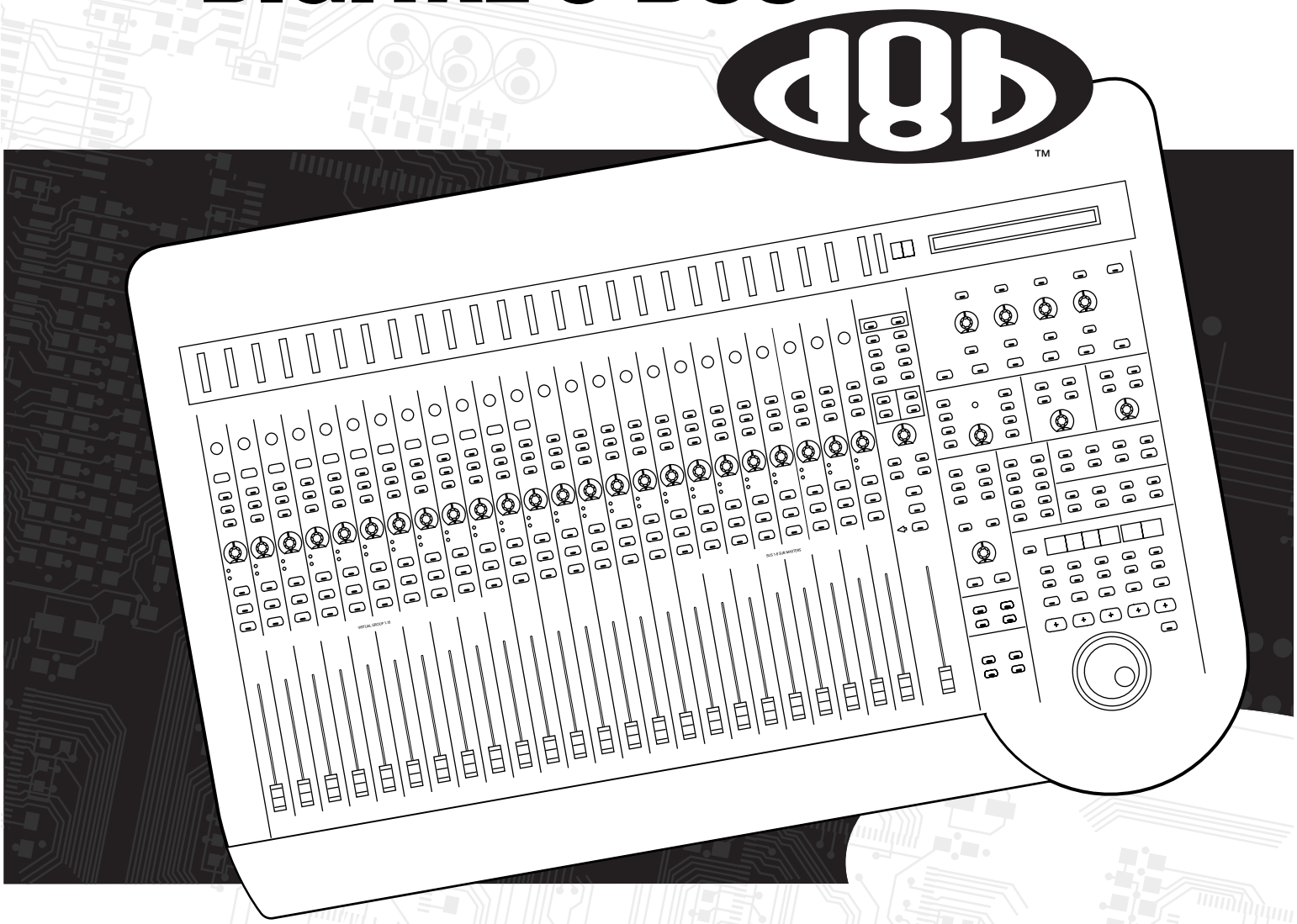
56 input, fully-automated digital mixing console.

DIGITAL 8•BUS



SERVICE MANUAL

#820-182-00

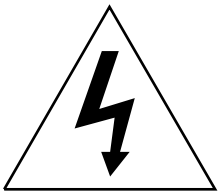
MACKIE. Digital Systems™

CLICK HERE to go to the Table of Contents on page 4

D8B HOME

CAUTION *AVIS*

RISK OF ELECTRIC SHOCK
DO NOT OPEN
RISQUE DE CHOC ELECTRIQUE
NE PAS OUVRIR



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE THE COVER (OR BACK)
NO USER SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED PERSONNEL

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE

TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS POLARIZED PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR EVITER LES RISQUES DE CHOC ELECTRIQUE, NE PAS ENLEVER LE COUVERCLE. AUCUN ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER L'ENTRETIEN AU PERSONNEL QUALIFIE.

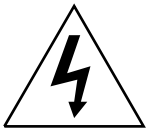
AVIS:POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, N'EXPOSEZ PAS CET ARTICLE A LA PLUIE OU A L'HUMIDITE.

POUR PREVENIR LES CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR, UN PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS LAISSER AUCUNE PARTIE A DECOUVERT.

This apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

ATTENTION :Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant las limites applicables aux appareils numériques de class A/de class B (selon le cas) prescrites dans le réglement sur le brouillage radioélectrique édicté par les ministere des communications du Canada.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio energy and, if not installed properly and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Le symbole éclair avec point de flèche à l'intérieur d'un triangle équilatéral est utilisé pour alerter l'utilisateur de la présence à l'intérieur du coffret de "voltage dangereux" non isolé d'ampleur suffisante pour constituer un risque d'éléctrocution.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Le point d'exclamation à l'intérieur d'un triangle équilatéral est employé pour alerter les utilisateurs de la présence d'instructions importantes pour le fonctionnement et l'entretien (service) dans le livret d'instruction accompagnant l'appareil.

BACK

WARNING
Service on the d8b must only be undertaken by experienced service technicians.

! SMD !
The d8b makes extensive use of surface mount components. Servicing technicians should have the tools, experience and patience to perform surface mount rework.

! ESD !
The d8b contains components that may be damaged by elecrostatic discharge. All standard ESD precautions must be taken when servicing.

Additional Safety Information

Mackie Designs' Digital 8•Bus has been tested and conforms to the following standards and directives of the European Council:

73/23/EEC	Low Voltage Directive with amendments 91/263/EEC, 89/392/EEC, and 89/336/EEC
89/336/EEC	EMC Directive
IEC 950(1991)/EN60950:1992	Electrical Safety Requirements
EN55103-1 and EN55103-2	Residential (E1) and Commercial (E2) Environments

CE

Note: The following notice concerns the lithium battery located on the motherboard inside the Remote CPU.

CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

ATTENTION: IL Y A DANGER D'EXPLOSION S'IL Y A REMPLACEMENT INCORRECT DE LA BATTERIE, REMPLACER UNIQUEMENT AVEC UNE BATTERIE DU MEME TYPE OU D'UN TYPE ÉQUIVALENT RECOMMANDÉ PAR LE CONSTRUCTEUR. METTRE AU REBUT LES BATTERIES USAGÉES CONFORMÉMENT AUX INSTRUCTIONS DU FABRICANT.

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BACK

INTRODUCTION

This manual contains service information for the d8b digital audio mixer. To service the d8b, technicians should be familiar with op-amp based and discrete analog circuitry, digital troubleshooting, microprocessors, digital audio, DSP, ESD, ESP, and the operation/ application of mixing consoles. Presentation of this manual does not constitute endorsement of qualifications by Mackie Designs.

This manual is available in Adobe© Portable Document Format (PDF), as part of Mackie Designs' Digital Service CD-ROM (part# 820-163-00). This is available to all Service centers authorized to repair the d8b. Also included on the CD-ROM are the schematics, PCB layouts, parts lists, assembly drawings, some IC data sheets and the owner's manual.

It is essential that you become familiar with the owner's manual as it contains all of the operational details, hookup diagrams, specifications and just about everything d8bwegian. It will be a great help for you to verify customers complaints, and to check for correct operation.

This service manual does not include an in-depth circuit analysis, rather it provides an overall guide to details not immediately obvious from the schematics alone. It is intended to help you troubleshoot down to board level and identify and swap out any bad circuit boards. Component level troubleshooting down to resistor or IC level, may be undertaken if time permits, or if there appears to be something obvious.

SERVICE TECHNICAL ASSISTANCE

Mackie Designs, Service Technical Assistance, is available 8AM - 5PM PST, Monday through Friday for Authorized Mackie Service Centers, at 1-800-258-6883. Feel free to call with any questions and speak with a carefully-calibrated technician. If one is not available, leave a detailed message and a qualified Mackoid will return your call asap.

DISCLAIMER

GETTING STARTED

Upon receiving a d8b for repair, your first impression may be to run screaming into the night. After reading this overview, checking the schematics, pcb layouts, assembly drawings, parts lists, having a good look at the owner's manual and inspecting the unit, you will probably realize that your first impression was correct.

Think of the remote CPU as a standard PC with extra power supplies for the console. Standard PC troubleshooting techniques and commercially available diagnostic DOS software can be applied to repair the remote CPU.

