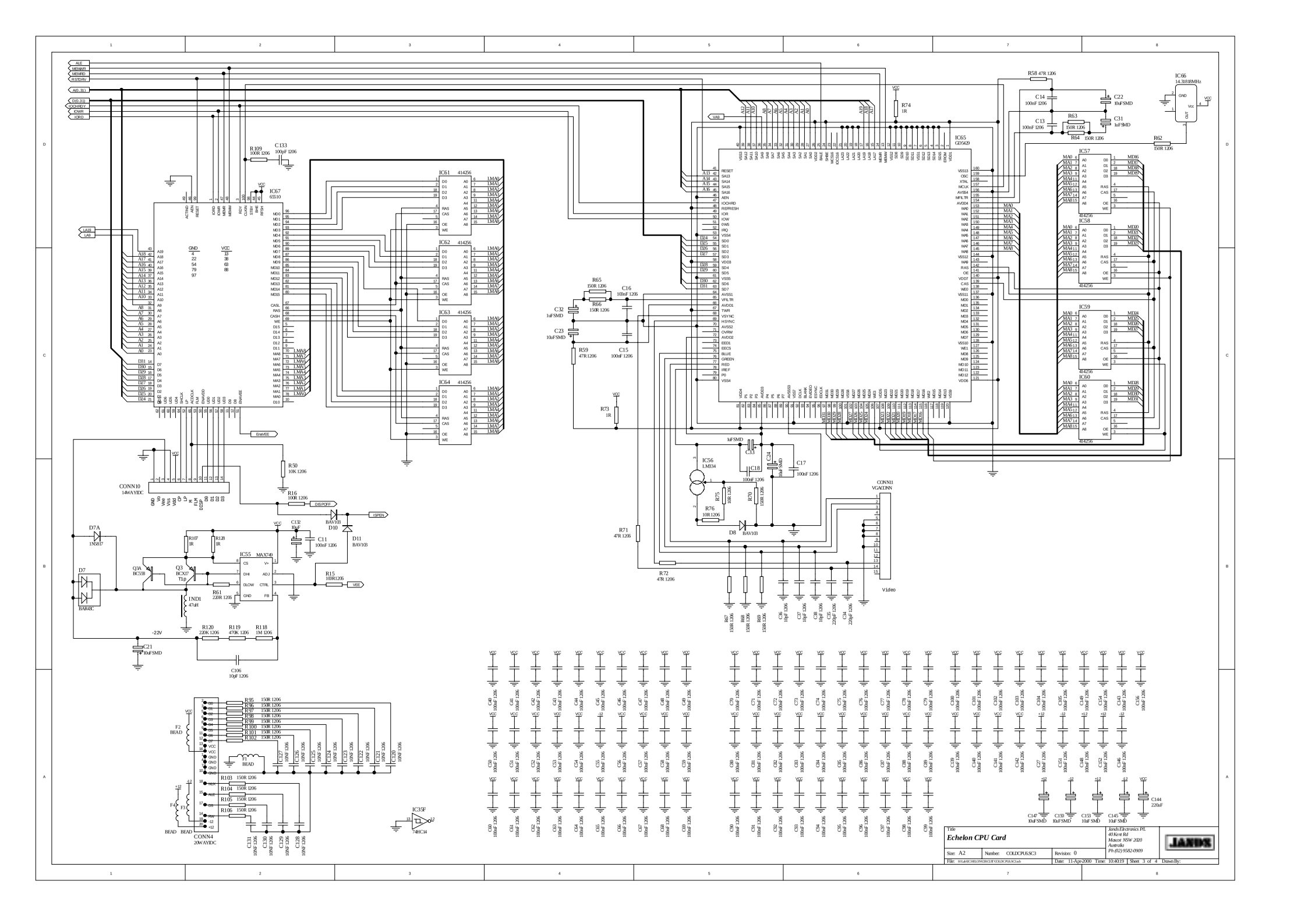
Drawn By:
Jands Electronics PTL
40 Kent Rd
Mascot NSW 2020
Australia
Ph (02) 9582-0909
JANDS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MEMWR
MEMRD
IOSTDRV
A0..31\
D\0..31\
IOCHRDY
IOWR
IORD
R109 100R 1206
C133 100pF 1206
IC67 65510
IC61 414256
IC62 414256
IC63 414256
IC64 414256
R74 1R
R58 47R 1206
C14 100nF 1206
C13 100nF 1206
C22 10uFSMD
C31 1uFSMD
R63 E0R 1206
R64 150R 1206
R62 150R 1206
IC66 14.31818MHz
IC65 GD5429
IC57
IC58
IC59
IC60
R65 150R 1206
R66 150R 1206
C16 100nF 1206
C32 1uFSMD
C23 10uFSMD
R59 47R 1206
C15 100nF 1206
R73 1R
IC56 LM334
C33 1uFSMD
C18 100nF 1206
C24 1uFSMD
C17 100nF 1206
R75 10R 1206
R70 150R 1206
R76 10R1206
D8 BAV103
R71 47R 1206
R72 47R 1206
CONN11 VGACONN
Video
R67 150R 1206
R68 150R 1206
R69 150R 1206
C36 10pF 1206
C37 10pF 1206
C38 10pF 1206
C35 220pF 1206
C34 220pF 1206
CONN10 14WAYIDC
R50 10K 1206
R16 100R 1206
DISPOFF
ISPEN
D10 BAV103
D11 BAV103
D7A 1N5817
D7 BAR49C
R107 1R
R128 1R
C132 10uF
C11 100nF 1206
IC55 MAX749
Q3A BC558
Q3 BCX17 TUp
R15 330R1206
VEE
R61 220R 1206
IND1 47uH
-22V
R120 220K 1206
R119 470K 1206
R118 1M 1206
C21 10uFSMD
C106 10pF 1206
F2 BEAD
F1 BEAD
F4 BEAD
F3 BEAD
R95 150R 1206
R96 150R 1206
R97 150R 1206
R98 150R 1206
R99 150R 1206
R100 150R 1206
R101 150R 1206
R102 150R 1206
R103 150R 1206
R104 150R 1206
R105 150R 1206
R106 150R 1206
C127 10NF 1206
C126 10NF 1206
C125 10NF 1206
C124 10NF 1206
C123 10NF 1206
C122 10NF 1206
C121 10NF 1206
C120 10NF 1206
C131 10NF 1206
C130 10NF 1206
C129 10NF 1206
C128 10NF 1206
CONN4 20WAYIDC
IC35F 74HC14
C144 220uF
C149 10uFSMD
C150 10uFSMD
C151 10uF SMD
C145 10uF SMD
Title
Echelon CPU Card
Jands Electronics PTL
40 Kent Rd
Mascot NSW 2020
Australia
Ph (02) 9582-0909
Size: A2
Number: COLDCPU6.SC3
Revision: 0
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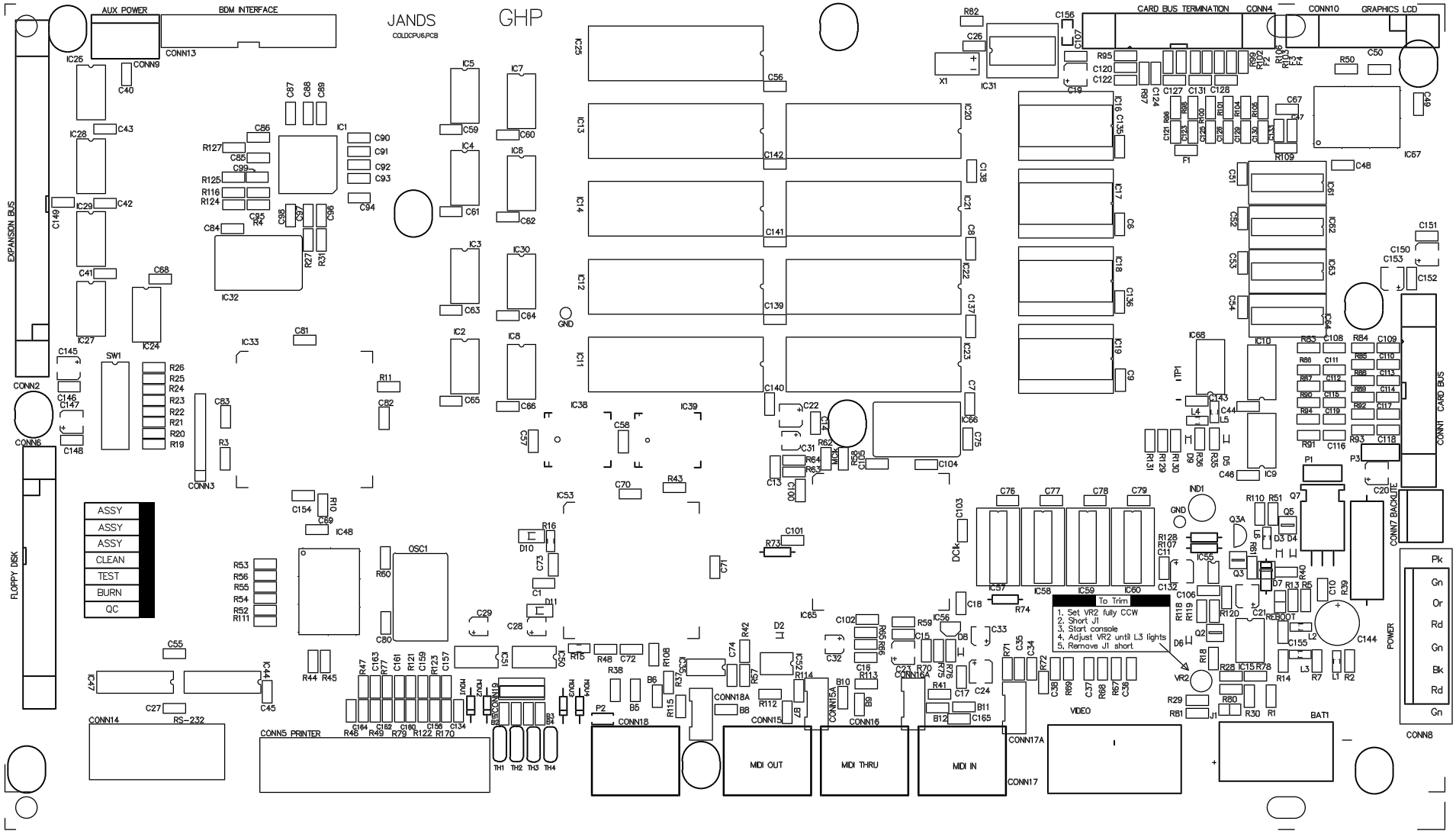
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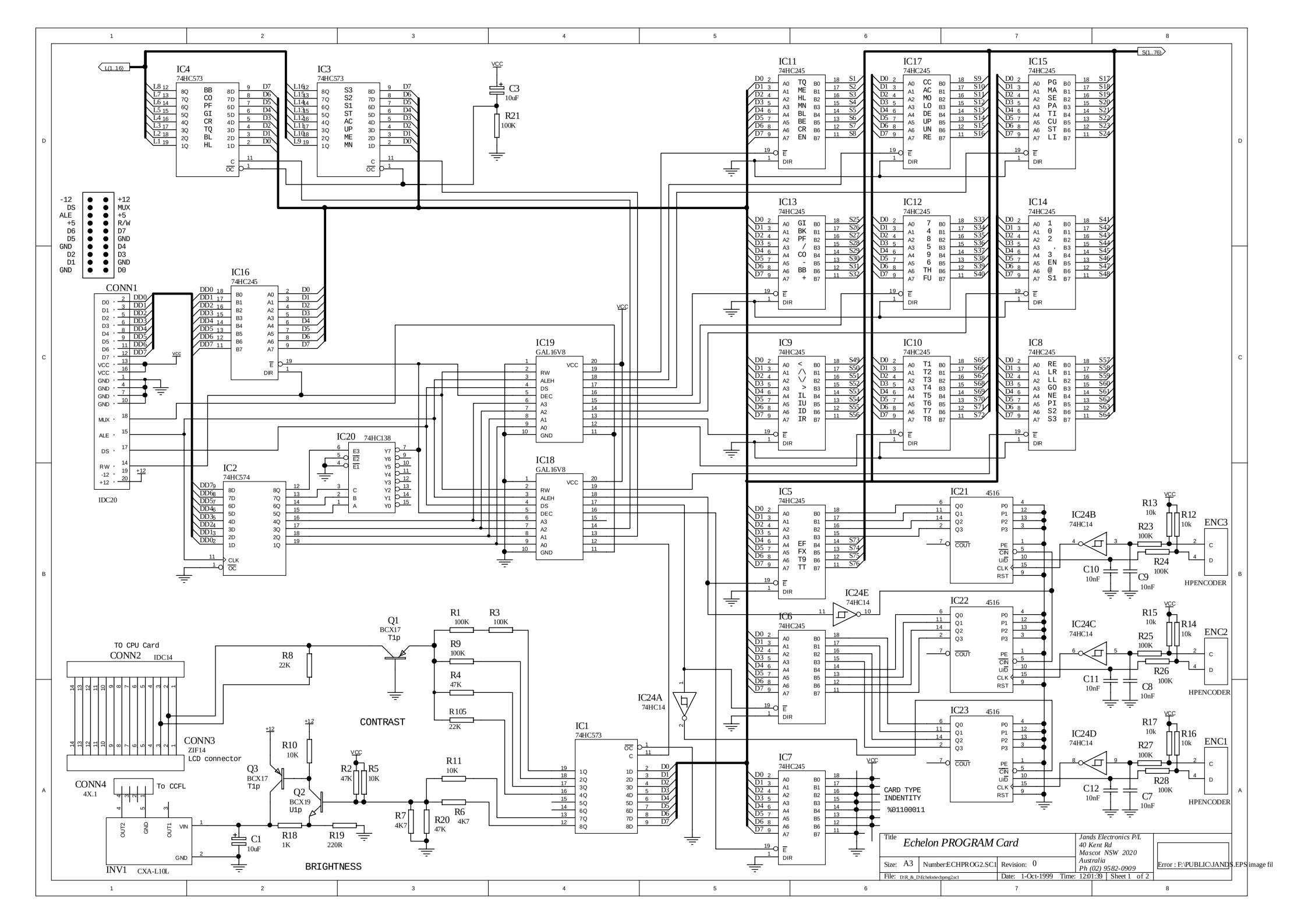
GHP
COLDCPU6.PCB
AUX POWER
BDM INTERFACE
CONN13
CONN9
CARD BUS TERMINATION
CONN4
CONN10
GRAPHICS LCD
EXPANSION BUS
FLOPPY DISK
CONN2
CONN6
CONN3
CONN7 BACKLITE
CONN1 CARD BUS
POWER
CONN8
ASSY
ASSY
ASSY
CLEAN
TEST
BURN
QC
To Trim
1. Set VR2 fully CCW
2. Short J1
3. Start console
4. Adjust VR2 until L3 lights
5. Remove J1 short
REBOOT
VR2
VIDEO
CONN14
RS-232
CONN5 PRINTER
CONN18
MIDI OUT
MIDI THRU
MIDI IN
CONN17A
CONN17
BAT1
Pk
Gn
Or
Rd
Gn
Bk
Rd
Gn