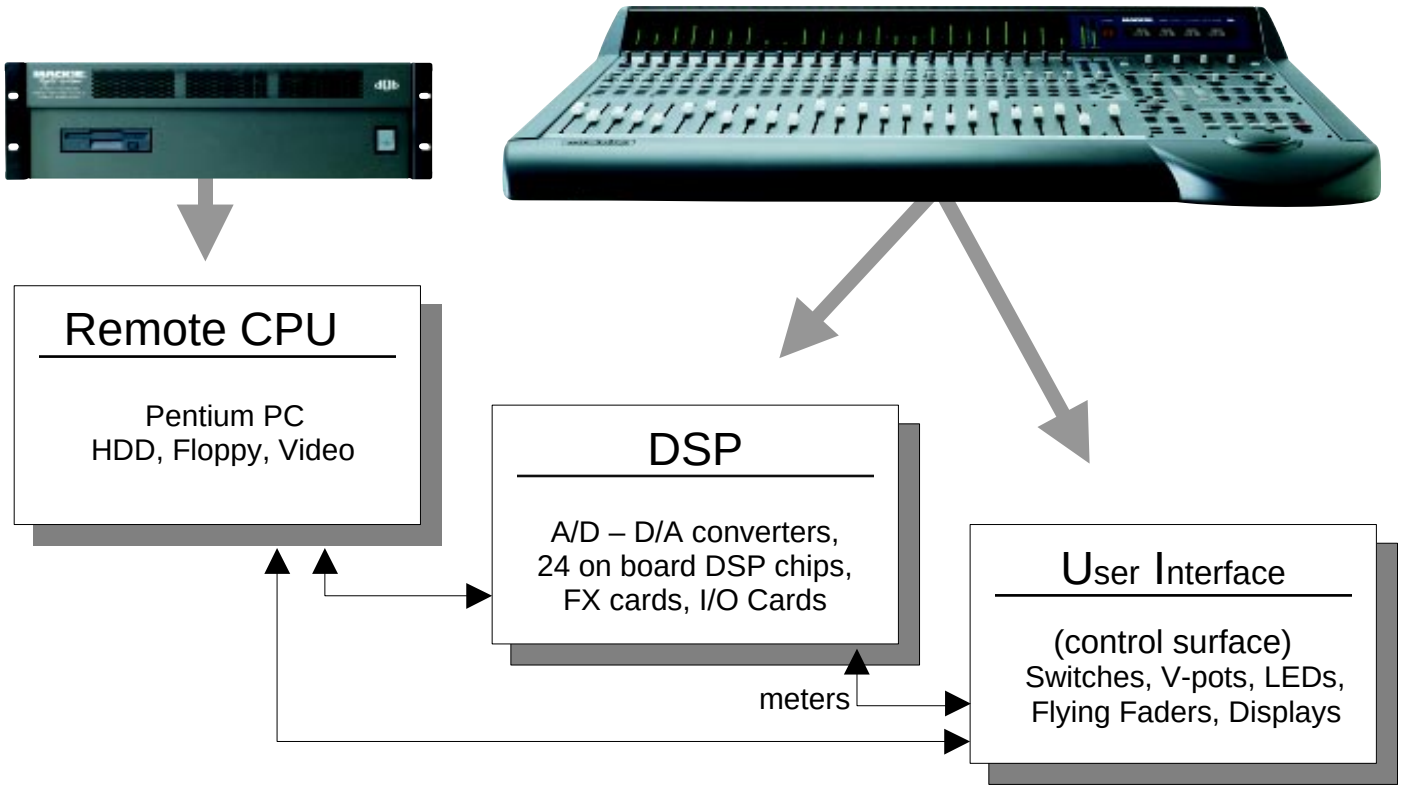
In its simplest form, the mixer and the remote CPU are two boxes full of circuit boards, all joined together with lots of connectors and ribbon cables. A preliminary inspection will often reveal a simple problem, such as a bad connection somewhere, a loose cable, a bad switch or control, or the CPU's CMOS settings may need to be reset.

Our technical support team are available to discuss any d8b problems and offer solutions. If you ever suspect that a customer's complaint is related to the version of Mackie software they are using, you should consult with your customer and Mackie Designs before downloading the latest software from our website: www.mackie.com

BACK

OVERVIEW

The 'Digital' functions of the d8b can be broken down into 3 main systems; Computer, DSP, and User Interface. The computer is a Pentium system which is contained in the Remote CPU with the Power Supply . It communicates via standard com ports (RS-232) to the DSP and UI systems in the console.



The computer runs Mackie's real time operating system and handles functions normally associated with a PC such as keyboard, mouse, disk drives, video, etc. The DSP system controls all Digital Signal Processing functions in the console. The User Interface system reads and updates the control surface.

Commands from the UI are looped through the computer. For example, if the Mute button on channel 1 is pressed, the UI system detects it and communicates the event to the computer. The computer then tells the DSP system to mute CH-1, and tells the UI system to light CH-1's mute LED. Note that the LED is not lit by the UI system directly. Commands can also be issued by clicking on the monitor screen (GUI). Note: the DSP communicates the meter information directly to the UI, not looped through the computer.

BACK

COMPUTER SYSTEM

HARDWARE

The computer system within the Remote CPU chassis consists of the following hardware;

- Computer motherboard
- Computer microprocessor
- RAM
- HDD, FDD
- Ethernet® Card
- SVGA Video Card
- MIDI Card, SMPTE

These are all standard PC compatible parts. However, because the drivers are written into the Mackie OS, other similar devices may not be compatible. Also, it should be noted that 'upgrading' the processor, RAM, or HDD is of little value as the Mackie OS will not take advantage of it.

EXTRA CIRCUITRY

Circuit boards inside the Remote CPU, which are not normally found inside a standard PC are: extra power supplies, AC line and fusing circuits, chicken soup machine etc.

- Mackie board 201 is the remote CPU's power distribution
- Mackie board 123 is a Linear power supply for the consoles analog functions
- An OEM 5V supply for the consoles digital functions

SOFTWARE

The d8b's computer runs Mackie's real time operating system.
THERE IS NO MS-DOS OR WINDOWS IN THE SYSTEM!
You will not find COMMAND.COM, CONFIG.SYS, or AUTOEXEC.BAT anywhere on the hard drive. After the BIOS starts, the system boots directly into the Mackie Operating System. CMOS setup can be accessed as in a regular PC.

The Mackie OS also contains the operating software for the DSP and UI systems. Most future upgrades can be done without swapping EPROMS.

Please talk to our technical support team to discuss the d8b problems you are experiencing. There is a good chance that a customer's complaint may be cured by upgrading to the latest sotware version. You will first need the customer's permission before downloading any upgrades from our website (www.mackie.com).

TROUBLESHOOTING THE COMPUTER

A common error message you might see is "System Error 43 - Host did not boot."
The possible reason for this may be:

- The computer did not get through BIOS correctly.
- A static charge may have reset your BIOS CMOS settings.
- The data cable between the computer and the console is not connected, or is not a straight through 25 pin din connecter.

Possible Solution:

- Connect a keyboard and monitor and press F1 to enter the computer's BIOS during a boot.
- Once inside the BIOS, use the AUTODETECT hard drive menu and this will likely fix the errors you are having, once the detected drive information is saved. (See also the notes on the following page).

BACK

CMOS SETUP

If you encounter "System Error 43," Check the following CMOS setup which you can reach during bootup by pressing Del (or F1 depending on the age of the console).

- Enter the standard CMOS setup screen, change the Primary Master to AUTO (highlight and use PgUp/PgDn to modify).
- Next go to the Advanced CMOS setup and check the following:

Ist Boot Device	Floppy
2nd Boot Device	IDE-0
3rd Boot Device	Disabled (CD-ROM)
4th Boot Device	Disabled
Try other Boot Devices.....	Yes
S.M.A.R.T for Hard Disks.....	Disabled
Quick Boot	Enabled
Bootup Num Lock.....	On
Floppy Drive Swap	Disabled
Floppy Drive Seek.....	Enabled
PS/2 Mouse support	Auto
System Keyboard.....	Absent
Primary Display	VGA/EGA
Password Check	Setup

When you have finished checking and/or making any corrections, press F10 to save the settings and exit. Then Reboot and see if this has done the trick, and the "System Error 43" has gone away.

NOTE: from November 1999 (serial numbers with prefix "BS11954" or higher), the motherboard changed to 480-039-00, and there are different CMOS settings:

Press and Hold <Delete> key to go to BIOS Setup program
Using the arrow keys, select STANDARD CMOS SETUP, Press <Enter> ("Page Up" and "Page Down" keys, and number pad can be used to change BIOS values).
Change the Date to current day, month, year. Press <Enter>
Change Time to current time (24-hour clock), Press <Enter>
Make sure all HARD DRIVES on table are set to "AUTO" MODE
Change "Halt On:" to "All, But Keyboard", Press <Enter>
Back out to root menu by pressing <Esc>
Select "BIOS FEATURE SETUP" and make sure "Boot Sequence" is "A,C,SCSI". <ESC>
Select CHIPSET FEATURES SETUP, Press <Enter>
Change "PCI 2.1 Compliance" to "Enabled".
Change "Spread Spectrum" to "Enabled" and then <ESC> to main BIOS menu.
Select INTEGRATED PERIPHERALS, <Enter>
Change "Init Display First" to "PCI Slot", <Enter>
Make sure "Onboard Serial Port 1" is set to "3F8/IRQ4" and "Onboard Serial Port 2" is set to "2F8/IRQ3", then press <ESC> to return to the main BIOS menu.
Select SAVE & EXIT SETUP. Type "Y" for yes, <Enter>

FURTHER TROUBLESHOOTING

If the CMOS setup is correct and a problem still remains, you will have to delve into the Remote CPU and troubleshoot the computer system.
The computer can be booted with a DOS system floppy for running all of your favorite DOS diagnostic programs. To do this:

- Find or make a bootable floppy, i.e. one which has the DOS system installed.
- Place the disc in the drive before turning on the Remote CPU.
- The computer should start up into DOS from this disc, rather than from the Mackie OS.
- Insert any standard DOS diagnostic software and run tests, for example on the hard drive, video card, mother board etc.

Check the extra Mackie power supply voltages are correct, as shown on the schematic chapters 201 (power distribution) and 123 (Linear power supply). Also check the voltages on the console end: see the console power distribution board chapter 111.

BACK

DSP SYSTEM

A simplified block diagram of the DSP system is shown on the next page. At the heart of the system is an Analog Devices ADSP-2181. It acts as the console CPU, and controls all functions and communications within the DSP system. There are 24 proprietary DSP chips to handle the actual audio processing. Parallel processing with the 24 DSPs allows the d8b to complete all processing within one sample.

Operating instructions are loaded from the Remote CPU as the system boots. The EPROM does not contain operating firmware. Think of the EPROM as BIOS, it provides the system with basic instructions to make sure it powers up correctly and sets up to receive the operating software from the Remote CPU.

CLOCKS

All audio clocks for the DSP system originate at the clock (sync) card. The master clock is 512 x sample rate. See page 24 for some more details.

CODEC BOARD

The CODEC board contains 24 channels of A/D and D/A. Each ADC converts two analog audio signals into a two channel serial format which is sent to the DSP chips. All digital audio signals within the d8b are in this two channel format. The DACs convert this stream back to 2 channels of lovely analog audio.

DSP BOARD

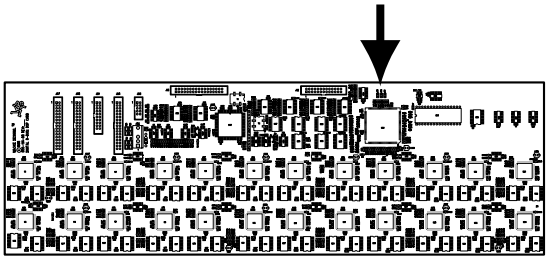
Each of the 24 DSP chips has two serial inputs, DR_0 and DR_1, and two serial outputs, DT_0 and DT_1, a total of 48 inputs and 48 outputs (remember that each serial input is 2 channels of audio, so that's 96 channels!, but they're not all used). Digital audio data comes from and is sent to the CODEC board, I/O cards, and FX cards.
Y2 is the processor clock from which is derived CLK_1, CLK_2, CLK_3, CLK_4 and CLKIN.
Y1 is a UART clock.