ECHPROG2 Circuit diagrams and overlays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IC3
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10uF
R21
100K
L(1..16)
S(1..76)
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IC17
74HC245
IC15
74HC245
IC13
74HC245
IC12
74HC245
IC14
74HC245
IC9
74HC245
IC10
74HC245
IC8
74HC245
IC5
74HC245
IC6
74HC245
IC7
74HC245
CONN1
IDC20
IC16
74HC245
IC19
GAL16V8
IC18
GAL16V8
IC20
74HC138
IC2
74HC574
IC21
4516
IC22
4516
IC23
4516
IC24A
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IC24B
74HC14
IC24C
74HC14
IC24D
74HC14
IC24E
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10k
R12
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R23
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R24
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10nF
C9
10nF
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HPENCODER
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R14
10k
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100K
R26
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C8
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ENC2
HPENCODER
R17
10k
R16
10k
R27
100K
R28
100K
C12
10nF
C7
10nF
ENC1
HPENCODER
TO CPU Card
CONN2
IDC14
CONN3
ZIF14
LCD connector
CONN4
4X.1
To CCFL
INV1
CXA-L10L
Q1
BCX17
T1p
Q2
BCX19
U1p
Q3
BCX17
T1p
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R105
22K
R8
22K
R10
10K
R11
10K
R2
47K
R5
10K
R7
4K7
R20
47K
R6
4K7
R18
1K
R19
220R
C1
10uF
CONTRAST
BRIGHTNESS
CARD TYPE
INDENTITY
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Revision: 0
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Time: 12:01:39
Sheet 1 of 2
Jands Electronics P/L
40 Kent Rd
Mascot NSW 2020
Australia
Ph (02) 9582-0909
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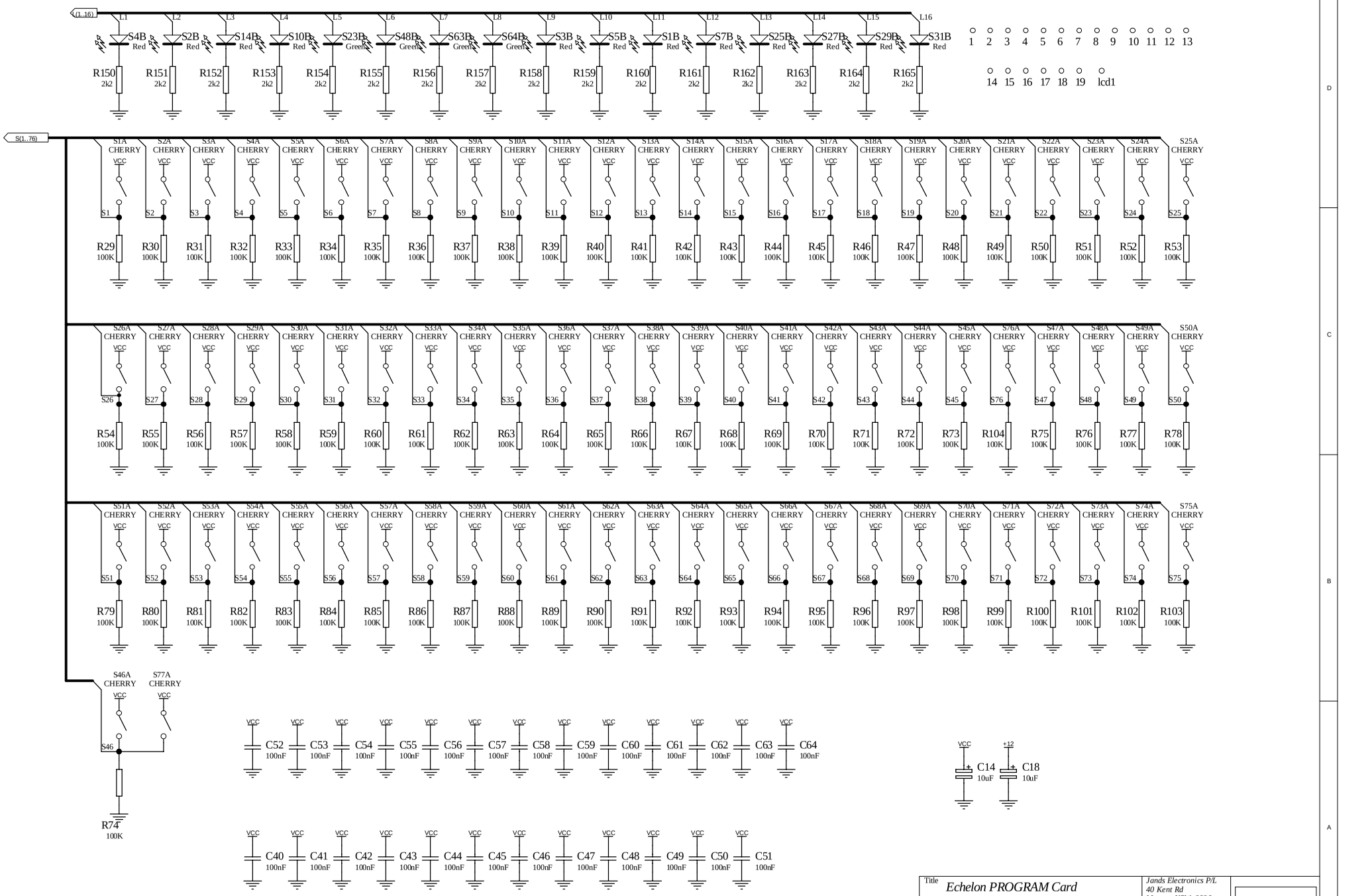

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Size: A3	Number:ECHPROG2.SC2	Revision: 0	
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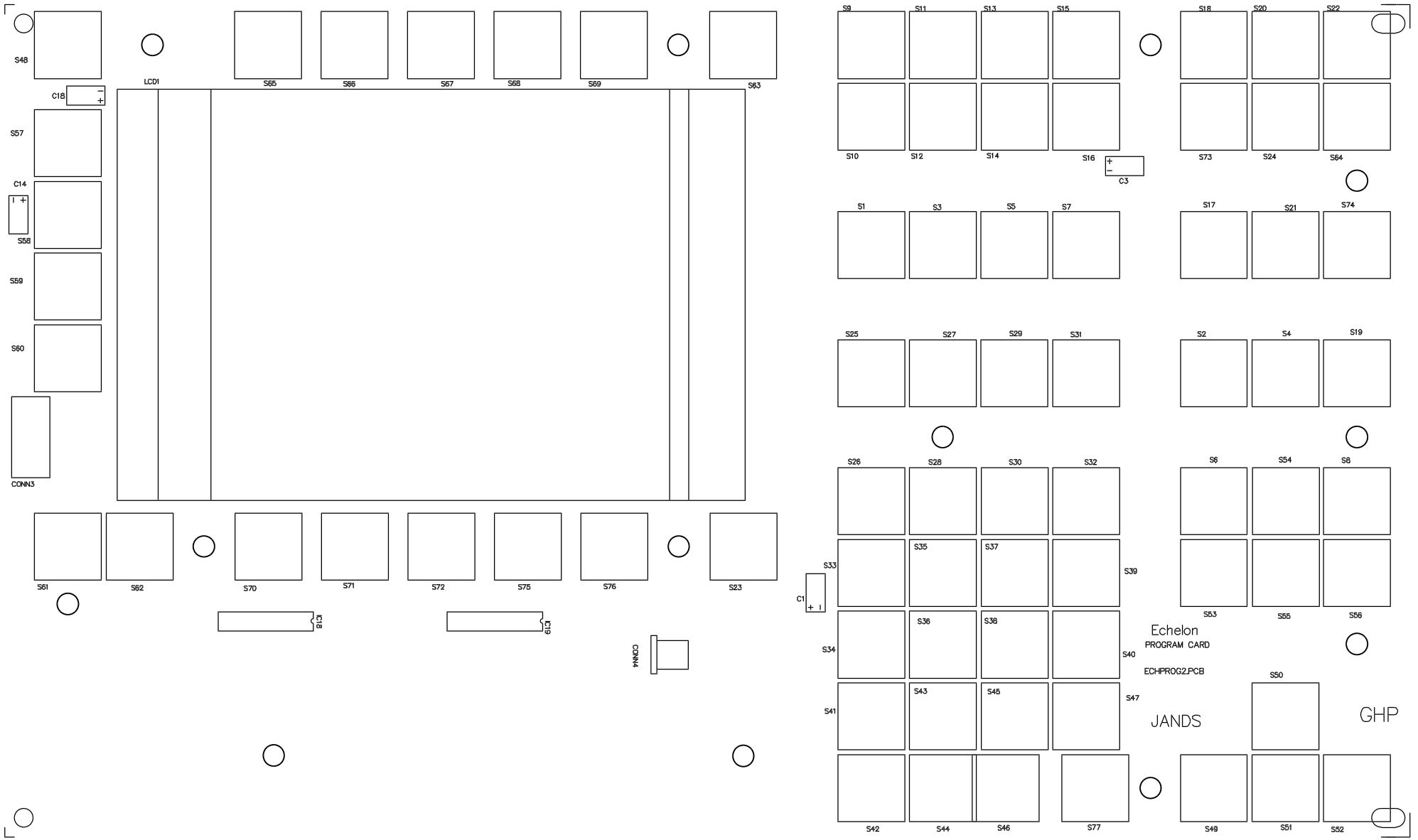
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S66
S67
S68
S69
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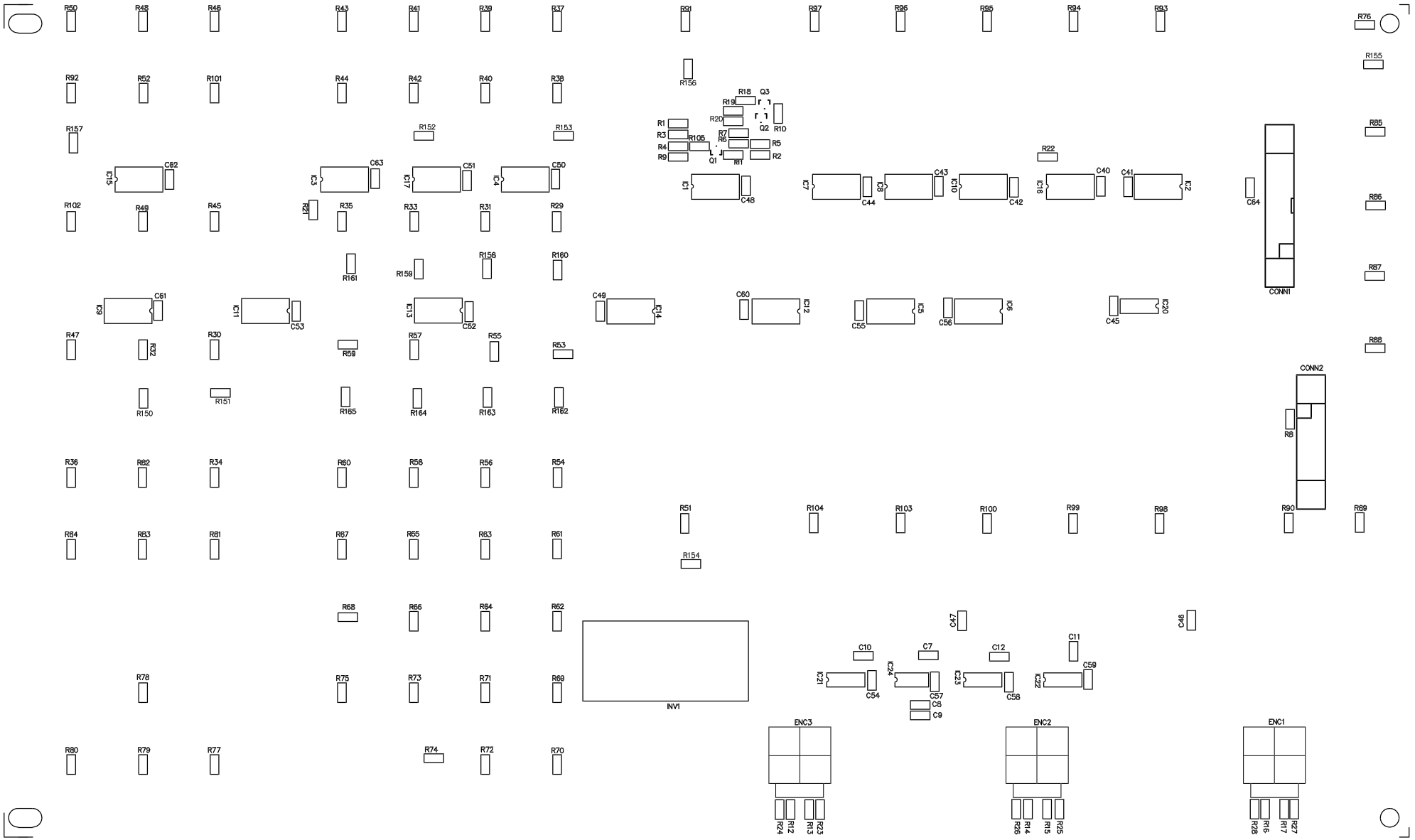
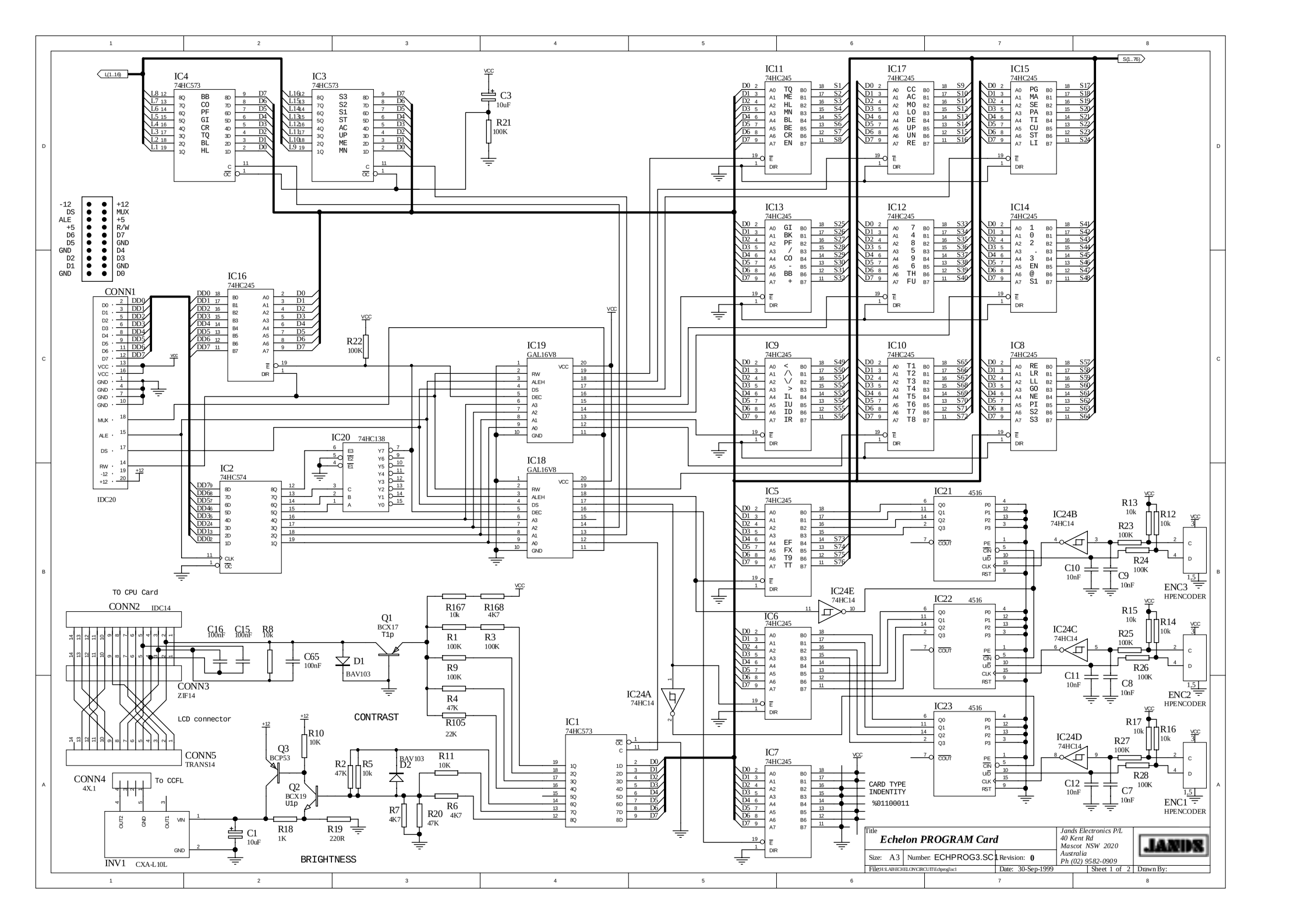
C18
S57
C14
S58
S59
S60
CONN3
S61
S62
S70
S71
S72
S75
S76
S23
C13
C15
CONN4
S9
S11
S13
S15
S18
S20
S22
S10
S12
S14
S16
S73
S24
S64
C3
S1
S3
S5
S7
S17
S21
S74
S25
S27
S29
S31
S2
S4
S19
S26
S28
S30
S32
S6
S54
S8
S33
S35
S37
S39
C1
S53
S55
S56
S34
S36
S38
S40
Echelon
PROGRAM CARD
ECHPROG2.PCB
S41
S43
S45
S47
S50
JANDS
GHP
S42
S44
S46
S77
S49
S51
S52


R50
R48
R46
R43
R41
R39
R37
R91
R97
R96
R95
R94
R93
R76
R92
R52
R101
R44
R42
R40
R38
R156
R155
R157
R152
R153
R18
Q3
R19
R20
R1
R3
R4
R9
R105
R7
R6
Q1
R11
Q2
R10
R5
R2
R85
C62
C63
C61
C51
C50
IC3
IC17
IC4
IC1
C48
IC7
C44
IC8
C43
IC10
C42
IC11
C40
IC16
C41
IC2
R22
C64
CONN1
R102
R49
R45
R21
R35
R33
R31
R29
R86
R161
R159
R156
R160
R87
C49
IC14
C60
IC12
C61
IC9
C53
IC11
C52
IC13
C55
IC5
C56
IC6
C45
IC20
R47
R32
R30
R59
R57
R55
R53
R88
CONN2
R8
R150
R151
R165
R164
R163
R162
R36
R82
R34
R60
R58
R56
R54
R90
R89
R51
R104
R103
R100
R99
R98
R84
R83
R81
R67
R65
R63
R61
R154
R47
R46
R68
R66
R64
R62
C10
C7
C12
C11
C59
IC21
C54
IC24
C57
C8
C9
IC23
C58
IC22
R78
R75
R73
R71
R69
INV1
ENC3
ENC2
ENC1
R80
R79
R77
R74
R72
R70
R24
R12
R13
R23
R26
R14
R15
R25
R28
R16
R17
R27

ECHPROG3 Circuit diagrams and overlays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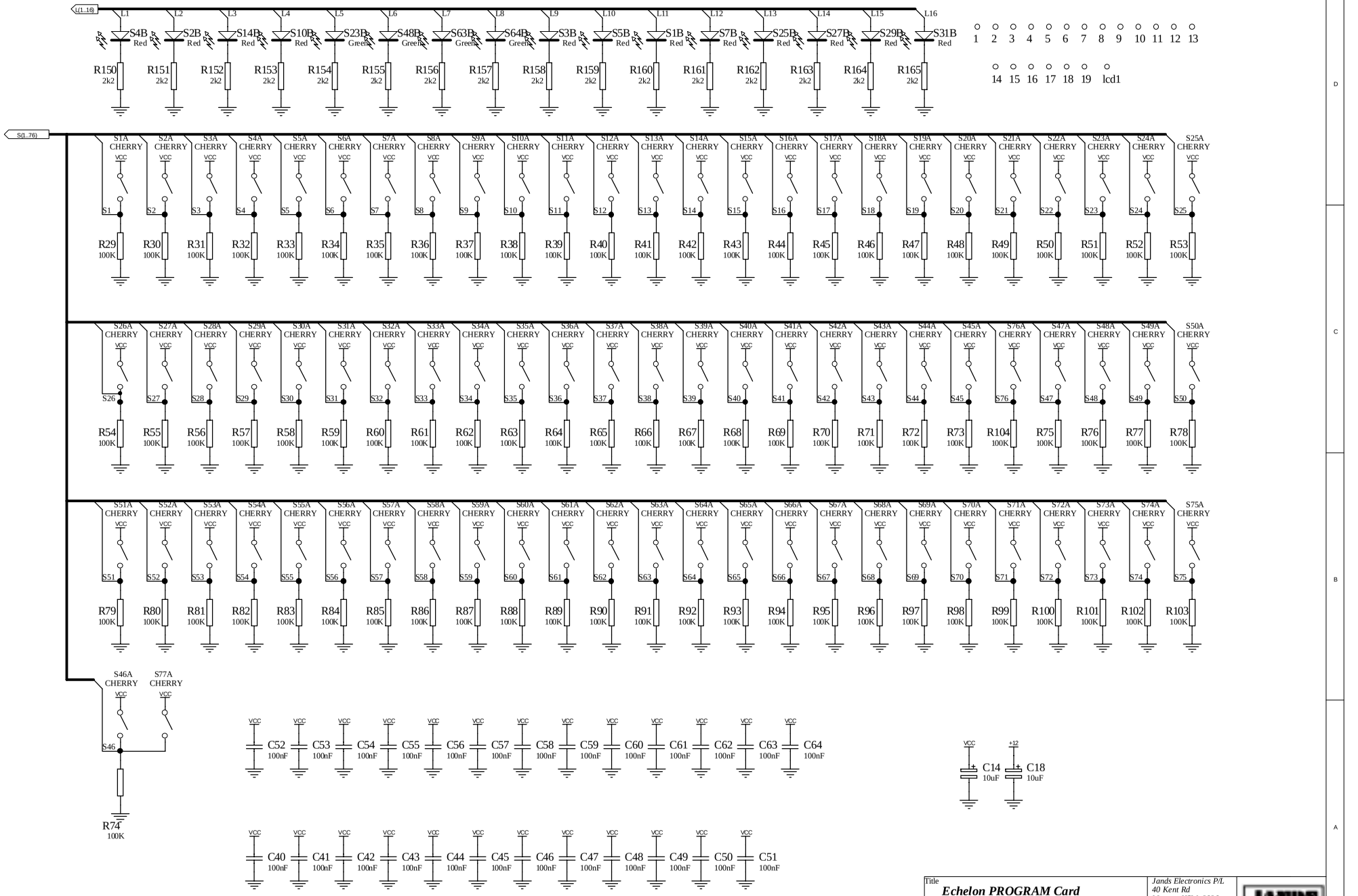
IC3 74HC573
C3 10uF
R21 100K
IC11 74HC245
IC17 74HC245
IC15 74HC245
IC13 74HC245
IC12 74HC245
IC14 74HC245
IC9 74HC245
IC10 74HC245
IC8 74HC245
IC16 74HC245
CONN1
IDC20
R22 100K
IC19 GAL16V8
IC18 GAL16V8
IC20 74HC138
IC2 74HC574
IC5 74HC245
IC6 74HC245
IC7 74HC245
IC1 74HC573
IC21 4516
IC22 4516
IC23 4516
IC24A 74HC14
IC24B 74HC14
IC24C 74HC14
IC24D 74HC14
IC24E 74HC14
TO CPU Card
CONN2 IDC14
CONN3 ZIF14
LCD connector
CONN5 TRANS14
CONN4 4X.1
To CCFL
INV1 CXA-L10L
CONTRAST
BRIGHTNESS
Q1 BCX17 T1p
Q2 BCX19 U1p
Q3 BCP53
D1 BAV103
D2 BAV103
CARD TYPE INDENTITY
%01100011
ENC1 HPENCODER
ENC2 HPENCODER
ENC3 HPENCODER
Title
Echelon PROGRAM Card
Size: A3
Number: ECHPROG3.SC1
Revision: 0
Date: 30-Sep-1999
Sheet 1 of 2
Drawn By:
Jands Electronics P/L
40 Kent Rd
Mascot NSW 2020
Australia
Ph (02) 9582-0909
JANDS



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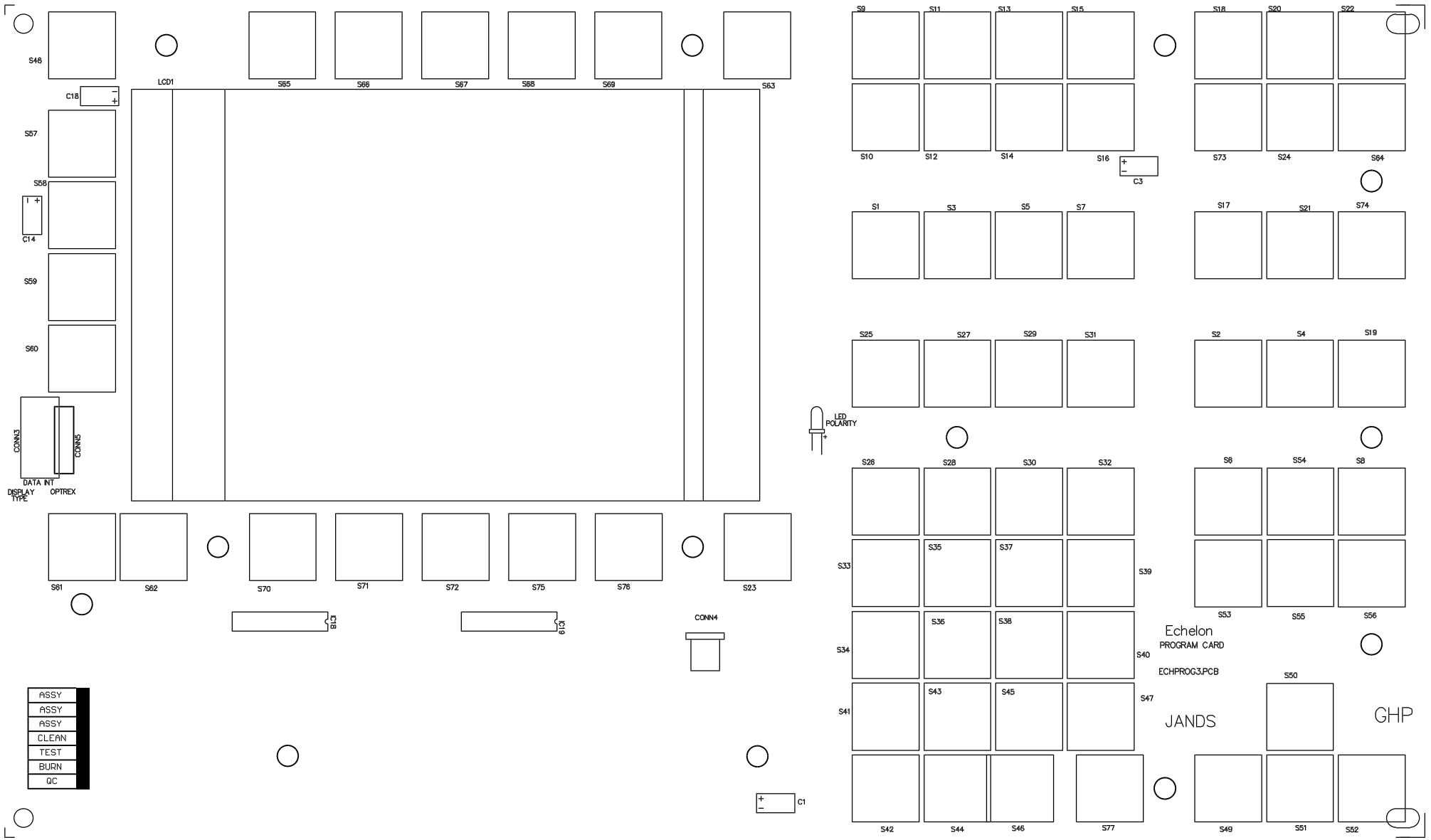
Size: A3	Number: ECHPROG3.SC2	Revision: **0**	
File: H:\LAB\ECH\ELONCIRCUIT\Echprog3.sc2		Date: 30-Sep-1999	Sheet 2 of 2 Drawn By: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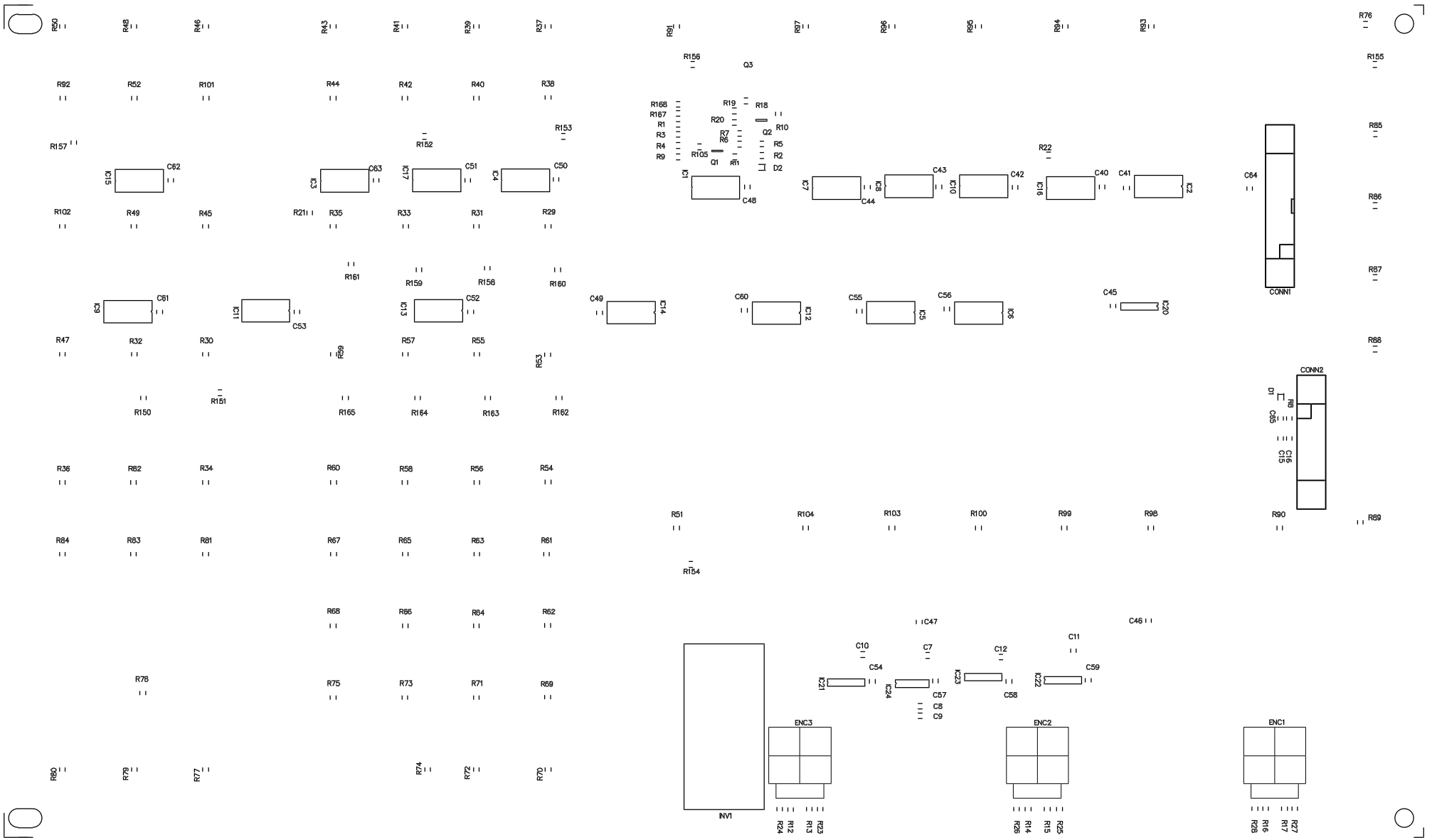
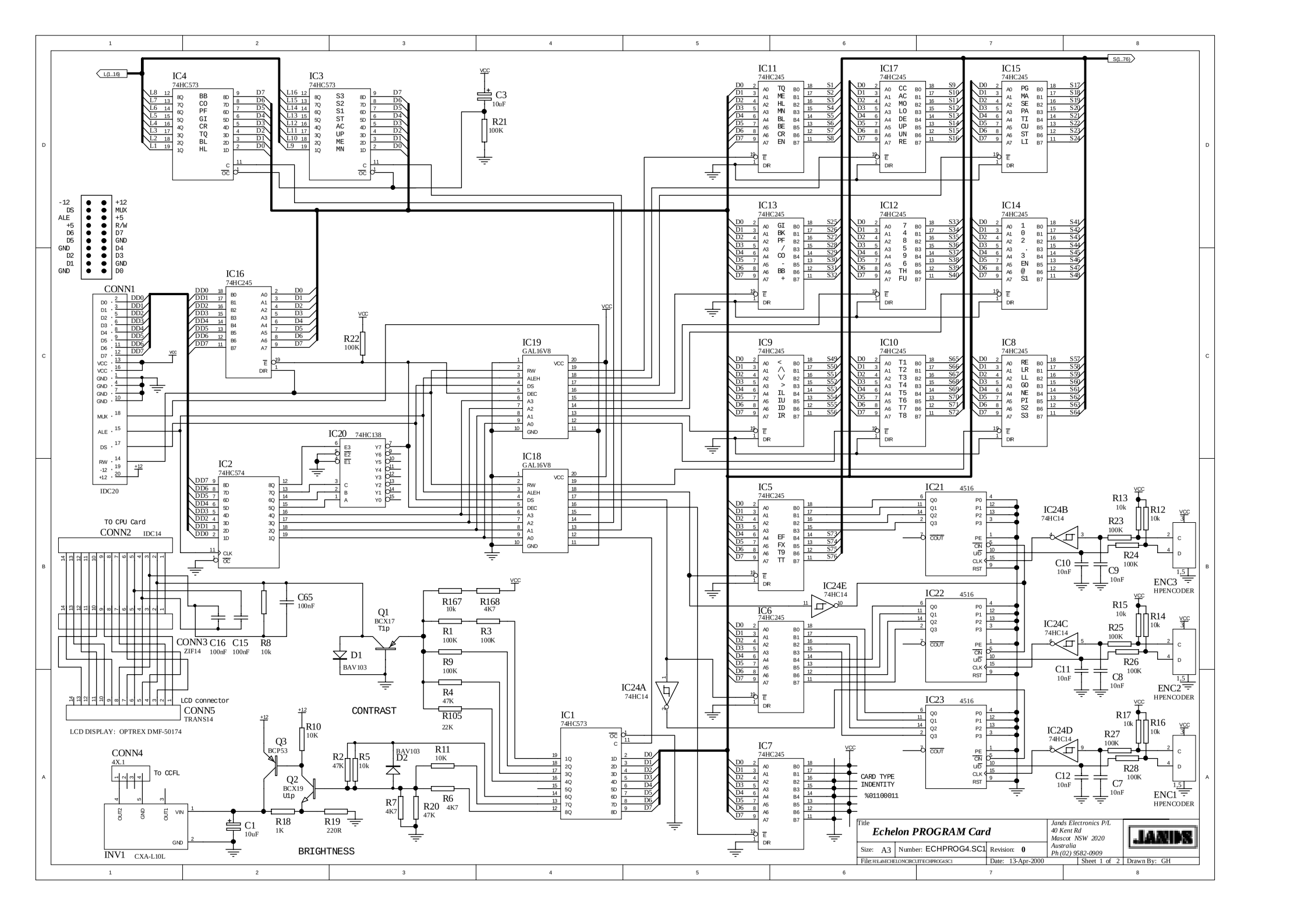
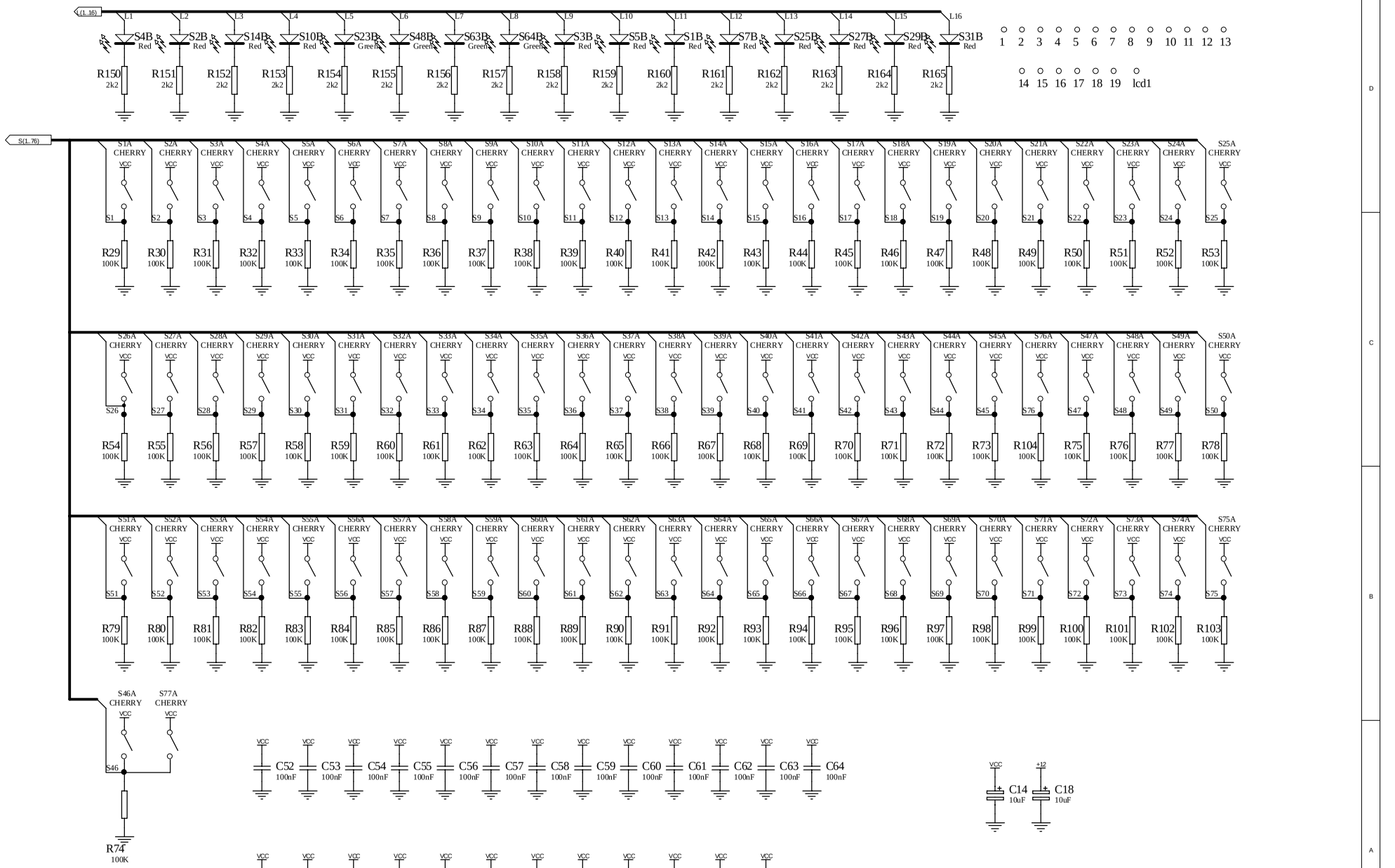
LCD1
S65
S66
S67
S68
S69
S63
C18
S57
S58
C14
S59
S60
CONN3
CONN5
DATA INT
DISPLAY TYPE
OPTREX
S61
S62
S70
S71
S72
S75
S76
S23
C19
C18
CONN4
ASSY
ASSY
ASSY
CLEAN
TEST
BURN
QC
C1
S9
S11
S13
S15
S10
S12
S14
S16
C3
S18
S20
S22
S73
S24
S64
S1
S3
S5
S7
S17
S21
S74
S25
S27
S29
S31
S2
S4
S19
LED POLARITY
S26
S28
S30
S32
S33
S35
S37
S39
S34
S36
S38
S40
S41
S43
S45
S47
S42
S44
S46
S77
S8
S54
S8
S53
S55
S56
Echelon
PROGRAM CARD
ECHPROG3.PCB
S50
JANDS
GHP
S49
S51
S52