DSP INPUTS		DSP OUTPUTS	
12	Mic/Line Inputs	8	Subgroups
12	Line Inputs	2	L/R Mix
24	Tape Input Cards	24	Tape Returns Cards
16	FX Card Returns	16	FX Card Sends
2	Meter (monitor)	12	Aux sends
8	Alt Input Card	8	Alt Output Card
		2	Solo

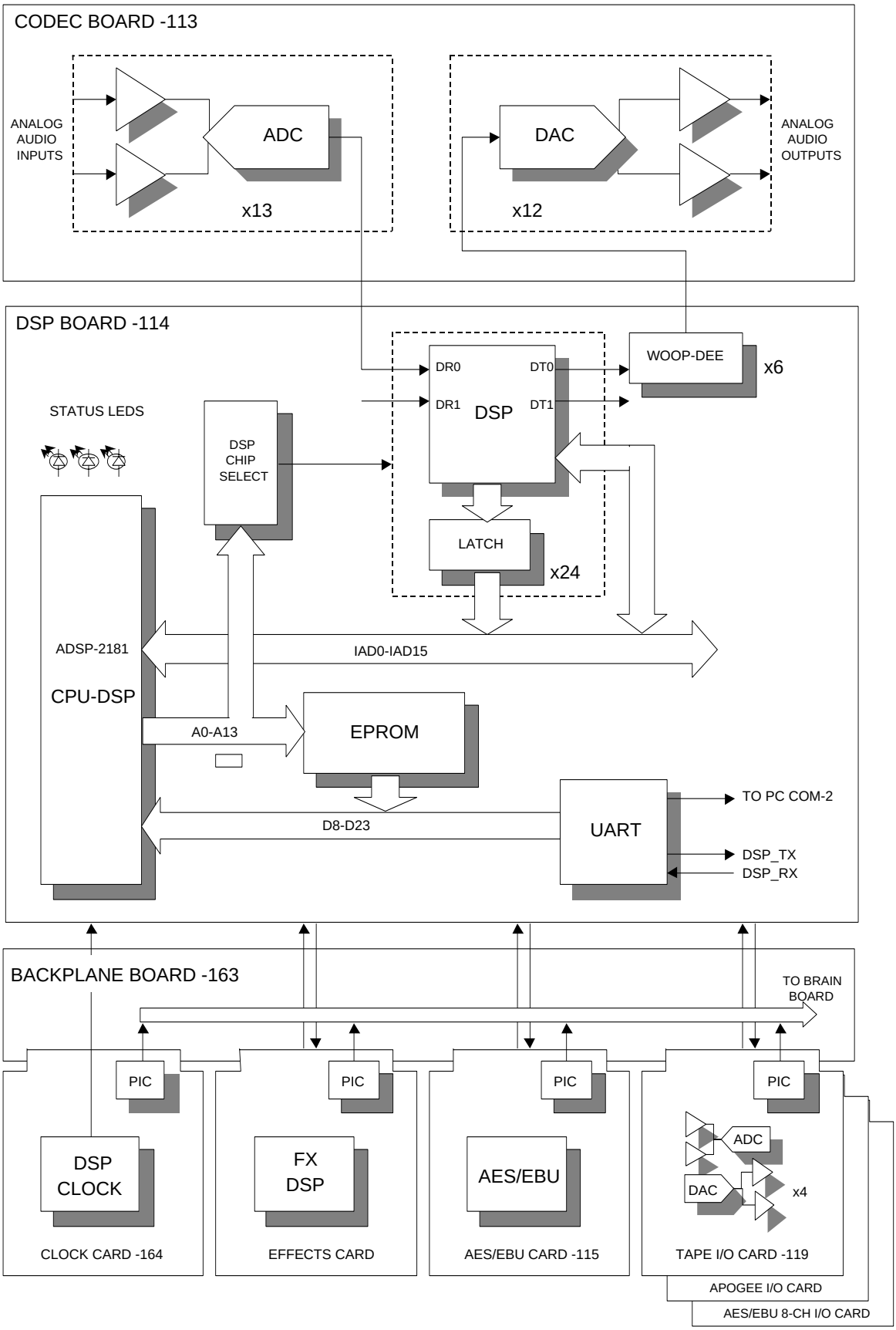
The processing algorithm works in such a way that each serial output consists of one mix and one direct output. In order to route mixes to the same DACs the serial data is juxtaposed in sync with the L/R clock.

There are three status indicators on the board: D2 (green),D3 (yellow), D1 (red).

- If all three are on, a fault has been detected.
- If the red LED is on solidly, then this is operating OK.



BACK


CODEC BOARD -113
ANALOG AUDIO INPUTS
ADC
x13
DAC
x12
ANALOG AUDIO OUTPUTS
DSP BOARD -114
DR0
DT0
DR1
DSP
DT1
WOOP-DEE
x6
STATUS LEDS
DSP CHIP SELECT
LATCH
x24
ADSP-2181
CPU-DSP
IAD0-IAD15
A0-A13
EPROM
D8-D23
UART
TO PC COM-2
DSP_TX
DSP_RX
BACKPLANE BOARD -163
TO BRAIN BOARD
PIC
PIC
PIC
PIC
DSP CLOCK
FX DSP
AES/EBU
ADC
DAC
x4
CLOCK CARD -164
EFFECTS CARD
AES/EBU CARD -115
TAPE I/O CARD -119
APOGEE I/O CARD
AES/EBU 8-CH I/O CARD

BACK

UI SYSTEM

A simplified block diagram of the User Interface system is shown on the next page. Like the DSP system, an Analog Devices ADSP-2181, is used as the CPU. It controls all functions and communications within the UI system. Also, like the DSP system, operating instructions are loaded from the Remote CPU as the system boots. If the UI system does not 'find' the Remote CPU, it will display 'ERROR 43 HOST COMPUTER NOT FOUND' in the VFD.

CLOCKS

Unlike the DSP system, the UI system runs on its own clock. The Clock (Sync) card is for the DSP system only. Keep the clock's main spring wound up.

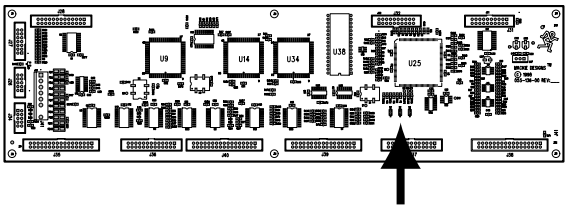
BRAIN BOARD

The Brain Board reads in two types of information from the control surface. Switches are scanned in through PISO shift registers and transferred to the Brain as serial data. Analog voltages from faders and V-pots are multiplexed, then sent to an ADC on the Brain board.

The Brain Board also communicates via UART to all expansion cards. Every card used in the d8b has a PIC chip. The PIC chip outputs a copyrighted text string so that the d8b can verify the card is original and Mackie-authorized. Cards in which operating parameters can be varied are controlled via the Brain (UI System). The Brain Board also controls all functions on the DCA board.

X1 is the brain processor clock, X2 and X3 are UART clocks.

The Brain board has three status indicators: D3 (green),D2 (yellow), D1 (red).



- If they are all on, it did not read the EPROM.
- If only the green is on, then it read the EPROM but did not download the software.
- When it is running correctly, only the red LED should be on (and blinking).

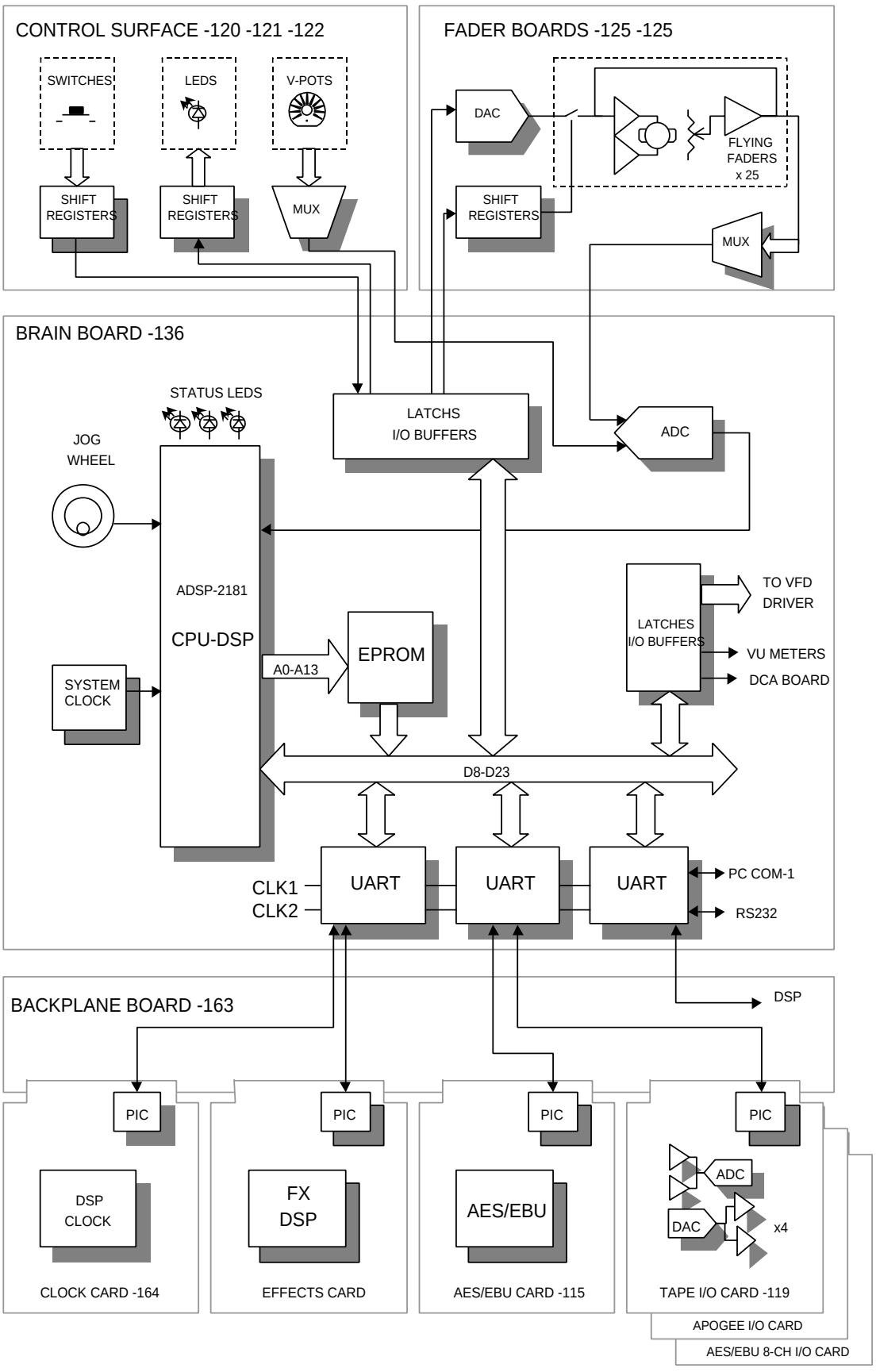
CONTROL SURFACE

Control surface LEDs, including V-pot indicators, are updated via SIPO shift registers. To control the fader motors, serial data is sent from the Brain board to a DAC on the fader board.