R50 R48 R46 R43 R41 R39 R37
R91 R97 R96 R95 R94 R93 R76
R92 R52 R101 R44 R42 R40 R38
R156 Q3 R155
R168 R167 R1 R3 R4 R9 R19 R18 R20 R7 R6 R10 Q2 R5 R2 D2 R105 Q1 R11
R157 R153 R152
C62 C63 C51 C50
IC15 IC3 IC17 IC4
IC1 C48
IC7 C44 IC8 C43 IC10 C42 IC16 C40 C41 IC2
R22
C64 CONN1
R85
R102 R49 R45 R21 R35 R33 R31 R29
R86
R161 R159 R158 R160
C61 C53 C52 C49
IC9 IC11 IC13 IC14
C60 IC12 C55 IC5 C56 IC6 C45 IC20
R87
R47 R32 R30 R59 R57 R55 R53
R88
CONN2
D1 R8 C55 C15 C16
R150 R151 R165 R164 R163 R162
R90 R89
R36 R82 R34 R60 R58 R56 R54
R51 R104 R103 R100 R99 R98
R84 R83 R81 R67 R65 R63 R61
R154
C47 C46
C10 C7 C12 C11
C54 C59
IC21 IC24 IC23 IC22
C57 C58
C8 C9
R68 R66 R64 R62
ENC3 ENC2 ENC1
R76
R75 R73 R71 R69
INV1
R24 R12 R13 R23 R26 R14 R15 R25 R28 R16 R17 R27
R60 R79 R77 R74 R72 R70

ECHPROG4 Circuit diagrams and overlays


IC4 74HC573
IC3 74HC573
C3 10uF
R21 100K
L(1..16)
S(1..76)
IC11 74HC245
IC17 74HC245
IC15 74HC245
IC13 74HC245
IC12 74HC245
IC14 74HC245
IC9 74HC245
IC10 74HC245
IC8 74HC245
IC16 74HC245
CONN1
IDC20
R22 100K
IC19 GAL16V8
IC18 GAL16V8
IC20 74HC138
IC2 74HC574
IC5 74HC245
IC6 74HC245
IC7 74HC245
IC1 74HC573
IC21 4516
IC22 4516
IC23 4516
IC24A 74HC14
IC24B 74HC14
IC24C 74HC14
IC24D 74HC14
IC24E 74HC14
TO CPU Card
CONN2 IDC14
CONN3 ZIF14
C16 100nF
C15 100nF
R8 10k
C65 100nF
Q1 BCX17 T1p
D1 BAV103
R167 10k
R168 4K7
R1 100K
R3 100K
R9 100K
R4 47K
R105 22K
CONTRAST
LCD connector
CONN5 TRANS14
LCD DISPLAY: OPTREX DMF-50174
CONN4 4X.1
To CCFL
Q3 BCP53
Q2 BCX19 U1p
R10 10K
R2 47K
R5 10k
D2 BAV103
R11 10K
R7 4K7
R6 4K7
R20 47K
R18 1K
R19 220R
C1 10uF
INV1 CXA-L10L
BRIGHTNESS
CARD TYPE INDENTITY
%01100011
R13 10k
R12 10k
R23 100K
R24 100K
C10 10nF
C9 10nF
ENC3 HPENCODER
R15 10k
R14 10k
R25 100K
R26 100K
C11 10nF
C8 10nF
ENC2 HPENCODER
R17 10k
R16 10k
R27 100K
R28 100K
C12 10nF
C7 10nF
ENC1 HPENCODER
Title
Echelon PROGRAM Card
Size: A3
Number: ECHPROG4.SC1
Revision: 0
File: H:\Lab\ECHELON\CIRCUIT\ECHPROG4SC1
Date: 13-Apr-2000
Sheet 1 of 2
Drawn By: GH
Jands Electronics P/L
40 Kent Rd
Mascot NSW 2020
Australia
Ph (02) 9582-0909



Title: ***Echelon PROGRAM Card***			*Jands Electronics P/L* *40 Kent Rd* *Mascot NSW 2020* *Australia* *Ph (02) 9582-0909*
Size: A3	Number: ECHPROG4.SC2	Revision: **0**	
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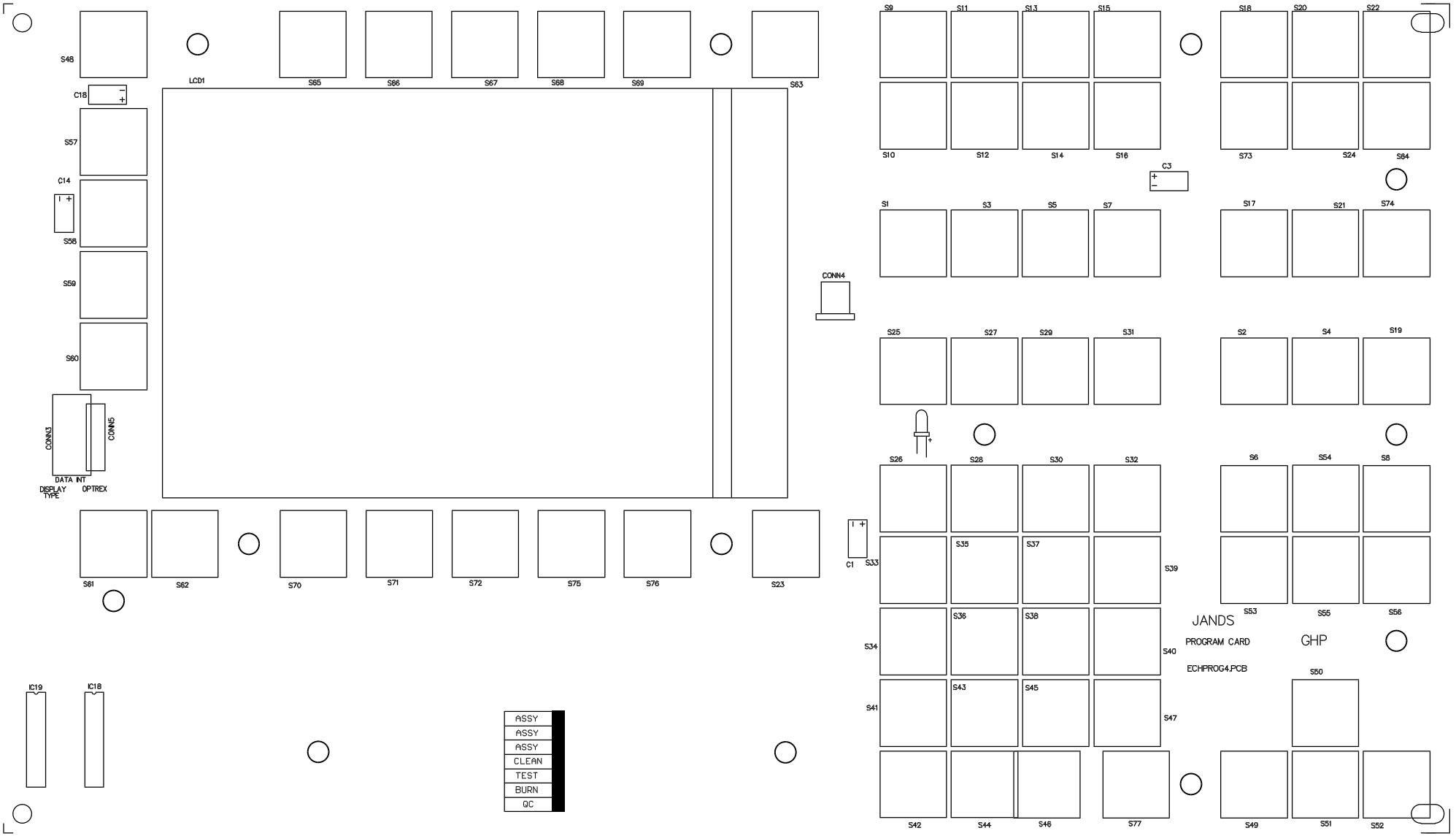
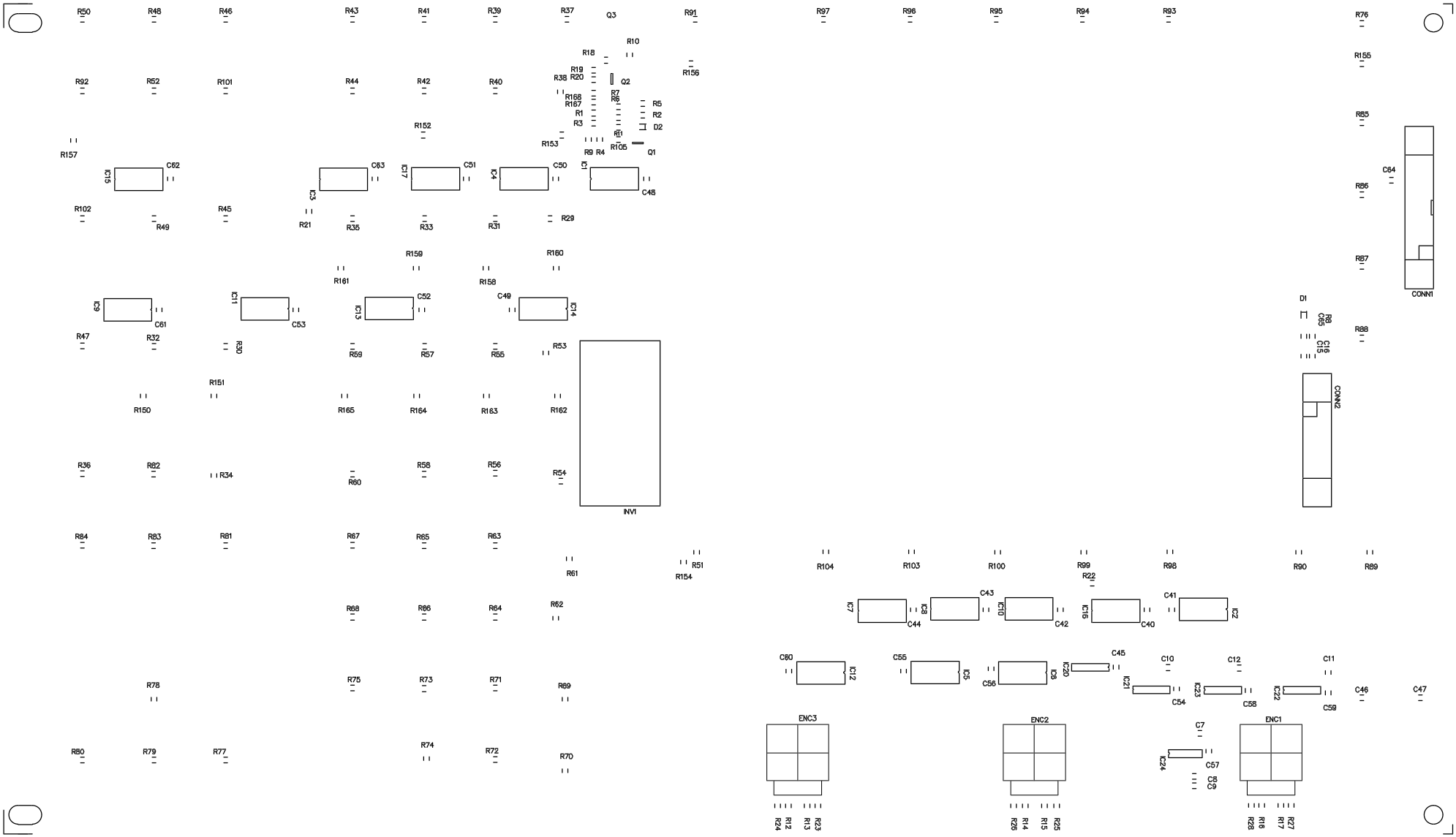
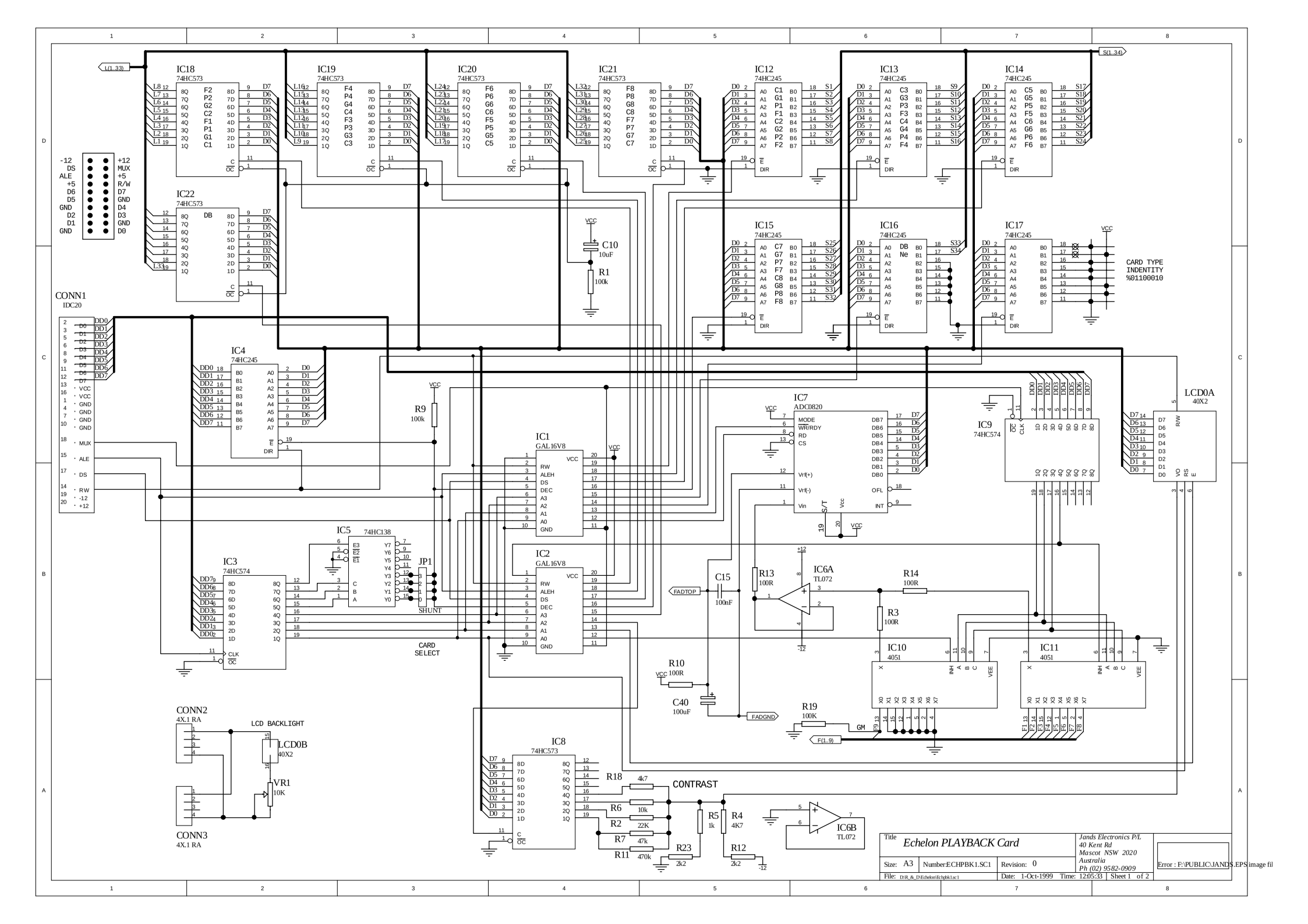