VU METERS

The VU meter LEDs are updated via shift registers but function differently than the control surface. Remember that the control surface commands are looped through the Remote CPU; VU meter information is not. The information for the VU meters comes directly from the DSP Board, and is communicated to the Brain Board via UART.

BACK


CONTROL SURFACE -120 -121 -122
SWITCHES
LEDS
V-POTS
SHIFT REGISTERS
SHIFT REGISTERS
MUX
FADER BOARDS -125 -125
DAC
FLYING FADERS x 25
SHIFT REGISTERS
MUX
BRAIN BOARD -136
STATUS LEDS
JOG WHEEL
LATCHS I/O BUFFERS
ADC
ADSP-2181
CPU-DSP
SYSTEM CLOCK
A0-A13
EPROM
LATCHES I/O BUFFERS
TO VFD DRIVER
VU METERS
DCA BOARD
D8-D23
CLK1
CLK2
UART
UART
UART
PC COM-1
RS232
BACKPLANE BOARD -163
DSP
PIC
PIC
PIC
PIC
DSP CLOCK
FX DSP
AES/EBU
ADC
DAC
x4
CLOCK CARD -164
EFFECTS CARD
AES/EBU CARD -115
TAPE I/O CARD -119
APOGEE I/O CARD
AES/EBU 8-CH I/O CARD

BACK

ANALOG SYSTEMS

The analog circuits used in the d8b should be familiar to anyone with experience servicing Mackie products. The 12 Mic Pre's are the same circuit which is used in the SR40•8. The line amps use Mackie's 'unity plus' architecture.

DCA BOARD

As the name suggests, the DCA board contains Digital Controlled Amplifiers to control the level of analog signals in the console's monitor section. The DCA board also contains an analog switching matrix to select and route monitor signals. The Brain Board controls switching and level functions on the DCA Board. DCAs are controlled by a serial data line. Analog switches are controlled by SIPO shift registers, except for TALK and PUNCH which are controlled directly by the Brain board's CPU.

POWER

POWER SUPPLIES

There are three power supplies within the Remote CPU chassis. A standard PC power supply for the Pentium Motherboard, a +5V, 100W OEM switching supply for the console's digital functions, and an analog supply for the console's analog functions.

The PC supply and the OEM supply should be treated as 'black boxes' and swapped if bad. The analog supply is nearly identical to the design used in the SR24•4, troubleshooting should be fairly straightforward.

POWER DISTRIBUTION

In the console, power is sent from the Power Distribution Board (111) to the Brain, DSP, Backplane, and Analog I/O boards. These boards then distribute power to the remaining boards.
Note: there are many bypass capacitors used throughout the console. If one of the power supply rails is low or intermittent, one of these may have shorted, but it not an easy thing to find which one. It will be a great help if you have a low impedance ohm meter. You should then be able to narrow in on the offending cap or ferrite.

NOTE:

The d8b keeps the same jumper designations for all PCBs, Hurrah! So J35 on the output board is also J35 on the Brain board. See the connectors chapter for complete details of every connector and pinout used in the console.

If the d8b has optional I/O cards installed, use a slotted screwdriver to make sure the installation screws are tightly secured, and not just finger-tight.

NOTE: The Bus numbers as written on the schematics for the CODEC and DCA board are reverse numbered by the software. So Bus 1 on the schematic is really Bus 8, Bus 2 is really Bus 7, Bus 3 = 6, Bus 4 = 5, Bus 5 = 4, Bus 6 = 3, Bus 7 = 2 and Bus 8 = 1.

BACK

DSP SIGNAL FLOW

The DSP board is the central hub of the signal flow system, the digital signals must find their way to the DSP board, get DSP'd and make their way out again to the big audio ocean.

LINK

Please take a look at the Block diagrams chapter, especially the diagram on page D3, and the DSP map on the next page. Also see the connectors chapter for details of every connector and pinout.

Signal names (golden rule)

Throughout the console, you will see digital signal names beginning with DR and DT. Anything which starts with DR is a digital signal on its way to the DSP board, any signal which starts with DT has come from the DSP board. Do not be surprised to see a few of the signals change name or number as they go from one board to the next, (but the DT or DR start part will not change).

Analog input signals

Analog audio signals coming from the Line inputs or Mic inputs are converted to digital by the CODEC board. Each pair of analog signals is combined to form one digital serial stream (DR) sent to the DSP. There are a total of 12 digital signals produced from 12 analog pairs.

Analog audio signals from the Tape cards are converted to digital by the Tape card's own A/D converters, and also paired to form digital data (DR) sent to the DSP board. Each Tape card has 8 audio inputs and this yeilds 4 digital signals per card, or a total of 12 digital signals from the three tape cards.

Digital input signals

Digital input signals coming in from the standard Digital I/O card and the PDI•8 digital I/O card are passed to the DSP board (DR). The incoming signals are already in the 2 channel digital serial form. The standard Digital I/O card has 1 digital input, the PDI•8 card has 4.

Digital input and output signals from the effects cards

There are slots for up to four effects cards. Each card can send and receive two digital signals to and from the DSP board.

DR (data received by DSP)

Digital data received by the DSP board for processing is labelled starting with DR. Each of the 24 DSP ICs can receive two digital data streams, so you will see DR0_ and DR1_, followed by which DSP IC is used, such as U1 , U3 or U24.

DT (data transmitted by DSP)

Digital data which is transmitted by the DSP board is labeled starting with DT. Each of the 24 DSP ICs can transmit two outputs DT0_ and DT1_.

12 digital signals go to the CODEC board to become these analog signals: 8 Buses, Mix L, Mix R, Solo L, Solo R and 12 Auxes.

12 digital signals go to the 3 Tape Cards (which have their own D/A convertors) to become 24 analog tape outputs.

8 digital signals go to the 4 Effects cards, 1 goes to the Digital I/O and 4 to the PDI•8 I/O card. The signals to the I/O cards are not converted to analog, but pass out of the digital output connectors on the rear panel of each card for digital recording. Note that each signal is still really a pair such as L/R.

DSP map

This table shows the data received (DR) and data transmitted (DT) by the DSP board. On a scale of 1 to 10, you will find this table fairly useful.

INPUT	ADC	SIG	CABLE	DSP		JUXT	SIG NAME(DSP)	CABLE	SIG NAME	DAC	OUTPUT
LINE 13+14	CODEC U3	DR1	J13-3	DR0_U1	DT0_U1	U46 (DT0_U2)	DT_1	J13-1	DT1	CODEC U52	BUS 1+2
		FX-1	J24-23	DR1_U1	DT1_U1			J24-1	DT1_U1	FX-1	
LINE 15+16	CODEC U103	DR2	J13-7	DR0_U2	DT0_U2	U46 (DT0_U1)	DT_2	J47-2	DT_2	TAPE I/O	TAPE 17+18
		FX-1	J24-25	DR1_U2	DT1_U2			J21-13	DT1_U2	FX-1	
LINE 17+18	CODEC U203	DR3	J13-11	DR0_U3	DT0_U3	U46 (DT0_U4)	DT_3	J13-5	DT2	CODEC U152	BUS 3+4
		FX-2	J24-7	DR1_U3	DT1_U3			J24-5	DT_3	FX-2	
LINE 19+20	CODEC U303	DR4	J13-15	DR0_U4	DT0_U4	U46 (DT0_U3)	DT_4	J47-6	DT_4	TAPE I/O	TAPE 19+20
		FX-2	J24-9	DR1_U4	DT1_U4			J21-15	DT1_U4	FX-2	
LINE 21+22	CODEC U403	DR5	J13-19	DR0_U5	DT0_U5	U86 (DT0_U6)	DT_5	J13-9	DT3	CODEC U252	BUS 5+6
		FX-3	J24-13	DR1_U5	DT1_U5			J24-11	DT_5	FX-3	
LINE 23+24	CODEC U503	DR6	J13-23	DR0_U6	DT0_U6	U86 (DT0_U5)	DT_6	J47-10	DT_6	TAPE I/O	TAPE 21+22
		FX-3	J24-15	DR1_U6	DT1_U6			J21-17	DT1_U6	FX-3	
RET 1+2	CODEC U603	DR7	J13-27	DR0_U7	DT0_U7	U86 (DT0_U8)	DT_7	J13-13	DT4	CODEC U352	BUS 7+8
		FX-4	J24-19	DR1_U7	DT1_U7			J24-17	DT_7	FX-4	
RET 3+4	CODEC U703	DR8	J13-31	DR0_U8	DT0_U8	U86 (DT0_U7)	DT_8	J47-14	DT_8	TAPE I/O	TAPE 23+24
		FX-4	J24-21	DR1_U8	DT1_U8			J21-19	DT1_U8	FX-4	
RET 5+6	CODEC U803	DR9	J12-3	DR0_U9	DT0_U9	U89 (DT0_U10)	DT_9	J13-17	DT5	CODEC U452	L/R MIX
	ALT I/O		J48-21	DR1_U9	DT1_U9			J48-19	DT1_U9	ALT I/O	
RET 7+8	CODEC U903	DR10	J12-7	DR0_U10	DT0_U10	U89 (DT0_U9)	DT_10	J47-19	DT_10	TAPE I/O	TAPE 9+10
	ALT I/O		J48-25	DR1_U10	DT1_U10			J48-23	DT1_U10	ALT I/O	
RET 9+10	CODEC U1003	DR11	J12-11	DR0_U11	DT0_U11	U89 (DT0_U12)	DT_11	J13-21	DT6	CODEC U552	L/R SOLO
	ALT I/O		J48-29	DR1_U11	DT1_U11			J48-27	DT1_U11	ALT I/O	
RET 11+12	CODEC U1103	DR12	J12-15	DR0_U12	DT0_U12	U89 (DT0_U11)	DT_12	J47-23	DT_12	TAPE I/O	TAPE 11+12
	ALT I/O		J48-33	DR1_U12	DT1_U12			J48-31	DT1_U12	ALT I/O	
TAPE IN 17+18	I/O CARD		J47-4	DR0_U13	DT0_U13	U92 (DT0_U14)	DT_13	J13-25	DT7	CODEC U652	AUX 1+2
				DR1_U13	DT1_U13						
TAPE IN 19+20	I/O CARD		J47-8	DR0_U14	DT0_U14	U92 (DT0_U13)	DT_14	J47-27	DT_14	TAPE I/O	TAPE 13+14
				DR1_U14	DT1_U14						
TAPE IN 21+22	I/O CARD		J47-12	DR0_U15	DT0_U15	U92 (DT0_U16)	DT_15	J13-29	DT8	CODEC U752	AUX 3+4
				DR1_U15	DT1_U15						
TAPE IN 23+24	I/O CARD		J47-16	DR0_U16	DT0_U16	U92 (DT0_U15)	DT_16	J47-31	DT_16	TAPE I/O	TAPE 15+16
				DR1_U16	DT1_U16						
TAPE IN 9+10	I/O CARD		J47-21	DR0_U17	DT0_U17	U95 (DT0_U18)	DT_17	J12-1	DT9	CODEC U852	AUX 5+6
				DR1_U17	DT1_U17						
TAPE IN 11+12	I/O CARD		J47-25	DR0_U18	DT0_U18	U95 (DT0_U17)	DT_18	J48-2	DT_18	TAPE I/O	TAPE 1+2
				DR1_U18	DT1_U18						
TAPE IN 13+14	I/O CARD		J47-29	DR0_U19	DT0_U19	U95 (DT0_U20)	DT_19	J12-5	DT10	CODEC U952	AUX 7+8
				DR1_U19	DT1_U19						
TAPE IN 15+16	I/O CARD		J47-33	DR0_U20	DT0_U20	U95 (DT0_U19)	DT_20	J48-6	DT_20	TAPE I/O	TAPE 3+4
				DR1_U20	DT1_U20						
TAPE IN 1+2	I/O CARD		J48-4	DR0_U21	DT0_U21	U98 (DT0_U22)	DT_21	J12-9	DT11	CODEC U1052	AUX 9+10
				DR1_U21	DT1_U21						
TAPE IN 3+4	I/O CARD		J48-8	DR0_U22	DT0_U22	U98 (DT0_U21)	DT_22	J48-10	DT_22	TAPE I/O	TAPE 5+6
				DR1_U22	DT1_U22						
TAPE IN 5+6	I/O CARD		J48-12	DR0_U23	DT0_U23	U98 (DT0_U24)	DT_23	J12-13	DT12	CODEC U1152	AUX 11+12
				DR1_U23	DT1_U23						
TAPE IN 7+8	I/O CARD		J48-16	DR0_U24	DT0_U24	U98 (DT0_U23)	DT_24	J48-14	DT_24	TAPE I/O	TAPE 7+8
				DR1_U24	DT1_U24						