S48
LCD1
S65
S66
S67
S68
S69
S63
C18
S57
C14
S58
S59
S60
CONN3
CONN5
DATA INT
DISPLAY TYPE
OPTREX
CONN4
S61
S62
S70
S71
S72
S75
S76
S23
C1
S9
S11
S13
S15
S10
S12
S14
S16
C3
S1
S3
S5
S7
S25
S27
S29
S31
S26
S28
S30
S32
S33
S35
S37
S39
S34
S36
S38
S40
S41
S43
S45
S47
S42
S44
S46
S77
S18
S20
S22
S73
S24
S64
S17
S21
S74
S2
S4
S19
S6
S54
S8
S53
S55
S56
JANDS
PROGRAM CARD
GHP
ECHPROG4.PCB
S50
S49
S51
S52
IC19
IC18
ASSY
ASSY
ASSY
CLEAN
TEST
BURN
QC


R50 R48 R46 R43 R41 R39 R37 Q3 R91
R10
R18
R19 R20 R38 Q2
R156
R92 R52 R101 R44 R42 R40
R168 R167 R7 R6 R5 R1 R2 R3 D2
R152
R153 R11
R105 R9 R4 Q1
R157
IC16 C62
IC3 C63
IC17 C51
IC4 C50
IC1 C48
R102 R45
R49 R21 R35 R33 R31 R29
R159 R160
R161 R158
IC9 C61
IC11 C53
IC13 C52
C49 IC14
R47 R32 R30 R59 R57 R55 R53
R151
R150 R165 R164 R163 R162
INV1
R36 R62 R34 R60 R58 R56 R54
R84 R83 R81 R67 R65 R63 R61 R51
R154
R68 R66 R64 R62
R78 R75 R73 R71 R69
R80 R79 R77 R74 R72 R70
R97 R96 R95 R94 R93
R76
R155
R85
C64
R86
R87
CONN1
D1
R88
C65 R8
C15 C16
CONN2
R104 R103 R100 R99 R22 R98 R90 R89
IC7 IC8 C43 IC10 C42 IC16 C40 C41 IC2
C44
C60 IC12
C55 IC5
C56 IC6
IC20 C45
IC21 C10 C54
IC23 C12 C58
IC22 C11 C59
C46 C47
ENC3
ENC2
ENC1
C7
IC24 C57
C8 C9
R24 R12 R13 R23
R26 R14 R15 R25
R28 R16 R17 R27

ECHPBAK1 Circuit diagrams and overlays


L(1..33)
S(1..34)
IC18
74HC573
IC19
74HC573
IC20
74HC573
IC21
74HC573
IC12
74HC245
IC13
74HC245
IC14
74HC245
IC22
74HC573
IC15
74HC245
IC16
74HC245
IC17
74HC245
-12
DS
ALE
+5
D6
D5
GND
D2
D1
GND
+12
MUX
+5
R/W
D7
GND
D4
D3
GND
D0
C10
10uF
R1
100k
CARD TYPE
INDENTITY
%01100010
CONN1
IDC20
IC4
74HC245
R9
100k
IC1
GAL16V8
IC7
ADC0820
IC9
74HC574
LCD0A
40X2
IC5
74HC138
IC3
74HC574
JP1
SHUNT
CARD
SELECT
IC2
GAL16V8
C15
100nF
FADTOP
R13
100R
IC6A
TL072
R14
100R
R3
100R
IC10
4051
IC11
4051
R10
100R
C40
100uF
FADGND
R19
100K
GM
F(1..9)
IC8
74HC573
R18
4k7
R6
10k
R2
22K
R7
47k
R11
470k
CONTRAST
R5
1k
R4
4K7
R23
2k2
R12
2k2
IC6B
TL072
CONN2
4X1 RA
LCD BACKLIGHT
LCD0B
40X2
VR1
10K
CONN3
4X1 RA
Title
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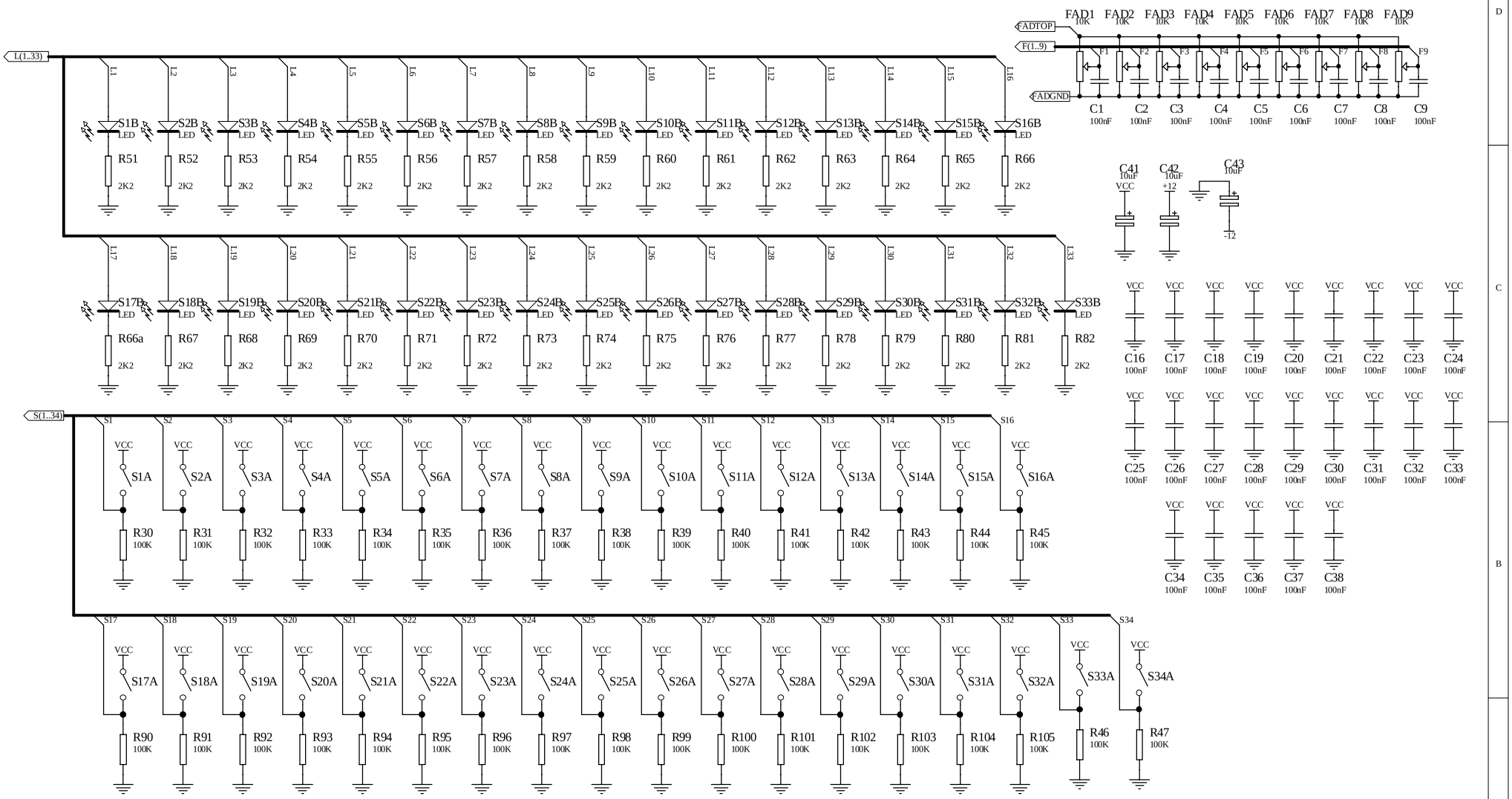
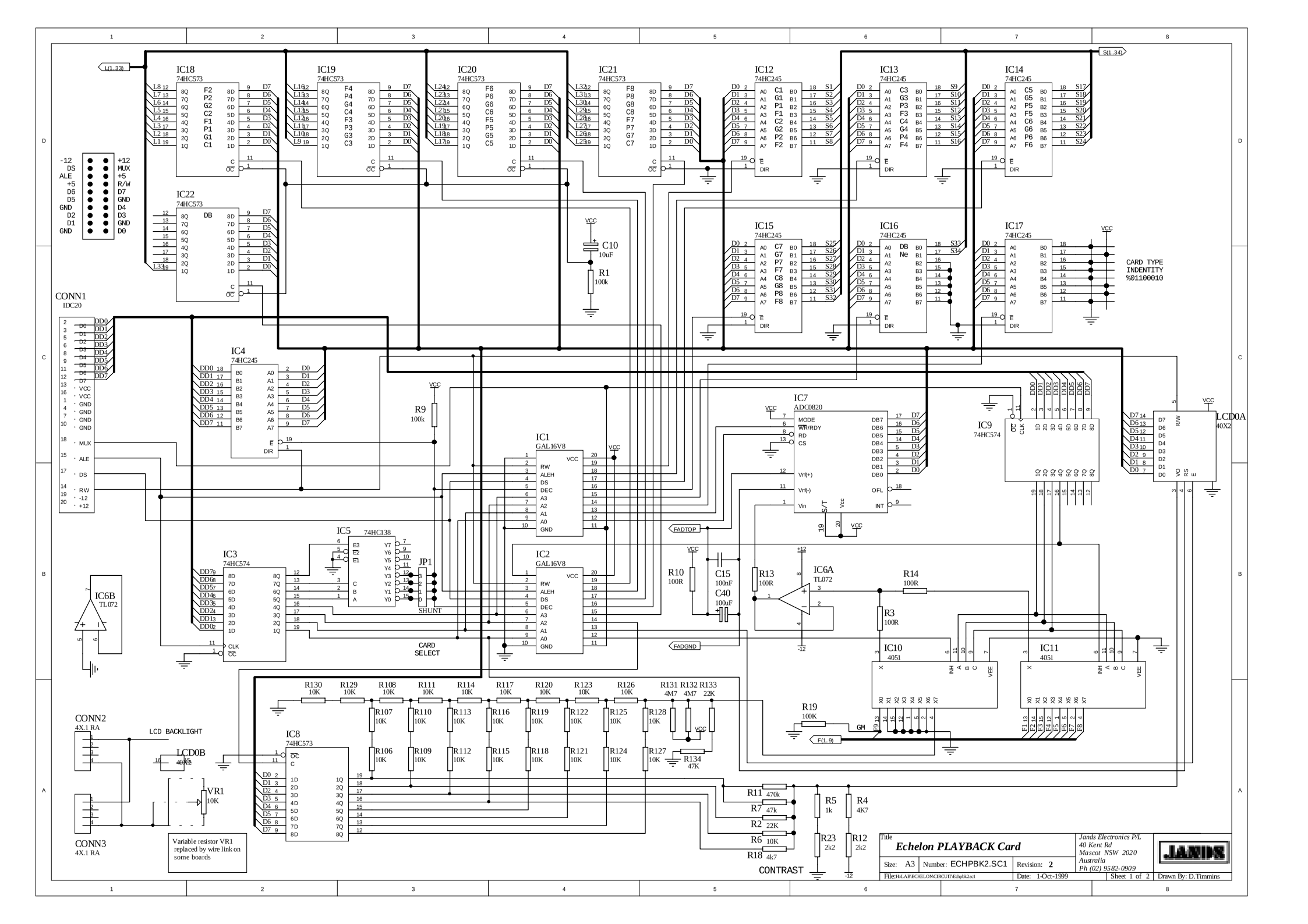
Size: A3
Number:ECHPBK1.SC1
Revision: 0
File: D:\R_&_D\Echelon\EchpBk1.sc1
Date: 1-Oct-1999
Time: 12:05:33
Sheet 1 of 2
Jands Electronics P/L
40 Kent Rd
Mascot NSW 2020
Australia
Ph (02) 9582-0909
Error : F:\PUBLIC\JANDS.EPS image fil



Title: **Echelon PLAYBACK Card**			*Protel Technology Inc.* *4675 Stevens Creek Blvd.* *Suite 200* *Santa Clara, CA 95051* *USA*
Size: A3	Number: ECHPBK1.SC2	Revision: 0	
File: D:\R_&_D\Echelon\Echpbk1.sc2	Date: 1-Oct-1999	Time: 12:06:24	Sheet 2 of 2

ECHPBAK2 Circuit diagrams and overlays


L(1..33)
S(1..34)
IC18
74HC573
IC19
74HC573
IC20
74HC573
IC21
74HC573
IC12
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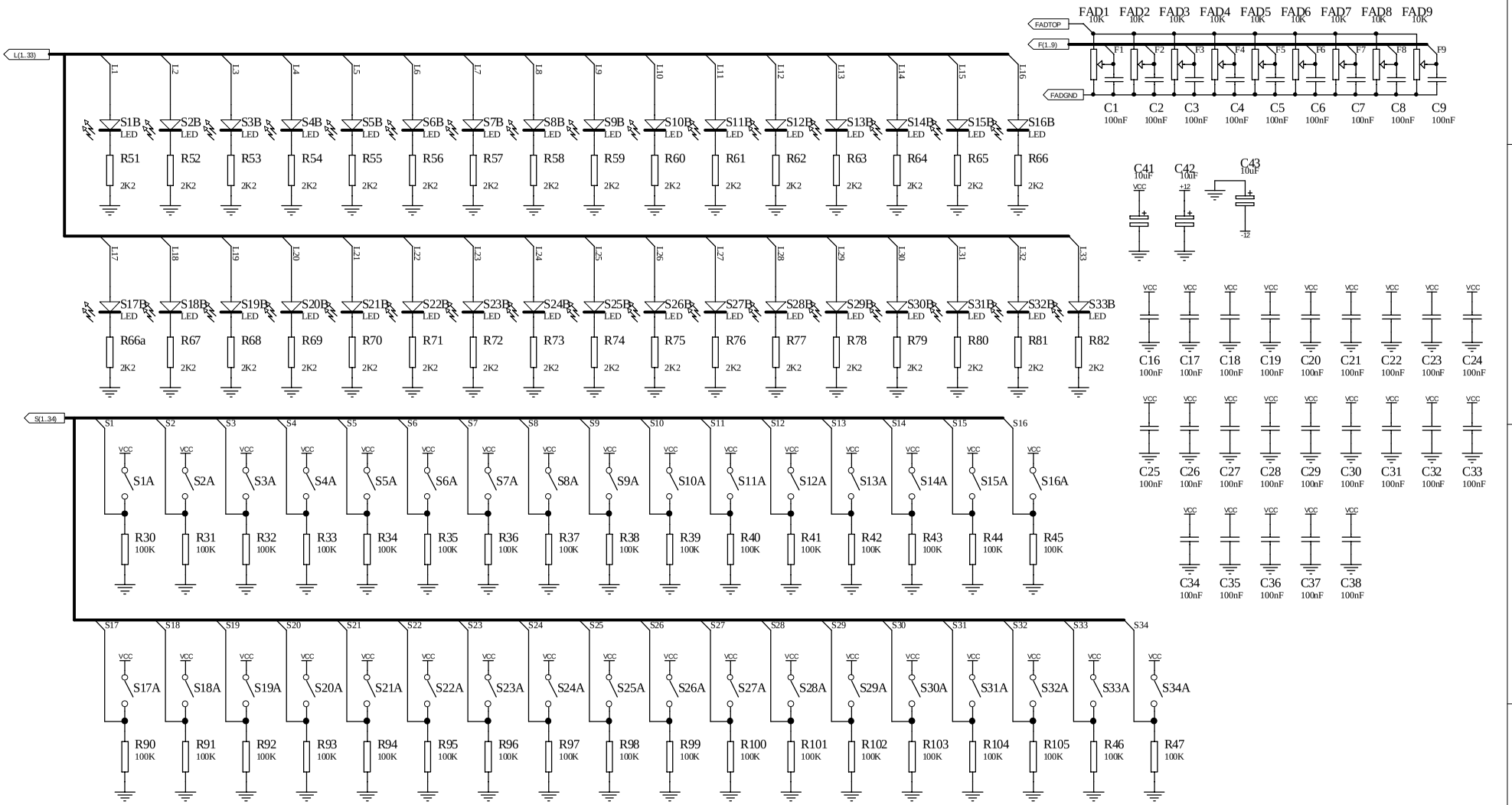
IC13
74HC245
IC14
74HC245
IC22
74HC573
IC15
74HC245
IC16
74HC245
IC17
74HC245
-12
DS
ALE
+5
D6
D5
GND
D2
D1
GND
+12
MUX
+5
R/W
D7
GND
D4
D3
GND
D0
C10
10uF
R1
100k
CARD TYPE
INDENTITY
%01100010
CONN1
IDC20
IC4
74HC245
R9
100k
IC1
GAL16V8
IC7
ADC0820
IC9
74HC574
LCD0A
40X2
IC5
74HC138
JP1
SHUNT
IC3
74HC574
IC2
GAL16V8
FADTOP
FADGND
R10
100R
C15
100nF
C40
100uF
R13
100R
IC6A
TL072
R14
100R
R3
100R
IC6B
TL072
CARD
SELECT
IC10
4051
IC11
4051
R130
10K
R129
10K
R108
10K
R111
10K
R114
10K
R117
10K
R120
10K
R123
10K
R126
10K
R131
4M7
R132
4M7
R133
22K
R107
10K
R110
10K
R113
10K
R116
10K
R119
10K
R122
10K
R125
10K
R128
10K
R106
10K
R109
10K
R112
10K
R115
10K
R118
10K
R121
10K
R124
10K
R127
10K
R134
47K
R19
100K
GM
F(1..9)
CONN2
4X.1 RA
LCD BACKLIGHT
LCD0B
40X2
VR1
10K
CONN3
4X.1 RA
IC8
74HC573
R11
470k
R7
47k
R2
22K
R6
10K
R18
4k7
R5
1k
R4
4K7
R23
2k2
R12
2k2
CONTRAST
Variable resistor VR1
replaced by wire link on
some boards
Title
Echelon PLAYBACK Card
Size: A3
Number: ECHPBK2.SC1
Revision: 2
File:H:\LABEC\HELONC\RCUIT\Echpbk2.sc1
Date: 1-Oct-1999
Sheet 1 of 2
Drawn By: D.Timmins
Jands Electronics P/L
40 Kent Rd
Mascot NSW 2020
Australia
Ph (02) 9582-0909
JANDS



Title: ***Echelon PLAYBACK Card***			*Jands Electronics P/L* *40 Kent Rd* *Mascot NSW 2020* *Australia* *Ph (02) 9582-0909*
Size: A3	Number: ECHPBK2.SC2	Revision: **2**	
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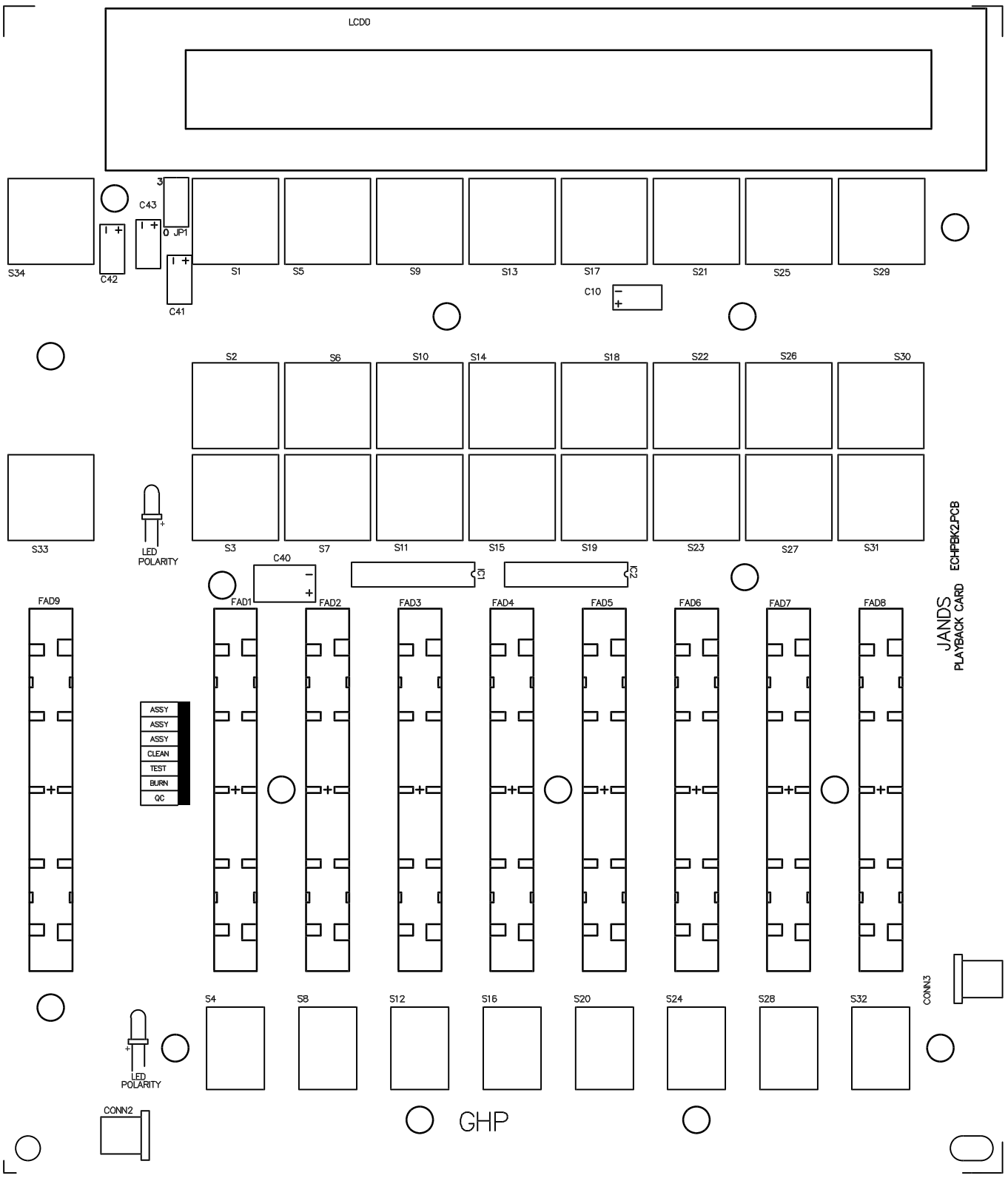
LCD0
C43
JP1
C42
C41
C10
S34
S1
S5
S9
S13
S17
S21
S25
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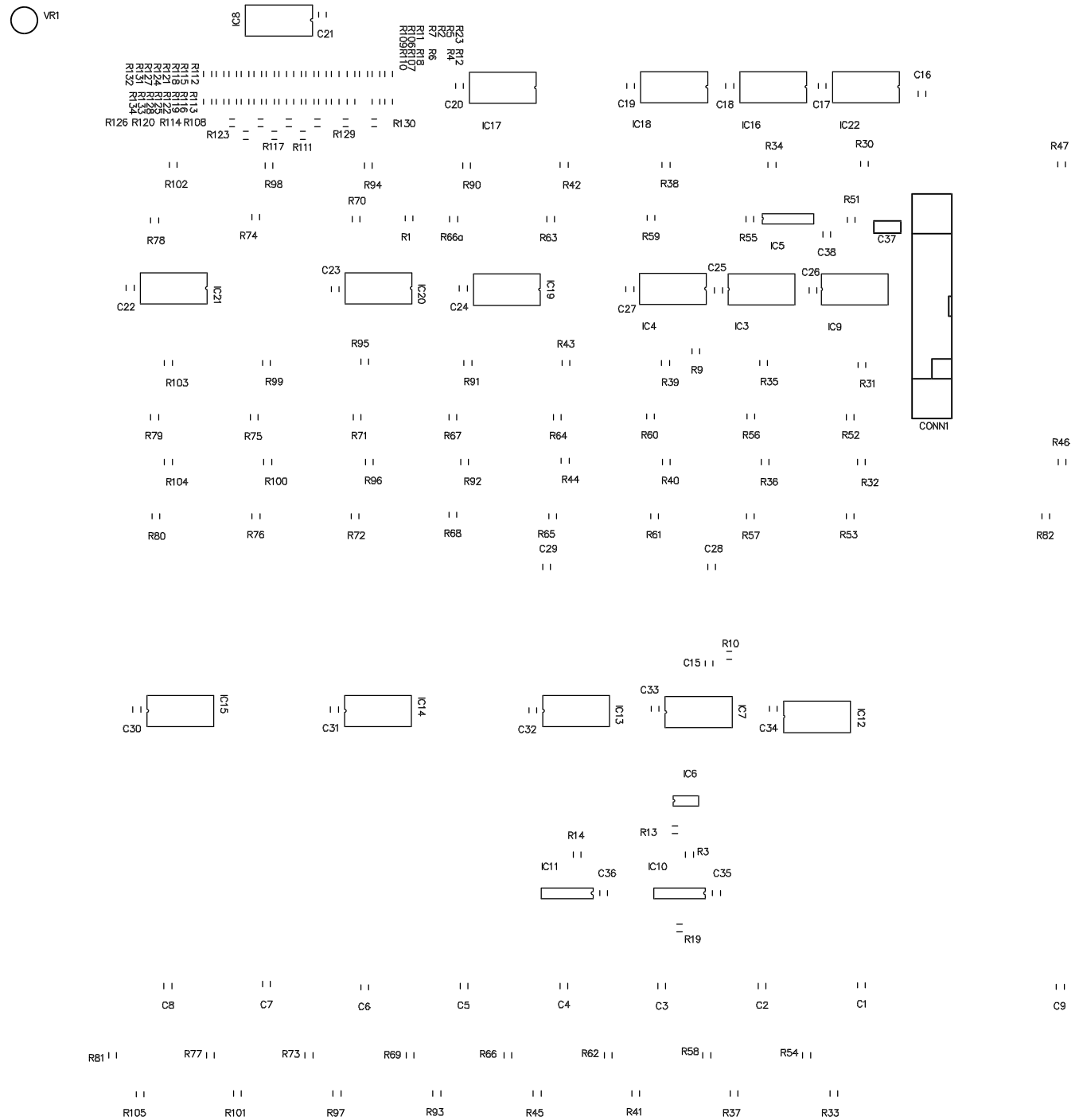
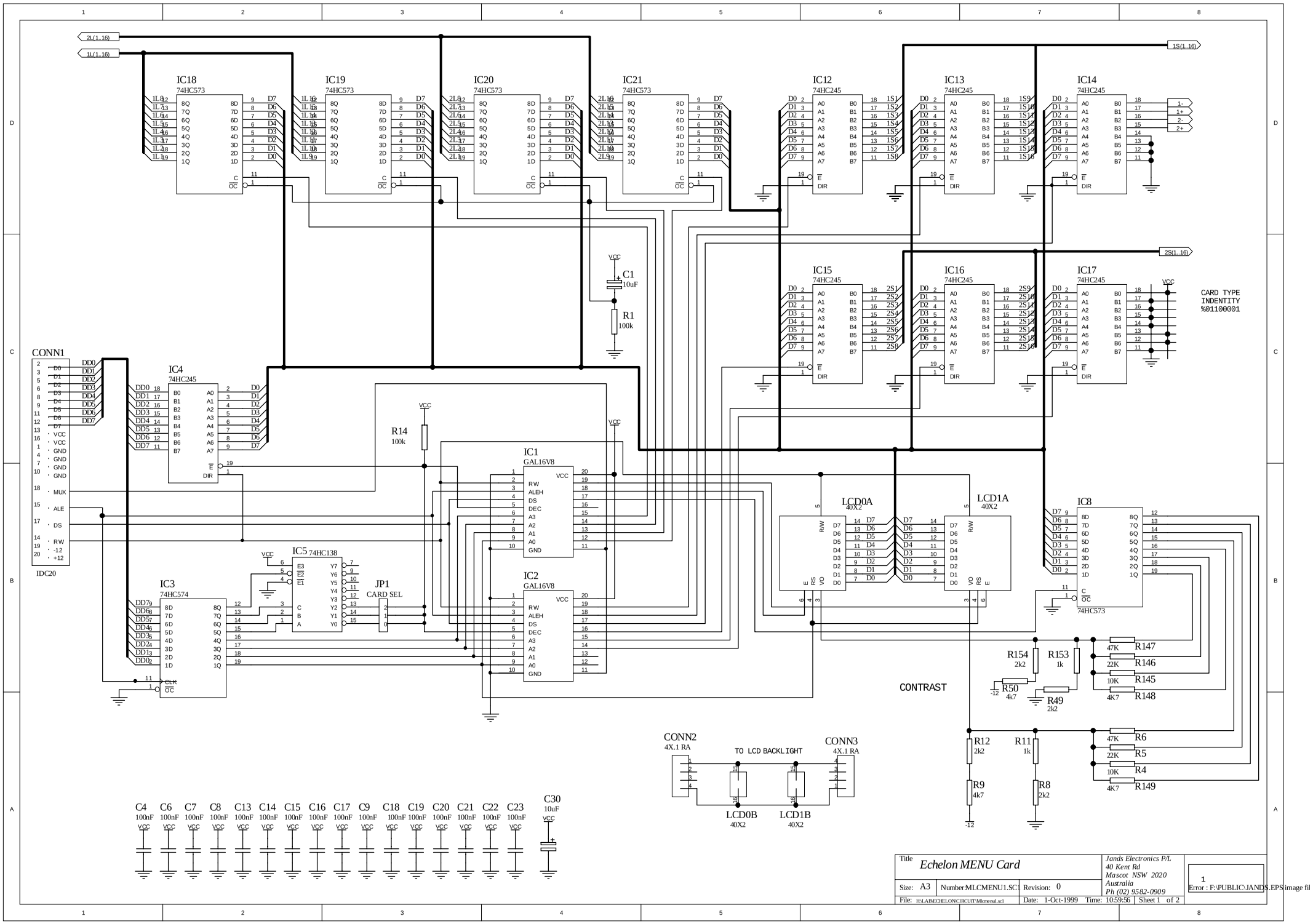
S2
S6
S10
S14
S18
S22
S26
S30
S33
S3
S7
S11
S15
S19
S23
S27
S31
LED POLARITY
C40
IC1
IC2
FAD9
FAD1
FAD2
FAD3
FAD4
FAD5
FAD6
FAD7
FAD8
ASSY
ASSY
ASSY
CLEAN
TEST
BURN
QC
JANDS
PLAYBACK CARD
ECHPBK2.PCB
CONN3
S4
S8
S12
S16
S20
S24
S28
S32
LED POLARITY
CONN2
GHP

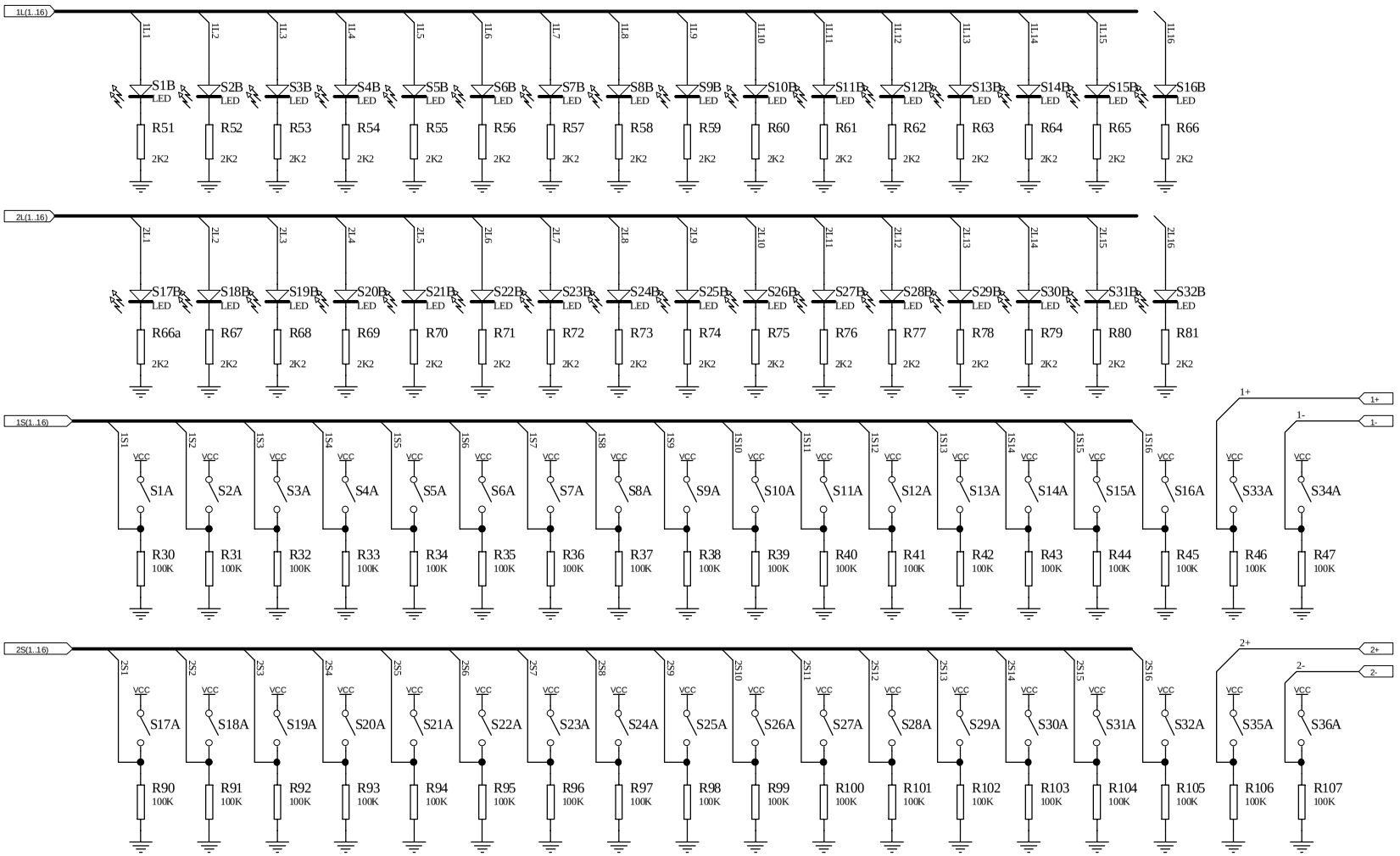

VR1
IC1
C21
R23 R22 R2 R7 R6 R4 R12
R11 R106 R107 R108 R109 R10
R112 R115 R118 R121 R124 R127 R132
R113 R116 R119 R122 R125 R128 R133 R134
R126 R120 R114 R108
R123
R117 R111
R129
R130
C20
IC17
C19
IC18
C18
IC16
C17
IC22
C16
R102
R98
R94
R90
R42
R38
R34
R30
R47
R70
R78
R74
R1
R66a
R63
R59
R55
IC5
R51
C38
C37
C22
IC21
C23
IC20
C24
IC19
C27
IC4
C25
IC3
C26
IC9
R95
R43
R103
R99
R91
R9
R39
R35
R31
R79
R75
R71
R67
R64
R60
R56
R52
CONN1
R46
R104
R100
R96
R92
R44
R40
R36
R32
R80
R76
R72
R68
R65
R61
R57
R53
R82
C29
C28
R10
C15
C30
IC15
C31
IC14
C32
IC13
C33
IC7
C34
IC12
IC6
R14
R13
R3
IC11
C36
IC10
C35
R19
C8
C7
C6
C5
C4
C3
C2
C1
C9
R81
R77
R73
R69
R66
R62
R58
R54
R105
R101
R97
R93
R45
R41
R37
R33