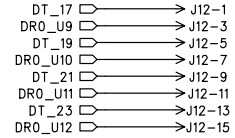
This is data going into the DSP board.

This is Data on the DSP board, showing which DSP does what.

This is Data transmitted by the DSP NOTE: some of the signal names completely change name at the connectors, especially J12 and J13. See the CODEC map

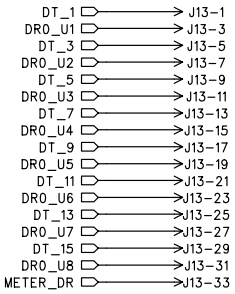
DSP CONNECTORS

This is a compilation of all the DSP board's connectors, mainly showing the data received and transmitted, and clocks. The power and ground pins are not shown here, to make things a little clearer. These can be found in the connectors chapter, or on the schematics.



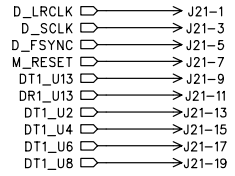
J12

Digital data to and from CODEC

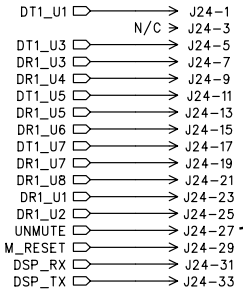


J13

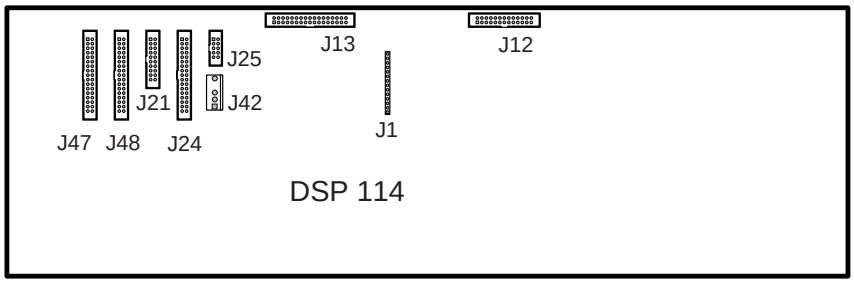
Digital data to and from CODEC

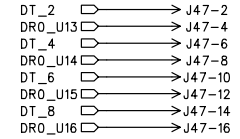


J21 To and from BACKPLANE (Clock, Effects and Digital I/O data)



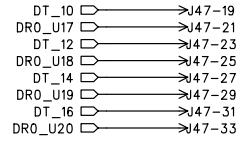
J24 To and from BACKPLANE (Effects data)
NOTE: UNMUTE is a very important line



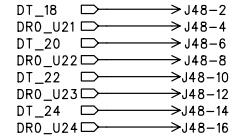


17–24

J47 To and from BACKPLANE (Tape I/O data)

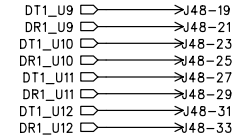


9–16

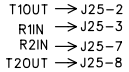


1–8

J48 To and from BACKPLANE (Tape I/O and Alt I/O Data)



XTRA



J25 REMOTE CPU (serial port)

CODEC BOARD

IC	Analog OUT	Analog OUT	DT from DSP	How it is labeled out of DSP board	Connector/pin
U52	BUS-1	BUS-2	DT1	DT_1	J13-1
U152	BUS-3	BUS-4	DT2	DT_3	J13-5
U252	BUS-5	BUS-6	DT3	DT_5	J13-9
U352	BUS-7	BUS-8	DT4	DT_7	J13-13
U452	MIX-L	MIX-R	DT5	DT_9	J13-17
U552	SOLO-L	SOLO-R	DT6	DT_11	J13-21
U652	AUX-1	AUX-2	DT7	DT_13	J13-25
U752	AUX-3	AUX-4	DT8	DT_15	J13-29
U852	AUX-5	AUX-6	DT9	DT_17	J12-1
U952	AUX-7	AUX-8	DT10	DT_19	J12-5
U1052	AUX-9	AUX-10	DT11	DT_21	J12-9
U1152	AUX-11	AUX-12	DT12	DT_23	J12-13

The Data transmitted (DT) from the DSP board is converted to Analog and split out into its two component signals. For example, DT_1 comes off the DSP board to the CODEC (using J13 pin 1), where it is renamed DT1. U52 converts DT1 into analog signals BUS-1 and BUS-2.
The analog signals, such as Bus, Aux, Mix and Solo then go off to the DCA board via J11

IC	Analog IN	Analog IN	DR to DSP	How it is labeled into DSP board	Connector /pin
U3	LINE-13	LINE-14	DR1	DRO_U1	J13-3
U103	LINE-15	LINE-16	DR2	DRO_U2	J13-7
U203	LINE-17	LINE-18	DR3	DRO_U3	J13-11
U303	LINE-19	LINE-20	DR4	DRO_U4	J13-15
U403	LINE-21	LINE-22	DR5	DRO_U5	J13-19
U503	LINE-23	LINE-24	DR6	DRO_U6	J13-23
U603	RET-1	RET-2	DR7	DRO_U7	J13-27
U703	RET-3	RET-4	DR8	DRO_U8	J13-31
U803	RET-5	RET-6	DR9	DRO_U9	J12-3
U903	RET-7	RET-8	DR10	DRO_U10	J12-7
U1003	RET-9	RET-10	DR11	DRO_U11	J12-11
U1103	RET-11	RET-12	DR12	DRO_U12	J12-15
U4	METER-L	METER-R	METER_DR	METER_DR	J13-33

Analog signals are converted to digital and combined in pairs. This gives the Data Received (DR) which goes off to the DSP board.
For example, analog signals Line 13 and Line 14 are converted by U3 on the CODEC board to become digital signal DR1. This passes to the DSP board via J13 pin 3, where it is renamed DRO_U1.

CODEC connectors

This is a compilation of all the CODEC board's connectors, mainly showing the analog inputs, data received and transmitted. The power,ground and clocks are not shown, but they can be found in the connectors chapter, or on the schematics.

J1-1 ⟵ RET-1
J1-2 ⟵ RET-1-GND
J1-3 ⟵ RET-2
J1-4 ⟵ RET-2-GND
J1-5 ⟵ RET-3
J1-6 ⟵ RET-3-GND
J1-7 ⟵ RET-4
J1-8 ⟵ RET-4-GND
J1-9 ⟵ RET-5
J1-10 ⟵ RET-5-GND
J1-11 ⟵ RET-6
J1-12 ⟵ RET-6-GND
J1-13 ⟵ RET-7
J1-14 ⟵ RET-7-GND
J1-15 ⟵ RET-8
J1-16 ⟵ RET-8-GND
J1-17 ⟵ RET-9
J1-18 ⟵ RET-9-GND
J1-19 ⟵ RET-10
J1-20 ⟵ RET-10-GND
J1-21 ⟵ RET-11
J1-22 ⟵ RET-11-GND
J1-23 ⟵ RET-12
J1-24 ⟵ RET-12-GND

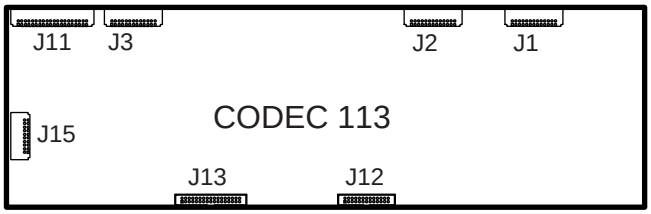
J1
Analog signals coming in from Analog I/O

J2-1 ⟵ AUX-1
J2-2 ⟵ AUX-1-GND
J2-3 ⟵ AUX-2
J2-4 ⟵ AUX-2-GND
J2-5 ⟵ AUX-3
J2-6 ⟵ AUX-3-GND
J2-7 ⟵ AUX-4
J2-8 ⟵ AUX-4-GND
J2-9 ⟵ AUX-5
J2-10 ⟵ AUX-5-GND
J2-11 ⟵ AUX-6
J2-12 ⟵ AUX-6-GND
J2-13 ⟵ AUX-7
J2-14 ⟵ AUX-7-GND
J2-15 ⟵ AUX-8
J2-16 ⟵ AUX-8-GND
J2-17 ⟵ AUX-9
J2-18 ⟵ AUX-9-GND
J2-19 ⟵ AUX-10
J2-20 ⟵ AUX-10-GND
J2-21 ⟵ AUX-11
J2-22 ⟵ AUX-11-GND
J2-23 ⟵ AUX-12
J2-24 ⟵ AUX-12-GND

J2
Analog signals going out to Analog I/O

J3-1 ⟵ LINE-13
J3-2 ⟵ LINE-13-GND
J3-3 ⟵ LINE-14
J3-4 ⟵ LINE-14-GND
J3-5 ⟵ LINE-15
J3-6 ⟵ LINE-15-GND
J3-7 ⟵ LINE-16
J3-8 ⟵ LINE-16-GND
J3-9 ⟵ LINE-17
J3-10 ⟵ LINE-17-GND
J3-11 ⟵ LINE-18
J3-12 ⟵ LINE-18-GND
J3-13 ⟵ LINE-19
J3-14 ⟵ LINE-19-GND
J3-15 ⟵ LINE-20
J3-16 ⟵ LINE-20-GND
J3-17 ⟵ LINE-21
J3-18 ⟵ LINE-21-GND
J3-19 ⟵ LINE-22
J3-20 ⟵ LINE-22-GND
J3-21 ⟵ LINE-23
J3-22 ⟵ LINE-23-GND
J3-23 ⟵ LINE-24
J3-24 ⟵ LINE-24-GND

J3
Analog signals coming in from control surface



J13-1 ⟵ DT1
J13-3 ⟵ DR1
J13-5 ⟵ DT2
J13-7 ⟵ DR2
J13-9 ⟵ DT3
J13-11 ⟵ DR3
J13-13 ⟵ DT4
J13-15 ⟵ DR4
J13-17 ⟵ DT5
J13-19 ⟵ DR5
J13-21 ⟵ DT6
J13-23 ⟵ DR6
J13-25 ⟵ DT7
J13-27 ⟵ DR7
J13-29 ⟵ DT8
J13-31 ⟵ DR8
J13-33 ⟵ METER_DR

J13
Digital signals
DT=from DSP
DR=to DSP

J12-1 ⟵ DT9
J12-3 ⟵ DR9
J12-5 ⟵ DT10
J12-7 ⟵ DR10
J12-9 ⟵ DT11
J12-11 ⟵ DR11
J12-13 ⟵ DT12
J12-15 ⟵ DR12

J12

J11-1 ⟵ BUS-1
J11-2 ⟵ BUS-1-GND
J11-3 ⟵ BUS-2
J11-4 ⟵ BUS-2-GND
J11-5 ⟵ BUS-3
J11-6 ⟵ BUS-3-GND
J11-7 ⟵ BUS-4
J11-8 ⟵ BUS-4-GND
J11-9 ⟵ BUS-5
J11-10 ⟵ BUS-5-GND
J11-11 ⟵ BUS-6
J11-12 ⟵ BUS-6-GND
J11-13 ⟵ BUS-7
J11-14 ⟵ BUS-7-GND
J11-15 ⟵ BUS-8
J11-16 ⟵ BUS-8-GND
J11-17 ⟵ MIX-LEFT
J11-18 ⟵ MIX-LEFT-GND
J11-19 ⟵ MIX-RIGHT
J11-20 ⟵ MIX-RIGHT-GND
J11-21 ⟵ SOLO-LEFT
J11-22 ⟵ SOLO-LEFT-GND
J11-23 ⟵ SOLO-RIGHT
J11-24 ⟵ SOLO-RIGHT-GND
J11-25 ⟵ METER-LEFT
J11-26 ⟵ METER-LEFT-GND
J11-27 ⟵ METER-RIGHT
J11-28 ⟵ METER-RIGHT-GND

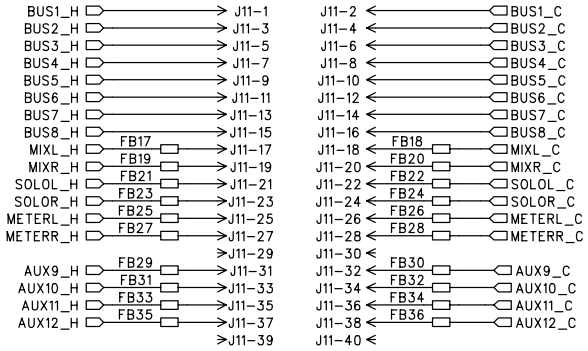
J11
Analog signals going out to DCA

NOTE: the Bus numbers are reversed by software, so Bus 1 is really Bus 8, Bus 2 is really Bus 7 etc.

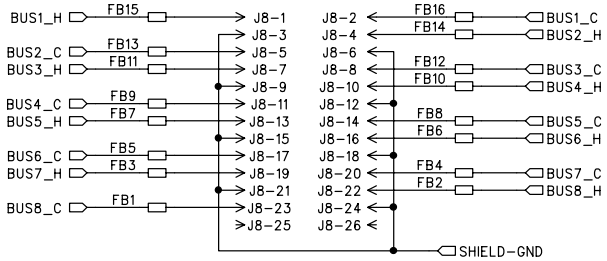
In other words, if you looked at J-11 pin 1, this is really Bus 8, not Bus 1.

DCA connectors

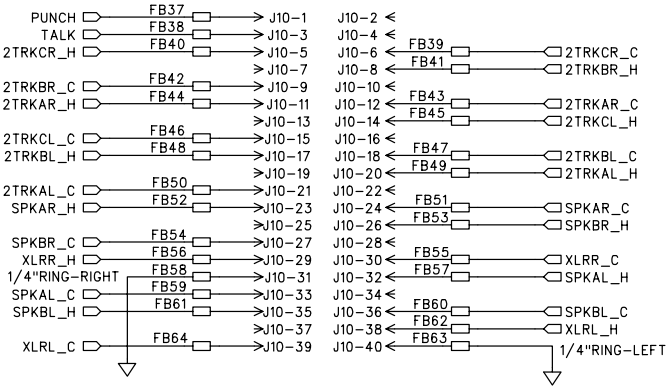
This is a compilation of all the DCA board's connectors, mainly showing the analog inputs, data received and transmitted.
The DCA board receives the analog Buses, Auxes, Mixes and Solos from the DSP board, then outputs (under control by the Brain board) to the Analog I/O board and Bus out.



J11
Analog signals coming in from CODEC board

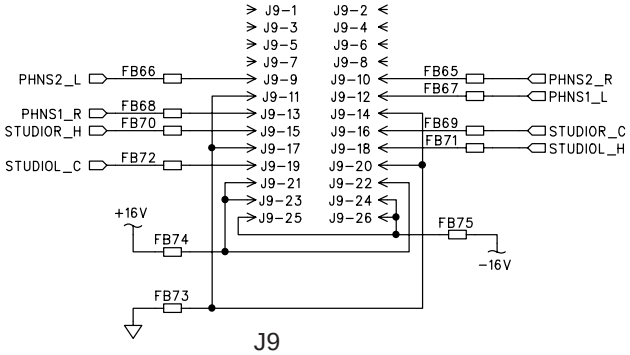


J8
Analog signals, going to rear panel 8 BUS OUT

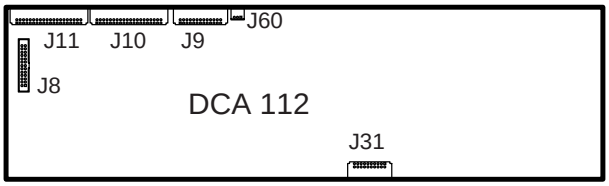


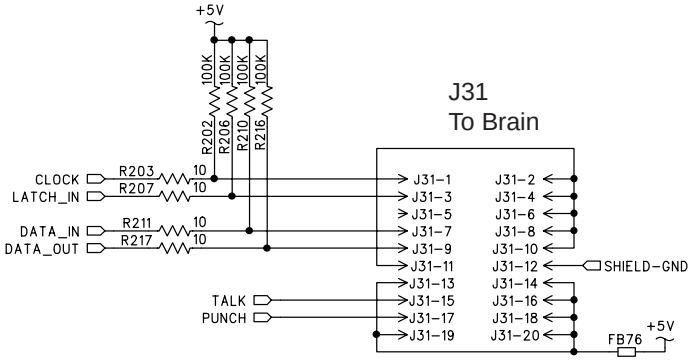
J10
Analog signals going out to Analog I/O

NOTE: The DB25 connector has different pin numbering. See Connectors chapter, page C-7. Also see previous page, about bus renumbering.



J9
Analog signals going out to Analog I/O





J31
To Brain

TAPE CARDS

This shows the analog inputs and outputs on the Tape cards. The analog signals go in and out of the rear panel DB25 connectors J101 and J102 respectively.

The Tape cards have their own D/A and A/D converters, therefore, only digital signals are passed to and from the DSP board.

Pairs of analog inputs are converted to digital form, for example, input 8 and 7 are combined to form digital signal DR4 which goes off to the DSP board. DT4 comes back from the DSP board, and is converted to analog outputs 7 and 8.

NOTE: the digital signals shown below are named as they appear on the Tape card only. The names are changed at the backplane board before going to the DSP baord. See the next page for details.

This shows the digital signals from the DSP board, and the analog output signals they become after D/A conversion. For example, digital signal DT4 on the Tape card comes from the DSP board. This is converted, and becomes analog signal 8 and analog signal 7. These appear on the DB25 output connector J102 for recording.

ANALOG OUTPUT	DIGITAL NAME	DB25 Connector/pin
8_OUT_HOT	DT4	J102-1
8 GND		J102-2
7_OUT_COLD	DT4	J102-3
6_OUT_HOT	DT3	J102-4
6 GND		J102-5
5_OUT_COLD	DT3	J102-6
4_OUT_COLD	DT2	J102-7
4 GND		J102-8
3_OUT_COLD	DT2	J102-9
2_OUT_HOT	DT1	J102-10
2 GND		J102-11
1_OUT_COLD	DT1	J102-12
		J102-13
8_OUT_COLD	DT4	J102-14
7_OUT_HOT	DT4	J102-15
7 GND		J102-16
6_OUT_COLD	DT3	J102-17
5_OUT_HOT	DT3	J102-18
5 GND		J102-19
4_OUT_COLD	DT2	J102-20
3_OUT_HOT	DT2	J102-21
3 GND		J102-22
2_OUT_COLD	DT1	J102-23
1_OUT_HOT	DT1	J102-24
1 GND		J102-25

ANALOG INPUT	DIGITAL NAME	DB25 Connector/pin
8_IN_HOT	DR4	J101-1
8 GND		J101-2
7_IN_COLD	DR4	J101-3
6_IN_HOT	DR3	J101-4
6 GND		J101-5
5_IN_COLD	DR3	J101-6
4_IN_COLD	DR2	J101-7
4 GND		J101-8
3_IN_COLD	DR2	J101-9
2_IN_HOT	DR1	J101-10
2 GND		J101-11
1_IN_COLD	DR1	J101-12
		J101-13
8_IN_COLD	DR4	J101-14
7_IN_HOT	DR4	J101-15
7 GND		J101-16
6_IN_COLD	DR3	J101-17
5_IN_HOT	DR3	J101-18
5 GND		J101-19
4_IN_COLD	DR2	J101-20
3_IN_HOT	DR2	J101-21
3 GND		J101-22
2_IN_COLD	DR1	J101-23
1_IN_HOT	DR1	J101-24
1 GND		J101-25

This shows the analog signals coming in from a tape deck, and the digital signals they become after A/D conversion. For example, analog signals 8 and 7 come in on the tape card's DB25 input connector J101 and are converted to become digital signal DR4. This then goes to the DSP board for processing.

TAPE CARDS continued

ANALOG TAPE OUTPUT PAIRS	DIGITAL SIG NAME ON TAPE BOARD	CARD TO BACKPLANE CONNECTOR AND PIN NO.	WHAT THE SIGNAL IS CALLED ON THE BACKPLANE AND DSP BOARD	BACKPLANE TO DSP CONNECTOR AND PIN NO.
23 AND 24	DT4	J20-7,56	DT_8	J47-14
21 AND 22	DT3	J20-5,58	DT_6	J47-10
19 AND 20	DT2	J20-3,60	DT_4	J47-6
17 AND 18	DT1	J20-1,62	DT_2	J47-2
15 AND 16	DT4	J19-7,56	DT_16	J47-31
13 AND 14	DT3	J19-5,58	DT_14	J47-27
11 AND 12	DT2	J19-3,60	DT_12	J47-23
9 AND 10	DT1	J19-1,62	DT_10	J47-19
7 AND 8	DT4	J18-7,56	DT_24	J48-14
5 AND 6	DT3	J18-5,58	DT_22	J48-10
3 AND 4	DT2	J18-3,60	DT_20	J48-6
1 AND 2	DT1	J18-1,62	DT_18	J48-2

NOTE: All three tape cards are identical, and the difference in signal name comes from where each card is fitted in the backplane slots. If a card is fitted into slot 1-8, it connects to the backplane's J18 and so for example, the card's DT2 becomes DT_20 on the backplane and DSP board. If the card is in the 9-17 slot, it uses J19 and so the card's DT2 becomes DT_12.

ANALOG TAPE INPUT PAIRS	DIGITAL SIG NAME ON TAPE BOARD	CARD TO BACKPLANE CONNECTOR AND PIN NO.	WHAT THE SIGNAL IS CALLED ON THE BACKPLANE AND DSP BOARD	BACKPLANE TO DSP CONNECTOR AND PIN NO.
23 AND 24	DR4	J20-8,55	DR0_U16	J47-16
21 AND 22	DR3	J20-6,57	DR0_U15	J47-12
19 AND 20	DR2	J20-4,59	DR0_U14	J47-8
17 AND 18	DR1	J20-2,61	DR0_U13	J47-4
15 AND 16	DR4	J19-8,55	DR0_U20	J47-33
13 AND 14	DR3	J19-6,57	DR0_U19	J47-29
11 AND 12	DR2	J19-4,59	DR0_U18	J47-25
9 AND 10	DR1	J19-2,61	DR0_U17	J47-21
7 AND 8	DR4	J18-8,55	DR0_U24	J48-16
5 AND 6	DR3	J18-6,57	DR0_U23	J48-12
3 AND 4	DR2	J18-4,59	DR0_U22	J48-8
1 AND 2	DR1	J18-2,61	DR0_U21	J48-4

These are the signals transmitted to the DSP board from the Tape inputs.
What happens is this: Two analog signals are converted into digital and combined into one digital signal.
For example, analog signals 23 and 24 (from the DB25 pin connector on the rear panel) are converted and combined to create a digital signal DR4 on the tape card. This is then given a new name of DRO_U16 and sent to the DSP board using connector J47, pin 16.

EFFECTS CARDS

There are four slots available on the backplane board for Effects cards. They can plug into the backplane connectors J51, J16, J14 and J17. The backplane connectors J21 and J24 transmit and receive data to and from the DSP board.In most cases, the digital signals have the same name on the backplane as appear on the DSP board, but there are a few exceptions, shown in the right hand column of the tables below.

EFFECTS CARD	FX CARD TO BACKPLANE CONNECTOR AND PIN #	WHAT THE SIGNAL IS CALLED ON THE BACKPLANE	BACKPLANE TO DSP BOARD CONNECTOR AND PIN NO.	WHAT THE SIGNAL IS CALLED ON THE DSP BOARD
FX1	J51-5,58	DT1_U2	J21-13	SAME
FX1	J51-10,53	DT1_U1	J24-1	SAME
FX2	J16-5,58	DT1_U4	J21-15	SAME
FX2	J16-10,53	DT_3	J24-5	DT1_3
FX3	J14-5,58	DT1_U6	J21-17	SAME
FX3	J14-10,53	DT_5	J24-11	DT1_5
FX4	J17-5,58	DT1_U8	J21-19	SAME
FX4	J17-10,53	DT_7	J24-17	DT1_7

These are the signals transmitted from the DSP board to the effects cards.

EFFECTS CARD	FX CARD TO BACKPLANE CONNECTOR AND PIN #	WHAT THE SIGNAL IS CALLED ON THE BACKPLANE	BACKPLANE TO DSP BOARD CONNECTOR AND PIN NO.	WHAT THE SIGNAL IS CALLED ON THE DSP BOARD
FX1	J51-11,52	DR1_U1	J24-23	SAME
FX1	J51-12,51	DR1_U2	J24-25	SAME
FX2	J16-11,52	DR1_U3	J24-7	SAME
FX2	J16-12,51	DR1_U4	J24-9	SAME
FX3	J14-11,52	DR1_U5	J24-13	SAME
FX3	J14-12,51	DR1_U6	J24-15	SAME
FX4	J17-11,52	DR1_U7	J24-19	SAME
FX4	J17-12,51	DR1_U8	J24-21	SAME

These are the signals transmitted from the effects cards to the DSP board.

EXTRA CARD

One slot on the backplane is available for an extra digital I/O card, such as the PDI•8. It connects to backplane connector J22 (in the ALT I/O slot). The signals to and from the DSP board pass through backplane connector J48. There are 4 digital inputs and outputs, each carrying two data signals.

CARD TO BACKPLANE CONNECTOR AND PIN #	WHAT THE SIGNAL IS CALLED ON THE BACKPLANE AND DSP BOARD	BACKPLANE TO DSP BOARD CONNECTOR AND PIN NO.
J22-1,62	DT1_U9	J48-19
J22-3,60	DT1_U10	J48-23
J22-5,58	DT1_U11	J48-27
J22-7,56	DT1_U12	J48-31

These are the signals transmitted from the DSP board to the extra card.

CARD TO BACKPLANE CONNECTOR AND PIN #	WHAT THE SIGNAL IS CALLED ON THE BACKPLANE AND DSP BOARD	BACKPLANE TO DSP BOARD CONNECTOR AND PIN NO.
J22-2,61	DR1_U9	J48-21
J22-4,59	DR1_U10	J48-25
J22-6,57	DR1_U11	J48-29
J22-8,55	DR1_U12	J48-33

These are the signals transmitted from the extra card to the DSP board

DIGITAL I/O CARD

One slot on the backplane is available for the standard digital I/O card. It connects to backplane connector J30. The signals to and from the DSP board pass through backplane connector J21. Note that once the digital signals reach the DSP board, they change name.

CARD TO BACKPLANE CONNECTOR AND PIN #	WHAT THE SIGNAL IS CALLED ON THE BACKPLANE	BACKPLANE TO DSP BOARD CONNECTOR AND PIN NO.	WHAT THE SIGNAL IS CALLED ON THE DSP BOARD
J30-1,62	DR	J21-11	DT1_U13
J30-2,61	DT	J21-9	DR1_U13

The clock card

The clock card generates the main clock signals used throughout the console. On other boards there are a few local clocks used, for example, for the serial Rx and TX connection to the remote CPU.

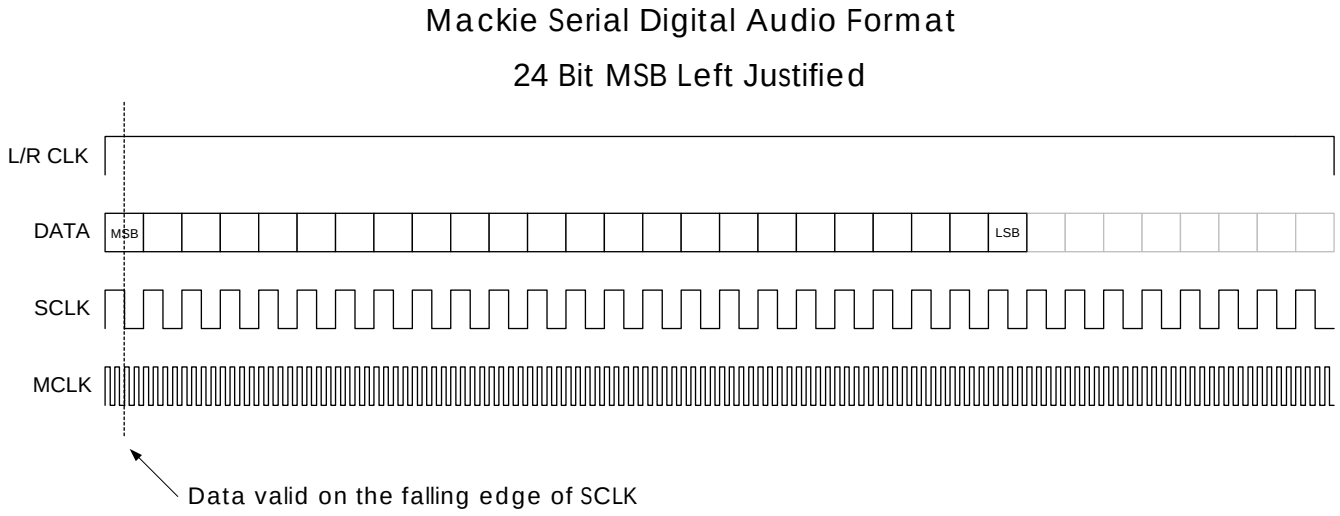
This table shows the signal flow from the clock card to the various boards in the D8B. The clock card fits into connector J23 on the backplane board. From there, the signals are distributed to other boards either by ribbon connectors, or using the backplane's buses to the Tape cards, FX cards, and Digital IO.

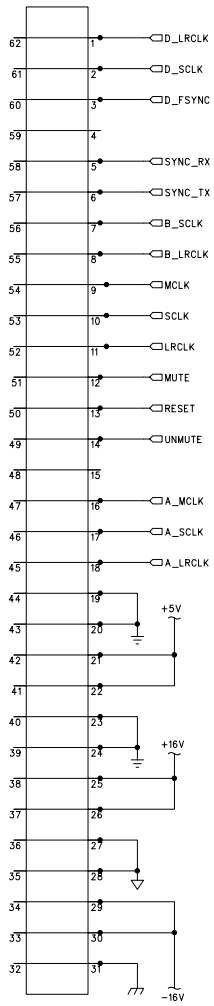
Have a look at the schematics/pcb layouts of the clock card. The last page of that chapter has a pcb layout with traces and some signals and voltages marked. Also refer to the connectors chapter for more details of each connector mentioned in the table below.

SIGNAL NAME	BACKPLANE CONNECTION	BACKPLANE OUTPUT	DESTINATION
D_LRCLK	J23, PINS 1+62	J21, PIN 1	TO DSP BOARD
D_SCLK	J23, PINS 2+61	J21, PIN 3	TO DSP BOARD
D_FSYNC	J23, PINS 3+60	J21, PIN 5	TO DSP BOARD
SYNC_RX	J23, PINS 5+58	J32, PIN 5	TO BRAIN BOARD
SYNC_TX	J23, PINS 6+57	J32, PIN 7	TO BRAIN BOARD
B_SCLK	J23, PINS 7+56	J17, PIN 8+55	TO ALL FX CARDS (J17, J14, J16 AND J51, ALL PIN 8+55)
B_LRCLK	J23, PINS 8+55	J17, PIN 13+50	TO ALL FX CARDS (J17, J14, J16 AND J51, ALL PIN 13+50)
MCLK	J23, PINS 9+54	J22, PIN 9+54	TO ALL TAPE CARDS AND EXTRA (J22, J20, J19, J18, ALL PIN 9+54)
SCLK	J23, PINS 10+53	J22, PIN 10+53	TO ALL TAPE CARDS AND EXTRA (J22, J20, J19, J18, ALL PIN 10+53)
LRCLK	J23, PINS 11+52	J22, PIN 11+52	TO ALL TAPE CARDS AND EXTRA (J22, J20, J19, J18, ALL PIN 11+52)
MUTE	J23, PINS 12+51	J15, PIN 1	TO CODEC BOARD AND ALL TAPE CARDS, EXTRA AND DIG IO (J22, J20, J19, J18 AND J30, ALL PINS 12+51)
RESET	J23, PINS 13+50	J15, PIN 3	TO CODEC BOARD AND ALL TAPE CARDS, EXTRA AND DIG IO (J22, J20, J19, J18 AND J30 ALL PINS13+50) AND ALL FX CARDS (J17, J14, J16 AND J51, ALL PIN 6+57)
UNMUTE	J23, PINS 14+49	J24, PIN 27	TO DSP BOARD
A_MCLK	J23, PINS 16+47	J15, PIN 9	TO CODEC BOARD
A_SCLK	J23, PINS 17+46	J15, PIN 7	TO CODEC BOARD
A_LRCLK	J23, PINS 18+45	J15, PIN 5	TO CODEC BOARD

The clocks

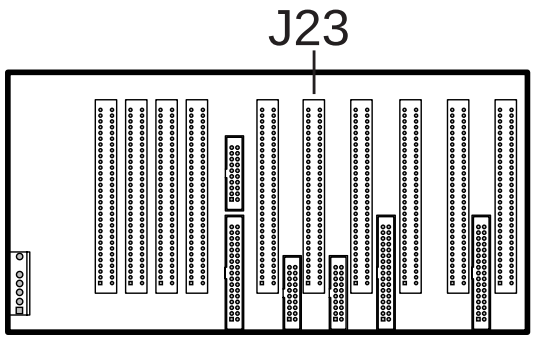
The diagram below shows the relationship between the various clock signals generated by the clock card.





J23

J23 pinouts show the signals to and from the clock card



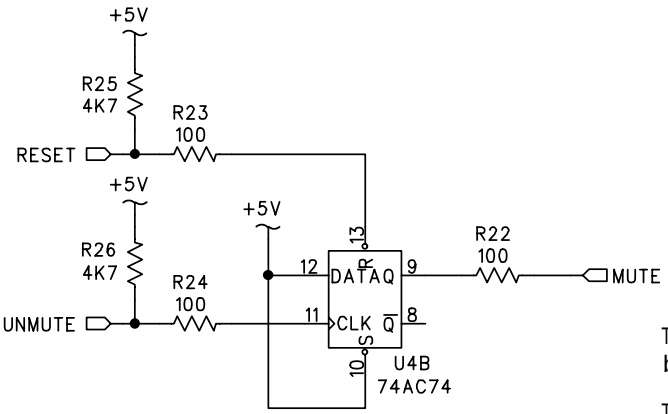
BACKPLANE

This is where the clock card plugs into the backplane

CLOCK BACK

MUTE and UNMUTE

On the clock card, there is an important Mute/Unmute circuit. It could have been fitted to any board, but it just so happens it was placed on the clock card. Here is the circuit:



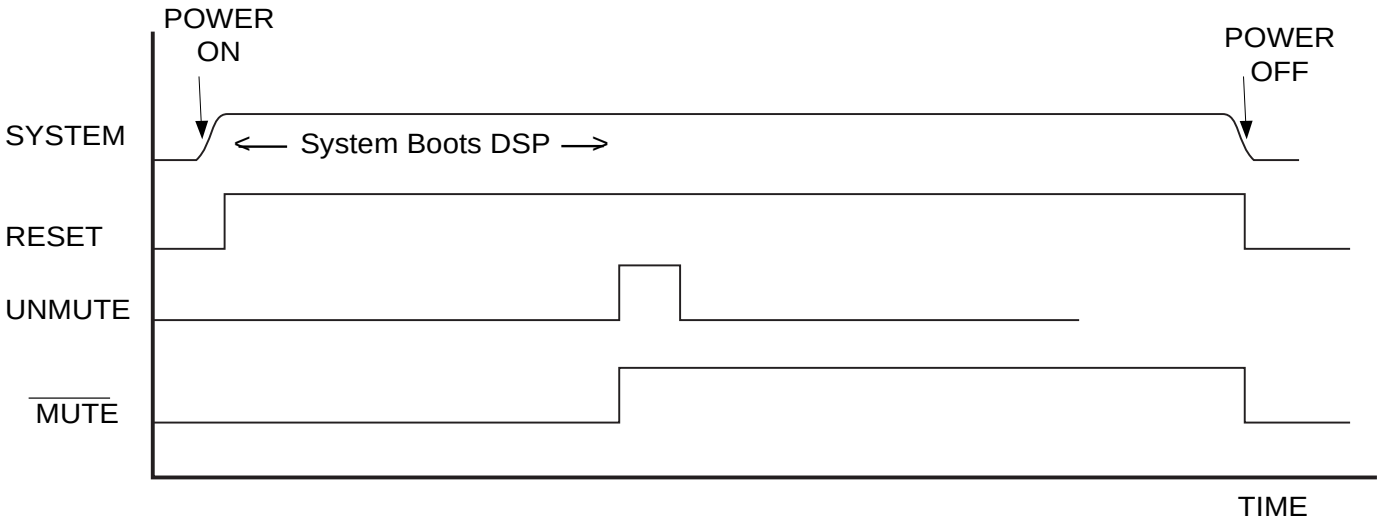
The UNMUTE and RESET signals come from the DSP board.

The MUTE signal will mute the D/A converters (CS4390 pins 15 and 16) on the CODEC board and the Tape Cards.

The left column of the table below shows the signals on the CLOCK card. This plugs into the BACKPLANE card connector J23. The traces on the BACKPLANE lead to it's various inputs and output connectors such as ribbon connector J15 to CODEC, J24 and J21 to DSP, card connectors J22, J20, J19 etc.)

SIGNAL NAME	BACKPLANE CONNECTION	BACKPLANE IN/OUTS	DESCRIPTION
MUTE	J23, PINS 12+51	J15, PIN 1	To CODEC board (J15, Pin 1) To TAPE CARDS (J22, J20, J19, all pins 12+51)
RESET	J23, PINS 13+50	J24, PIN 29	From DSP board (J24, pin 29, **and** J21, pin 7) To CODEC board (J15, pin 3) To TAPE CARDS, EXTRA and DIG IO (J22, J20, J19, J18 and J30 all pins13+50) To FX CARDS (J17, J14, J16 and J51, all on pins 6+57)
UNMUTE	J23, PINS 14+49	J24, PIN 27	From DSP board

NOTE that RESET is known as M_RESET on the DSP board. It simply changes name at the connectors J24 and J21.



As the console powers up, the D/A converters are muted on the CODEC board and the TAPE cards. This prevents noise form being heard or recorded on the Analog lines.

When the system has finished booting correctly, the all-important UNMUTE signal is sent from the DSP board to this little circuit, and so the D/A converters are unmuted and ready. So, if the DSP is not booted working correctly, the UNMUTE may not be sent, and the audio will remain muted.

BACK