MLCMENU1 Circuit diagrams and overlays



Title	*Echelon MENU Card*		*Jands Electronics P/L* *40 Kent Rd* *Mascot NSW 2020* *Australia* *Ph (02) 9582-0909*
Size: A3	Number:MLCMENU1.SC1	Revision: 0	
File: H:\LAB\ECHELON\CIRCUIT\Mlcmenu1.sc1	Date: 1-Oct-1999	Time: 10:59:56	Sheet 1 of 2

1
Error : F:\PUBLIC\JANDS.EPS image fil



Title	*Echelon MENU Card*	*Jands Electronics P/L* *40 Kent Rd* *Mascot NSW 2020* *Australia* *Ph (02) 9582-0909*	
Size: A3	Number:MLCMENU1.SC2 Revision: 0		
File: H:\LAB\ECHELON\CIRCUIT\Mlcmenu1.sc2	Date: 1-Oct-1999 Time: 11:01:04	Sheet 2 of 2	

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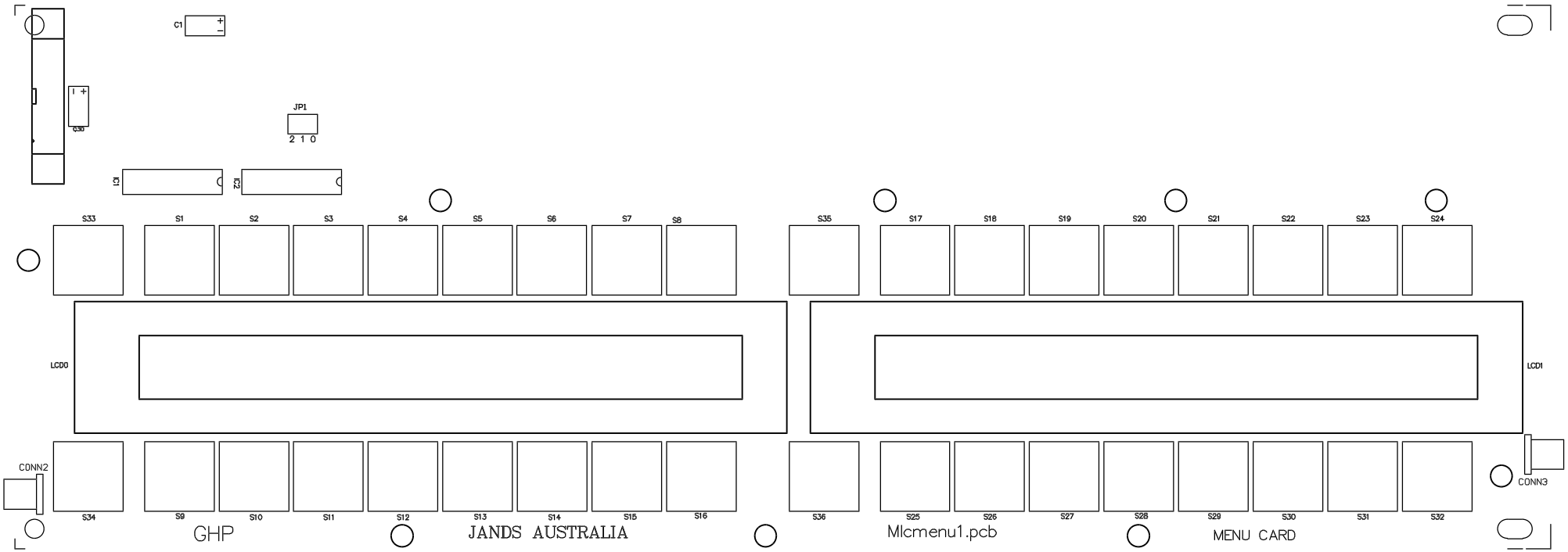
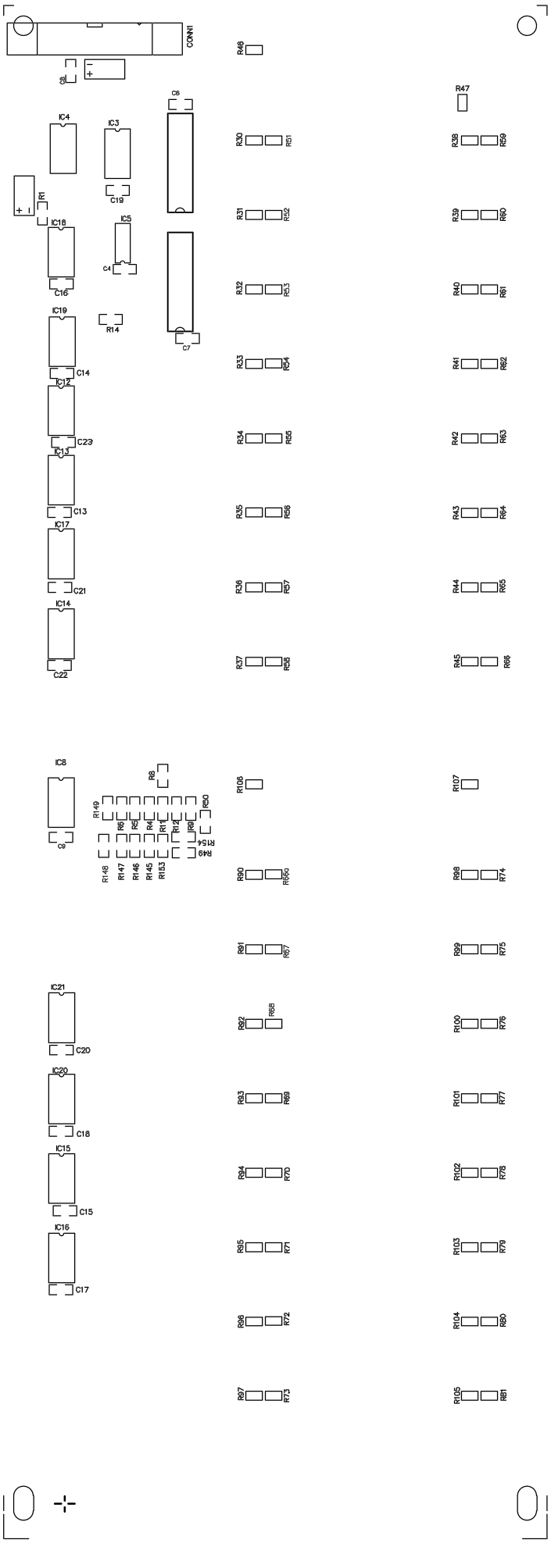
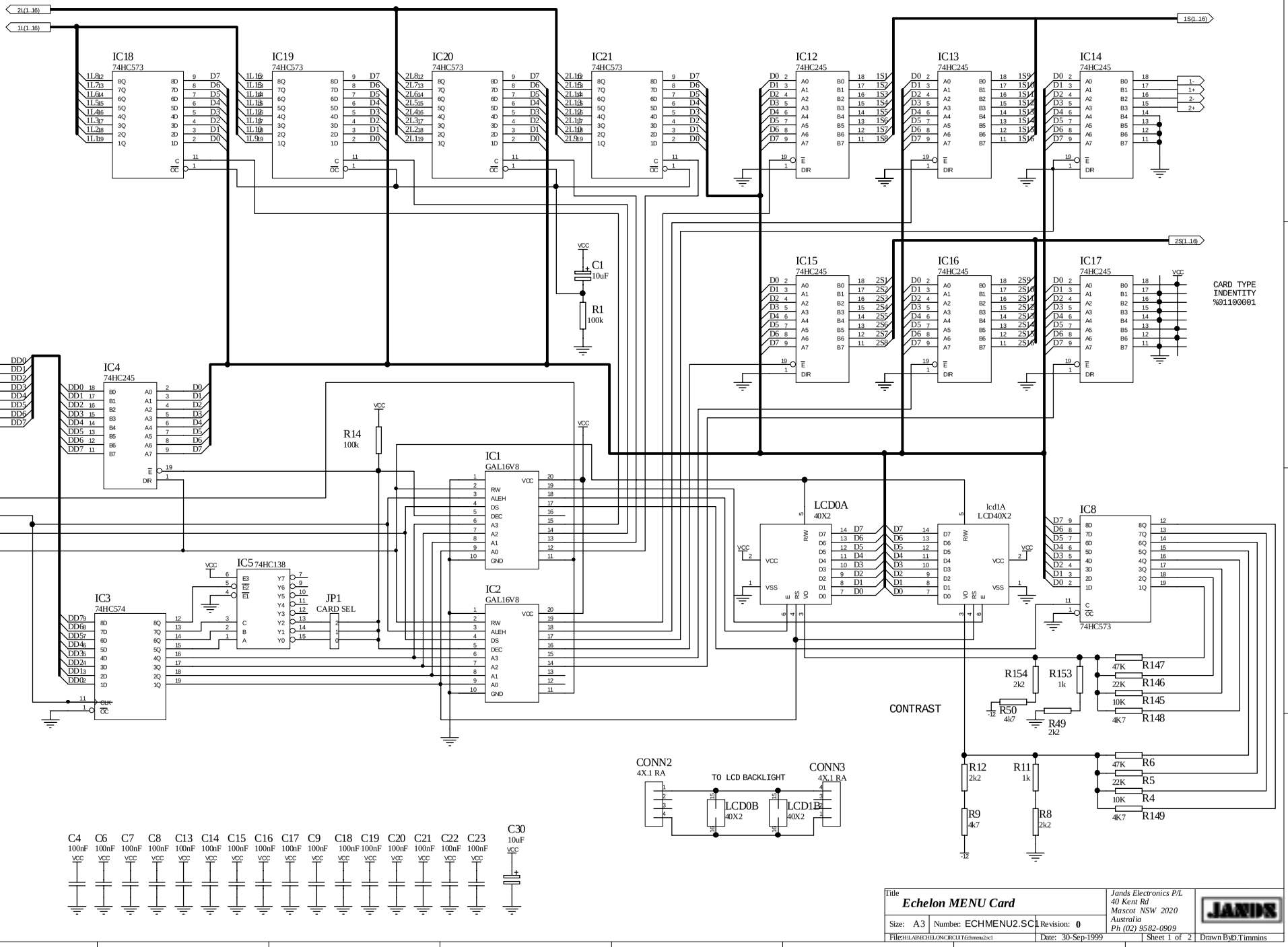
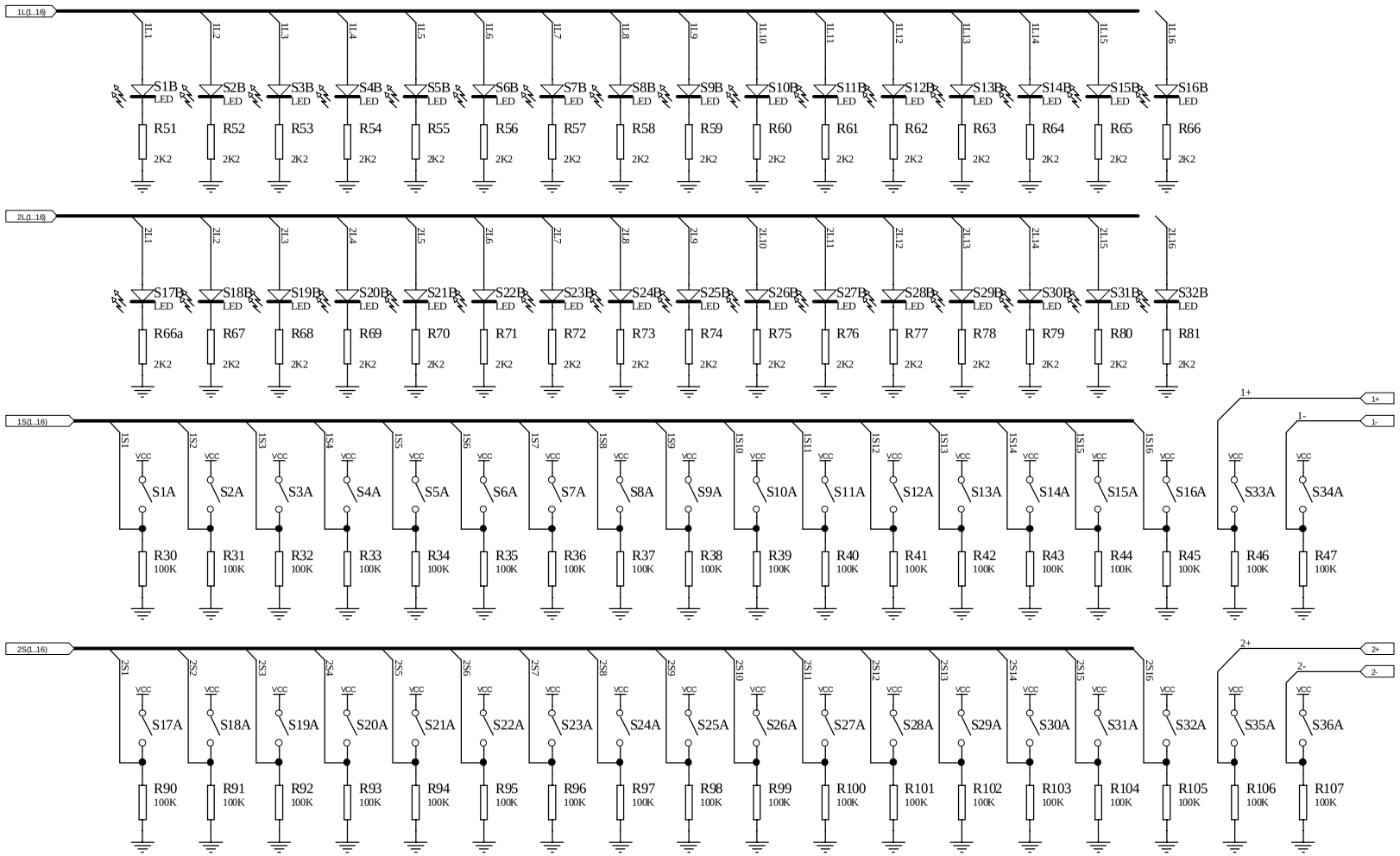

C1
JP1
2 1 0
C30
K3
K2
S33
S1
S2
S3
S4
S5
S6
S7
S8
S35
S17
S18
S19
S20
S21
S22
S23
S24
LCD0
LCD1
CONN2
CONN3
S34
S9
S10
S11
S12
S13
S14
S15
S16
S36
S25
S26
S27
S28
S29
S30
S31
S32
GHP
JANDS AUSTRALIA
MIcmenu1.pcb
MENU CARD

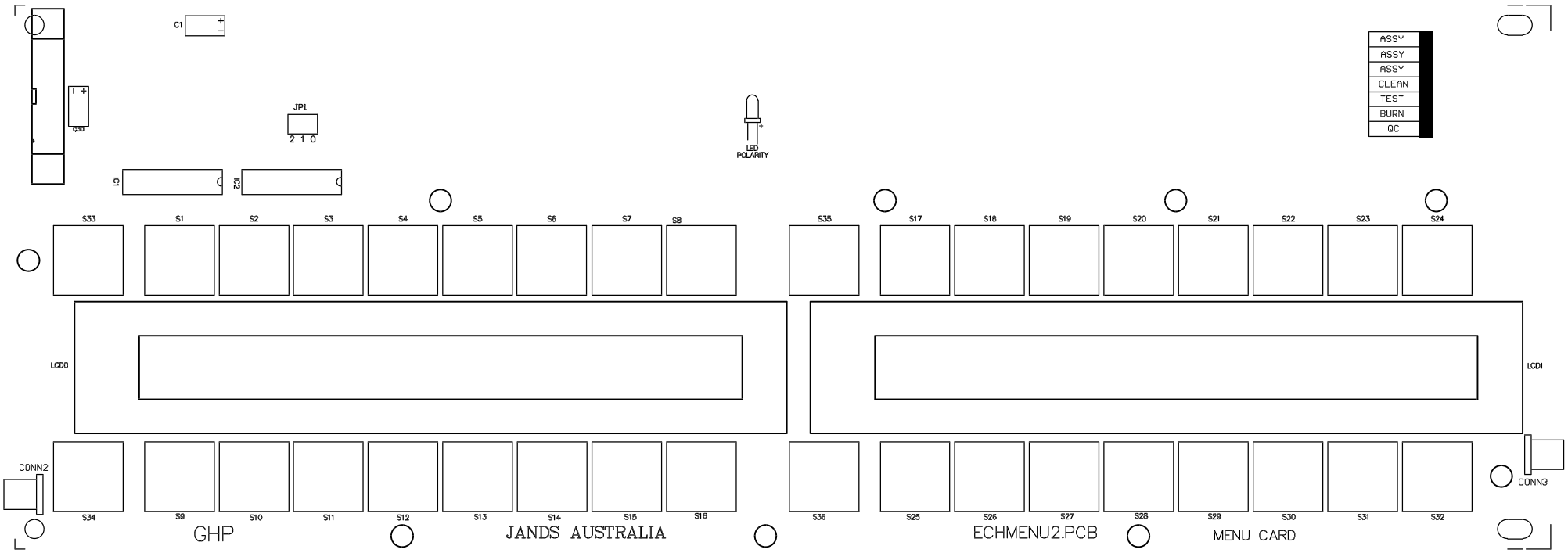

CONN1
C2
C6
IC4
IC3
C19
R1
IC18
IC5
C4
C16
R14
C7
IC19
C14
IC12
C23
IC13
C13
IC17
C21
IC14
C22
IC8
R8
R149
R5
R2
R4
R11
R12
R9
R150
R154
R148
R147
R146
R145
R153
C9
IC21
C20
IC20
C18
IC15
C15
IC16
C17
R46
R30
R51
R31
R52
R32
R53
R33
R54
R34
R55
R35
R56
R36
R57
R37
R58
R47
R38
R59
R39
R60
R40
R61
R41
R62
R42
R63
R43
R64
R44
R65
R45
R66
R106
R90
R155
R91
R67
R92
R68
R93
R69
R94
R70
R95
R71
R96
R72
R97
R73
R107
R98
R74
R99
R75
R100
R76
R101
R77
R102
R78
R103
R79
R104
R80
R105
R81

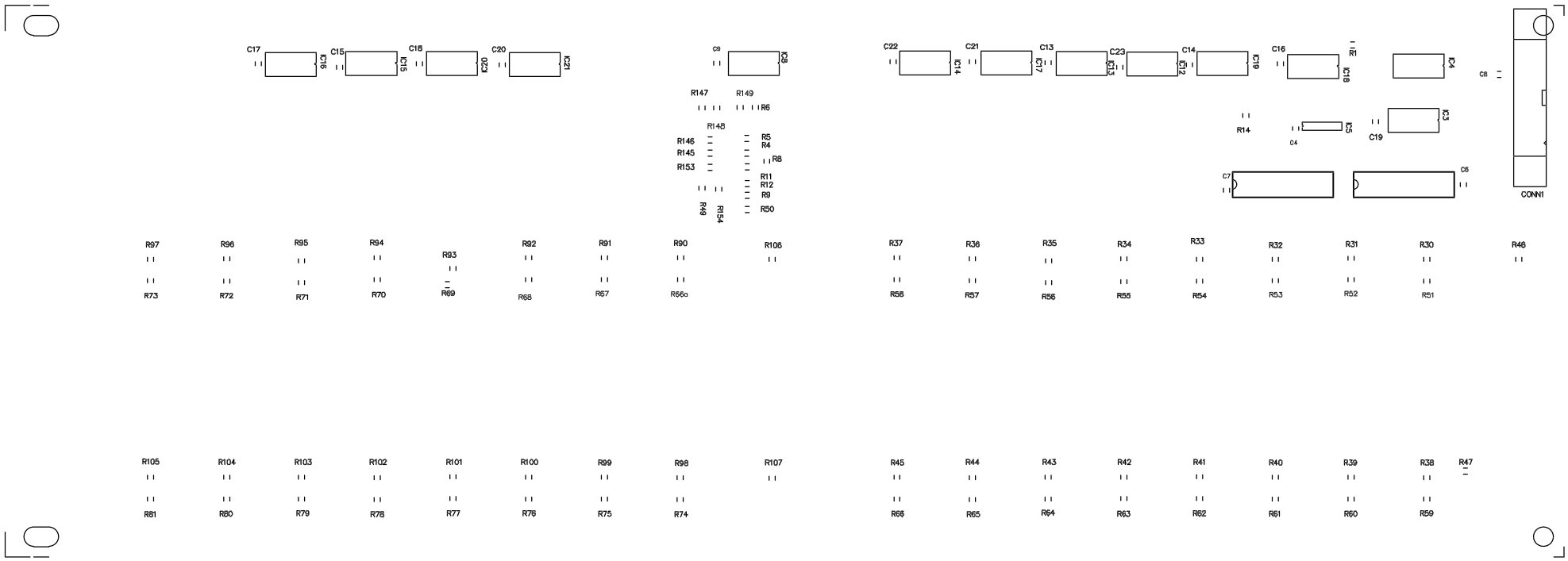
ECHMENU2 Circuit diagrams and overlays


2L(1..16)
1L(1..16)
1S(1..16)
2S(1..16)
IC18
74HC573
IC19
74HC573
IC20
74HC573
IC21
74HC573
IC12
74HC245
IC13
74HC245
IC14
74HC245
IC15
74HC245
IC16
74HC245
IC17
74HC245
C1
10uF
R1
100k
CARD TYPE
INDENTITY
%01100001
CONN1
IDC20
IC4
74HC245
R14
100k
IC1
GAL16V8
IC2
GAL16V8
IC5
74HC138
IC3
74HC574
JP1
CARD SEL
LCD0A
40X2
lcd1A
LCD40X2
IC8
74HC573
CONTRAST
R154
2k2
R153
1k
R50
4k7
R49
2k2
R147
47K
R146
22K
R145
10K
R148
4K7
CONN2
4X.1 RA
TO LCD BACKLIGHT
CONN3
4X.1 RA
LCD0B
40X2
LCD1B
40X2
R12
2k2
R11
1k
R9
4k7
R8
2k2
R6
47K
R5
22K
R4
10K
R149
4K7
C4
100nF
C6
100nF
C7
100nF
C8
100nF
C13
100nF
C14
100nF
C15
100nF
C16
100nF
C17
100nF
C9
100nF
C18
100nF
C19
100nF
C20
100nF
C21
100nF
C22
100nF
C23
100nF
C30
10uF
VCC
Title
Echelon MENU Card
Size: A3
Number: ECHMENU2.SC1
Revision: 0
File: H:\LAB\ECHELON\CIRCUIT\Echmenu2.sc1
Date: 30-Sep-1999
Sheet 1 of 2
Drawn By: D.Timmins
Jands Electronics P/L
40 Kent Rd
Mascot NSW 2020
Australia
Ph (02) 9582-0909
JANDS

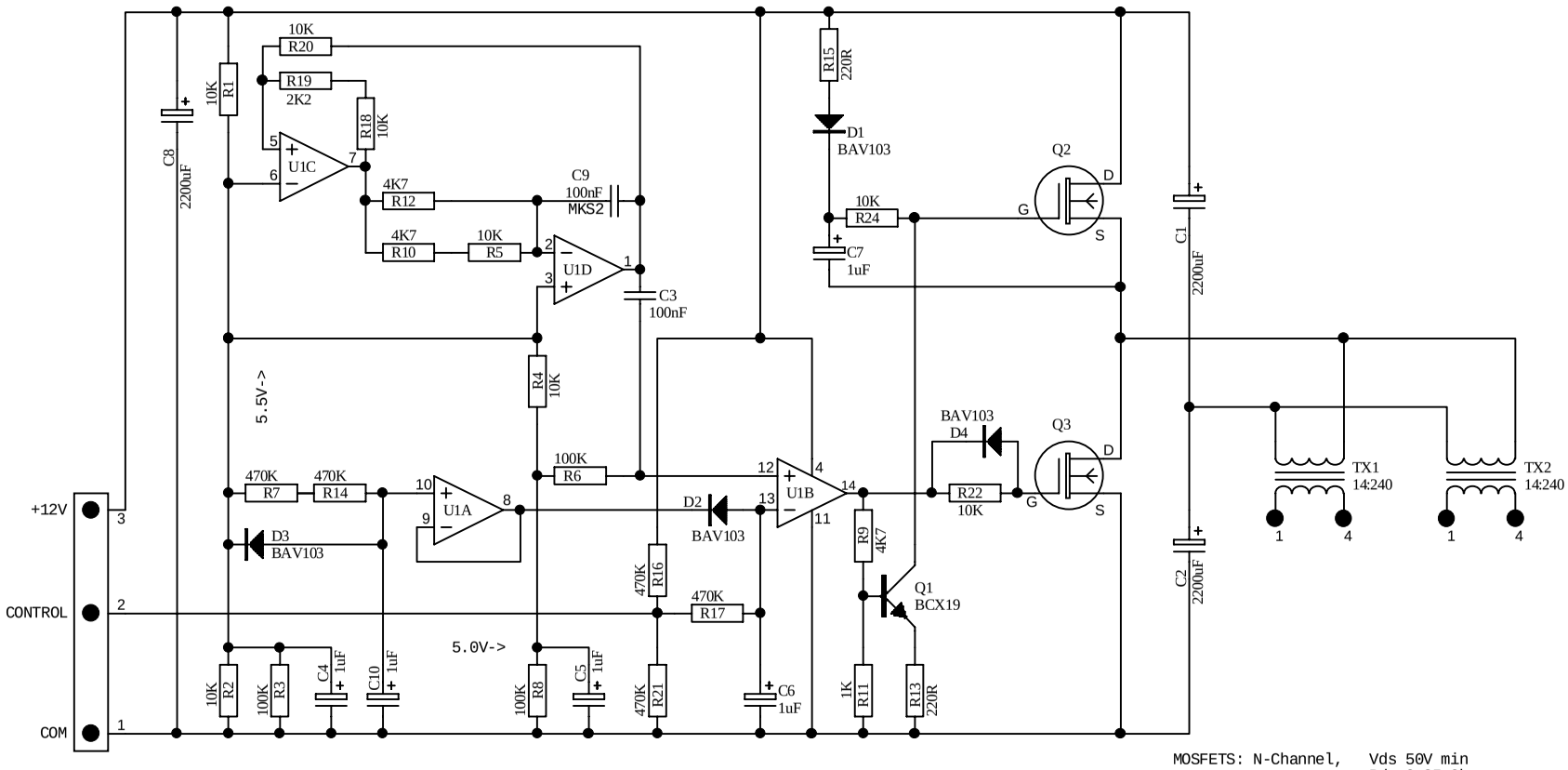


Title: ***Echelon MENU Card***			*Jands Electronics P/L* *40 Kent Rd* *Mascot NSW 2020* *Australia* *Ph (02) 9582-0909*
Size: A3	Number: ECHMENU2.SC2	Revision: **0**	
File: H:\LAB\ECH\ELONC\CIRCUIT\Echmenu2.sc2		Date: 30-Sep-1999	Sheet 2 of 2
Drawn By: D.Timmins			


C1
JP1
2 1 0
LED
POLARITY
ASSY
ASSY
ASSY
CLEAN
TEST
BURN
QC
S33
S1
S2
S3
S4
S5
S6
S7
S8
S35
S17
S18
S19
S20
S21
S22
S23
S24
LCD0
LCD1
CONN2
CONN3
S34
S9
S10
S11
S12
S13
S14
S15
S16
S36
S25
S26
S27
S28
S29
S30
S31
S32
GHP
JANDS AUSTRALIA
ECHMENU2.PCB
MENU CARD


C17
C15
C18
C20
C9
C16
C22
C21
C13
C23
C14
C19
C8
C7
C6
CONN1
R147
R149
R148
R146
R145
R153
R49
R154
R50
R14
R97
R96
R95
R94
R93
R92
R91
R90
R106
R37
R36
R35
R34
R33
R32
R31
R30
R48
R73
R72
R71
R70
R69
R68
R67
R66a
R58
R57
R56
R55
R54
R53
R52
R51
R105
R104
R103
R102
R101
R100
R99
R98
R107
R45
R44
R43
R42
R41
R40
R39
R38
R47
R81
R80
R79
R78
R77
R76
R75
R74
R66
R65
R64
R63
R62
R61
R60
R59

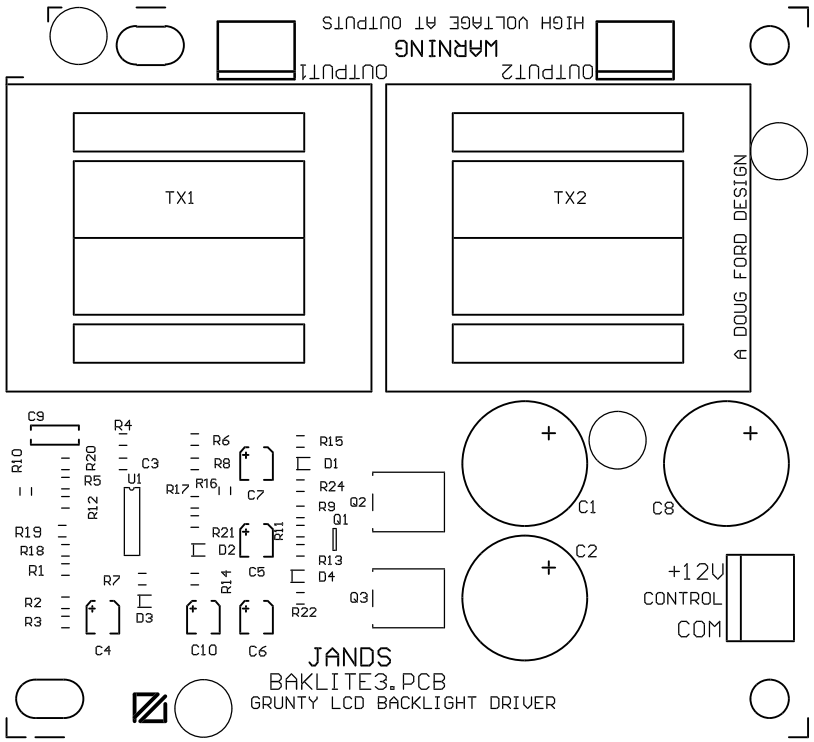
BAKLITE3 Circuit diagrams and overlay



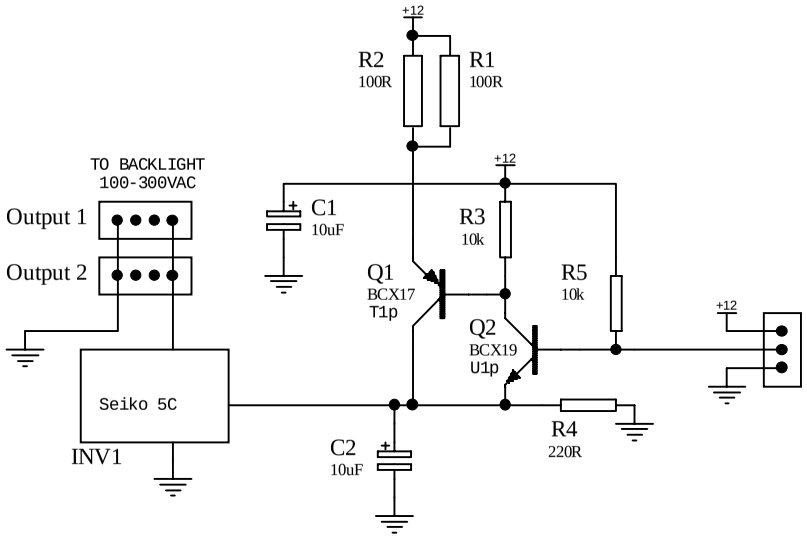
MOSFETS: N-Channel, Vds 50V min
Rds 0.25 Ohms max

eg. IRFR014 RFD14N05SM
STD12N05 MTD3055V

Title: ***BACKLIGHT DRIVER***			*Jands Electronics P/L* *40 Kent Rd* *Mascot NSW 2020* *Australia* *Ph (02) 9582-0909*
Size: A4	Number: backlight3.SCH	Revision: v3.0	
File: H:\LAB\ECHELON\CIRCUIT\Baklite3.sch	Date: 1-Oct-1999	Sheet 1 of 1	Drawn By: Doug Ford


HIGH VOLTAGE AT OUTPUTS
WARNING
OUTPUT1
OUTPUT2
TX1
TX2
A DOUG FORD DESIGN
C9
R4
R10
R20
R5
C3
U1
R12
R17
R16
R6
R8
C7
R15
D1
R24
R9
Q2
Q1
R21
D2
R11
C5
R13
D4
R19
R18
R1
R7
R14
R22
Q3
R2
R3
D3
C4
C10
C6
C1
C8
C2
+12V
CONTROL
COM
JANDS
BAKLITE3.PCB
GRUNTY LCD BACKLIGHT DRIVER

BKLTSML2 Circuit diagrams and overlay



Title: ***Small Backlight driver***				*Jands Electronics P/L* *40 Kent Rd* *Mascot NSW 2020* *Australia* *Ph (02) 9582-0909*
Size: A4	Number: bkltsml0	Revision: 0		
File: H:\LAB\EVENT4\CIRCUIT\Bkltsml2.sch		Date: 30-Sep-1999	Sheet 1 of 1	Drawn By: