DC-1

Digital Surround Processor

Service Manual

lexicon

Important Safety Instructions

Save these instructions for later use.

Follow all instructions and warnings marked on the unit.

Always use with the correct line voltage. Refer to the manufacturer's operating instructions for power requirements. Be advised that different operating voltages may require the use of a different line cord and/or attachment plug.

Do not install the unit in an unventilated rack, or directly above heat producing equipment such as power amplifiers. Observe the maximum ambient operating temperature listed in the product specification.

Slots and opening on the case are provided for ventilation; to ensure reliable operation and prevent it from overheating, these openings must not be blocked or covered. Never push objects of any kind through any of the ventilation slots. Never spill a liquid of any kind on the unit.

Never attach audio power amplifier outputs directly to any of the unit's connectors.

To prevent shock or fire hazard, do not expose the unit to rain or moisture, or operate it where it will be exposed to water.

Do not attempt to operate the unit if it has been dropped, damaged, exposed to liquids, or if it exhibits a distinct change in performance indicating the need for service.

This unit should only be opened by qualified service personnel. Removing covers will expose you to hazardous voltages.

This triangle, which appears on your component, alerts you to the presence of uninsulated, dangerous voltage inside the enclosure... voltage that may be sufficient to constitute a risk of shock.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

This triangle, which appears on your component, alerts you to important operating and maintenance instructions in this accompanying literature.

Adhere to all warnings on the unit and in the operating instructions.

Take precautions not to defeat the grounding or polarization of the unit's power cord.

Do not overload wall outlet, extension cords or integral convenience receptacles, as this can result in a risk of fire or electrical shock.

Route power supply cords so that they are not likely to be walked on or pinched by items placed on or against them, paying particular attention to cords at plugs, conveneince receptacles, and the point at which they exit from the unit.

The unit should be cleaned only as recommended by the manufacturer.

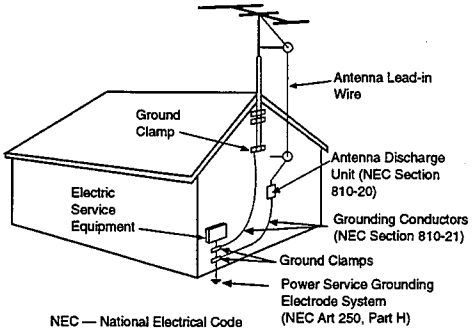
Communications Notice

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designated to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment OFF and ON, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient the receiving antenna
Relocate the computer with respect to the receiver
Move the computer away from the receiver
Plug the computer into a different outlet so that the computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to identify and Resolve Radio/TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.



NEC — National Electrical Code

Outdoor Antenna Grounding
If an outside antenna is connected to the receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna-discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See figure below.

Power Lines An outside antenna should be located away from power lines.

Acknowledgements

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SAFETY SUMMARY

The following general safety precautions must be observed during all phases of operation, service and repair of this instrument. Failure to comply with these precautions, or with specific warnings elsewhere in these instructions violates safety standards of design manufacture and intended use of the instrument. Lexicon assumes no liability for the customer's failure to comply with these requirements.

GROUND THE INSTRUMENT

To minimize shock hazard the instrument chassis and cabinet must be connected to an electrical ground. The instrument is equipped with a three-conductor AC power cable. The power cable must either be plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adapter with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the instrument.

DANGEROUS PROCEDURE WARNINGS

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING

Dangerous voltages, capable of causing death, are present in this instrument. Use extreme caution when handling, testing and adjusting.

SAFETY SYMBOLS

General definitions of safety symbols used on equipment or in manuals.

Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the instrument.

Indicates dangerous voltage. (Terminals fed from the interior by voltage exceeding 1000 volts must be so marked.)

WARNING — The WARNING sign denotes a hazard. It calls attention to a procedure, practice, condition or the like which, if not correctly performed or adhered to, could result in injury or death to personnel.

CAUTION — The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, condition or the like which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

NOTE: The NOTE sign denotes important information. It calls attention to procedure, practice, condition or the like which is essential to highlight.

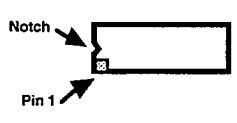
CAUTION

Electrostatic Discharge (ESD) Precautions

The following practices minimize possible damage to ICs resulting from electrostatic discharge or improper insertion.

- Keep parts in original containers until ready for use.
- Avoid having plastic, vinyl or styrofoam in the work area.
- Wear an anti-static wrist-strap.
- Discharge personal static before handling devices.
- Remove and insert boards with care.
- When removing boards, handle only by non-conductive surfaces and never touch open-edge connectors except at a static-free workstation.*
- Minimize handling of ICs.
- Handle each IC by its body.
- Do not slide ICs or boards over any surface.
- Insert ICs with the proper orientation, and watch for bent pins on ICs.
- Use anti-static containers for handling and transport.

*To make a plastic-laminated workbench anti-static, wash with a solution of Lux liquid detergent, and allow to dry without rinsing.



CAUTION

ICs inserted backwards will be destroyed. Incorrect insertion of ICs is also likely to cause damage to the board.

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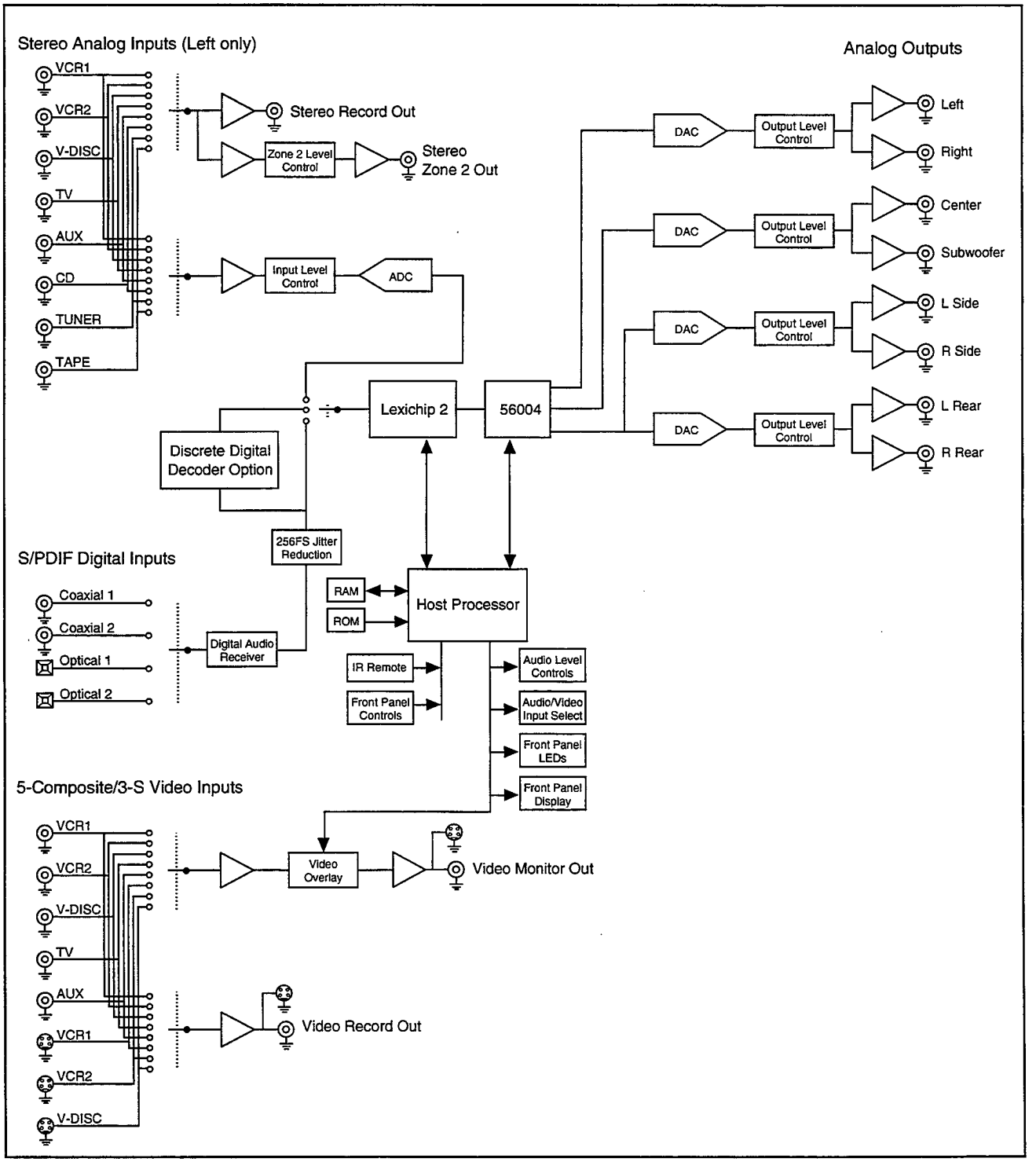
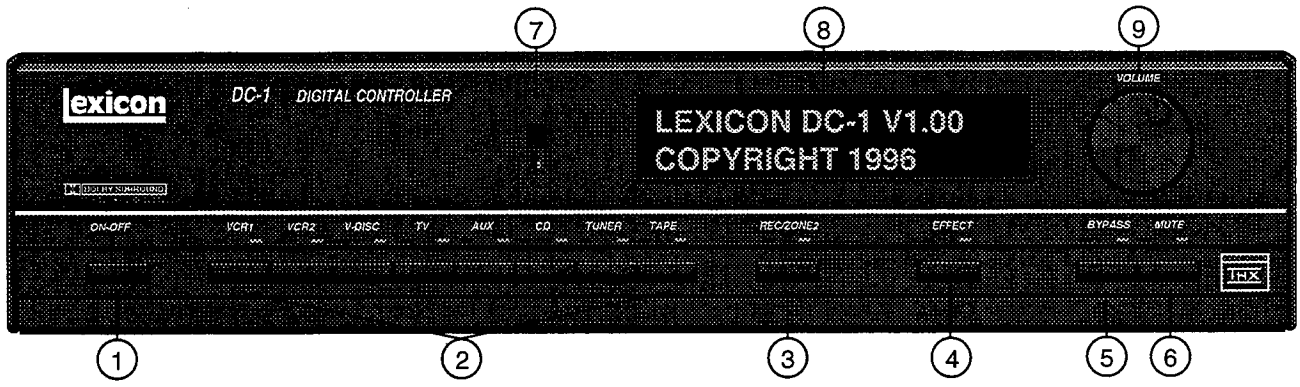
Product Overview

Block Diagram



The Front Panel



1. ON/OFF
ON/OFF alternately puts the DC-1 into and out of standby mode. Turning the DC-1 off with this button (or with the remote) deactivates the unit while leaving power to the signal processing circuitry to keep it at optimum operating temperature. Turning the DC-1 on with this button (or the remote) will restore the previous operating state.

2. Input Selection
Pressing any of these buttons (VCR1, VCR2, V DISC, TV, AUX, CD, TUNER, TAPE) selects the input at the corresponding rear panel connector as the current input selection and lights a green LED.

3. REC/ZONE 2
Selects and deselects the current input source for the RECORD and ZONE 2 outputs. When the REC/ZONE 2 function is engaged, the red LEDs are lit on the REC/ ZONE 2 button and on the selected source input button. To change the REC/ZONE 2 source, press and hold down REC/ZONE 2 while pressing another input selector.

The RECORD video and audio outputs, as well as the ZONE 2 audio outputs are enabled with REC/ZONE 2. Some specific record sources are disallowed because of the potential for feedback loops. By default these are TAPE and VCR1. If a prohibited source is selected, an error message is displayed. The prohibited REC/ZONE 2 source choices can be changed in the Setup menu.

4. EFFECT
Displays the current effect, then steps through all available effects.

5. BYPASS
Toggles the selected effect on and off. The stereo analog or digital inputs are fed unprocessed to the front left and right and subwoofer outputs while all other amplifier outputs are muted. A front panel LED will light yellow and screen messages indicate bypass is engaged.

6. MUTE
Attenuates all audio outputs except for RECORD or ZONE 2, lights a red LED, and displays a screen message to indicate mute is engaged. The attenuation level can be set in the Setup menu.

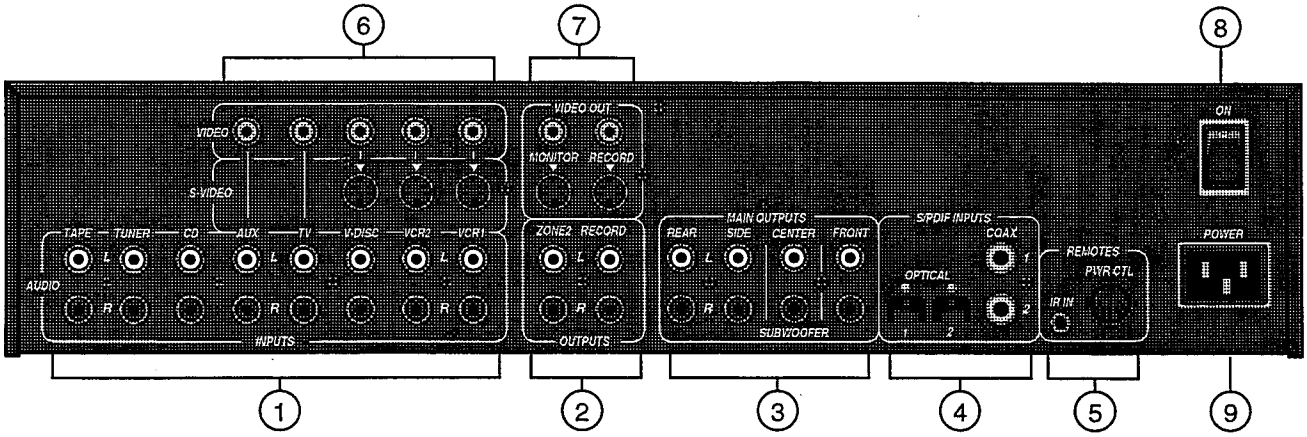
7. IR Receiver and LED
The IR receiver has an associated activity LED that lights green when valid IR signals are received, and an LED that lights red to indicate an overload condition at the inputs or within the DSP path. An IR input jack is available on the rear panel for a remote mounted IR receiver. The green activity LED remains illuminated when the unit is placed in Standby.

8. Display
A 2x20 backlit amber LCD displays the result of user action and the current status.

9. VOLUME
A position independent rotary encoder provides volume adjustment of all outputs, except for RECORD or ZONE2. Screen displays show a volume bar and level in dB, as well as the current volume setting.

CAUTION: Never make or break any connections to the DC-1 with the rear-panel power ON. Make sure any associated amplifiers have been turned off for at least one minute before turning this master power switch on or off.

The Rear Panel



1. AUDIO INPUTS
Eight stereo analog audio inputs are switched with corresponding video inputs and fed to the Main outputs. Inputs are nominally labeled as originating from an audio tape player, tuner, CD player, an unspecified auxiliary source, a TV tuner, a Laser or Video Disc player, a secondary, and a primary VCR.

2. ZONE2 and RECORD
Each pair of stereo audio outputs supplies the same signal according to the record input selection. ZONE2 signal levels can be controlled independently for use with a second set of amplifiers and speakers in another room. ZONE2 can also be used as a second record output. When the output for ZONE2 is set to 0dB (unity gain), it has the same output level as RECORD. RECORD can be expanded to two outputs using standard Y-connectors. Both outputs are muted in standby.

3. MAIN OUTPUTS
Three stereo amplifier outputs are provided for front, side and rear speakers. Single monaural outputs are provided for the center speaker and the subwoofer. The audio outputs are muted in standby.

4. S/PDIF INPUTS
Two coaxial RCA connectors and two optical connectors are provided for digital audio in the S/PDIF format.

5. REMOTES: IR IN, PWR CTL
The IR input is a miniature phone jack connector for input of modulated IR receiver data from an externally mounted IR LED receiver. Data is retransmitted by an IR LED mounted near the front panel IR receiver.

The Power Control port is a 5-Pin DIN connector. Pins 1 and 2 are ground, pin 3 is high when unit is on, low in standby or Off. High is indicated by either +5VDC or +12VDC, selectable via an internal jumper. Pin 5 can be enabled (high) or disabled (low) for specific input selections in the Setup menu.

6. VIDEO INPUTS
Five video input sources are provided. VCR1, VCR2 and V DISC, have both composite and S-video capabilities. (S-video is selected in preference to the composite signal.) AUX and TV accept composite only. Video inputs are selected with their corresponding audio inputs and fed to the appropriate monitor output jack. Record sources can be selected independently.

7. VIDEO OUTPUTS
RCA (composite) and S-video connectors are provided for monitor and record. If an S-video input is used, both S-video and composite are available at each output. If the video input is composite, only composite is available at each output. The monitor output incorporates the on-screen video overlay. Unless RECORD is enabled, the record output follows the monitor output selection without the on-screen display feature. Both outputs are blanked in standby.

8. Power On/Off
Master power switch disconnects the AC supply to the DC-1. This switch is intended to be left On during regular use. Whenever cables are connected or disconnected, or when the unit is not going to be used for an extended period of time, this switch should be set to Off.

9. POWER
AC power connector: 2-wire or 3-wire, 10 Amp, IEC 320.

To prevent a feedback loop with the record outputs, VCR1 and TAPE are normally restricted from assignment as record outputs. TAPE, TUNER, and CD default to VCR1 as a video input. Any input label and its default status can be changed in the Setup menu.

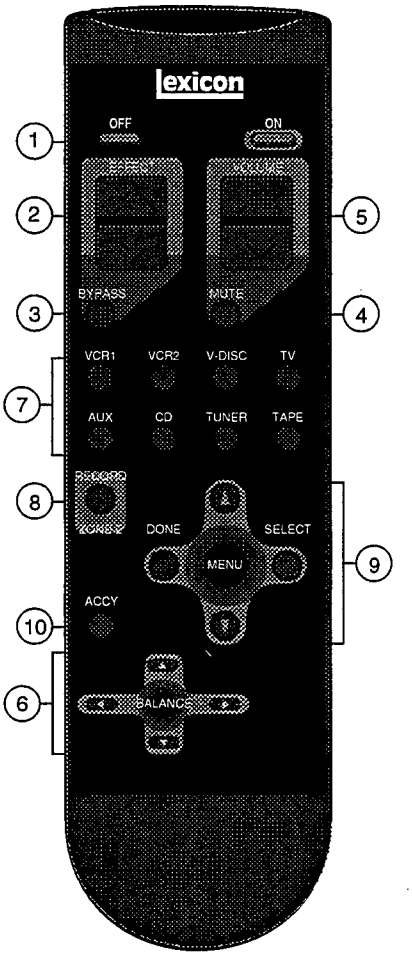
The Remote Control

1. OFF and ON
Separate OFF and ON buttons are provided for learning remotes, so that an automated key sequence does not require information regarding the current on/off status of the unit. OFF puts the unit into standby with audio muted, video blanked, the LCD and all LEDs, except for IR activity, turned off. The IR LED remains illuminated and the IR receiver remains active. The selected input, record status, current effect, volume and balance settings, and bypass state are saved. ON umutes audio and restores the unit to the state it was in prior to standby.

2. EFFECT Up and Down
Display the current effect, then step through all available effects. In standby, pressing either button turns the unit on, puts it into its last known state, and loads the last effect used.

3. BYPASS
Puts the front left and right outputs into stereo bypass. The stereo analog or digital inputs are fed unprocessed to the front left/right amplifier outputs while all other amplifier outputs are muted. A front panel LED will light yellow and screen messages indicate bypass is engaged.

4. MUTE
Attenuates all audio outputs except for RECORD or ZONE 2, lights a red LED, and displays a screen message. Attenuation level can be set in the Setup menu. In standby, turns the unit on and puts it into its last known state.



5. VOLUME Up and Down
Display the current volume setting, then adjust all outputs, except RECORD and ZONE 2. Screen displays show a volume bar and level in dB. In standby, pressing either button turns the unit on and puts it into its last known state.

6. BALANCE Front/Rear and Left/Right
Display, then adjust the Front/Rear and Left/Right level balances. Front and Rear controls change the level balance between the front (Left, Center, Right) and rear (L&R Side, L&R Rear) outputs. Left and Right controls change the level balance between the left and right Front, Side and Rear outputs. In standby, pressing any BALANCE button restores operation.

7. Input Selection
Individual buttons select from 8 inputs and activate a corresponding green LED on the front panel. Depending on the Setup configuration, selection may also load a new effect. In standby, pressing any Input Selection button turns the unit on, selects the source and loads the assigned effect, or restores the last known state.

8. RECORD/ZONE 2
Selects and deselects the current input source for RECORD and ZONE2 outputs. When the REC/ZONE 2 function is engaged, red LEDs are lit at the front panel REC/ZONE2 button and at the selected source input button. To modify the ZONE 2 output without affecting other output levels, press and hold RECORD/ZONE2 while adjusting VOLUME.

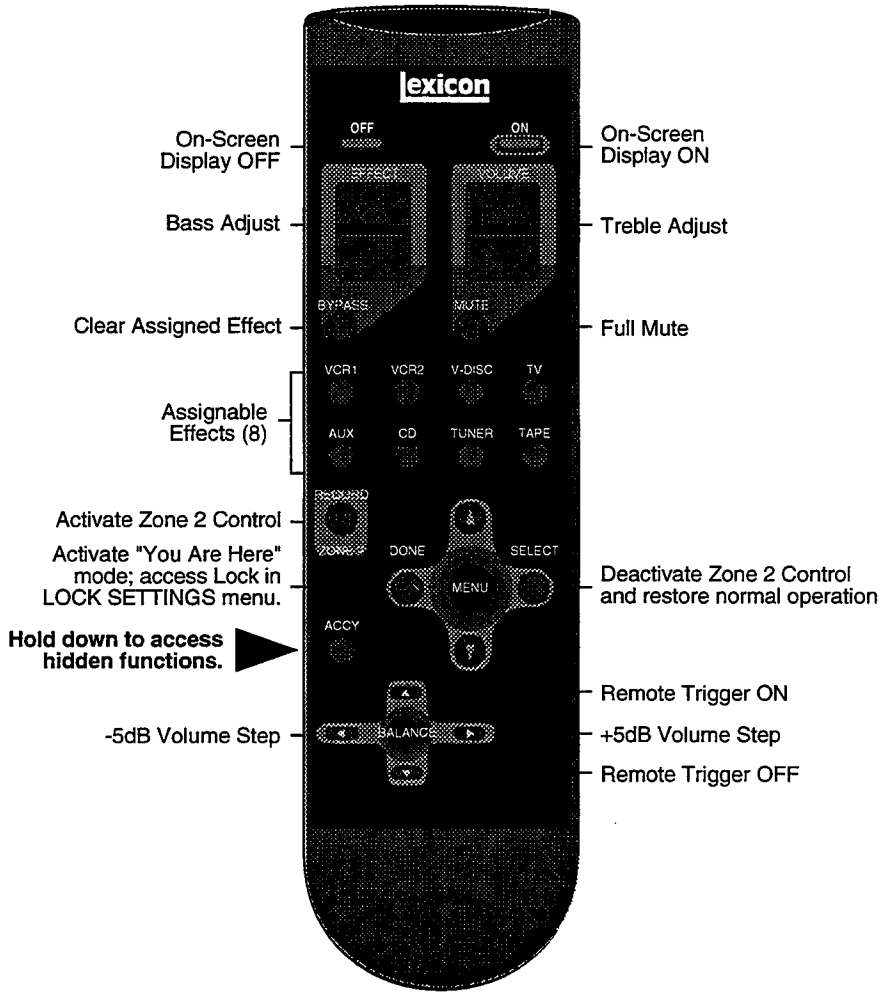
Press MUTE while holding down RECORD/ZONE2 to fully attenuate the ZONE2 outputs. The ZONE2 mute status will be indicated by a screen message. The attenuation level of the ZONE2 output mute is not user adjustable. Repeat to cancel MUTE.

9. MENU:
SELECT, ▲, ▼ and DONE
Allow access to and adjustment of all displayed menu items. (Volume, Bypass, Balance and Mute functions remain active in menu mode.) MENU ▲ and ▼ step a display cursor through listed menu items. SELECT displays submenus, or chooses a menu item for adjustment. The ▲ and ▼ buttons alter the settings of selected parameters. DONE saves the current changes.

Press one of the EFFECT buttons, any Input Selector, RECORD/ZONE2, or any BALANCE button to exit. Press OFF to exit the menu and enter standby.

10. ACCY
Provides accessory functions when pressed in conjunction with other remote buttons. (See following page.)

Remote Control ACCY Functions



Press and hold ACCY while pressing DONE to activate a "You Are Here" mode which:

- Disables mute
- Sets volume to -30dB
- Centers Balance controls
- Loads the Pro Logic Effect
- Selects the VCR1 input
- Activates On-Screen display with 2 second timeout
- Sets Remote Trigger ON
- Sets all tone controls to 0dB or OFF

Location Considerations

The DC-1 is a highly specialized signal processing computer and requires special care during installation to ensure optimum performance.

The DC-1 may be installed on a shelf or in a standard 19" equipment rack, using rack-mounting hardware available from Lexicon. Observe the following precautions:

- Select a dry, well-ventilated location out of direct sunlight.
- Do not stack the DC-1 directly above heat-producing equipment such as power amplifiers.
- Avoid placing the DC-1 near unshielded TV or FM antennas, cable TV decoders, or other receivers. The DC-1 may interfere with some FM tuners if it is placed immediately above or below them. Some products, particularly power amplifiers, may cause hum in the DC-1 if they are in close proximity.
- Make sure the DC-1 front panel IR receiver window is unobstructed. The remote control must be in line-of-sight to this receiver for proper operation. If line-of-sight is impractical, an infrared remote repeater can be used with the rear panel IR connector. The DC-1 may be placed in a glass-doored cabinet but smoked glass will make the front panel Liquid Crystal Display (LCD) difficult to read and will reduce the sensitivity of the IR receiver.

AC Connections

The DC-1 is designed to be connected to an uninterrupted AC power line in the same manner as a VCR or aTV. Like all computers, the DC-1 is sensitive to voltage fluctuations. We therefore recommend the use of an AC line filter to protect against line surges, or the installation of a line conditioner to protect against under voltage (brownouts) as well as overvoltage conditions.

The DC-1 has a master power switch on the rear panel above the IEC standard AC power receptacle. This switch may be left ON continuously when the unit is in regular use. When the DC-1 will not be used for an extended period of time, or whenever you are connecting or disconnecting any cables to the unit, this switch should be turned OFF.

Connect the power cable to the DC-1, then plug the power cord into a wall outlet or into an unswitched outlet on a surge protector. Be sure that the power cord is firmly seated in the connector on the rear panel of the DC-1.

Wiring Considerations

Audio/Video Cables

There is controversy over the audible effects of different types of interconnects. Good engineering practices have minimized the effect that cables might have on the inputs and outputs of the DC-1 — but feel free to evaluate different interconnects in your system. If you want to do some tweaking, be conscious of the mechanical stress from repeated insertion and overly tight connectors, and the possibly corrosive nature of some contact-enhancing fluids.

Note that the use of standard audio cables for video or digital audio applications may cause signal degradation, and is not recommended. For these connections, please use only cables that are designed for the application — these have different impedance characteristics than cables approved for analog audio applications.

Both audio and video cables should be kept as short as possible.

Speaker Connections

In general, speaker cables should be kept short, and low-impedance wire should be used throughout to assure efficient power transmission and avoid audible distortion. Recommended wire lengths are given in the table below. Although these examples can be used as a general guide, your system manuals should provide detailed information specific to your components.

Wire Lengths

Length	AWG Size
up to 12 feet	16 gauge
up to 18 feet	14 gauge
up to 29 feet	12 gauge
up to 51 feet	10 gauge

Audio/Video Connections

Before making any connections, turn off ALL audio and video components, including individual power amplifiers. (Unplug any preamps and power amps that don't have power switches.)

The DC-1 is designed to function as the control center of the system, selecting inputs and controlling the volume of all speakers in the system. There are several ways to integrate the DC-1 into the system, but they basically fall into two categories: those where the DC-1 is connected directly to all of the amplifiers in the room, and those where the DC-1 is connected into a tape or signal processor loop of a preamp or receiver.

You may choose to connect the DC-1 in the tape monitor, or external processor loop of a preamp, allowing you to completely bypass the DC-1. This, however, will make the system somewhat more complicated to operate, and adds a gain stage (the preamp) that is not needed.

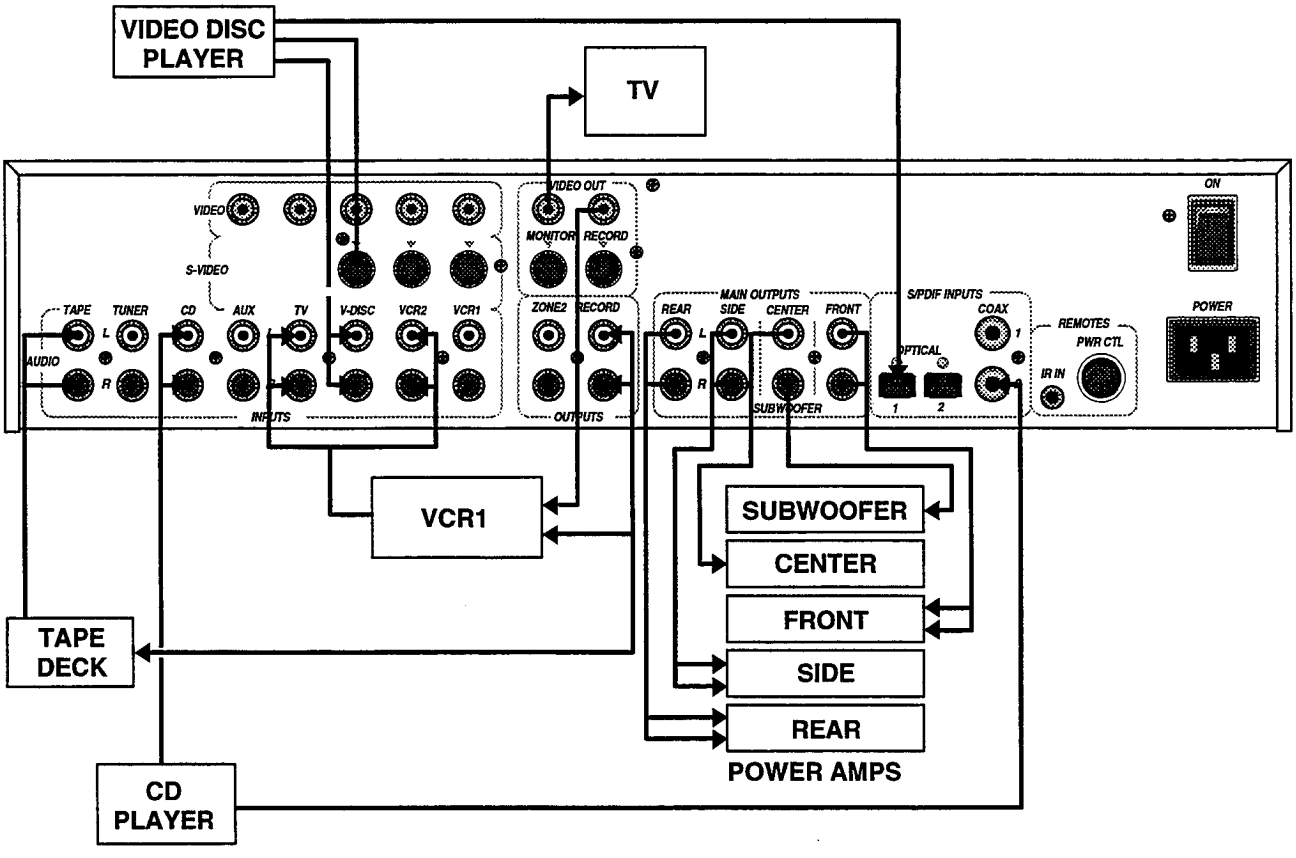
Connection

Connecting the DC-1 as a preamp

Input sources can each be connected directly to the DC-1 inputs. A typical system might use the TV, VCR1, V-DISC and CD and TUNER (output through a preamp). Since TAPE, TUNER and CD are audio only, the video output will default to the video signal from VCR1. This feature allows TV or other video source viewing while different audio is playing.

Connect your main stereo amplifier to the DC-1 FRONT outputs. Connect any additional amplifier/speaker combinations to the remaining outputs on the DC-1: side amplifiers to the SIDE outputs, rear amplifiers to the REAR outputs, center-channel amplifier to the CENTER output and the subwoofer amp to the SUBWOOFER output. If you are using THX-type dipolar surround speakers, the amplifier driving them should be connected to the DC-1 SIDE outputs.

Whenever possible, connect both analog and digital outputs of digital sources.



Note the use of Y-connectors to feed the DC-1 Record output to both the VCR and the tape deck. In this example, Y-connectors are also used to direct the VCR audio output to both the TV and VCR inputs on the DC-1 so that the VCR can be used as a TV tuner.

Video Connections

The DC-1 has five composite video inputs, three of which are paired with S-Video. Connection to an S-Video input will override any standard composite signal connected via the RCA-type connector. Note that an S-Video input will be output on both the composite and S-Video outputs. The converse is not true — composite input signals will not be output as S-Video.

You can assign any video source to any (or all) of the eight DC-1 inputs via the Input Configuration submenu of the Setup menu. This can be very useful in systems which use a VCR as the tuner for TV viewing, as the video feed from the VCR can be assigned to both the VCR and TV inputs. Audio can be fed to both inputs with Y-connectors. (Do not use Y-connectors on video signals.) This allows the video signal from the VCR to be used for both TV and VCR viewing.

You can also assign it to audio-only sources such as an AM/FM tuner, to enjoy music from another source while viewing the TV.

It is important to remember that the impedance characteristics of composite video and digital audio are different from analog audio. You should only use cables specifically designed for video and digital audio. Consult your dealer for recommendations.

Digital Audio Connections

Like the video inputs, the digital inputs can be set up to be selected with any of the eight inputs via the Setup menu. Two coaxial (RCA) and two optical (TOSLINK™) inputs are provided. No default assignments are made for the coaxial or optical inputs.

Using the digital inputs will always provide better performance. Whenever possible, make analog connections as well, as some older laser discs do not contain digital soundtracks (and, therefore, require an analog connection). The analog connection is normally used for the RECORD and ZONE 2 outputs.

Recording a Digital Source Using the DC-1 D/A Converter

For recording purposes, it is advisable to connect the analog outputs of your digital source, as the record outputs do not have dedicated D/A converters. (There are already eight in the DC-1!) It is possible to use the internal D/A converters in the DC-1 for recording. The DC-1 must be in the Effect bypass mode. Select the input you want to record, then press the REC/ZONE2 button until the display reads SELECTED FOR RECORD.

Digital Input Status Detection

If digital audio input is selected without a valid source, or if a digital error state which affects audio performance is detected, all audio outputs are muted and an error message is displayed for two seconds. The associated input on the front panel will display a blinking red LED while the error condition persists. When valid data is restored, the unit returns to normal operation. Whenever emphasis is detected within the incoming digital audio channel status bits, de-emphasis is automatically applied.

RECORD/ZONE 2 Operation

The DC-1 offers independent input selection and level control for the Main and Zone 2 outputs. Three different methods of control are described below. (Note that Record and Zone 2 outputs are in parallel, so input selection for Zone 2 will effect identical changes at the Record outputs.)

Zone 2 controls available during normal operation
In normal operation, pressing RECORD/ZONE 2 on the remote control or the front panel will assign the current input selection to the Record/ Zone 2 outputs without affecting the Main outputs. Holding down RECORD/ZONE 2 allows Zone 2 adjustment of VOLUME and MUTE without affecting the Main outputs. To de-assign the Record/Zone 2 outputs, simply press and hold RECORD/ ZONE 2 again.

For example:

VCR2 is selected for the Main outputs and its associated green front panel LED is illuminated. Pressing and holding down the front panel REC/ZONE 2 button will light the red LEDs above the REC/ZONE 2 button and the currently selected input (in this example, VCR2). The display will show:

VCR2
SELECTED FOR RECORD

Pressing REC/ZONE 2 again will cause the red LEDs to go out, and will display:

RECORD OUTPUT
DISABLED

To assign a different input via the front panel, simultaneously press REC/ZONE 2 and the desired input selector. To change the input assignment via the remote, first de-assign the current input by holding down the RECORD/ZONE 2 key, then press the desired input selector. This will change the input assignment for the Main outputs. Assign this new input to the Record/Zone 2 outputs by pressing and holding RECORD/ZONE 2.

As protection against feedback, the TAPE and VCR1 inputs are normally blocked from being used as sources for the Record and Zone 2 outputs. This default condition can be changed in the Setup menu.

Zone 2 Remote Control

The remote control can be placed into an exclusive Record/Zone 2 control mode during normal operation by holding down ACCY while pressing RECORD/ ZONE 2. This will display the message:

ZONE 2 IR REMOTE
MODE ENABLED

In this mode, the Volume, Mute, Input selection and L/R Balance controls will directly control the Zone 2 outputs with no effect on the Main outputs. Pressing any key other than the input selectors, the MUTE or the BALANCE keys will display the message:

ZONE 2 MODE ENABLED
KEY INVALID

To exit Zone 2 Remote mode and return the remote control to normal operation, press and hold ACCY while pressing SELECT. The message:

NORMAL IR REMOTE
MODE ENABLED

will be displayed to confirm that normal operation has been restored.

Exclusive Zone 2 Control

The DC-1 can also be used as an exclusive Zone 2 controller, allowing remote use of the system while the local room (the room in which the DC-1 is located) remains muted. To use the DC-1 in this manner, turn on the DC-1 by pressing the RECORD/ZONE2 key on the remote. The unit will power up with the System Mute and Effect Bypass activated. The remote will default to Zone 2 IR Remote mode as described above, with Volume, Mute, Input Selection and L/R Balance controlling only the Record and Zone 2 outputs. To return to normal operation, simply press OFF, then ON.

Digital audio inputs can be selected for the Record/Zone 2 outputs under the following conditions:

- The digital input must be assigned to an input via the Setup menu.
- The input must have Record/Zone 2 operation enabled. (TAPE and VCR1 are normally "BLOCKED", but can be changed in the Setup menu.)
- The input must be selected for Main outputs.
- Effect Bypass must be enabled.

Periodic Maintenance

Under normal conditions the DC-1 requires minimal maintenance. Use a soft, lint-free cloth slightly dampened with warm water and a mild detergent to clean the exterior surfaces of the unit.

Do not use alcohol, benzene or acetone-based cleaners or any strong commercial cleaners.

Avoid using abrasive materials such as steel wool or metal polish. If the unit is exposed to a dusty environment, a vacuum or *low-pressure* blower may be used to remove dust from the unit's exterior.

Ordering Parts

When ordering parts, identify each part by type, value and Lexicon Part Number. Replacement parts can be ordered from:

Lexicon, Inc.
3 Oak Park
Bedford MA 01730-1441
Telephone: 617-280-0300
Customer Service Fax: 617-280-0499

ATT: Customer Service

Returning Units for Service

Before returning a unit for warranty or non-warranty service, consult with Lexicon to determine the extent of the problem, and to obtain Return Authorization. No equipment will be accepted without Return Authorization from Lexicon.

If you choose to return a DC-1 to Lexicon for service, Lexicon assumes no responsibility for the unit in shipment from customer to the factory, whether the unit is in or out of warranty. All shipments must be well packed (using the original packing materials if possible), properly insured, and consigned to a reliable shipping agent.

When returning a unit for service, please include the following information:

- Name
- Company name
- Street address
- City, State, Zip Code, Country
- Telephone number (including Area Code)
- Serial number of unit
- Description of the problem
- Preferred method of return shipment
- Return Authorization #, both inside and outside of package

Please enclose a brief note describing converssations with Lexicon personnel and give the name and telephone number of the person directly responsible for maintaining the unit.

Do not include accessories such as manuals, cables, footswitches, etc. with the unit, unless specifically requested to do so by Lexicon Service personnel.

2

DC-1 Specifications

Inputs: Audio: 8 stereo (RCA) pairs
Minimum Input Level: 500 mVrms for maximum output
200 mVrms for Dolby level (Input Gain=0dB)
Input Impedance: 100 kΩ in parallel with 150pF

Video: 5 composite (RCA), 3 S-video, NTSC, PAL, SECAM compatible
Input Level and Impedance: 1Vpp, 75Ω

Digital: 4: 2 coaxial (RCA), 2 optical (TOSLINK™),
conforms to S/PDIF standard

Outputs: Audio: 8 outputs: Left, Center, Right, L&R Sides, L&R Rears, Subwoofer (RCA)
Maximum Output Level: minimum 6 Vrms (System Volume=+12dB)
Output Impedance: 100 Ω in parallel with 150pF

Video: 2 composite (RCA), 2 S-video, NTSC, PAL, SECAM compatible
Output Level and Impedance: 1V p-p, 75Ω

Conversion: A/D Conversion: 16-bit Delta-Sigma
D/A Conversion: 20-bit Delta-Sigma

Frequency Response: 10 Hz-20 kHz, ±0.5dB, Ref. 1kHz

THD+Noise: Less than 0.01% @1kHz, maximum output level

Dynamic Range: 90dB minimum, 22kHz bandwidth,
Ref. 1kHz@ -60dB below maximum output level

Signal to Noise Ratio: 90dB minimum, 22kHz bandwidth, Ref. 1kHz at maximum output level

Power Requirements: 100-240 VAC, 50-60Hz 35Watts (universal input)
IEC detachable power cord provided per country of destination

Dimensions: 17.3"W x 11.5"D x 3.6"H (440 x 292 x 92mm)
19.0"W x 11.5"D x 3.5"H (483 x 292 x 89mm) with rack mounting brackets

Weight: 10.5 lbs. (4.8kg)

Environment: Operating Temperature: 32° to 95°F (0° to 35°C)
Storage Temperature: -22° to 167°F (-30° to 75°C)
Relative Humidity: 95% maximum without condensation

Remote Controls: 1 hand-held, battery-powered remote control unit uses 2 AAA batteries

Specifications subject to change without notice.

3

Performance Verification

Quick Performance Check

Required Equipment

Clean, antistatic, well lit work area

High quality music source playback system

Compact Disc Player with stereo amplifier and 2 full range stereo speakers

Audio patch cables: 2 single-ended,shielded audio cables with RCA plugs on both ends for connecting the outputs of the compact disc player to the inputs of the DC-1

2 single-ended shielded audio cables with RCA plugs on one end and appropriate connectors on the other end for connection to the input of the stereo amplifier.

Low Distortion Oscillator: Single-ended 600Ω output, <.005% THD

Audio input Y cables : shielded audio Y cable with 2 RCA plugs on the Y end and an appropriate connector to the Low Distortion Oscillator output.

DC-1 Remote Control

The information in this section can help determine whether or not a unit is operating correctly. Always complete the performance verification before proceeding to the troubleshooting procedures.

Initial Inspection

1. Check each front panel switch for smooth mechanical operation and verify that the display acknowledges its function.
2. Verify that all of the front panel LEDs light.
3. Check all the buttons on the remote and verify that the display is responding to all the remote commands.

Audio Input Test

Setup

1. Connect the oscillator outputs to the Left and Right inputs of VCR1 on the rear panel of the DC-1.
2. Connect the DC-1 Left and Right Front audio outputs to the amplifier left and right inputs.
3. Put the DC-1 in Extended Diagnostics mode by applying power to the DC-1 while pressing and holding down both the front panel REC/ZONE2 and EFFECT buttons until **Extended Diagnostics** appears on the front panel display.
4. Press TAPE on the remote to select **AUDIO Test**.
5. Press VCR1 on the remote. **AUDIO Test 13** confirms that the VCR1 input is connected to all outputs.
6. Slowly increase the volume, then sweep the oscillator from 20Hz to 20kHz. You should hear clear audio from the left and right front outputs of the DC-1. Power off the amplifier and the DC-1 for at least one minute. Remove the cables from the Front outputs and move them to the Center (left) and Subwoofer (right) outputs. Repeat the oscillator sweep, check the audio, and repeat the procedure for the remaining DC-1 main audio outputs.
7. To test the rest of the DC-1 inputs, power off the amplifier and the DC-1 for at least one minute. Reconnect the DC-1 Front Left and Right outputs to the left and right amplifier inputs. Connect the oscillator output to the DC-1 VCR2 input.
8. Press VCR2 on the remote. The display should show **AUDIO Test 12.**
9. Leave the amplifier connected to the DC-1 front outputs while testing the VCR2 input and the remaining inputs. Sweep the oscillator and check the audio at the front outputs. Repeat the test for the remaining inputs. The following ID #s indicate which input is selected.

VCR1: 13	VCR2: 12	V-DISC:11	TV: 10
AUX: 0F	CD: 0E	TUNER:0D	TAPE: 0C

10. Press and hold ACCY then press DONE to return to the top of the diagnostics menu. Turn the front panel VOLUME knob until the display reads, **Extended Diagnostics/Restart....** then press the front panel MUTE button. The unit will cycle and return to normal operation

Listening

Connect a music source to the DC-1. Slowly increase the volume level on the amplifier to a comfortable listening level and verify that the output is free from noise, distortion or any other audio irregularities.

Mute Test

For proper mute testing, the DC-1 must be set to full mute.

1. On the remote, press MENU ▲, ▼ or SELECT to access the Main Menu.
2. Press MENU ▼ until the display reads **Main Menu/Setup** then press SELECT to enter the Setup Menu.
3. Use MENU ▼ to display **Output Levels**, then press SELECT.
4. Use MENU ▲ or ▼ to display: **Menu Mute Level /-30dB**, then press SELECT to display: **System Mute Assign/ -30dB.**
5. Press MENU ▼ to display **Full Mute**. Press SELECT, then press DONE four times to resume normal operation.
6. Press MUTE (on the remote or on the front panel) and verify that the output signal disappears.
7. Press MUTE again and verify that the output signal returns.
8. To reset your Mute level return to the Output Levels menu and reset the dB value.

Audio Performance Verification

Performing these tests assures that the audio signal paths in the DC-1 are functional and that the DC-1 meets its published specifications.

Required Equipment

Clean, antistatic, well lit work area

Low Distortion Oscillator : single-ended 600 ohm output < .005% THD

THD+N Distortion Analyzer with switchable 30kHz or audio bandpass filtering

Single-ended shielded audio cable with RCA plug on one end an appropriate connector on the other end for connection to the Low Distortion Oscillator output

Single-ended shielded audio cable with RCA plug on one end an appropriate connector on the other end for connection to the THD+N Distortion Analyzer

Input to Record Output Test

This test verifies the functionality of all the Audio Inputs of the DC-1 by checking gain, frequency response, THD+N, and S/N Ratio.

Setup

1. Attach the audio input cable between the Low Distortion Oscillator and the DC-1 left VCR1 input.
2. Attach the audio output cable between the DC-1 left Record output and the input of the Distortion Analyzer.
3. Put the DC-1 in Extended Diagnostics mode by powering up the DC-1 while pressing and holding down both the front panel REC/ZONE2 and EFFECT buttons until **Extended Diagnostics** appears on the display.
4. On the remote, press TAPE to select **AUDIO Test**.
5. Press and hold ACCY, then press RECORD. **94** on the display indicates that the record output is enabled for the selected DC-1 input.
6. To test the VCR1 input, press and release RECORD, then press VCR1. The displayed code will change to **14** then to **13**.

Procedure

1. Apply a 1kHz signal at +12dBV (+4Vrms) to the input channel.
2. Set the scale on the Distortion Analyzer to measure +12dBV (+4 Vrms) signal level. Make sure any filters are off.
3. Verify that the output level from the DC-1 is +12dBV (+4 Vrms) ±0.5dB.
4. Set the oscillator frequency to 1kHz. Adjust the scale on the Distortion meter to measure 0.01% THD+N, and turn on the 30kHz low pass or audio bandpass filter. Verify that THD+N is less than 0.01%.
5. Use the output level from step 3 for the 0dB reference to check frequency response. Turn the filter off. Sweep the oscillator frequency from 10Hz to 20kHz. Verify that the signal level is within ±0.5dB of reference level over the frequency band.
6. Set scale on the Distortion Analyzer to measure -90dBr signal level. With the filter on, either turn off the output from the oscillator or disconnect the oscillator from the DC-1 input. Verify that the noise floor is less than -90dBr.
7. To test the right channel, reconnect the cables to the associated right input.
8. To test the remaining inputs, repeat steps 5 and 6 of the Setup instructions. Move the cable to the next audio input and press the appropriate buttons on the remote to activate the path for test. The reference numbers for each path are:

RECORD, VCR1: 14, 13	RECORD, VCR2: 14, 12	RECORD, V-DISC: 14, 11
RECORD, TV: 14, 10	RECORD, AUX: 14, 0F	RECORD, CD: 14, 0E
RECORD, TUNER: 14, 0D	RECORD, TAPE: 14, 0C	

Input to Zone 2 Output Test

Setup

1. Attach the audio input cable between the Low Distortion Oscillator and the DC-1 left VCR1 input.
2. Attach the audio output cable between the DC-1 ZONE2 left output and the input of the Distortion Analyzer.
3. Put the DC-1 in Extended Diagnostics mode by powering up the DC-1 while pressing and holding down both the front panel REC/ZONE2 and EFFECT buttons until **Extended Diagnostics** appears on the display.
4. On the remote, press TAPE to select **AUDIO Test**.
5. Press and hold ACCY, then press RECORD. **94** on the display indicates that the Zone 2 output is available to any of the DC-1 inputs.
6. To test the VCR1 input, press and release RECORD, then press VCR1. The displayed code will change to **14** then to **13**.

Procedure

1. Apply a 1kHz signal at +12dBV (+4Vrms) to the input channel.
2. Set the scale on the Distortion Analyzer to measure +12dBV (+4Vrms) signal level. Make sure any filters are off.
3. Verify that the output level from the DC-1 is +9.5dBV (+3 Vrms) ±0.5dB.
4. Set the oscillator frequency to 1kHz. Adjust the scale on the Distortion Analyzer to measure 0.01% THD+N, and turn on the 30kHz low pass or audio bandpass filter. Verify that THD+N is less than 0.01%
5. Using the output level from step 3 for the 0dB reference, check the frequency response. Turn the filter off. Sweep the oscillator frequency from 10Hz to 20kHz and verify that the signal level is within ±0.5dB of reference level over the frequency band.
6. Set scale on the Distortion Analyzer to measure -90dBr signal level. With the filter on, either turn off the output from the oscillator or disconnect the oscillator from the DC-1 input. Verify that the noise floor is less than -90dBr.
7. To test the right channel, reconnect the cables to the associated right input.
8. To test the remaining inputs, repeat steps 5 and 6 of the Setup instructions. Move the cables to the next audio input and press the appropriate button on the remote to activate that path, then repeat the procedure. The reference numbers for each input path are:

RECORD, VCR1: 14, 13	RECORD, VCR2: 14, 12	RECORD, V-DISC: 14, 11
RECORD, TV: 14, 10	RECORD, AUX: 14, 0F	RECORD, CD: 14, 0E
RECORD, TUNER: 14, 0D	RECORD, TAPE: 14, 0C	

Audio Output Test

This test verifies the functionality of all main audio paths. The performance of the A/D and D/A conversion circuitry are checked through gain, frequency response, THD+N, and S/N Ratio tests.

Setup

1. Attach the audio input cable between the Low Distortion Oscillator and the DC-1 left VCR1 input.
2. Attach the audio output cable between the DC-1 left Front output and the input of the Distortion Analyzer.
3. Put the DC-1 in Extended Diagnostics mode by applying power to the DC-1 while pressing and holding down both the front panel REC/ZONE2 and EFFECT buttons until **Extended Diagnostics** appears on the front panel display.
4. On the remote, press TAPE to select **AUDIO Test**.
5. Press and hold ACCY, then press ON. **98** will appear on the display to indicate that the Audio Output Test is set.
6. To test the VCR1 input, press VCR1 on the remote. The display will show **13.**

Procedure

1. Apply a 1kHz signal at +12dBV (+4 Vrms) to the input channel.
2. Set the scale on the Distortion Analyzer to measure +12dBV (+4Vrms) signal level. Make sure any filters are off.
3. Verify that the output level from the DC-1 is +12dBV (+4Vrms) ±0.5dB.
4. Set the oscillator frequency to 1kHz. Adjust the scale on the Distortion Analyzer to measure 0.01% THD+N, and turn on the 30kHz low pass or audio bandpass filter. Verify that THD is less than 0.01%
5. Using the output level from Step 3 for the 0dB reference, check the frequency response. Turn the filter off. Sweep the oscillator frequency from 10Hz to 20kHz. Verify that the signal level is within ±0.5dB of reference level over the frequency band.
6. Set scale on the Distortion Analyzer to measure -90dBr signal level. With the filter on, either turn off the output from the oscillator or disconnect the oscillator from the DC-1 input. Verify that the noise floor is less than -90dBr.
7. To test the right channel, reconnect the cables to the associated right input.
8. Repeat for each of the six remaining main outputs of the DC-1.

RECORD, VCR1: 14, 13	RECORD, VCR2: 14, 12	RECORD, V-DISC: 14, 11
RECORD, TV: 14, 10	RECORD, AUX: 14, 0F	RECORD, CD: 14, 0E
RECORD, TUNER: 14, 0D	RECORD, TAPE: 14, 0C	

Required Equipment

Compact Disc Player, or other source with 44.1kHz sample rate, digital coax and optical outputs

Stereo amplifier and 2 full range stereo speakers.

2 single-ended,shielded audio cables with RCA plugs on both ends for connecting the outputs of the audio source to the inputs of the DC-1

2 single-ended, shielded audio cables with RCA plugs on one end and appropriate connectors on the other end for connection to the input of the stereo amplifier

Digital Input Tests

As this test verifies only the digital inputs, it is important that all previous tests from this section be performed first.

Setup

1. Connect the coaxial digital audio source to the DC-1 Coax 1 input.
2. Connect the DC-1 left and right Front audio outputs to the amplifier left and right inputs, and turn down the volume level control on the amplifier.
3. Put the DC-1 in Extended Diagnostics mode by applying power to the DC-1 while pressing and holding down both the front panel REC/ZONE2 and EFFECT buttons until **Extended Diagnostics** appears on the front panel display.
4. Press TAPE on the remote to select **AUDIO Test**.
5. Press and hold down ACCY, then press CD to select a digital input source. The display should read: **AUDIO Test 8E.**
6. Press EFFECTS ▼ to select Coax1 for testing. **1B** will be displayed to indicate the Digital Input Test path is set.

Procedure

1. With the audio source playing, slowly increase the volume level on the amplifier to a comfortable listening level and verify that the outputs are free from noise, distortion or any other audio irregularities.
2. To test the remaining three digital inputs, the following button pushes must be performed in step 6 of the Setup instructions:

   To test Coax 2, press EFFECTS. **1A** will be displayed.

   To test Optical 1, press and hold ACCY, then press EFFECTS. **9B** will be displayed.

   To test Optical 2, press and hold ACCY, then press EFFECTS. **9A** will be displayed.
3. To discontinue digital input testing and return to the Extended Diagnostics menu, press and hold ACCY, then press DONE. Press DONE again to completely exit Extended Diagnostics.

AC-3 Output Tests

Setup

Required Equipment

1 DAT Player or other source with 48kHz sample rate, digtal coax or optical outputs.
1 digital audio cable: single ended shielded cable with RCA plugs (coaxial) or Toslink (optional)
1 Single ended shielded cable with RCA plug on one end and an appropriate connector on the other end for connection to stereo amplifier.
1 Stereo Amplifier
2 full range speakers.

1. Connect the Digital source to the DC-1 COAX 1 input (Optical 1 if using optical cable).
2. Connect the DC-1 Left Front audio output to the amplifier's left input, and turn down the amplifier volume control.
3. Put the DC-1 in Extended Diagnostics mode by applying power to the DC-1 while pressing and holding down both the front panel REC/ZONE2 and EFFECT buttons until **Extended Diagnostics** appears on the front panel display.
4. Press TAPE on the remote to select **AUDIO Test.**
5. Press and hold down ACCY, then press AUX on the remote. This will set the digital audio input path in the DC-1 through the AC-3 board.
6. Pressing the following sequence of buttons will complete the path through the DC-1 and set it to the Left Front Output .

   Press and hold ACCY, then press BYPASS.

   Release both buttons and press DONE.

   Press and release AUX, BYPASS, then BAL LEFT.

   Press and hold ACCY, then press BAL FRONT.

   Release both buttons and press DONE .

   This sets the unit to pass audio to the Left Front Output .

Procedure

1. With the audio source playing, slowly increase the volume on the ampilfier to a comfortable listening level and verify that the ouput is free from noise, distortion, or any other audio irregularites.
2. To test the remaining 7 Outputs replace the the remote button pushes in step 6 of the Setup section with the ones listed below. Be sure to connect the corresponding output selected for test to the amplifier.

Front Output
ACCY/BYPASS
DONE
AUX, BYPASS, BAL RIGHT
ACC/BAL FRONT
DONE

Left Side Output
ACCY/BYPASS
DONE
AUX, BYPASS, BAL LEFT
ACCY/BAL LEFT
DONE

Left Rear Output
ACCY/BYPASS
DONE
AUX, BYPASS, BAL LEFT
ACCY/BAL BACK
DONE

Center Output
ACCY/BYPASS
DONE
AUX, BYPASS, BAL LEFT
ACCY/BAL RIGHT
DONE

Right Side Output
ACCY/BYPASS
DONE
AUX, BYPASS, BAL RIGHT
ACCY/BAL RIGHT
DONE

Right Rear Output
ACCY/BYPASS
DONE
AUX, BYPASS, BAL RIGHT
ACCY/BAL BACK
DONE

Subwoofer Output
ACCY/BYPASS
DONE
AUX, BYPASS, BAL RIGHT
ACCY/BAL RIGHT
DONE

Video Input/Output Tests

Required Equipment

VCR or V-Disc player with both Composite and S-Video outputs

Color TV Monitor with both Composite and S-Video inputs

1 single-ended, shielded video RCA cable

1 single-ended, shielded S-Video cable

These tests verify that the five composite inputs, the three S-Video inputs, and the video outputs are passing video.

Composite Input to Monitor Output Test

Setup

1. Connect the composite video output from the VCR to the DC-1 VCR1 composite video input.
2. Connect the composite video Monitor output to the monitor composite video input.
3. Put the DC-1 in Extended Diagnostics mode by applying power to the DC-1 while pressing and holding down both the front panel REC/ZONE2 and EFFECT buttons until **Extended Diagnostics** appears on the front panel display.
4. Press TV on the remote to display **VIDEO Test.**
5. Turn on the video source and the monitor.

Procedure

1. To test the VCR1 input to Video Monitor output path, press VCR1 on the remote. **13** will appear next to the **VIDEO Test** message on the display indicating the path has been set
2. Press Play on the video source.
3. Verify that a clear, undistorted picture appears on the monitor.
4. Pause the video source.
5. Move the cable to the next video input and press the corresponding button on the remote to activate that path for test, then repeat the above procedure.

   The reference numbers for each input path are:

   VCR1: 13 VCR 2: 12 V-DISC: 11 TV: 10 AUX: 0F

Composité Input to Record Output Test

Setup

1. Connect the composite video output from the VCR to the DC-1 VCR1 composite video input.
2. Connect the composite video Record output of the DC-1 to the monitor composite video input.
3. Put the DC-1 in Extended Diagnostics mode by applying power to the DC-1 while pressing and holding down both the front panel REC/ZONE2 and EFFECT buttons until **Extended Diagnostics** appears on the front panel display.
4. Press TV on the remote to display **VIDEO Test.**
5. Turn on the video source and the monitor.

Procedure

1. To test the VCR1 input to video record output path, press and release RECORD on the remote. **14** will appear next to the **VIDEO Test** message. Press VCR1 on the remote. **13** will appear next to the **VIDEO Test** message, indicating the path has been set.
2. Press Play on the video source.
3. Verify that a clear, undistorted picture appears on the monitor.
4. Pause the video source.
5. Move the cable to the next video input and press the corresponding button on the remote to activate that path for test, then repeat the above procedure.

   The reference numbers for each input path are:

   RECORD, VCR 1: 14, 13 RECORD, VCR 2: 14, 12 RECORD, V-DISC: 14, 11
   RECORD, TV: 14, 10 RECORD, AUX: 14, 0F

S-Video Input to Monitor Output Test

Setup

1. Connect the S-Video output from the VCR to the DC-1 VCR1 S-Video input.
2. Connect the S-Video Monitor output of the DC-1 to the monitor video input.
3. Put the DC-1 in Extended Diagnostics mode by applying power to the DC-1 while pressing and holding down both the front panel REC/ZONE2 and EFFECT buttons until **Extended Diagnostics** appears on the front panel display.
4. Press TV on the remote to display **VIDEO Test.**
5. Turn on the video source and the monitor.

Procedure

1. To test the VCR1 input to video monitor output path, press and hold ACCY on the remote, then press VCR1. **93** will appear next to the **VIDEO Test** message on the display of the DC-1, indicating the path has been set.
2. Press Play on the video source.
3. Verify that a clear, undistorted picture appears on the monitor.
4. Pause the video source.
5. Move the cable to the next S-Video input and press the appropriate buttons on the remote to activate that path for test, then repeat the above procedure.

   The reference numbers for each input path are:

   ACCY/VCR1: 93 ACCY/VCR2: 92 ACCY/V-DISC: 91

S-Video Input to Record Output Test

Setup

1. Connect the S-Video output from the VCR to the DC-1 VCR1 S-Video input
2. Connect the S-Video Record output of the DC-1 to the monitor S-Video input.
3. Put the DC-1 in Extended Diagnostics mode by applying power to the DC-1 while pressing and holding down both the front panel REC/ZONE2 and EFFECT buttons until **Extended Diagnostics** appears on the front panel display.
4. Press TV on the remote to display **VIDEO Test.**
5. Power on the video source and the monitor.

Procedure

1. To test the VCR1 S-Video input to video record output path, press and release RECORD. **14** will appear next to the **VIDEO Test** message. Press and hold ACCY, then the VCR1 button on the remote. **93** will appear next to the **VIDEO Test** message on the display of the DC-1, indicating the path has been set .
2. Press Play on the video source.
3. Verify that a clear, undistorted picture appears on the monitor.
4. Pause the video source.
5. Move the cable to the next S-Video input and press the corresponding button on the remote to activate that path for test, then repeat the above procedure.

   The reference numbers for each input path are:

   RECORD, ACCY/VCR1: 14, 93 RECORD, ACCY/VCR 2: 14, 92
   RECORD, ACCY/V-DISC: 14, 91

4

Troubleshooting

Diagnostics

There are two sets of DC-1 Diagnostics: Power On Diagnostics, and Extended Diagnostics. Power On Diagnostics are automatically executed each time power is applied to the DC-1 via the rear panel Power switch. Extended Diagnostics are not automatically executed, but can be invoked by the user for specific purposes. Extended Diagnostics include additional tests to verify front panel controls, infrared communications, and audio and video performance, as well as those used to troubleshoot the DC-1.

In normal use, the DC-1 is left connected to AC power and its operation is controlled by the front panel ON/STANDBY button, or by the remote control. When controlled this way, Power On Diagnostics are not executed.

Diagnostic Reporting

All diagnostic functionality is reported to the LCD, and to the front panel LEDs. These identify the test being executed, and pass and failure information. The LEDs are utilized to report diagnostic status in the event that the LCD is not functioning. More information is available on the diagnostic reporting operation of the LCD and the front panel LEDs in the LCD Display, and Front Panel LEDs sections.

In the event of diagnostic failure, additional failure information, such as data sent, data received, address location, etc., is listed in an error log. The error log can be viewed on the LCD. Information covering the error log can be found in the Error Log section.

LCD Display

The LCD is the primary source of information during diagnostics. The exact display information will depend on the test or tests being executed. When an individual diagnostic test is executed, the LCD will display the name of that test. Groups of tests, such as those run during Power On diagnostics, display a generic message on the top line of the LCD, such as DIAGNOSTIC TESTS. Failure messages display an E followed by a number identifying which test failed.

Front Panel LEDs

A test number associated with the current test is displayed on the front panel LEDs. The LEDs are used in binary format with the MUTE LED as the LSB and the red TAPE LED as the MSB. Running test number 1 illuminates only the MUTE LED, with all the others off. Running test number 2 illuminates only the BYPASS LED, with all others off. Running test number 3 illuminates both the MUTE and BYPASS LEDs, with all others off, etc.

If a failure occurs, the red VCR1 LED is illuminated to indicate test failure along with the LEDs identifying the test. The diagnostics will attempt to continuously execute the failed test to keep the signal lines active as an aid in debugging the failure. These error reporting and repeat test functions, combined with the DC-1's continuous scaning of the front panel LEDs, cause LED flickering which should be considered as normal during diagnostics.

Error Log

An error log containing a log of the last 20 failures is available as a menu item in the Extended Diagnostics Tests. If the error quantity exceeds 20, additional error messages will be stored at the first location in the log (FIFO). The error log is stored in the non-volatile section of SRAM.

Every failure stored in the error log has 6 parts:

#NN E## tXX aYYYYYY
wZZZZZZ rQQQQQQ

1. #NN: Error Log Number. The error log location number is shown in hexadecimal (00-13). Turn the VOLUME knob clockwise to scroll through all 20 error log locations.
2. E##: Failure Number. The E indicates an error and the two-digit number identifies the test that failed.
3. tXX: Failure Type.

   01=Address Failure. During an address test, data sent does not match data retrieved does not match.

   02=Data Failure. During a data test the data sent does not match data retrieved.

   03=Timeout Failure. The device being sent data does not return any ready or data transfer acknowledge.

   04=Counter Failure

   05=Non-Volatile Data Failure. The data stored in non volatile memory during the Pre-Burn In test does not match the value tested during the Burn-in Loop.
4. aYYYYYY: Failing address location. The address, in hexadecimal, where the failure occurred.
5. wZZZZZZ: Value Written. The target value, in hexadecimal, that was written to the address where the failure occurred.
6. rQQQQQQ: Value Read. The actual value, in hexadecimal, that was read from the address where the failure occurred.

Diagnostics Control/Interface

Various combinations of button pushes are used to control diagnostic activity. During Power On Diagnostics, three options are available: skipping the Power On Diagnostics, entering Extended Diagnostics, or proceeding to the next test. Each of these options is described below.

Skip Power On Diagnostics

Simultaneously pressing the VCR1 and TAPE buttons will skip the Power On Diagnostics routine and put the unit directly into operating mode. The DC-1 periodically checks for this button combination during the Power On Diagnostics and will attempt to skip any remaining tests when this command is detected.

Enter Extended Diagnostics

When power is applied to the DC-1, the LED and front panel LEDs are lit for 3 seconds. To enter Extended Diagnostics, press and hold down both the front panel REC/ZONE 2 and EFFECT buttons until the end of the 3-second interval. The LCD will indicate **Extended Diagnostics**. Alternatively, during the interval, press and hold SELECT on the Remote until **Extended Diagnostics** is displayed.

Pressing and holding EFFECT and MUTE following failure of any test other than the Z80 CPU test will activate Extended Diagnostics. After a failure occurs the unit will attempt to display the failed test number, and will execute a loop of the failing test.

Proceed to the Next Diagnostic Test

Pressing and holding BYPASS and REC/ZONE 2 after the failure of any Power On Diagnostic test (other than the Z80 CPU test) will cause the DC-1 to attempt to proceed to the next diagnostic test. Normally, test failure will initiate a test loop to keep the signal lines active as an aid in debugging the failure. At the end of each loop the diagnostics will check to see if the BYPASS and REC/ZONE 2 buttons are being held. The amount of time required to hold the buttons in will vary with the length of the currently running test.

Power On Diagnostics

Power On diagnostics verify the functionality of the basic DC-1 hardware. They do not completely test all hardware, nor can they fully diagnose a failure. Power On diagnostics take approximately 20 seconds to complete. When the unit is powered on, an attempt is made to illuminate the LCD and front panel LEDs for approximately three seconds. As soon as the Z80, EPROM, SRAM and LCD are determined to be functional, the LCD will show:

DIAGNOSTIC TESTS
••••••••••••••••••••

The dots on the lower display line decrement from both sides as the rest of the Power On diagnostic tests are completed to indicate the progress of the tests.

The Power On diagnostic tests are listed below, in the order in which they are performed. Each test has an identifying number which is displayed with any failure message.

E1 Z80 CPU Test.
E2 EPROM Checksum Test.
E3 Z80 SRAM Test (Non-Volatile Section Saved).
E4 LCD Test.
E5 Z80 System Interrupt Timer Test.
E6 Lexichip II WCS and Word Clock Test.
E7 Lexichip II DRAM Test.
E8 56004 SPI (Serial Peripheral Interface) Test.
E9 AC-3 Option Board Test

If a failure occurs, the test will attempt to write an entry into the error log and enter a loop to exercise signal lines to aid in debugging. The error log is stored in the nonvolatile section of the SRAM so that it is not destroyed during Power On diagnostics. A single error log entry is made each time the DC-1 is powered up, a diagnostic test is executed, and a failure encountered.

E1 Z80 CPU Test

This test verifies operation of the the internal Z80 registers. The test requires that the address, data and control busses from the Z80 and the EPROM be operational. After deasserting interrupts and sending the test number to the front panel LEDs, the Z80 attempts to pass the values FFh, 55h, AAh, and 00h through the Z80's internal registers. If a failure occurs the test will attempt to initiate a loop to exercise the address, data and control lines.

If any of the busses have serious problems, or if the Z80 and/or EPROM is defective, the unit will not boot and will not be able to initiate a test loop.

E2 EPROM Checksum Test

This test verifies the EPROM has the correct program and verifies the bank switching of all DC-1 banks. The data in each of the banks of the EPROM are added in an addition of the entire EPROM. The test verifies that the calculated checksum matches the checksum value stored in the EPROM.

E3 Z80 SRAM Test

This test performs nondestructive testing on the SRAM. The test first saves the data in the location being tested. Then that location is tested by writing and reading FFh and 00h. The original data is then returned to the SRAM and the next location tested. In the Preburn-in test, further destructive testing is performed on the entire SRAM.

The destructive test, includes a counter test and a data write and read test. These tests do not save the data before writing. Also, more data patterns are written into this section of the SRAM. The counter test writes a 0 into the first location of memory, a 1 into the next, then a 2, etc. This repeats until the volatile section of the SRAM is tested.

The data test of the SRAM writes and reads the volatile section with 55h, AAh, FFh, 00h, 01h, 02h, 04h, 08h, 10h, 20h, 40h, 80h, FEh, FDh, FBh, F7h, EFh, DFh, BFh, and 7Fh. The last 16 patterns shift 1's and 0's through the memory locations.

E4 LCD Test

The LCD performs a busy test and a memory test. The busy test is performed by sending information to the LCD and verifying that the LCD asserts then deasserts its busy status. The LCD memory test consists of writing 55h and AAh to the character generator memory and display memory space of the LCD and reading them back.

E5 Z80 System Interrupt Timer Test

This test checks the system interrupt timer. The PIC 16C54 microcontroller is initialized to start the interrupt timer and the interrupt interval is measured by the Z80. A single interrupt takes approximately 2.048ms.

E6 Lexichip WCS Test

The WCS test is a destructive memory test which involves a counter test and a data write and read test.

The counter test writes a 0 into the first location, a 1 into the next, then a 2, etc. until the entire section of the WCS memory is tested.

The data write and read test, writes and reads the memory with 55h, AAh, FFh, 00h, 01h, 02h, 04h, 08h, 10h, 20h, 40h, 80h, FEh, FDh, FBh, F7h, EFh, DFh, BFh, and 7Fh. The last 16 patterns shift 1's and 0's through the memory locations.

E7 Lexichip DRAM Test

This test uses a counter test and a single data write and read test. A single data write and read test is used during the power on diagnostics to conserve time. The Extended Diagnostics use additional data patterns.

The counter test writes a 0 into the first location, a 1 into the next, then a 2, etc. This repeats this until the entire section of the DRAM is tested. The data test writes and reads the memory with 55555h.

E8 56004 SPI Test

This test verifies that the 56004 is able to boot and to pass data. The test does not fully verify the audio processing function of the 56004. However, if the 56004 can pass this test, which also exercises the CPU of the 56004, most of the internal workings of the chip are operational. First the 56004 is reset and the test program is loaded. Then test data patterns are sent via the serial host interface and read back via the SC_RETURN_DATA line. If the data returned matches what was sent, the test passes.

If the test fails the 56004 can be isolated from the path in the Extended Diagnostics. See the LOOP SPI Test for information on how to remove the 56004 from the data path, thus identifying the failure as originating with the 56004 or the communication circuitry.

E9 AC-3 Option Board Test

This test, which verifies that the AC-3 Option board is functioning properly, has two parts. First, the Zoran microprocessor (U1) is booted, and various initialize commands are sent to it. Second, the memory chips (U2-4) are tested.

When the Power On diagnostics are completed the LCD will display a Version # and Copyright message, and become operational.

Extended Diagnostics

Extended Diagnostics contain a set of tests which check DC-1 functionality more extensively than the Power On diagnostic tests, as well as troubleshooting tests which can be used to help isolate the source of failures.

Pressing and holding down both the front panel REC/ZONE 2 and EFFECT buttons while turning on the rear panel power switch DC-1 will activate Extended Diagnostics.

Pressing and holding EFFECT and MUTE following failure of any test other than the Z80 CPU test will activate Extended Diagnostics. After a failure occurs the unit will attempt to display the failed test number, and will execute a loop of the failing test.

Any of these methods will display the message:

EXTENDED DIAGNOSTICS
Select a Test

Once this message is displayed, the held buttons can be released.

Turn the front panel VOLUME knob to select a test, or group of tests, then press MUTE to execute the test(s). Some tests are organized into groups which proceed automatically (such as Power On diagnostics). Upon successful completion of a group test, the LCD will display **DONE**, and exit to the main menu or continuously loop (as the Burn-In Loop test).

If an individual test is selected, it will continuously run and report passage each time it successfully completes the test. If a test fails, the LCD and the red VCR1 LED will attempt to identify the failed test. The test will attempt to loop on itself to keep the signal lines active for debugging purposes.

To return to the Extended Diagnostics menu, hold down the front panel BYPASS button and press MUTE. To return to the top of the Extended Diagnostics menu, hold ACCY and press DONE on the remote.

Pre-Burn in Tests

The Pre-burn in tests are a group of tests which are identical to the Power On diagnostic tests, but with more time allotted to fully evaluate functionality, particularly in the Lexichip DRAM memory test.

Any of the tests can be run individually by turning the VOLUME knob to the desired test and pressing the MUTE front panel button to execute the test. If the test is selected to be individually run, the test runs continuously. If the test passes, the LCD will attempt to report the test passes upon each successful completion. If the test fails the LCD will attempt to report the failure and the test will continue looping on itself to keep the signal lines active for debugging purposes.

Functional Suite

This group of tests is used to verify functionality of the switches, LED's, VOLUME knob, LCD display, logo illumination, etc. The tests include:

Character Test
Block Test
Switch Test
LED Test
AC3 SPI Test
AC3 MEM Test
Contrast Test

Selecting the Functional Suite causes this group of tests to run in sequence. Any of these tests can be selected with the VOLUME knob to run individually. Pressing MUTE will execute the selected test continuously. If the test passes, the LCD will attempt to report the test passes upon each successful completion. If the test fails the LCD will attempt to report the failure and the test will continue looping on itself to keep the signal lines active for debugging purposes.

Character Test

This test, in combination with the Block Test, verifies that all display segments are functioning. The Character Test places the same character on all LCD segments. The front panel VOLUME knob is then used to change the character.

Block Test

This test, in combination with the Character Test, verifies that all display segments are functioning. The Block Test illuminates all pixels on a single segment of the LCD. The front panel VOLUME knob is then used to move the block to each segment.

Switch Test

When this test is running, press any button on the front panel. The LCD will indicate which front panel button has been pressed, and any LEDs associated with the button will be lighted.

LED Test

As the VOLUME knob is turned each individual LED is illuminated.

AC3 SPI Test
This test sends 81h to the Zoran microprocessor (U1) on the AC-3 board and instructs the Zoran to return the version encoded in its ROM. The test will pass if the Zoran sends the correct version back.

AC3 MEM Test
This test verifies that the memory chips (U2-4) on the AC-3 board are functioning properly. An address test is used to verify that all address locations are available. Each memory location is then tested with the patterns 55555, AAAAA, FFFFF and 00000.

Contrast Test
The Contrast Test verifies that the range of contrast control for the LCD is functioning. Turn the VOLUME knob to step the LCD contrast through its range. Logo illumination is also tested. The logo board is illuminated throughout the contrast of the LCD except at one step (fully counter clockwise).

Burn-In Loop
This test is executed during the burn-in cycle to exercise the digital circuitry. The Burn-In Loop Test continuously runs the Pre Burn-In Test with one exception. The data left in the non-volatile section of the SRAM during the Pre Burn-In Test is checked by the Burn-In Loop Test to verify the data remains intact. If a failure occurs, the diagnostic attempts to go into a loop on the test that failed, the LCD attempts to display the error, and an entry is made into the error log.

SRAM Initialize
This test initializes the entire SRAM. Upon completion of the test the DC-1 initiates Power On diagnostics and returns to normal operation. All settings are restored to their factory default values.

Debugging Tests
The following tests are designed to help isolate sections of circuitry to aid in fixing a failed DC-1.

Remote (IR) Test
This test verifies the functionality of the IR Remote. Press a key on the remote and verify that the LCD displays the hexadecimal code identifying the key . The hex display on the LCD remains unchanged until another remote key is pressed. While the remote key is being pressed the IR acknowledge LED will flash and the LCD displays the IR icon along with the hex value. To exit the test, hold down the front panel BYPASS button and press MUTE. When you have successfully exited the test the LCD will display an arrow on the left side pointing to the word REMOTE.

Loop SPI (56004 Loop) Test
The LOOP SPI Test allows one to take the 56004 out of the data path and verify if the problem in the DC-1 is the 56004 or the supporting circuitry. To run the test move jumper W7 to the TEST position, pins 2&3. Then press the MUTE front panel button to run the test. This will pass serial data out of U56 pin 9, SCDATA, to U54 pin 14. Normally during the 56004 SPI Test the data at U54 pin 14 is from the 56004.

Softknob (VOLUME) Test
This test verifies that the VOLUME knob can be read as it is rotated clockwise and counterclockwise. When the test is activated, a number indicating knob position (00-35) is displayed on the right side of the LCD. A displayed arrow indicates clockwise and counterclockwise movement of the knob.

Audio I/O Test
This test configures the DC-1 to pass audio data through the A/D, DSP, and D/A circuitry without any DSP effects processing. Specific tests are described in Chapter 3: *Performance Verification.*

Video I/O Test
This test configures the DC-1 to exercise and calibrate the video module.

Troubleshooting

Problems with the DC-1 usually fit into one of three categories: user interface, audio, or video problems. User interface problems can range from a non-functioning remote or front panel control to no display. Audio problems involve the signal quality from the analog or digital audio inputs and outputs. Video problems affect the presence of the On-Screen display or the quality of the video signal being switched through the DC-1. Some symptoms can be traced directly to a particular sub-system, while others can be caused by multiple sub-system failures.

When a problem is encountered, it is good practice to verify the overall operation of the DC-1 by running all of the tests in the proof-of-performance section and the Diagnostics. Additionally, refer to the Troubleshooting section of the DC-1 User Guide (Lexicon Part No. 070-11787) to isolate possible user setup problems.

WARNING **CAUTION**

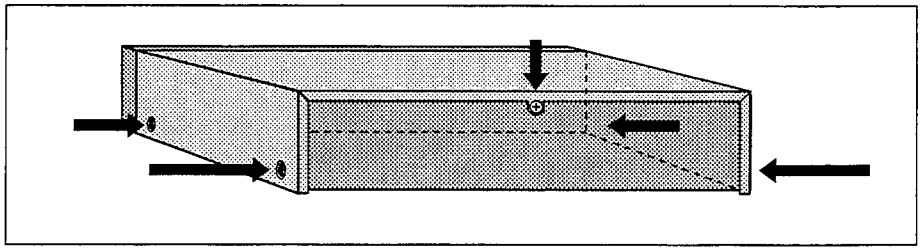
As the following procedures require removal of the DC-1 cover, it is imperative that these tests be performed with regard to all safety and ESD precautions.

Assembly/Disassembly

Remove the five (5) screws which attach the top cover to the unit: two (2) on each side and one (1) at the center rear. Orient the unit so that you are facing the front panel. Hold the top cover on each side at the rear of the unit. Remove the top cover by pulling the sides slightly away from the chassis and then sliding the cover up and toward the rear of the unit.

Replacing the top cover requires getting the front edge of the top cover into the slot along the top edge of the front panel. Orient the unit so that you are facing the front panel. Hold the top cover on each side at the rear of the cover. Hold the cover at roughly a 45° angle from front to back, with the front edge of the cover lowered. Spread the rear edges of the cover slightly and slide the cover onto the

chassis. Slide the front edge of the cover into the slot of the front panel and then lower the cover onto the chassis. Replace the cover screws at the locations indicated.



User Interface Problems

Remote Control

A remote control may not function properly for a variety of reasons. The top of the remote must be pointed directly toward the DC-1 without any obstructions between the remote control and the unit for proper transmission of the data sent at infrared frequencies. Excessive ambient light conditions can also interfere with data transmission. In addition, a remote control held within a few inches of the DC-1 may not function properly, as the IR receiver can be overloaded at close distance.

If the remote control is not functioning after all of these conditions have been corrected, replace the batteries. Remember to use only alkaline-type batteries. If the remote still does not function, try another DC-1 remote control if available. If both remotes fail to work, the problem may lie within the DC-1.

Front Panel Display and IR Receiver

Verify that cable connections from the Main board (J20, J24) to the front panel LCD and IR boards are secure.

Excessive vibration can eventually break the strands of cables making them intermittent or possibly open. Connections can become oxidized, corroded or otherwise contaminated causing them to become intermittent, open, or resistive. For all of these reasons, caution should be used in troubleshooting. Before removing any cables, inspect them carefully for proper seating and continuity at all points between the boards.

Verify that the +5VD supply is operational and within specification. Check the distribution of the supply to ensure that power is reaching the appropriate front panel boards.

Switch, Encoder and LED problems

If only one front panel control is failing, then the problem is probably a bad switch, encoder or LED. For problems specific to the front panel power switch or volume encoder, verify the cable connections from the Main board (J23 and J26) to the front panel power switch and the Encoder board. If more than one control is failing, the problem may be with the main processor.

Audio Problems

When troubleshooting any kind of equipment, intermittent problems are among the most difficult to trace. The first step is to collect as much information as possible. The following list presents some basic questions which should be answered before attempting repairs.

Does the problem occur...

- on only one output?
- at only certain signal frequencies?
- at only certain signal levels
- in only certain programs?
- at only certain sample frequencies?
- only with input?
- only without input?

Is the problem temperature sensitive?

Is the problem shock sensitive?

In general, it is best to run all of the audio proof-of-performance tests to verify overall performance and to further isolate the problem. This can be vital when troubleshooting subtle problems. Although system failures may cause a variety of tests to fail, troubleshooting based on one symptom type may be much easier than another. For example, a bad capacitor may produce a high level of distortion and a frequency response problem. The frequency response problem would be easier to trace because the signal level can be monitored throughout the signal path on an ordinary oscilloscope.

All cable connectors mounted to the main board should be verified for proper, intermittent-free operation and continuity.

One Bad Channel

One of the most useful pieces of information is determining whether a problem occurs on one or all channels. If the problem occurs at one output only, the following assumptions can generally be made with some level of confidence:

The power supplies are OK.
System timing (clocks) is OK.
The digital circuitry (except for the A/D and D/A conversion circuitry) is OK.

These problems can be fairly easy to troubleshoot, as the working channel can be used as a reference. With the same signal applied to both inputs, compare the signals on both channels at various points along the analog signal path. This method may localize the problem fairly quickly.

Diagnostics may be helpful in isolating RAM or DSP failures that might cause bad audio. Refer to the Diagnostics Descriptions for more information.

All Channels Bad

The fact that a problem occurs in all channels can be revealing, as the likelihood of two or more separate components failing in the same way at the same time is remote. The problem is likely be with a component or components common to all channels. Another likely cause is a defective power supply. Verify that the power supplies are operational and within specification.

No Output

If there is no output from only one channel, the problem can easily be traced by comparing the signals at various points along the analog signal path with a functioning channel.

If there is no output from any channel, check the ±15V analog and ±5V analog power supplies to verify that they are operational and within specification. If the power supplies are OK, determine whether the problem lies within the A/D conversion or the D/A conversion, then troubleshoot the appropriate circuitry.

Video Problems

Determine if the problem exists with all video inputs or outputs, with only certain types of video inputs or outputs (composite or S-Video) or with only a single video input or output.

Verify that there is reliable continuity between all of the rear panel connectors and the video connector board. (Note that the S-Video input and output connectors are mounted directly on the video board.) For composite video problems, verify the connections from the video connector board (J508) to the video board (J7).

If the problem exists with only one connection or type of input/output, troubleshoot the associated circuitry on the video board. If the problem exists with all video inputs and outputs, verify the connection from the video board (J8) to the main board (J15) and/or troubleshoot the associated main board interface.

Initial Tests

1. Inspect the DC-1 for obvious signs of physical damage.
2. Verify that all switches operate smoothly.
3. Remove the DC-1 top cover, as described earlier. Locate the power supply mounted vertically on the left side of the chassis. Locate the fuse at the back of the pc board across from the power switch. Remove the fuse and verify the correct value of 3.15 Amp 250volts.

Caution

Replace fuse only with same type and rating.

4. Verify that all socketed ICs are correctly seated.
5. Verify that all ribbon cables are correctly installed and secured.
6. Check for burnt or obviously damaged components.

Power Supply

Required Equipment

Clean, antistatic, well lit work area

Variable AC supply, 2 amp minimum.

Digital Multimeter (DMM) 3 .5 digit, 0.5%, or better, accuracy

The main power supply in the DC-1 has an operational range of 100-240VAC, 50-60Hz, 35Watts. The following test is for North American line voltage of 120VAC.

1. Set the variable AC supply to 0 volts
2. Connect the power cord between the supply and the DC-1.
3. Turn the DC-1 rear panel Power switch ON and slowly bring up the voltage to 120VAC. The current should not exceed 0.3 Amps for 100/120V testing (0.15Amps for 220/240V) . If the unit draws excessive current, turn the DC-1 off and check the supply rails for shorts.
4. Use a DMM to measure all the power supply rails by using the DC-1 chassis ground as the 0VDC reference. Verify that all voltages are within the tolerance range shown below.

Battery Test

Turn the DC-1 rear panel Power switch OFF. Locate C280 (at the right of SRAM U62 on the right side of the main board) and verify that the voltage at the rear side of C280 to chassis ground is >2.50 VDC.

Main Board

Supply Rail	Tolerance	Location
+5VD	4.94-5.26	Front Left Corner Red wires soldered at J14
+15V	15.00-16.95	Test point Rear Left Corner Left of Y1
-15V	14.25-15.75	Test point Rear Left Corner Right of U6
Battery	≥2.5	With the unit powered off, measure from ground to the rear of C280 (near U62)

Video Board

Supply Rail	Tolerance	Location
+5VA	4.94-5.26	Test point right side of board
-5VA	4.75-5.25	Test point right side of board
+5VAS	4.75-5.25	Test point right side of board

Power Control Trigger Outputs

Two trigger outputs are available on the rear panel 5-pin DIN connector labeled PWR CTL. The Remote Power Control Trigger is high whenever the DC-1 is on. This trigger goes low in Standby, or off. The Remote Aux Control Trigger may be assigned to be activated for specific inputs, or it may be controlled via the remote control by holding down ACCY while pressing BAL ▲ (on) or Bal ▼ (off). Each trigger output can be independently configured for +12V or +5V operation.

Trigger Output	Pin #	+5V	+12V
Remote Power Control	3	W4, W5	W6
Remote Aux Control	5	W1, W2	W3

One of two circuit topologies may be found in a particular DC-1. The specific topology can be determined by checking if ferrite beads or 5.1Ω resistors are installed in locations FB1 and FB2. The following table gives an indication of output voltage and drive capability for each topology.

Configuration	FB1, FB2	Min Vout	Max Vout	Max Iout
+5V	ferrite beads	4.2 volts	4.7 volts	180mA
+5V	resistors	3.3 volts	5.1 volts	200mA
+12V	ferrite beads	11.0 volts	13.7 volts	100mA
+12V	resistors	11.5 volts	15.2 volts	140mA

Video Subcarrier Calibration

Required Equipment

Frequency Counter, 7 digit accuracy

1. Enter the Extended Diagnostics mode.
2. Press TV on the remote to enter the Video Test.
3. Press MENU ▼. The output frequency at TP2 on the Video board becomes the NTSC calibration frequency.
4. Set the counter to measure at a gate rate of 0.1 second and adjust the variable capacitor (C39) to set the frequency at TP2 to 3.57168MHz.
5. Press SELECT. The frequency should now be between 4.43737 and 4.43781MHz.
6. Turn off the DC-1.

Restoring Defaults

This will erase any programs you have stored, as well as all setup and calibration values.
Note any settings you want to re-use before proceeding.

Turn the DC-1 OFF with either the front panel switch or the remote. Turn the unit back ON and press and hold BYPASS on the remote while the copyright message is displayed. (Make sure you do not block the infrared receiver on the DC-1 front panel.) The on-screen display will read:

FACTORY PRESETS MENU
EXIT
RESTORE DEFAULTS

If you want to resume normal operation *without* restoring all defaults, this is your last chance. Use MENU ▲ or ▼ to highlight EXIT, then press SELECT.

To restore defaults, use MENU ▲ or ▼ to highlight RESTORE DEFAULTS, then press SELECT. This will clear and reload all preset effects and all factory settings of Volume, Balance, Contrast, Configuration, etc.

When the message FACTORY DEFAULTS RESTORED is displayed, press DONE to return to normal operation.

5

Theory of Operation

DC-1 Theory of Operation is divided into three sections: digital, analog and video. The digital section discusses the Z80 host processor and its peripherals, system clocks, the PIC microcontroller, the Lexichip and 56004 digital signal processors, and the upgrade path for discrete 5.1 sound capability. The analog section includes the signal paths for both analog and digital audio inputs, A/D and D/A conversion, level controls and the power supply. The video signal paths and on-screen display are discussed in the third section.

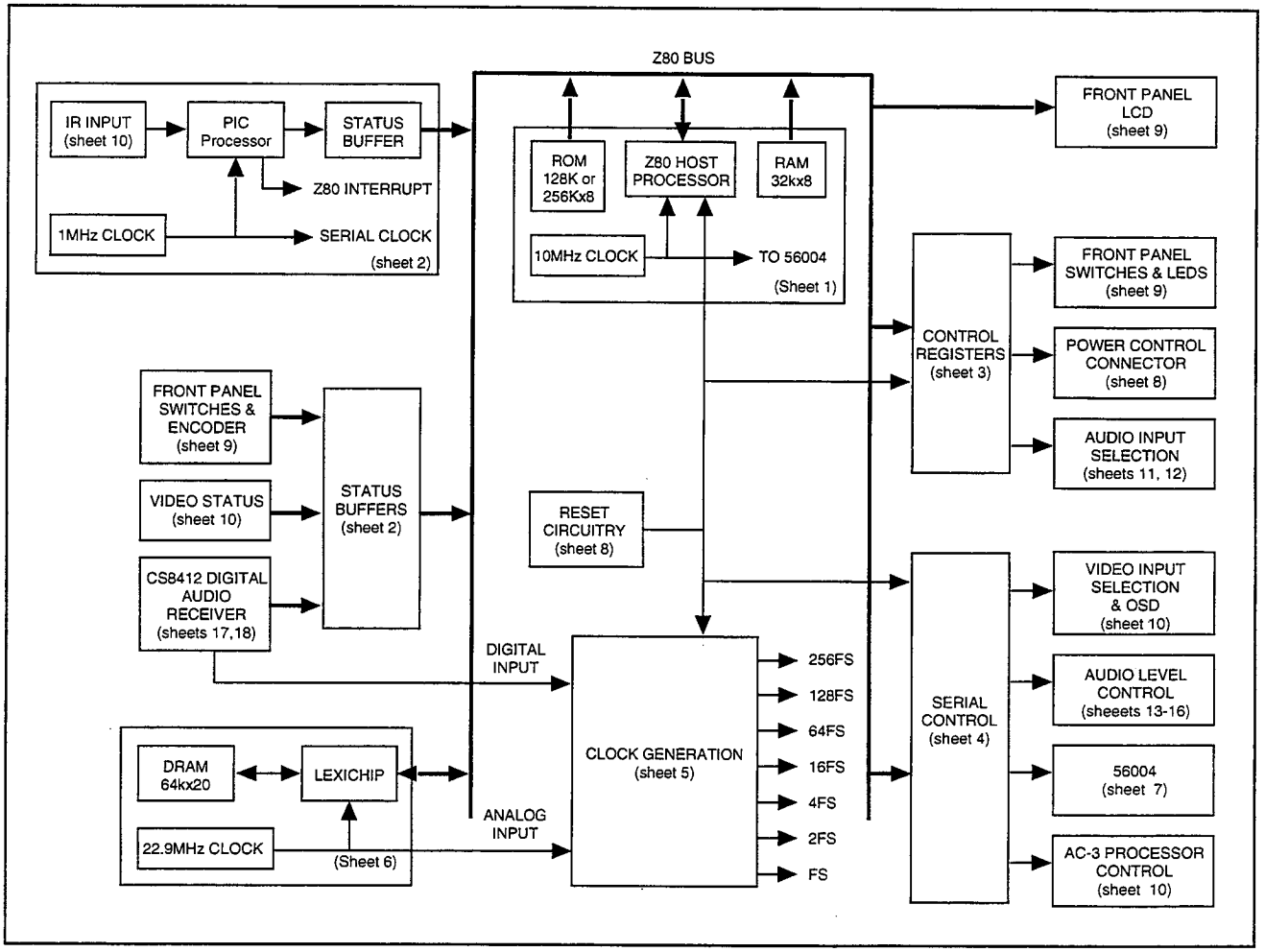
Digital Theory

The digital section of the DC-1 is capable of receiving two channels of 20-bit audio. This is first processed by the Lexichip digital signal processor. In surround modes, the stereo pair is decoded and used to create up to seven channels. Other effects include reverb and ambience programs. The seven channels of audio are then passed serially to a 56004 processor which adds equalization and creates the subwoofer output. The 56004 outputs are then sent to the D/A converters for output conversion.

An upgrade path is provided for discrete 5.1 surround. For the Dolby Digital upgrade, AC-3 encoded data is passed to a Zoran 38500 DSP processor which unpacks and decodes the surround data. Its six outputs are transmitted to the Lexichip as serial data multiplexed onto a single line clocked by a 256fs bit clock.

The Z80 host processor is responsible for all host control functions as well as slave DSP duties. Host functions include front panel display and switches, receiving IR input, On Screen Display, input and output level control, and Lexichip and 56004 initialization and parameter update. Refer to the following block diagram and the Main Board scematic sheets 1-10 for the digital section.

Digital Block Diagram



Memory Map

Z80 Processor (sheet 1)

Program ROM has an address range of 18 bits, comprised of 15 bits from the Z80 address bus and 3 bits derived from a programmable bank-select register. Bank-select bits are placed in the Z80 I-register and appear on the upper half of the address bus during the refresh phase of every instruction fetch. The bits are latched by U70 and U76 when ZMREQ/ and ZRFSH/ are both low. U71 gates the latched bits with Z80 address bit 15 to form the address bits 17, 16 and 15 of ROM U77. When the Z80 addresses the upper 32K of logical memory, the bank bits determine which 32K of physical memory is visible. Because of the gating, logical addresses in the lower 32K are independent of the bank register, and low logical addresses always access a common physical bank. The maximum physical ROM size is 256KB, accessible as eight banks of 32KB.

Chip selects for memory and memory-mapped IO devices are generated by U69. The memory map for a 128KB ROM is detailed in the following table.

<table>
<tr><th>ADDRESS</th><th>BANK 0</th><th>BANK 1</th><th>BANK 2</th><th>BANK 3</th></tr>
<tr><td>0000H
1000H
2000H
3000H</td><td colspan="4">COMMON
ROM</td></tr>
<tr><td>4000H
5000H</td><td colspan="4">SRAM</td></tr>
<tr><td>6000H</td><td colspan="4">LEXICHIP</td></tr>
<tr><td>7000H</td><td colspan="4">LCD</td></tr>
<tr><td>8000H
9000H
A000H
B000H</td><td>COMMON
ROM
(SHADOWED)</td><td rowspan="8">ROM
BANK 1</td><td rowspan="8">ROM
BANK 2</td><td rowspan="8">ROM
BANK 3</td></tr>
<tr><td>C000H
D000H
E000H
F000H</td><td>ROM
BANK 0</td></tr>
</table>

Lexichip WCS

Lexichip WCS (sheets 1&6)

The Z80 runs off a 10MHz crystal oscillator, the Lexichip off a 22.9MHz crystal, (512fs, fs=44.1kHz + 1.42%). The Z80 and Lexichip communicate asynchronously, which has the following implications.

Wait states are imposed on the Z80 to ensure successful A-phase access of the Lexichip. Two wait states lengthen the Z80 write strobe to three T-states (300ns), which covers the worst-case requirement of five Master Clock periods (218ns). The two wait states are generated by Z80 GAL U69, latch U68 and latch U74. The wait signal is initiated by WAIT_ON/ and terminated by LEX_WAIT_OFF/ . WAIT_ON/ is derived from ZMREQ/ clocked with 10MHz/ (inverted Z80 clock) because of worst-case propagation delay considerations.

The write strobe is created in the Z80 GAL by using the Lexichip ZCLK output to create quadrature phase. LEXWR/ goes low during the C phase of a Z80 write and is set high by DISLEXWR/ at the start of the next C phase. It will be held high until the end of Z80 WR/.

LCD Interface (sheets 1&9)

The front panel LCD interface is implemented as memory-mapped IO. Seven wait states are generated by Z80 GAL U69 and associated logic to meet the relatively slow access characteristics of the LCD module.

The chip select to the LCD, LCD_EN/, is generated by U76. During a read cycle, the access is ended by ZMREQ/ clocking the enable low. This maintains Z80 read data hold time and meets the LCD address hold time. During a write cycle, the enable is cleared low earlier by LCD_WAIT_OFF/.

The LCD data buffer U73 is enabled by LCD/ from the Z80 GAL. Z80 address bit 2 sets the data buffer direction and address bit 0 provides the read/write signal to the LCD.

I/O Memory Map (sheet 1)

All peripherals not mapped into memory space appear in I/O space. Reads and writes are decoded separately to ensure write hold time. All registers are reset to zero at power up except the serial control register.

The I/O data buffer U80 is enabled by ZIORQ/ and the direction is set by Z80 address bit 0.

I/O Writes (sheets 1&3)

I/O writes employ a truncated write pulse in order to meet the hold-time requirements of the 74HC273 control register chips. This is done by clocking ZWR/ twice, inverting it, and then ORing it with the original ZWR/ (U68 & U75). Clocking twice is required because the Z80 automatically inserts one wait state for all I/O accesses. This write pulse is then used along with ZIORQ/ to enable decoders U63 and U65 which generate the I/O write strobes to the registers.

LEDs, Switches and Encoder (sheets 2, 3&9)

LEDs

The LED rows and the IR LED are controlled by a 74HC574 (U87) which is capable of ±35ma per pin and 70ma per package. The columns are controlled by a 74HC273 (U82) which drives three PNP transistors. There are seven rows and three columns, arranged by functionality so that only three LEDs per column will be on at a time. The LED rows are arranged with one color per row so that the row resistors compensate for the difference in brightness between red and green LEDs.

The LEDs are turned on by first writing to the control register U87, LED_ROW0...6, 0=on, 1=off. Then the desired column is turned on and the LED is lit by writing a 0 to SWITCHCOL_0, 1 or 2 in U82. The LED control register U87 can be tri-stated. Its output control is connected to RESET so that the LEDs will be off when the system first powers up.

The red overload LED is mounted on the IR front panel board. It is driven by DSP_OVLD, a control bit from U85, which is sent to the IR board on J19. As this LED is controlled by its own bit, it is not part of the row and column scanning matrix.

Switches

The thirteen switches are divided into three columns, (grouped 4, 4 and 5) which are selected for scanning by the signals SWITCHCOL_0, SWITCHCOL_1 and SWITCHCOL_2.. The selected column is read through 5 bits of input buffer U81. Diodes D45,46, and 48 prevent these three signals from being shorted together if two switches in the same row are pressed simultaneously.

Encoder

The rotary encoder and its cable are mounted on a separate front panel board which plugs into J17 on the main board. Filtering on the main board reduces the effect of any contact noise. The encoder bits are read by the Z80 through input buffer U81.

Z80 Serial Control (sheet 4)

Several devices in the DC-1 are controlled serially: the On-Screen Display controller, the video board control register, the 56004, the input and output level controls and the ZR38500 on the AC-3 option board.

The Z80 first writes the data into the 74HC165 parallel to serial shift registers (U55, U56, U57). An I/O write to the 74HC175 serial control register 0 (U53) or serial control registers 1 and 2 (U49 and 52), enables the chip select and starts the serial transmission. The SERIAL GAL state machine (U51) generates the shift clock and automatically disables the chip select when the word has been transmitted (after 8, 16, or 24 bits, depending on the device addressed). SER_CTRL_ON/ is asserted while a serial transmission is in progress.

The word length required by different devices is as follows:

8 bit	On-Screen Display, ZR 38500
16 bit	video control register and level controls
24 bit	56004

The serial state machine operates at a clock rate of 1MHz, derived from the oscillator circuit of U39. It takes approximately 25µS to transmit a 24 bit word.

Serial Control Return Data (sheet 2)

Both the 56004 and the ZR38500 (optional) can transmit serial data back to the Z80. This data is received by the serial/parallel shift register U54. The ZR38500 transmits bytes, the 56004 transmits 24-bit words, of which the Z80 can pick up only the LSByte. This data is used for inter-processor status and communication, and diagnostics. Jumper W7 allows the serial transmission to be looped directly to the serial receiver for test purposes (with positions 2 and 3 jumpered). For normal operation, W7 should be jumpered in position 1 and 2.

PIC16C54 Microcontroller Subsystem (sheet 2)

The PIC 16C54 (U39) is a self-contained microcontroller which is used to receive infrared remote control information and to generate Z80 interrupt timing. Timing is based on a 1MHz ceramic resonator. Parameters of the IR decoder and interrupt timer are loaded into the PIC by the Z80 using the PIC_CONFIG pulse train.

IR Remote Decoder

The serial bitstream from the IR photodetector IC (IR board, U501) conveys binary remote control data encoded in pulse intervals of 1 to 2ms. The PIC receives the demodulated serial bitstream, measures its timing characteristics, and extracts binary and formatting data from it. The program screens for the appropriate address information in the bitstream, and performs other checks to validate the data.

Data is delivered in an 8-bit parallel format to be read by the host processor through U40. The 8-bit data is self-flagging. A value of 00h indicates no-data, or null. Any non-0 byte value identifies itself as a received code.

IR Acknowledge LED

Pin 18 of the PIC drives the IR acknowledge LED on the front panel through Q11. Once valid data is received and presented to the parallel port, IR_ACK_PIC is asserted high and a timer is started; if no other data or repeat code is received, the pin is deasserted after 65ms, generating a blink on the LED. The LED blinks repeatedly while valid data are being presented to the Z80.

Interrupt Timer

As a time interval generator, the PIC provides a quasi-periodic pulse train which is used as a system timing interrupt by the Z80. The interrupt time is set for 2.048ms. The rising edge of U39-2 clocks flip-flop U50, which asserts SYSTEM_INT/. U50 is cleared automatically by CLR_INT/ from U60, which automatically detects the Z80 interrupt acknowledge cycle.

System Clocks (sheet 5)

There are four possible configurations which can be selected by control bits CLOCK_SELECT0 and CLOCK_SELECT1 in the 74ACT153 selector U44:

1. Analog audio source at 44.7kHz with 256fs derived from the 22.9Mhz Lexichip Master clock, 512fs.
2. Digital S/PDIF audio source at 44.1kHz with 256fs provided by the CS8412 S/PDIF receiver (U8).
3. Digital audio source via discrete 5.1 option board (AC-3) at 48kHz with 256fs provided by the CS8412 S/PDIF receiver
4. Digital audio source via discrete 5.1 option board (AC-3) at 44.1kHz with 256fs provided by the CS8412 S/PDIF receiver.

In the following descriptions and discussions about audio data, common terms such as "fs", "Bit clock" and "Framing signal" are often used. "nnn fs" is used as an abbreviation to indicate the speed of a clock in terms of sample period, where nnn is an integer multiplier. For example, "2fs" indicates the clock is at twice (2x) the sample rate. When capitalized (2FS), this indicates a specific signal name. Please note that this clock speed will change according to the current sample rate selected by the DC-1. When an analog source is selected, the internal sample rate is 44.7 kHz (sample period=22.4µs). The DC-1 will also slave to digital audio sources with sample rates of 44.1kHz (period=22.7µs) and 48kHz (peeriod=20.8µs).

"Bit clock" is the signal used to clock serial data into or out of a particular device, such as a digital signal processor, or A/D and D/A converter. Bit clocks with inverted signal names, such as 64FS/ , indicate data is clocked on the falling edge. Otherwise, data is clocked on the rising edge, as in 64FS.

"Framing signal" indicates the beginning and end of a specific audio word or frame. A typical frame within the DC-1 contains 32 bit cells, or data locations. The actual audio word is limited to 20 bits, which means it may be left or right justified within the frame. Refer to the DC-1 System Clocks and Audio Data diagram for the exact location of audio words within a frame.

The selected 256FS is divided down in a clock chain that creates 128 FS/ through 2 FS/, (U45, U46). The required clocks are as follows:

256FS	drives the clock chain, A/D converter, and is used as a bit clock to clock 8 words of serial audio from the AC-3 board into the Lexichip and out of the Lexichip into the 56004. (256FSA, AC3_256FS, DSP_BITCLK)
128FS/	used as the bit clock between the 56004 outputs and the D/A converters. (56K_BCLK_OUT/, DABCLK/)
AC3_64FS/	used as the input bit clock for the digital audio data on the AC-3 board
64FS	used as the bit clock for the A/D converters and CS8412 S/PDIF receiver. (64FSA, SPDIF_64FS)
GATED_64FS/	used to clock serial audio input data from either the A/D or the CS8412 S/PDIF receiver into the L/R serial to parallel registers for input to the Lexichip
16FS/	used in the digital audio de-jitter circuits

4FS/ used as the framing signal for the AC-3 board serial output and the Lexichip serial output. (AC3_4FS/)

2FS/ used to create the GATED_64FS/ bit clock that clocks serial audio source data into the serial to parallel shift registers for input to the Lexichip

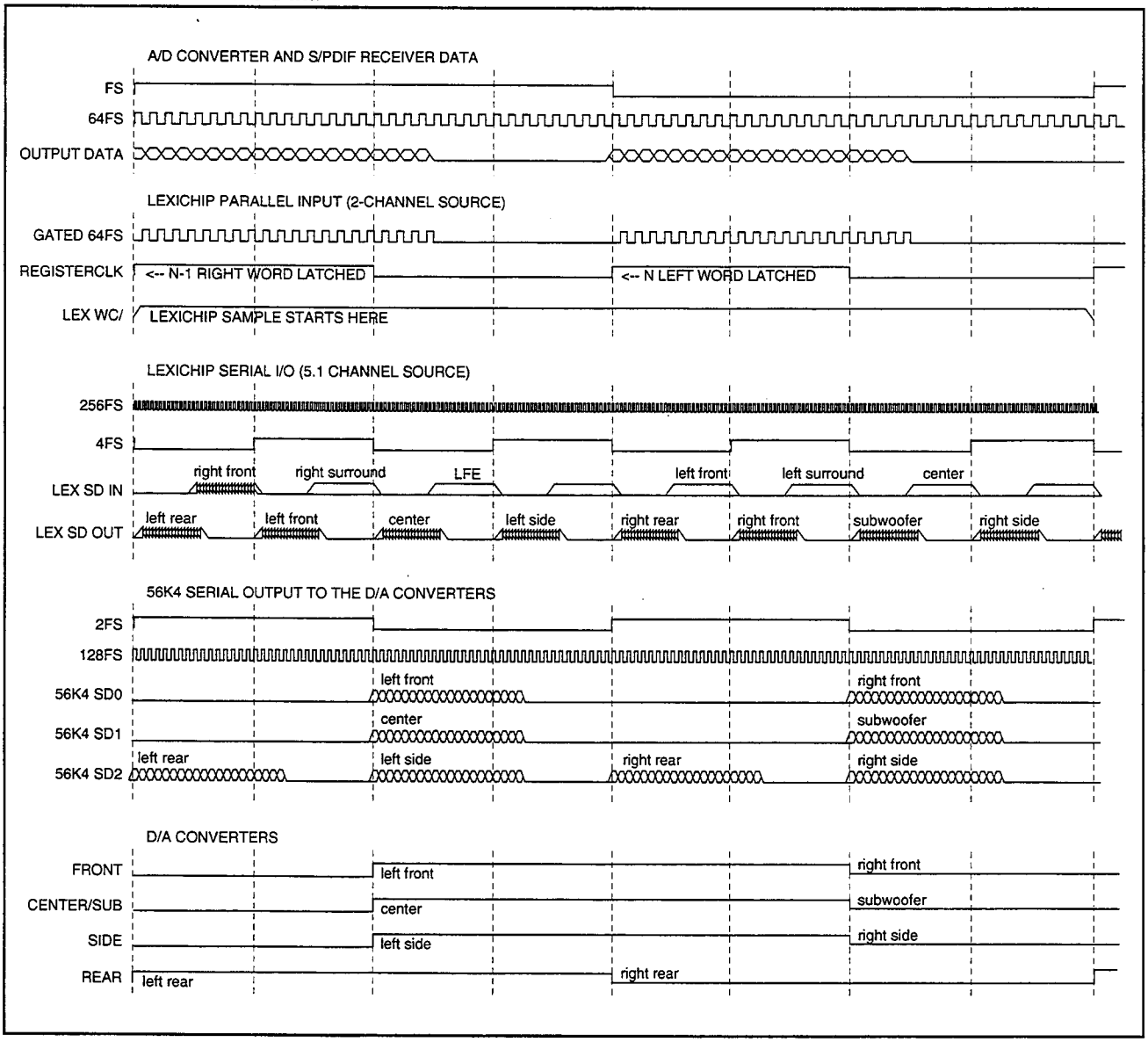
2FS used as the register clock for the 74HC595 serial to parallel shift registers — also provides the framing signal for the 56004 serial audio outputs

FS_SHIFT FS/ shifted one quarter sample to create the framing signal for the front, center/sub and side D/A converters.

FS/ system word clock used by the Lexichip, 56004 and AC3 board. (DSP_FS/, AC3_FS/)

FS system word clock used by the A/D, CS8412 S/PDIF receiver and rear D/A converters. (ADC_FS, SPDIF_FS)

DC-1 System Clocks and Audio Data



Lexichip (sheet 6)

Lexichip Phase

There is one ZCLK cycle from the Lexichip per four MC/ cycles; ZCLK is logically LEXPHASEAB. Inverted, it becomes LEXPHASECD, which is used to latch the Z80 address and is clocked by MC in the LEXI GAL to create LEXPHASEDA. These two signals enable the detection of the Lexichip instruction phase.

Word Clock

The Lexichip is slaved to an external asynchronous word clock. It is synchronized in the LEXI GAL (U90). The incoming word clock FS/ is first clocked by MC. The resulting signal FSD/ is then reclocked by MC when the Lexichip is in phase D. This ensures that no instructions are truncated and that LEX_WC/ always begins during phase A. This also ensures that the Lexichip/Z80 "wait until word clock" instruction functions properly.

In addition, because the sample period equals exactly 128 Lexichip instruction cycles in analog mode, the Lexichip PCLK0 bit is programmed to go high only during instruction #127. This is used in the LEXI GAL to prevent the Lexichip word clock from being clocked low until the last instruction has occurred.

Parallel Audio Input

Incoming serial audio data is converted to parallel words by shift registers U95, U96 and U97. The shift clock is 64FS/ gated to form GATED_64FS/ which clocks in 24 bits. The registers are read by the Lexichip using an I/O input instruction. LEX_IN/ creates LEX_REG0, which enables the registered data onto the Lexichip data bus.

Serial Audio Input

Serial audio from the AC-3 option board is fed to the Lexichip serial input using time-division-multiplexing at a clock rate of 256fs. The framing signal is 4FS/, which provides eight possible time slots, six of which are occupied. The frame signal and input data are sampled on the falling edge of bitclock. The 20-bit data from the AC-3 board is right justified in the frame and then delayed by one extra bitclock.

Serial Audio Output

The Lexichip passes six or seven 20-bit audio words to the 56004. This is accomplished by time-division-multiplexing these words onto one serial line. The bit clock rate is 256fs and the framing signal is 4FS/. Data is loaded into the Lexichip shift register starting at bit clock # 30 , (after frame is detected). Data is then shifted out of the Lexichip on the rising edge of bitclock. It is then reclocked with 256fs by U91. This guarantees setup time to the falling edge of bitclock at the serial audio input of the 56004 with an I^2S format, (the MSB data bit occurs one bitclock after change of frame.)

DRAM

The DRAM consists of one 64kx16 (U93), and one 256kx4 (U94), in order to provide a 20-bit wide data path. A dual layout is provided which can accommodate a 256Kx16 part . Series resistors are used on the RAS, CAS, WE, and address lines to reduce ringing.

DSP56004 (sheet 7)

Clocks

The 56004 runs off the 10MHz clock which is multiplied up to 60MHz by the internal PLL. The PLL supply pins are filtered with ferrite bead FB24 and capacitor C313. Immediately after reset, the PLL is disabled because the PINIT pin is pulled low. This is required because the multiplication factor of the PLL coming out of reset is 400. With the PLL disabled, the 56004 will operate at 10MHz until the program code is loaded and run.

Mode Pins

The three interrupt pins function as mode pins immediately after reset. The 56004 boots from the serial input when mode 5 is selected.

(NMI)	(IRQB)	(IRQA)
MODE C	MODE B	MODE A
High	Low	High
		SERIAL BOOT MODE

Interrupts

Two interrupts are provided between the Z80 and the 56004. 56004_NMI/ goes to the non-maskable input which is edge sensitive. To interrupt the 56004, the Z80 clears the bit and then immediately sets it high again. This bit is high when the 56004 comes out of reset to select serial boot mode.

The second Z80 control bit, 56004_IRQB/, is cleared low before the 56004 is released from reset to select serial boot mode. It is then set high again during run time. To interrupt the 56004, the Z80 clears the bit and then immediately sets it high again.

IRQA uses FS/ as the word clock interrupt. It is gated with control bit 56004_WC_EN which must be low when the 56004 comes out of reset so that it enters serial boot mode. After reset is released, it is set high again, enabling word clock to the 56004.

GPIO Pins

These are the 56004's general purpose programmable pins. All four GPIO pins appear in Z80 status buffer U86 for handshaking and diagnostic purposes.

When the 56004 is operating in normal run mode, GPIO0 toggles. It is high for 75% of each sample period.

Serial Host Interface

The serial host interface is used in SPI slave mode. The SPI interface consists of five lines:

SHI Slave Mode Pin Function		
SS/IHA2	pin 42	56004 chip select
SCKISCL	pin 26	Serial bit clock input
MISOISDA	pin 35	Serial data output
MOSIIHA0	pin 41	Serial data input
HREQ/	pin 43	Host Request, 56004 ready

The 56004 receives and transmits 24-bit words. Every time the Z80 initiates a serial transfer, the 56004 simultaneously clocks in the receive word and clocks out a transmit word. When HREQ/ is asserted low, it indicates that the 56004 is ready to receive and transmit data.

Serial Audio Interface (SAI)
This interface has independently programmable receive and transmit sections.

SAI Inputs
The SAI receive section runs in slave mode with 4FS/ as the framing signal and 256FS/ as the bitclock. This provides for eight time slots which accommodate 20-bit words.

SAI Outputs
The SAI transmit section runs in slave mode with 2FS/ as the framing signal, and 128FS/ as the bitclock. The serial data consists of 20-bit words. This format outputs data on the falling edge of bitclock, simultaneous with the transition of the framing signal.

Three SAI outputs drive four stereo DACs. This is accomplished by using 2FS/ as the framing signal which provides four slots per sample period. The front, center/sub and side DACs are framed with fs shifted 1/4 sample. The rear DAC is framed with fs. The three outputs are shown on the DC-1 System Clocks and Audio Data diagram.

ONCE Interface
The On Chip Emulation (ONCE)of the 56004 is identical to that of other members of the family. It consists of four lines which are brought out to a 10pin connector, J6. The port is used for software debugging only. To use the port, the 0Ω resistor R302 must be removed and pins 2 and 3 of W8 must be jumpered together. This places control of the 56004 reset line under the control of the in circuit emulator.

Reset and Battery Backup (sheet 8)

The reset circuitry has 3 primary purposes: it initializes the Z80 CPU and many other chips when power is first applied, it stops activity when power is going down, and it protects data stored in SRAM through battery-backup when power is off.

5-Volt Sensing
Power validity is judged by monitoring the 5-volt rail directly.

U41 is the 5-volt sensor MC34164, a micropower device incorporating a precision voltage reference and hysteresis comparator. It asserts a low level on its RESET/ output (pin 1) whenever its input (pin 2) is too low, as power is coming up or going down.

U41 has a high/low thresholds guaranteed to be between 4.15 and 4.45V (nominally 4.33V and 4.27V respectively), and typical hysteresis of 60mV (20mV minimum). The input pin is fed from divider R222 and R221, which scale the 5V down slightly. This raises the effective thresholds closer to 5V. The divider ratio is chosen to give effective nominal thresholds of approximately 4.75V and 4.68V.

U41-1 is open collector, pulled up by R226. RESET/ from U41-1 is the main power-up and power-fail reset signal from which others are derived.

RESET/ remains asserted for a while after power-up to allow oscillators to start and other circuitry to settle. This delay is achieved by delaying the effective input to U41. When power is applied, C244 is charged through R220. Q6 is a PNP emitter follower that keeps U41-2 below threshold while this charging takes place. Diode D22 adds a small offset to U41-2 to ensure proper operation at low voltage, when power is just coming up or finally tailing off.

Because U41's threshold is so close to 5V, the delay interval is substantially greater than the RC time constant. When U41-2 reaches threshold, RESET/ snaps high. Reset is removed cleanly due to the Schmitt nature of the U41 transfer characteristic.

On power-down, C244 has no effect because D22 and Q6 get back biased. U41-2 follows the divided 5V instantaneously, so RESET/ goes low promptly after the low threshold is reached. This asserts Z80 reset while 5V is close to spec and all circuitry is still operating according to normal rules.

As the 5V falls, C244 discharges through R220. Because of the high threshold of U41, the response to charge/discharge cycles is asymmetrical. Even a brief loss of 5V that gives only a partial discharge of C244 produces a suitable reset pulse when power is reapplied.

SRAM Protection

U62 is the low-power SRAM (Main Board schematic sheet 1). The SRAM CS1/ pin is tied to RAMEN/, which is used to protect/unprotect the SRAM. If CS1/ is high, the SRAM ignores external signals and is immune to erroneous write pulses. If SRAM power (BAT_Vcc) is >2V, the SRAM retains its contents. When 5V is low (off), BAT_VCC is derived from the lithium battery BAT1 through Schottky diode D23 and R229.

When power is off, Q8 is off, and RAMEN/ is pulled to BAT_VCC through R228. Just after power is applied, in the delay period before RESET/ goes high, Q8 remains off, and RAMEN/ remains pulled to BAT_VCC, protecting the SRAM. The SRAM remains protected during the entire reset interval.

After RESET/ goes high, Q8 turns on, after a short delay to charge C245 through R225. Q8 drives RAMEN/ low, which removes SRAM protection. By then, however, the CPU and other logic have stabilized in an inactive initial state where SRAM pins CS2 and WR/ are not asserted, so the SRAM harmlessly transitions from a "protected" state to an "available-but-not-selected" state.

When power fails, U41-1 goes low, asserting RESET/ and in turn RESETA/, which resets the Z80. The Z80 synchronously samples its reset pin, and resets in 3 clock cycles (300ns). As it enters reset, the Z80 closes out write operations gracefully, and there are no erroneous or illegal SRAM writes. The shutdown time is a few microseconds, which is very short compared to the decay rate of the 5V rail.

In the protect circuit, the purpose of C245 is to keep Q8 on for a short time after CPU reset is asserted. This keeps the SRAM active until the Z80 is sure to have stopped, so the end of activity is governed by the well-behaved synchronous activity of the Z80. Then after a safe number of microseconds, Q8 goes off and the SRAM gets protected. By then the CPU has reset, so no CPU activity gets cut off when protection gets applied. As power fails completely, the CPU and other logic may enter illegal states, violate truth tables, etc, but the SRAM is protected because its CS1/ pin (RAMEN/) is at BAT_VCC, and it doesn't matter what the addresses are or if there are glitches on the WE/ and CS2 pins.

At extremely low supply voltage (<0.7V), U41 cannot saturate its output to properly assert RESET/, but at such low voltage, R223 and R225 ensure that there is no base current into Q8, and with Q8 off the SRAM remains protected.

SRAM VCC

When Q8 turns on to unprotect the SRAM, it also turns on Q9, which switches BAT_VCC to +5VD. When protection is re-entered, Q9 turns off, leaving BAT_VCC near 5V, held up by C280. The RAM CS1/ and VCC pins are nevertheless equal, because there is no current through R228. This remains true as BAT_VCC decays and ultimately gets maintained by the battery. During normal operation, the SRAM VCC is close to the 5VD that supplies all the other logic.

AC-3 Upgrade (sheet 10)

This design supports an upgrade path to implementing Dolby AC-3 surround. The AC-3 board uses the Zoran ZR38500 DSP processor, which unpacks AC-3 data from a digital bitstream and decodes it into 6 channels.

The six channel output of the ZR38500 is passed to the input of the Lexichip by transmitting all six channels on a single time division multiplexed line with a 256FS/ bitclock and a 4FS/ framing signal.

The Z38500 is initialized by the Z80 through its serial host interface.

Analog, Digital Audio and Power Supply Theory

Overview

This section describes the theory behind the analog and digital audio front-ends, A/D and D/A conversion, analog output drivers and power supply circuit design for the DC-1.

Any one of eight stereo analog audio sources or four digital audio sources may be selected for "monitoring", or processing by the DC-1. In addition, one of the eight analog sources may be selected for "recording", where the signals are passed, without processing, directly to the record output jacks. Different sources may be selected for monitor and record, permitting the user to record from a CD while listening to the tuner or watching the VCR.

A second pair of jacks, labeled Zone2, is wired in parallel with the Record jacks. The Zone2 signal path has a level control which may be adjusted via the remote control, providing the capability of source and level control for a pair of speakers in another room. When using the Zone2 outputs, different sources can be assigned for the main room and the second zone (room), but the source selected for Zone2 will be assigned to the Record outputs as well, and vice-versa.

When selected for monitoring, the analog source passes through a level control chip before going to the A/D converter allowing optimization of the input level before conversion for maximum dynamic range. The output of the A/D converter passes through a multiplexer, which selects the analog or digital audio source, on its way to the Lexichip.

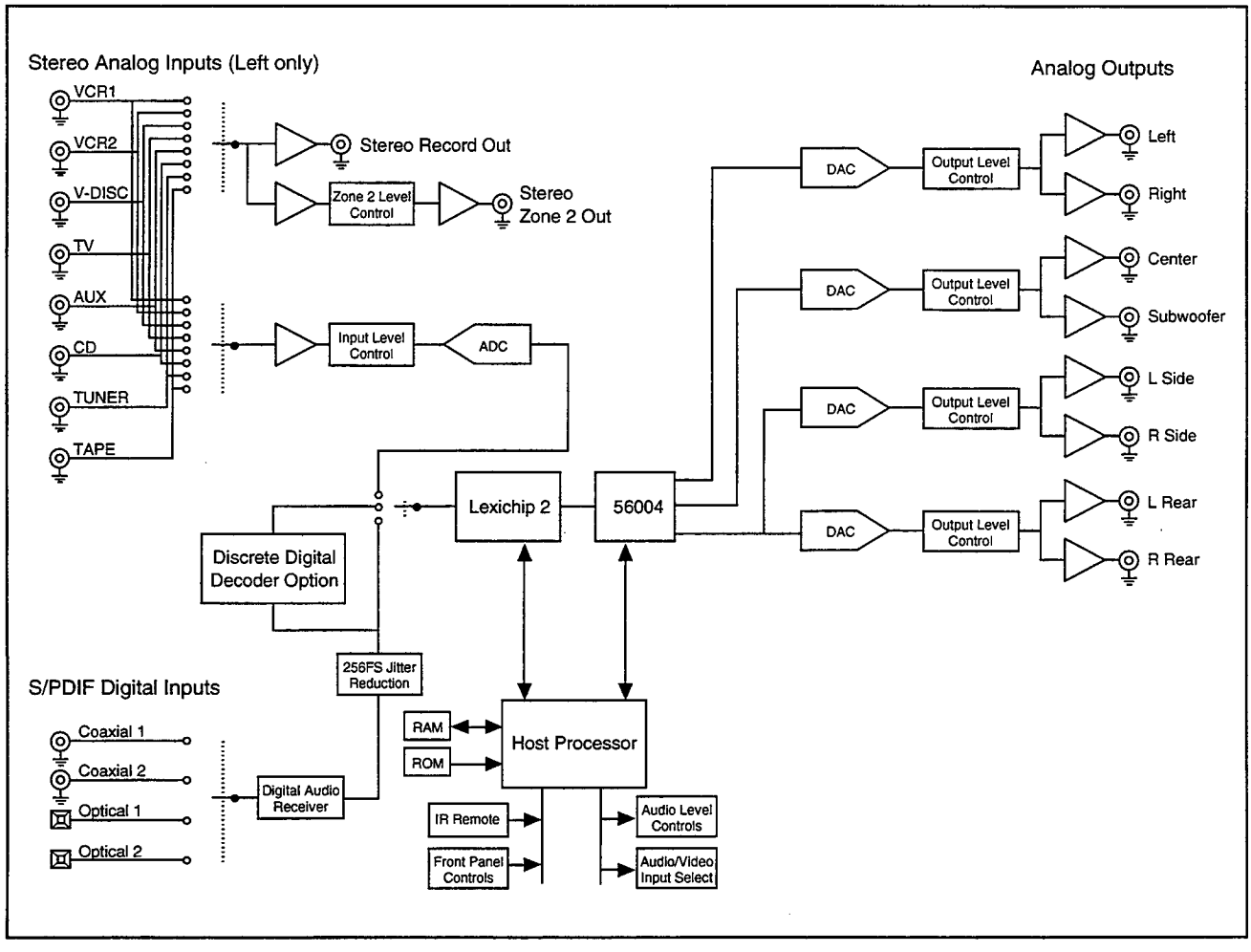
One of four (two coaxial, two optical) digital audio sources are selected and passed to the digital audio receiver. The receiver's 256FS output clock passes through jitter reduction circuitry on its way to the Lexichip.

The Lexichip performs the surround decoding and outputs seven audio channels (L&R Front, Center, L&R Side, L&R Rear) to the 56004. The 56004 generates the subwoofer by combining L&R Front and Center channels and passing this signal through a lowpass filter (crossover). The eight digital audio outputs from the 56004 feed four stereo 20 bit D/A converters.

The outputs from the D/A converters pass through level controls before going to the output amps, which have 10dB of gain. The level control chips are controlled by the host processor.

The block diagram which follows shows only the left analog channel. The following circuit descriptions refer to the Main Board schematic, sheets 11-19.

Analog Block Diagram



Analog Audio Inputs (sheets 11 & 12)

Sheets 11 and 12, which show the left and right inputs, respectively, are virtually identical. Each input also uses similar components. Series ferrite beads and 150pF ceramic caps to ground are installed to reduce RFI. 100Ω series resistors serve two purposes: to limit current to the BAV99 diodes under overvoltage conditions, and to provide a minimum load of 100Ω rather than a short to ground to other equipment when the DC-1 is powered down. The diodes protect the analog multiplexers from overvoltage conditions.

Four DG408 analog multiplexers are used for input selection. Each multiplexer selects one of eight inputs via three control pins (A0,1,2). Control bits RSEL [0:2] select the record source and MSEL [0:2] select the monitor source. U30 and U34 route the left and right record inputs, while U31 and U35 route the left and right monitor inputs. An enable pin allows all sources to be de-selected when low.

When AREC_EN goes low, the analog record sources are de-selected and the record outputs are muted by virtue of the 470kΩ resistors (R215,216) to ground. Similarly, MONITOR_EN de-selects the monitor sources when low. This is controlled by the A/D converter, which disables the input multiplexers during its calibration cycle. Offsets from the input circuitry are taken into account for offset calibration.

470kΩ resistors (R213-216) provide a DC path to ground when all sources are de-selected. The unity gain LF353 voltage followers (U32,33) buffer the incoming signals.

The outputs of U33 pass through 47uF caps to eliminate any DC offsets present on the incoming signals. The record outputs incorporate 10kΩ resistors to ground to bleed off DC, 100Ω series resistors for protection, and ferrite beads plus 150pF caps for RFI suppression. The outputs of U33 also go to the Zone2 level controls on sheet 13.

A DG444 analog switch (U36) is used to route the output signals from the side D/A converters to the Record/Zone2 outputs. This path is used to send an S/PDIF digital audio input to the record outputs using the side DACs. To do so, DIG_REC_SEL/ and AREC_EN are brought low.

On the monitor side, the outputs of U32 feed two voltage dividers (R174,176; R175,178). These dividers reduce the signal by 6dB in order to prevent clipping in the input level control. Two 47uF caps block DC before the signals go on to sheet 13.

Input/Zone2 Level Control & A/D Conversion (sheet 13)

Two Crystal CS3310 ICs (U28,29) are used to control Zone2 output level and A/D converter input level, respectively. The CS3310 is capable of independently adjusting the signal level for two channels from +31.5dB to -95.5dB in 0.5dB steps. It also has a built-in zero crossing detector which monitors the incoming signal. When VC_ZCEN is high, the gain is changed only during zero crossing in order to minimize clicks. The CS3310 has a standard serial interface with chip select, bit clock and data input. Separate clock and data signals are used to control the input and output level controls in order to minimize noise. A serial data output pin may be used to verify data is coming into a specific chip. A MUTE/ pin is also provided.

The CS3310 requires ±5 volt supplies for the analog rails, thereby limiting the signal range it can handle. An additional +5 volts is needed for the digital circuitry. To prevent latch-up, the digital supply is derived from +5VA through a resistor. 10uF tantalum capacitors are used in parallel with 0.1uF ceramic caps for bypassing all the supplies in order to reduce noise.

The LZ2IN and RZ2IN signals pass through voltage dividers (R165,171; R170,172) that cut the signal level by 10dB to prevent clipping in the Zone2 level control (U28). Two 47uF capacitors block any DC offsets to insure the zero crossing performance. The output from U28 feeds a dual op amp (U27) which has 6dB of gain. This op amp drives the Zone2 outputs through 47uF blocking caps (C175,176) and 100Ω series resistors for protection. Ferrite beads and 150pF caps are installed for RFI suppression.

Signals LIN and RIN come from the monitor input selectors and feed U29. After level adjustment, the output of U29 passes through an RC low pass filter before going to the inputs of the A/D converter (U37). Each filter includes a 51Ω series resistor with a 0.01uF Mylar cap to ground to minimize aliasing from frequencies above 2.8 MHz.

The Crystal CS5338 16-bit A/D converter (U37) is a Delta-Sigma type operating

at 64x oversampling. It requires ±5 volt analog supplies and +5V logic and digital supplies. The logic supply is derived from the +5VA rail through a 51Ω resistor (R217). The digital supply comes from the +5VD rail, with a series ferrite bead and 10uF tantalum cap installed for noise reduction. 10uF tantalum capacitors are used in parallel with 0.1uF caps to filter noise on the analog rails and internal VREF. Because the level control chip (U29) operates on ±5 volt rails, there is no need for additional circuitry to limit the analog signal levels before they enter the A/D converter.

The converter's serial interface operates in slave mode, with 256FSA, 64FSA and ADC_FS clocks supplied from the DC-1 clock tree (sheet 5). U37's FSYNC input is tied high so that the serial output data (A_SERAUDIO_IN) is aligned by ADC_FS. A 100Ω source resistor (R218) minimizes ringing on the serial data waveform. DC-1's internal sample rate is 44.7kHz.

The CS5338 has an offset calibration mode which is entered during power up and whenever an input selection is made during normal operation. The AD_CAL signal actually has two functions. Bringing this signal high puts the converter into a power down mode mode which reduces power consumption. Power down mode is entered whenever the DC-1 is placed in standby. Furthermore, bringing the AD_CAL signal high then low enters the calibration mode. Calibration takes 4096 FS cycles to complete (about 91.5ms). Bringing AD_CAL high causes DCAL to go high. DCAL stays high until calibration is complete. In this case, DCAL is inverted by U61 and is used to disable the monitor input mux during calibration. With the ACAL pin tied to ground, the converter corrects for any offsets in the analog signal path in addition to its internal offsets.

D/A Conversion & Output Level Control (sheets 14 & 15)

Four Crystal CS4329 stereo 20 bit D/A converters (U14,18,22,26) are used to convert eight channels of audio data from the 56004 to analog signals. The 56004 has three separate serial data output ports: 56K_SD0 which contains the data for the front left and right channels, 56K_SD1 which has the center and subwoofer data, and 56K_SD2 which multiplexes the data for both side and rear channels.

Sheet 14 includes the D/A converters (U14, 18), low pass filters (U13,17), level controls (U12,16) and output amps (U11,15) for the left/right front, center and subwoofer outputs. Sheet 15 contains the D/A converters (U22,26), low pass filters (U21,25), level controls (U20,24) and output amps (U19,23) for the left/ right side and rear channels. Because identical components are used, the following description applies for every channel.

The CS4329 D/A converter is a Delta-Sigma type operating at 128x oversampling with 20 bit resolution. Each D/A converter includes a switched-capacitor analog lowpass filter located before the analog outputs. This type of filter reduces the effect of jitter on the incoming data from increasing THD at the analog outputs. The CS4329 requires +5 volts for both analog and digital supplies. +5VD is filtered through a ferrite bead and 10uF tantalum capacitor with a 0.1uF ceramic cap for the digital supply. Additional filtering is provided by a resistor with separate tantalum and ceramic bypass capacitors for the analog supply.

Each D/A converter serial interface operates in slave mode, with 256FSA, DABCLK/ (128FS) and DAC_FS (SPDIF_FS for rear channels) clocks supplied from the DC-1 clock tree (sheet 5). Serial data is sourced from one of three ports on the 56004. The CS4329 will also perform de-emphasis in the digital domain. The DC-1 will assert the DEEMPH/ signal whenever emphasis is detected on an incoming S/PDIF signal. De-emphasis is disabled for analog inputs. Mode pins DIF0,1,2 are wired to accept serial data that is right-justified, MSB first. 0Ω jumpers are used to configure DIF2 for 16 or 20 bit operation.

The CS4329 provides differential outputs for the analog signals which go into an active 3-pole low pass filter. Each filter has a Butterworth response to insure flatness in the passband, with a gain of 1.9dB and -3dB point at 37kHz. The outputs from the filter pass through 47uF capacitors in order to remove the 2.2 volt bias on the DAC's output signals before feeding the CS3310 level controls. The combination of the maximum output level from the D/A converter and the low gain in the filter guarantee the signal into the level control will not overload. Each level control feeds an inverting op amp with 10dB of gain which drives the DC-1 outputs. The phase of the signal is maintained by inversion in both the low pass filter and output amp circuits.

Analog Audio Outputs (sheet 16)

All eight monitor outputs are shown on sheet 16. Signals from all the output amplifiers pass through 47uF caps with 10kΩ resistors to ground in order to minimize DC offsets. Each output pair then passes through relays (RY1-4) which serve to minimize clicks or thumps when the DC-1 is being powered on or off. The relay coils are powered by the +15V rail through a 51Ω resistor (R57) and 100uF bypass cap (C48). When RESETB/ goes high, Q5 is turned on, energizing the relay coils, and thereby permitting the signals to pass through to the output RCA connectors. Conversely, when RESETB/ is low, Q5 and the relays are turned off, shorting the outputs to ground.

Each output incorporates 100Ω series resistors for protection, and ferrite beads with 150pF ceramic caps for RFI suppression.

S/PDIF Digital Audio Inputs (sheets 17 & 18)

Sheet 17 contains the S/PDIF input selection and receiver, while sheet 18 includes the jitter reduction for the 256FS master clock. The DC-1 accommodates S/PDIF signals per IEC 958 specifications at a sample rate of 44.1kHz ±1000ppm. The 48kHz sample rate is supported by software in the AC-3 version only.

Four input connectors are provided, two coaxial (RCA) and two optical (TOSLINK™). Each of the coaxial inputs is terminated with 75Ω resistors per IEC 958 specifications and 150pF caps for RFI suppression. BAV99 diodes are installed to protect the 74HC4053 (U1) multiplexer from overvoltage on the coaxial inputs. One section of U1 selects one of the coaxial signals, while another selects one of the optical inputs. The outputs of each switch pass to the third section of U1, which determines whether the selected coaxial or optical input will be coupled to the receiver.

The selected coaxial signal passes through a 74HCU04 (U2) configured as an amplifier to insure its levels exceed the threshold of the CS8412 receiver. Likewise, a 1kΩ pullup resistor is placed at the output of each TosLink receiver to guarantee CMOS signal levels.

A Crystal CS8412 receiver (U8) is used to lock to and decode the incoming S/PDIF signal. The CS8412 serial port is configured in slave mode, with data coming out MSB first, at the beginning of each frame. AES_SELECT determines the data that is presented to the Z80 via pins 26 and 27 (channel status bits or error and frequency information). When AES_SELECT is low, error and frequency status are reported and the 6.144MHz clock (U6) is passed to pin 13 of U8 for frequency reference.

The CS8412 has separate supply pins for its digital circuitry and phase locked loop (PLL). The PLL supply is filtered by a ferrite bead with a 10uF tantalum in parallel with a 0.1uF ceramic capacitor. C26 and R31 are required for the internal PLL.

The 256FSJ output clock from the CS8412 passes through a second PLL on sheet 18. Because the CS8412 does not attenuate jitter below 100kHz, this circuit is necessary in order to reduce jitter and keep high-level THD at a minimum. Separate jitter reduction circuits are provided for 44.1kHz and 48kHz sample rates.

The 74HC161 (U5) divides 256FSJ to 16FSJ/. A phase detector is made up of a 74AC74 and 74AC08 (U3,4) which compares 16FSJ/ with the 16FS/ reference clock. The outputs of the phase detector are used to turn on one of two switches in the DG444 (U7). One pair of switches in U7 is used along with R33-35, R37 and C28 to control the bias for the 11.3MHz voltage-controlled oscillator (VCO). The VCO uses varactors (VRC1-3) to pull an 11.3MHz ceramic resonator (Y2) over a range sufficient to lock to a standard S/PDIF 44.1kHz ±1000ppm based 256FS clock.

An identical VCO based on a 12.3MHz ceramic resonator (Y3) is used for reducing jitter on a S/PDIF signal at 48kHz ±1000ppm. Here, the other pair of switches in U7 combine with R41-43, R45 and C33 to control the bias for the 12.3 MHz VCO.

The low-jitter 256FS clock output from the respective VCO is used as a master clock when a digital audio input is selected. Clock selection occurs on sheet 5.

Power Supply (sheet 19)

A universal input switching power supply produces the voltages required by DC-1 circuits. It operates over an input voltage range of 90 to 264 VAC at 50 or 60Hz. The supply is capable of producing +5 VDC @ 3 Amps, +15 VDC @ 2 Amps and -15 VDC @ 0.35 Amps. The +5 Volt supply is used for all DC-1 digital circuitry; the ±15 Volt supplies are required for the analog circuitry.

AC voltage comes into the DC-1 via an IEC connector on the rear panel. After passing through a ferrite bead and power switch, it enters the power supply via a 2-pin connector. A 6-pin connector located at the opposite end of the supply accommodates the DC output voltages and returns. A cable assembly with a ferrite bead brings the supply voltages over to the main board. +5 Volt and digital ground connections to the main board are made near the supply (J14), while the ±15 Volt and analog ground connect under the video board (J11).

The power supply is not field serviceable. Contact an authorized repair facility, or Lexicon Customer Service for exchange or repair. A 3.15 Amp fast-acting fuse is incorporated on the supply module's AC input side. Always replace with a fuse of identical rating.

The ±15 Volt rails pass through a π filter to reduce high frequency noise before they are distributed to any analog circuitry. After this filter, the ±15 Volt rails go to two voltage regulators. These regulators (U42,43) produce the ±5VA supplies that are required for the A/D converter, CS3310 level controls and video circuitry.

The +5 Volt supply passes through low and high frequency bypass capacitors (C308-310) upon entering the main board. +5VD is distributed to the appropriate circuitry after passing through these capacitors.

Video Module Theory

Overview

DC-1 video circuitry is contained on a separate board. Signal input and output connectors are mounted on-board. Power and control are provided by the DC-1 main board. The video circuit descriptions refer to the separate video board schematic.

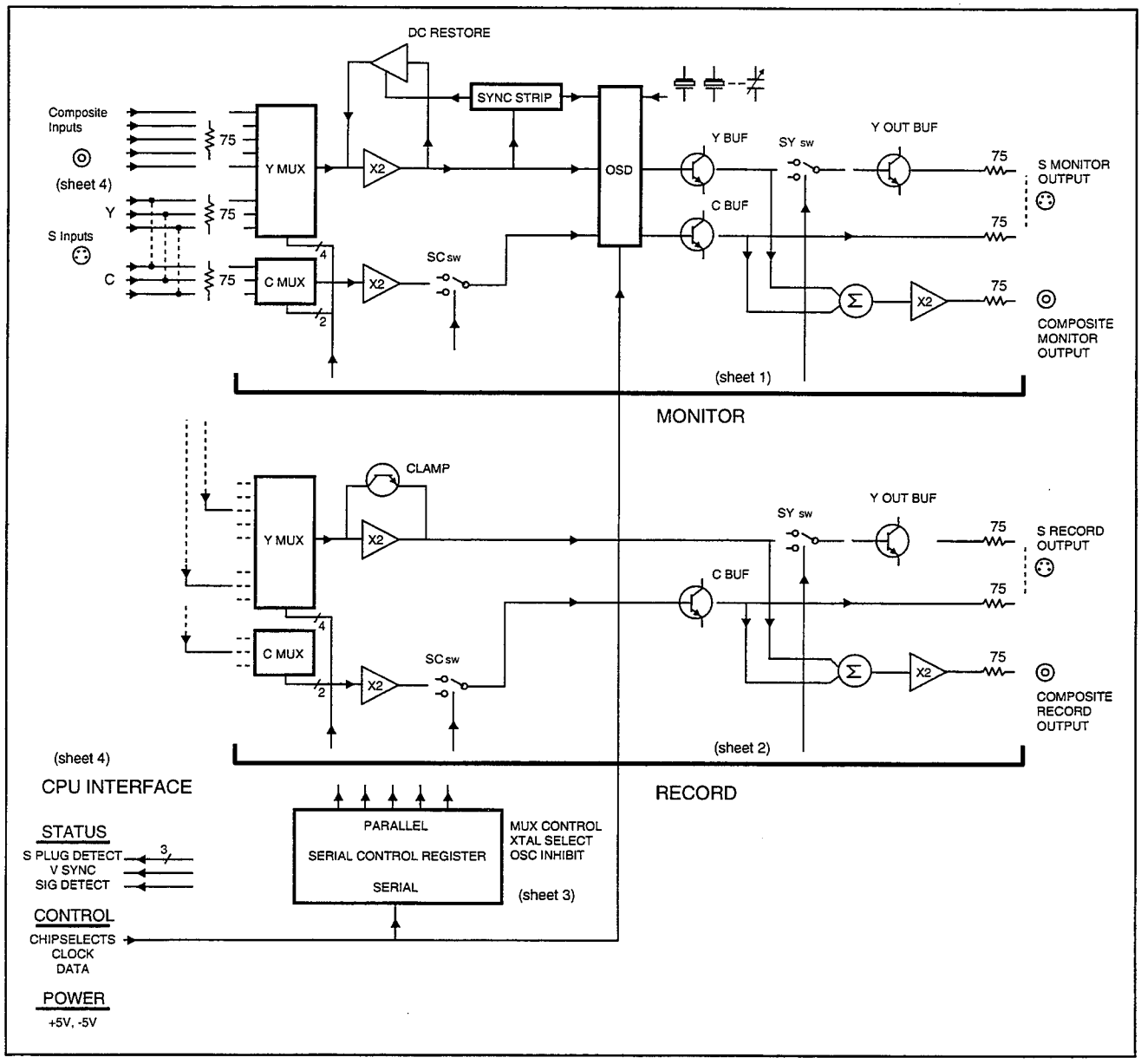
Functionality is shown in the following block diagram. The module accepts composite or S-video inputs and routes them through individual multiplexers to monitor and record outputs. The monitor channel includes an On-Screen Display (OSD), permitting character display on either a self-generated video waveform (local raster) or overlaid on thru video. The OSD chip handles PAL and NTSC raster and color generation, and also supports both composite and S-video overlay/generation. As a feature, when the source is S-video, a composite video output is produced as the sum of the S-video luminance (Y) and chrominance (C). The OSD chip is serially controlled by the Z80 host processor on the main board.

The Z80 also manages signal routing and other aspects of operation through a 16-bit control register, which is also implemented serially. Signal-present and plug-inserted status (for S-video) is presented to the Z80 for managing default operation. (Note that the signal-detect function only pertains to the monitor channel, for managing the OSD operation. This function is absent in the record channel.)

Video Signal Levels

Video outputs drive 75Ω transmission lines using the usual matching series resistance (source-termination), which attenuates signal level by 2. All incoming signals are amplified by two to maintain overall unity-gain, 1Vp-p video level in and out. The OSD chip natively generates the proper 2Vp-p video signals.

Video Block Diagram



Video Inputs (sheet 4)

Input Termination

Each video input is terminated with 75Ω to ground. The terminated signals are applied in parallel to both the monitor and record input multiplexers (sheets 1,2). The monitor circuitry (sheet 1) and record circuitry (sheet 2) have many common features. The main difference is that the monitor path includes the OSD.

Monitor Channel (sheet 1)

Y Multiplexer

The DC-1 has 5 composite video inputs and 3 S-video inputs. Composite video (CV) and S-video luminance (SY) are selected by one 8-input multiplexer U6 (74HC4051). The multiplexer selects one of the 8 inputs under control of MSEV[0:2] when enabled by MYEN/=L. It mutes when U6 is inhibited (MYEN/=H).

Y DC Level

The OSD chip overlays characters on thru-video by generating a video waveform which gets substituted for the thru-video in sync with the horizontal and vertical sweep. The OSD reference level is 1.57 volts. The active DC-restorer adjusts the DC level of the gain stage to give the thru-video the proper reference.

Y Input Gain Stage

The signal selected by the multiplexer is AC-coupled to the amplifier through C14. The luminance gain is implemented by wideband video op-amp U7. Resistors R40 and R46 set the gain, which is slightly greater than 2 to make up for slight losses in the following stages.

DC Restorer (sheet 3)

A sample-and-hold type of active DC restorer is implemented with opamp U11 and switch U12-15. The video is sampled during backporch time by a pulse from the sync stripper . During backporch, the feedback loop which includes the sample-and-hold is closed, and the level of VIDR tends toward CLAMP_LEVEL as U11 acts to null the loop. When the switch opens breaking the loop, the output of the opamp BPCOR holds its level during the subsequent horizontal line. BPCOR is essentially a slowly-varying DC voltage that tracks the shift of the AC-coupled video waveform.

C Multiplexer/Amplifier (sheet 1)

S-video chrominance (SC) is selected by the integrated triple-input multiplexer/amplifier U4, NJM2246. Selection is governed by the same MSEV bits that select luminance. Chrominance is a symmetrical AC signal, unlike luminance, and is AC- coupled after the 75Ω termination (sheet 4). Divider R38/R73, bypassed by C12, develops a DC bias of around 2V for the AC-coupled chroma amplifier inputs. Each chroma signal is biased from this voltage through 47K (R21,R22,R25). U4 amplifies the selected chroma by 2 (non-adjustable). The amplified chroma from U4 is AC-coupled through C17 and re-biased to the nominal operating point of the OSD by divider R74/R71. C17 is large because the OSD presents a low-frequency switched load during character overlay. Switch U8 either passes the selected chroma or switches to another bias divider R72/R70 to mute chroma. The NJM2246 is isolated from capacitive loads by series resistor R28.

Thru-Video (sheet 1)

S-video thru

In S-video mode, multiplexers U6 and U4 select the S source. The signal pin assignments to these multiplexers are arranged so the same digital code selects corresponding Y and C channels. U4 passes chroma to CIN of the OSD through switch U8-4 (MCEN/=L). The OSD connects its inputs to its outputs via its internal CMOS switches. YOUT and COUT from the OSD are buffered by emitter-followers Q7 and Q6, respectively. Switch U8 passes Y to the 2nd (final) emitter follower Q5 (MCOMP=L), which produces output SYMON through source-termination resistor R23. R23 plus the dynamic impedance of Q5 make a total equivalent output resistance close to the desired 75Ω. Resistors R61 and R54 affect the DC bias point, and drop the Y blanking level from the OSD fairly close to 0VDC. Buffered chroma from Q6 is AC-coupled by C11 and source terminated by R26 to produce output SCMON.

Composite from S

In S-video mode, a composite output is made from the separate S signals (Y and C) by summing the buffered YOUT and COUT. Summing resistors R57 and R51 are driven by emitter followers Q7 and Q6. The resistive summing attenuates the '2V' video levels by 1/2. This loss is made up by the remaining section of op-amp U7, which has gain-of-2. Input resistors R37 and R44 apply a positive voltage to the negative input of U7, which shifts the DC output level down so blanking is around 0VDC. The gain of the summing stage is determined by R37, R44, and R45. R36 provides the necessary source termination.

Composite thru

In composite mode, Y multiplexer U6 selects a composite video source from an RCA jack. Composite video gets amplified and DC-restored the same as S-video luminance, and applied to the OSD YIN. Since there is no corresponding chrominance source, U8-4 gets switched to mute the chroma input (MCEN/=H). It is inappropriate to send out composite video as S-video luminance, so U8-14 disconnects the Y channel from the output path. Since COUT is essentially 0Vac, summing YOUT + COUT gives YOUT; composite video out equals composite video in.

OSD Video (sheet 1)

Full Screen

Full-screen OSD is generated in both S-video and composite formats simultaneously. YOUT and COUT are both active and get summed to form the desired composite out just as with S-video thru. Switch U8-14 gets switched on to enable SYMON S-video output; SCMON is automatically active. Full-screen OSD video is always available to both the S-video output and the composite output, regardless of what the input is.

Overlay Video

Video overlays are monochrome only. This restriction is imposed because the OSD color encoding is based on the local crystal, whereas the color decoding of the overlay is based on the burst of the thru-video. Since these two color subcarriers are not related, no sensible color can be encoded in overlay mode. Internal OSD registers permit the built-in chroma generator to be defeated.

(J4,J5,J6), ungrounding a pullup resistor and asserting a logic level (SVID1_DETECT, SVID2_DETECT, SVID3_DETECT). These levels are fed to the main board where they can be read by the Z80. In normal operation, when a user makes a selection, the corresponding logic level gets read and the S-video channel configuration gets set up if a plug is inserted, otherwise the corresponding composite video configuration gets set up.

Video Priority (sheet 4)

Sync Stripper

Sync is extracted from the monitor video VIDR by U9, an NJM2229 sync detector chip and its associated components. This chip incorporates a no-adjustment horizontal AFC circuit based on a ceramic resonator Y1 operating at 32 xf_H (32x 15,625=500.0kHz:PAL/SECAM, 32x 15,734=503.4kHz:NTSC).

Sync Detection (sheet 3)

The stripped CSYNC-OUT and AFC outputs are combined using gate sections of U13 and shaped by the network of R94,R96,D14, and C44 to generate the backporch pulse for use by the the DC restorer. Separate H and V syncs from U9 are inverted in sections of U13 and fed to the OSD chip U10 to sync up the OSD with the thru video for overlay purposes. Inverted vertical sync VSYNC/ from U13 is fed off-board through the main connector and is readable by the Z80.

The AFC is sensitive to its 5V supply. Well-regulated 5V is taken from the main board and decoupled with FB1, C42, and C49 (sheet 4) to supply +5VAS to U9 and associated components.

Signal presence

When a valid video signal is applied to VIDEO-IN, U9 asserts the signal-detect output SYNC_DETECT, which is also available to the Z80 as a status bit. When a source is selected for monitoring, if SYNC_DETECT indicates that no incoming signal is present, the full-raster OSD appears.

S-video defeat

When S luminance is not connected to the normal input/OSD path, it gets switched to the network formed by R56,R62,R78,R79. This network synthesizes a video waveform by combining sync and a digital output from the OSD at a proper DC level, forming a video waveform capable of delivering monochrome text display to the S output. Normally the system software puts the OSD into one of its optional modes to generate the composite sync signal OSD_CSYNC.

Schematic sheet 2 describes the record channel, which is largely a subset of the

Record Channel (sheet 2)

Schematic sheet 2 describes the record channel, which is largely a subset of the monitor circuitry shown on schematic sheet 1. The parallels will be apparent from a comparison of the two sheets, and the same circuit descriptions generally apply. The differences are described in this section.

Chroma multiplexer/amplifier U3 shares the bias network from sheet 1.

RYEN and RCEN are the counterparts of MYEN/ and MCEN/, but with opposite sense. Y multiplexer U5 is enabled when RYEN=H, chroma switch U2-15 is enabled when RCEN=H.

For record, DC is restored using sync-tip clamping, since accuracy does not need to be high. The negative tips of sync cause Q3 and Q4 to conduct, forming feedback which keeps the sync tip level at the point where Q3 just barely conducts. Current pulses through R11 charge C4 to maintain the appropriate DC level. The base voltage of Q3 is such that blanking level of a normal video signal is close to 0VDC at the output. R10 and R17 provide DC bias for the amplifier input.

The record channel has no counterpart to Q7. Q2 and Q1 buffer the S Y and C respectively. When S Y is disconnected by U2-4, it gets switched to a DC level formed by R12 and D1, which brings SYREC close to 0VDC.

Chroma coupling capacitor C3 is smaller than its counterpart C17 because it is not subject to the switched loading of the OSD (ref sec 3.5). Q1 is biased through R6 from ground.

The DC operating points of the sync-tip clamping and chroma buffer Q1 are such that the blanking level of the summed composite CVREC is close to 0VDC.

OSD Chip Operation (sheet 1)

OSD Cystal

The video module is designed so that domestic and foreign TV standards (NTSC, PAL, SECAM) are accomodated without the need to do any cover-off configuring. The 2 crystals that define the different standards are software-selectable. The output of the OSD oscillator stage is switched between the two crystals by U12-4. The OSD oscillates at 4 times the color subcarrier (4 fsc), 14.3 or 17.7MHz for NTSC or PAL, respectively. The oscillator operates the selected crystal in a conventional 'parallel' configuration. The C_0 capacitance of the unselected crystal contributes to the load capacitance of the active crystal, and this introduces some extra component-to-component variation. C39 trims the oscillator in order to bring both frequencies within acceptable tolerance .

Dotclock Frequency

The OSD horizontal dotclock determines the width of the displayed characters. (The height is always one pixel per scanline.) The frequency is determined by LC network L1,C31,C32, which operates at 7-8MHz.

Oscillator Inhibit

When the OSD is off, and thru-video is being viewed normally, small amounts of crosstalk from local oscillator activity can potentially produce fixed- or moving-pattern artifacts in luminance, and variable color-shift effects in chrominance. Oscillator-inhibit is provided to give the cleanest signal for the normal viewing situation.

When the OSD is in external sync mode, the dotclock oscillator is stopped whenever its EXHSYN/ pin is low, and allowed to run when EXHSYN/ is high. Control bit HINH is gated into the EXHSYN/ input through U13 to keep the dotclock inhibited (schematic sheet 3).

XINH inhibits the crystal oscillator through diode D13, which holds the the oscillator input biased out of the active range. During reset, both oscillators are enabled.

Oscillator Calibration

The OSD chip offers a method for probing the frequencies of the dotclock and the crystal oscillators without detuning the actual oscillator components . When the OSD TEST/ input is asserted, the role of two output pins is changed to permit frequency calibration. Typically the dotclock is not adjusted, but it can be checked; the accuracy of the color subcarrier f_{SC} is more critical, and an adjustment is provided.

In test mode, the chip drives TP2 from internal logic that relates to the crystal as shown in the table. Note that the test frequencies are slightly different from the subcarrier frequencies.

Nominal Video Frequency Relationships

MODE	f_{SC} MHz	$f_{CRYSTAL}=4xf_{SC}$ MHz	$f_{CRYSTAL}/f_H$	f_H kHz	$f_{CRYSTAL}/f_{TEST}$	f_{TEST} MHz
NTSC	3.579545	14.31818	910	15.73426	910/227	3.57168
PAL	4.433619	17.73448	1135+4/625	15.62500	$\frac{1135+4/625}{284}$	4.43750

Test Frequency Ranges

MODE	f_{TEST} -50ppm MHz	f_{TEST}	f_{TEST} +50ppm MHz	ppm for 10Hz
NTSC	3.57150	3.57168	3.57186	2.8
PAL	4.43728	4.43750	4.43772	2.3

PAL mode

The OSD chip is natively PAL-capable. Selecting PAL mode involves both programming internal OSD registers and selecting the $4xf_{sc}$ crystal with U12-4. The OSD generates the 625-line/50Hz PAL raster and encoded PAL color.

SECAM considerations

For SECAM compatibility, the fullscreen OSD is configured for 50Hz monochrome grayscale. During overlay, switch U8-15 bypasses the high-frequency SECAM color-subcarriers around the OSD. With SECAM, overlaid characters are not "carved out" of the thru video as well as they are in PAL or NTSC; the color of the thru-video bleeds through the overlay.

Main Board Interface (sheet 4)

OSD Serial Control

A command to the OSD chip consists of two 8-bit transfers, LSB first. Individual bits are clocked in on the rising edge of the SER_CTRL_CLK/ while the chip is selected by OSD_CS/.

Control Registers

Two 8-bit 74HC595 shift registers U14,U15 are cascaded to form one logical 16-bit register. Bits are clocked into the input shift registers on the rising edge of SER_CTRL_CLK/ in a single 16-bit transfer. The output parallel registers are updated on the rising edge of the 'chip select' VIDEO_REG_CS/, which is simply a clock to the output registers. The shift registers are cleared by RESET/, during which time the output registers are repeatedly loaded by 15kHz taken from the sync detect AFC. Clearing the register results in a proper reset state for all bits except the enable to the record Y multiplexer U5. U2-14 is used as an inverter to give RYEN the proper sense, and so U5 is disabled during reset.

Control Bit Assignments

D0:2	MSEV[0:2]	Monitor source select
D3	MYEN/	Monitor Y enable
D4:6	RSEV[0:2]	Record source select
D7	RYEN	Record Y enable
D8	MCEN/	Monitor chroma enable
D9	RCEN	Record chroma enable
D10	MCOMP	Monitor composite, inhibit SY out
D11	RCOMP	Record composite, inhibit SY out
D12	PALX	Select 625/50 (PAL) OSD crystal
D13	SECEN	SECAM overlay 'transparency'
D14	XINH	Inhibit OSD crystal oscillator
D15	HINH	Inhibit OSD dotclock oscillator

Status Bits

Five status bits are brought to the host connector, as described above: the 3 bits from the S-video DIN auxiliary contacts, signal detect from U9, and vertical sync.

Power

Most of the analog video circuitry is powered by +5VA, which is fed from the main board +5VD supply. (One exception is the sync stripper, described above.) The negative rail is -5VA, which is supplied by the -5VA from the main board and is decoupled with FB2,C43, and C48.

Signal Names

+15V	+15 Volts Analog
+5VA	+5 Volts Analog
+5VAE	+5 Volts Analog, video emitter followers
+5VAS	+5 Volts Analog, video sync stripper
+5VD	+5 Volts Digital
-15V	-15 Volts Analog
-5VA	-5 Volts Analog
1MHZ	Serial-control clock
10MHZ	Z80 Master Clock
10MHZ/	Z80 Wait state generation clock
128FS/	Digital Audio Bitclock (56k-D/A, 128x wordclock)
16FS/	Digital Audio De-jitter Reference Clock (16x wordclock)
16FSJ/	Digital Audio De-jitter Clock with Jitter (16x wordclock)
24BIT_FRAME	Framing Signal for Serial-to-Parallel Shift Registers, Lexichip input
256FS	Digital Audio Master Clock (256x wordclock)
256FSA	Analog Converter Master Clock (256x wordclock)
256FSJ	Digital Audio Clock with Jitter, from S/PDIF rcvr (256x wordclock)
256FS_44K	Reference Clock for S/PDIF Input @ 44.1 kHz, from de-jitter VCO (256x wordclock)
256FS_48K	Reference Clock for S/PDIF Input @ 48 kHz, from de-jitter VCO (256x wordclock)
256FS_MC	Reference Clock for Analog Input (internal sample rate), from Lexichip Xtal (256x wordclock)
2FS	Framing Signal for 56k-D/A Serial Data (2x wordclock)
2FS/	2x wordclock reference (derived from 256FS)
4FS/	Framing Signal for Lexichip-56k Serial Data (4x wordclock)
64FS/	64x wordclock reference (derived from 256FS)
64FSA	A/D Converter Bitclock (64x wordclock)
56K4_10MHZ/	DSP56004 Master Clock
56K4_A[0:8]	DSP56004 Memory Address Bus
56K4_CS/	DSP56004 Serial-control Chip Select
56K4_HREQ/	DSP56004 Host Request
56K4_IRQB/	DSP56004 Interrupt Request B
56K4_MA[0:8]	DSP56004 Memory Address Bus
56K4_NMI/	DSP56004 Non-Maskable Interrupt
56K4_RST/	DSP56004 Reset
56K4_SD_IN	DSP56004 Serial Audio Data Input
56K4_WC_EN/	DSP56004 Wordclock Enable
56K_BCLK_OUT/	DSP56004 Serial Audio Output Bitclock (128x Wordclock)
56K_SD0	DSP56004 Serial Audio Data Output Port 0 (Front L&R)
56K_SD1	DSP56004 Serial Audio Data Output Port 1 (Center & Sub)
56K_SD2	DSP56004 Serial Audio Data Output Port 2 (Sides & Rears)

A[0:7]	Lexichip Audio Memory Address Bus
AC3_128FS/	not used
AC3_256FS	AC3 output bitclock (256x wordclock)
AC3_4FS/	AC3 output word-select (4x wordclock)
AC3_64FS/	AC3 input bitclock (64x wordclock)
AC3_CS/	AC3 DSP Serial-control Chip Select
AC3_FS/	AC3 input/output framing signal (1x wordclock)
AC3_GPIOA	AC3 general purpose I/O bit 0
AC3_GPIOB	AC3 general purpose I/O bit 1
AC3_RST/	reset to AC3 DSP
AC3_SERAUDIO	AC3 serial audio output (256x wordclock)
AC3_SPARE	not used
ADC_FS	A/D Converter Framing Signal (1x wordclock)
AD_CAL	A/D Calibration Enable (active high)
AD_CAL/	A/D Calibration Enable (active low)
AES_SELECT	AES bitstream Error&Freq/Channel Status Select
AREC_EN	Record input-select audio multiplexer enable
A_SERAUDIO_IN	Analog Serial Audio Data Input (from A/D)
BACKLIGHT	LCD Backlight Enable
BAT_VCC	Battery/Vcc Supply to Non-Volatile RAM
BBIT[0:2]	ROM Bank Selection Bits
BPCOR	Analog backporch dc correction voltage
BWR/	ROM Bank Write Enable
C0/	Channel Status 0/Error Report (Pro/Consumer)
CA	Channel Status a/Error Report (Audio/Non-audio)
CAS/	DSP56004 Memory Column Address Strobe
CB	Channel Status b/Error Report
CBIAS	Analog DC bias, S-Video chroma
CC	Channel Status c/Freq Report (Emphasis)
CD	Channel Status d/Freq Report
CE	Channel Status e/Freq Report
CHASSIS_GND	Ground to on/off switch case
CLAMP_LEVEL	Analog video dc-restorer reference voltage
CLKB	AC3 output bitclock (256x wordclock)
CLKD_SD_OUT	Clocked Serial Data Output
CLOCK_SELECT[0:1]	System Clock Select
CLR_INT/	Clear Interrupt
COAX/OPTIC	Coaxial/Optical S/PDIF Input select
COL[0:2]	LED Column Select bits
CONTRAST	LCD Contrast bias voltage
CONTRAST[0:3]	LCD Contrast Control Bits
CONTROL_REG[0:5]	Z80 Control Register Clocks
CTROUT	Center Analog Output
CTRSUB_VC/	Center&Sub Volume Control Serial-control select
CTRSUB_VC_CS/	Center&Sub Volume Control Chip Select
CVAUX	Analog composite video input, AUXiliary
CVMON	Analog composite video output, monitor
CVREC	Analog composite video output, record
CVTV	Analog composite video input, TV
CVVCR1	Analog composite video input, VCR1
CVVCR2	Analog composite video input, VCR2
CVVD	Analog composite video input, V-DISC

DAB[0:19]	Lexichip Digital Audio Bus
DABCLK/	D/A Converter Bitclock (128x wordclock)
DAC_FS	D/A Converter Framing Signal (1x wordclock)
DCAL	A/D Converter Calibration Status
DEEMPH/	De-emphasis Control Bit
DIG_IN2/1	Source 1-2 S/PDIF Input Select
DIG_REC_SEL	Digital audio record source select
DIG_REC_SEL/	Digital audio record source select
DOTCLOCK	Video horizontal dotclock
DSP_BITCLK	DSP Bitclock (Lexi-56k, 256x wordclock)
DSP_FS/	DSP Framing Signal (1x wordclock)
DSP_OVLD	DSP Overload LED Control Bit
D_SERAUDIO_IN	Digital Serial Audio Data Input (from S/PDIF receiver)
ENCODER_[0:1]	Volume Encoder Bus
ENCODER_GND	Volume Encoder Ground
ERF	S/PDIF receiver Error Flag
FILM/MUSIC	Film/Music Auxiliary Control Bit
FRONT_PANEL/	Front Panel Status Buffer Enable
FRONT_VC/	Front L&R Volume Control Serial-control select
FRONT_VC_CS/	Front L&R Volume Control Chip Select
FS/	System Wordclock Reference
FS_SHIFT	Shifted Framing Signal for DACs (1x wordclock)
FS_SHIFT/	Shifted Framing Signal (1x wordclock)
GAL_WC/	Lexichip GAL Wordclock Output
GATED_64FS/	Bitclock for Serial-to-Parallel Shift Registers, Lexichip input
GMHSYN/	Gated monitor horizontal sync
GNDA	Analog Ground
GNDC	Chassis Ground
GNDD	Digital Ground
GPIO[0:3]	DSP56004 General Purpose I/O Bus
HINH	Video horizontal dotclock oscillator inhibit
INPUT_VC/	Input Level Control Serial-control select
INPUT_VC_CLK	Input Level Control Serial Clock
INPUT_VC_CS/	Input Level Control Chip Select
INPUT_VC_DATA	Input Level Control Serial Data
INT	System Interrupt Clock Output from PIC
IO_D[0:7]	Z80 I/O Data Bus
IR_ACK_LED/	IR Acknowledge LED control voltage
IR_ACK_PIC	IR Acknowledge LED enable, IR decoder ucontroller (PIC)
IR_ACK_Z80	IR Acknowledge LED enable, Z80
IR_AUXIN	Auxiliary IR input, modulated
IR_AUXRET	Auxiliary IR input return
IR_BUFFER/	IR Buffer enable
IR_DATA	IR demodulator serial output
LCAS/	Lexichip Memory Column Address Strobe
LCD/	LCD Register Enable
LCD_D[0:7]	LCD Data Bus
LCD_EN	LCD Enable
LCD_WAIT_OFF/	Signals end of LCD Wait period
LED_ROW[0:6]	LED Row Control Bus
LEFTOUT	Left Front Analog Output
LEX/	Lexichip Chip Select
LEXCAS/	Lexichip Memory Column Address Strobe
LEXPHASEAB	Lexichip Phase AB Clock
LEXPHASECD	Lexichip Phase CD Clock
LEXRAS/	Lexichip Memory Row Address Strobe
LEXWE/	Lexichip Memory Write Enable
LEXWR/	Z80-Lexichip Write Strobe
LEX_IN/	Lexichip Audio Data Input Strobe
LEX_REG0/	Lexichip Serial-to-Parallel Register Output Enable
LEX_RST/	Lexichip Reset
LEX_SD_OUT	Lexichip Serial Audio Data Output
LEX_WAIT/	Lexichip Wait Status Bit (from Lexichip)
LEX_WAIT_OFF/	Signals end of Lexichip Wait period
LEX_WC/	Lexichip Word Clock
LIN	Left Monitor Analog Input
LRAS/	Lexichip Memory Row Address Strobe

LREAROUT	Left Rear Analog Output
LRECIN	Left Record Input
LROW[0:6]	LED Row Control Bus
LSIDE	Left Side DAC Output
LSIDEOUT	Left Side Analog Output
LWE/	Lexichip Memory Write Enable
LZ2IN	Left Zone2 Input
MA[0:8]	Lexichip Memory Address Bus
MC	Lexichip Master Clock buffered output (512x wordclock)
MC/	Lexichip Master Clock output (512x wordclock)
MCAS/	DSP56004 Memory Column Address Strobe
MCEN/	Monitor chrominance input enable
MCOMP	Monitor channel composite-only (S-luminance output disable)
MD[0:3]	DSP56004 Memory Data Bus
MONITOR_EN	Monitor input-select audio multiplexer enable
MRAS/	DSP56004 Memory Row Address Strobe
MRD/	DSP56004 Memory Read Strobe
MSEL[0:2]	Monitor input-select audio multiplexer control bits
MSEV[0:2]	Monitor input-select video multiplexer control bits
MUTE/	Output Mute Enable
MWR/	DSP56004 Memory Write Strobe
MYEN/	Monitor input-select luminance multiplexer enable
OSD_CS/	Serial-control chipselect, video OSD
OSD_CSYNC/	OSD composite sync output
OUTPUT_VC/	Output Volume Control Serial-control select
OUTPUT_VC_CLK	Output Volume Control Serial Clock
OUTPUT_VC_DATA	Output Volume Control Serial Data
OVLD_LED	Overload LED control voltage
P[15:17]	Z80 ROM Address Select (post Bank-select bits)
PALX	PAL crystal select
PCLK0	Lexichip Programmable Clock 0
PIC_CONFIG	IR decoder ucontroller (PIC) Configuration Control Bit
PIC_RST/	IR decoder ucontroller (PIC) Reset
RAM	Z80 RAM Chip Select
RAMEN/	Z80 RAM Enable
RAS/	DSP56004 Memory Column Address Strobe
RCEN	Record input chrominance enable
RCOMP	Record channel composite-only (S-luminance output disable)
RD/	DSP56004 Memory Read Strobe
REAR_VC/	Rear Volume Control Serial-control select
REAR_VC_CS/	Rear Volume Control Chip Select
REMOTE_PWR_EN	Remote Power Control Bit
RESET	Primary Reset (active high)
RESET/	Primary Reset (active low)
RESET/	Reset to control register (video bd)
RESETA/	Buffered Reset A (to Z80, GALs)
RESETB/	Buffered Reset B (to DSP clocks, output relays)
RIGHTOUT	Right Front Analog Output
RIN	Right Monitor Analog Input
ROM/	ROM Output Enable
RREAROUT	Right Rear Analog Output
RRECIN	Right Record Input
RSEL[0:2]	Record input-select audio multiplexer control bits
RSEV[0:2]	Record input-select video multiplexer control bits
RSIDE	Right Side DAC Output
RSIDEOUT	Right Side Analog Output
RYEN	Record input-select luminance multiplexer enable
RZ2IN	Right Zone2 Input
SCGAL_CTRL	Serial GAL Control Bit
SCMON	Analog S-video chrominance output, monitor
SCOL_0	Switch Column 0 Select Bit (to Off/On switch)
SCREC	Analog S-video chrominance output, record
SCVCR1A	Analog S-video chrominance input, vcr1, AC-coupled
SCVCR2A	Analog S-video chrominance input, vcr2, AC-coupled
SCVDA	Analog S-chrominance input, v-disc, AC-coupled

SC_BUFFER/	Serial-control readback buffer enable
SC_CS/	Serial-control readback buffer chip select
SC_RETURN_DATA	Serial-control readback buffer Returned Data path
SECEN	SECAM filter switch enable
SERAUDIO_IN	Serial audio data input (from mux)
SERIAL_DEBUG	Serial-data readback for debug
SER_CLK_EN/	Serial-data register Clock Enable
SER_CTRL_CLK	Serial-control bitclock (for 56004, AC3 bd)
SER_CTRL_CLK/	Serial-control bitclock (for data registers, video bd)
SER_CTRL_DATA	Serial-control data register output
SER_CTRL_ON/	Serial-control On status bit
SER_CTRL_REG0/	Serial-control Register 0 clock
SER_CTRL_REG1/	Serial-control Register 1 clock
SER_DATA_REG0/	Serial-data Register 0 control bit
SER_DATA_REG1/	Serial-data Register 1 control bit
SER_DATA_REG2/	Serial-data Register 2 control bit
SER_END/	Serial-control End status bit
SIDE_VC/	Side Volume Control Serial-control select
SIDE_VC_CS/	Side Volume Control Chip Select
SPDIF_64FS	S/PDIF Receiver Bitclock (64x Wordclock)
SPDIF_FS	S/PDIF Receiver Framing Signal (1x wordclock)
SROW_4	Switch Row 4 Select Bit (to Off/On switch)
STATUS[0:2]	Z80 Status Buffer Enables
SUBOUT	Subwoofer Analog Output
SVID1_DETECT	S-video plug detect, VCR1
SVID2_DETECT	S-video plug detect, VCR2
SVID3_DETECT	S-video plug detect, VDISC
SWCOL_[0:2]	Switch Column Select bits
SWITCHCOL_[0:2]	Switch&LED Column Select bits
SWROW[0:4]	Switch Row Select bits
SYMON	Analog S-video luminance output, monitor
SYNC_DETECT	Sync detect (signal-present) from sync stripper chip
SYREC	Analog S-video lumnance output, record
SYSTEM_INT/	System Interrupt clock
SYVCR1	Analog S-video luminance input, vcr1
SYVCR2	Analog S-video luminance input, vcr2
SYVD	Analog S-luminance input, v-disc
S_CHAR	S-luminance isolated character generator

TW[0:6]	Number of timed wait states for Z80
VC/	Volume Control serial-control status (to serial GAL)
VC_ZCEN	Volume Control Zero Crossing Enable
VERF	S/PDIF receiver Validity+Error Flag
VIDEO_REG_CS/	Video control registers, serial-control chip select
VIDR	Analog DC-restored monitor video
VOLUME_CTRL_ZCEN	Volume Control Zero Crossing Enable
VSYNC/	Vertical sync
WAIT_ON/	Z80 Wait State Control bit
WR/	DSP56004 Memory Write Strobe
XA0	Lexichip Audio Memory Address 8
XINH	Video crystal oscillator inhibit
Z80_FS	Z80 wordclock reference
ZA[0:15]	Z80 Address Bus
ZA_L[0:9]	Z80-Lexichip Address Bus (latched)
ZD[0:7]	Z80 Data Bus
ZIORQ/	Z80 I/O Request
ZM1/	Z80 Machine cycle 1
ZMREQ/	Z80 Memory Request
ZMREQ1/	Z80 Memory Request 1 (latched)
ZNMI/	Z80 Non-maskable interrupt
ZNMI_MASK/	Z80 Non-maskable interrupt mask
ZONE2_MUTE/	Zone2 Mute Enable
ZONE2_VC/	Zone2 Volume Control Serial-control select
ZONE2_VC_CS/	Zone2 Volume Control Chip select
ZRD/	Z80 Read Strobe
ZRFSH/	Z80 Refresh Clock
ZWAIT/	Z80 Wait Enable
ZWR/	Z80 Write Strobe
ZWR1/	Z80 Write strobe extended-1
ZWR2	Z80 Write strobe extended-2
ZWRPULSE/	Z80 Write Pulse (for control registers)

MAIN BOARD

Parts List

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
CARBON FLM RES				
202-00504	RES,CF,5%,1/4W,5.1 OHM	2	05/20/96•	FB1,2
202-09794	RESSM,RO,5%,1/10W,0 OHM	14		R81,105,129,153,155, 233,246,302, R304,307,309,310,318,370
202-09795	RESSM,RO,5%,1/10W,2.2K OHM	17		R1,18-21,27,226,275,312-315,341, R354-356,361
202-09871	RESSM,RO,5%,1/10W,1K OHM	24		R2,7,24,25,31,58,228-230,252-257 R261,270,276,277,300,358,363,364, R367
202-09873	RESSM,RO,5%,1/10W,10K OHM	27		R59,62,83,86,107,110,131,134, R157-160,219,223,225,258,262,273, R278-284,337,339
202-09894	RESSM,RO,5%,1/10W,1M OHM	5		R35,39,43,47,336
202-09897	RESSM,RO,5%,1/10W,470 0HM	7		R29,268,301,343,345,351,357
202-09899	RESSM,RO,5%,1/10W,47 OHM	54	•05/20/96	R231,232,234,236,237,239-244,247, R249-251,259,263-267,285-297 R305,316,319-329,331-335,350,353
202-09899	RESSM,RO,5%,1/10W,47 OHM	53	05/20/96•	R231,232,234,236,239-244,247, R249-251,259,263-267,285-297 R305,316,319-329,331-335,350,353
202-10426	RESSM,RO,5%,1/10W,15K OHM	8		R33,34,36,38,41,42,44,46
202-10466	RESSM,RO,5%,1/10W,20K OHM	1		R272
202-10557	RESSM,RO,5%,1/10W,4.7K OHM	3		R224,260,274
202-10558	RESSM,RO,5%,1/10W,47K OHM	2		R26,227
202-10559	RESSM,RO,5%,1/10W,100 OHM	3		R218,338,340
202-10569	RESSM,RO,5%,1/10W,10 OHM	12	•05/20/96	R30,65,82,89,106,113,130,137, R154,173,180,298
202-10569	RESSM,RO,5%,1/10W,10 OHM	8	05/20/96•	R30,65,89,113,137,173,180,298
202-10570	RESSM,RO,5%,1/10W,120 OHM	3		R342,344,349
202-10571	RESSM,RO,5%,1/10W,100K OHM	17		R197-212,220
202-10573	RESSM,RO,5%,1/10W,470K OHM	4		R213-216
202-10574	RESSM,RO,5%,1/10W,10M OHM	2		R28,269
202-10585	RESSM,RO,5%,1/4W,51 OHM	8		R10,11,15,16,57,177,179,217
202-10586	RESSM,RO,5%,1/4W,100 OHM	28		R49-56,161-164,181-196
202-10597	RESSM,RO,5%,1/10W,180 OHM	3		R359,365,368
202-10598	RESSM,RO,5%,1/10W,330 OHM	6	•05/20/96	R9,14,348,360,366,369
202-10598	RESSM,RO,5%,1/10W,330 OHM	4	05/20/96•	R348,360,366,369
202-10599	RESSM,RO,5%,1/10W,3K OHM	2		R346,347
202-10836	RESSM,RO,5%,1/4W,1K OHM	6		R3-6,8,13
202-10990	RESSM,RO,5%,1/4W,7.5 OHM	1		R362
202-11347	RESSM,RO,5%,1/4W,3 OHM	2		R12,17
202-11683	RESSM,RO,5%,1/10W,5.1 OHM	4	•05/20/96	R82,106,130,154
METAL FLM RES				
203-10415	RESSM,RO,1%,1/10W,432 OHM	8		R66,67,90,91,114,115,138,139
203-10424	RESSM,RO,1%,1/10W,4.99K OHM	2		R37,45
203-10560	RESSM,RO,1%,1/10W,75.0 OHM	3	05/20/96•	R22,23,352
203-10560	RESSM,RO,1%,1/10W,75.0 OHM	4	•05/20/96•	R22,23,237,352
203-10580	RESSM,RO,1%,1/10W,3.01K OHM	8		R61,64,85,88,109,112,133,136

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
METAL FLM RES cont'd.				
203-10583	RESSM,RO,1%,1/10W,10.0K OHM	13	•04/24/96	R60,63,84,87,108,111,132,135, R166-169,221
203-10583	RESSM,RO,1%,1/10W,10.0K OHM	29	04/24/96•	R60,63,68,71,74,77,84,87,92,95, R98,101,108,111,116,119,122,125, R132,135,140,143,146,149, R166-169,221
203-10896	RESSM,RO,1%,1/10W,1.00K OHM	9		R40,48,171,172,174-176,178,222
203-10897	RESSM,RO,1%,1/10W,2.00K OHM	2		R165,170
203-10898	RESSM,RO,1%,1/10W,4.87K OHM	16	•04/24/96	R72,73,78,79,96,97,102,103,120, R121,126,127,144,145,150,151
203-10991	RESSM,RO,1%,1/10W,1.40K OHM	16	•04/24/96	R69,70,75,76,93,94,99,100, R117,118,123,124,141,142,147,148
203-10992	RESSM,RO,1%,1/10W,6.04K OHM	16	•04/24/96	R68,71,74,77,92,95,98,101,116, R119,122,125,140,143,146,149
203-11080	RESSM,RO,1%,1/10W,1.15K OHM	16	04/24/96•	R69,70,75,76,93,94,99,100, R117,118,123,124,141,142,147,148
203-11494	RESSM,RO,1%,1/10W,8.06K OHM	16	04/24/96•	R72,73,78,79,96,97,102,103,120, R121,126,127,144,145,150,151
ELECTROLYT CAP				
240-00608	CAP,ELEC,2.2uF,50V,RAD	3		C28,33,244
240-07335	CAP,ELEC,47uF,25V,RAD,NON-POL	24		C49,50,59,60,79,80,89,90,109, C110,119,120,139,140,149,152, C173-176,181,182,189,190
240-09786	CAP,ELEC,100uF,25V,RAD,LOW ESR	4		C48,250,251,309
TANTALUM CAP				
241-09366	CAPSM,TANT,10uF,25V,20%	1		C23
241-09798	CAPSM,TANT,10uF,10V,20%	33		C24,55,57,62,75,78,85,87,92, C105,108,115,117,122,135,138, C145,147,151,165,168,183,185 C188,191,193,198,230,232,234,238 C258,261
PCRB/PP CAP				
244-06173	CAP,MYL,4700pF,5%,RAD	16		C64,66,73,74,94,96,103,104,124, C126,133,134,154,156,163,164
244-06176	CAP,MYL,.047uF,5%,RAD	1		C26
244-06883	CAP,MYL,.01uF,5%,RAD	10		C63,65,93,95,123, C125,153,155,195,196
244-10423	CAP,MYL,.22UF,10,RAD	5		C247,248,252,253,308
CERAMIC CAP				
245-09291	CAPSM,CER,470pF,50V,NPO,5%	17	•04/24/96	C68-71,98-101 C128-131,158-161,245
245-09291	CAPSM,CER,470pF,50V,NPO,5%	1	04/24/96•	C245
245-09875	CAPSM,CER,.1uF,50V,Z5U,20%	164		C3-5,8-11,13-16,19-22,25,27,29-32 C34-37,51,54,56,58,61,67,72,76,77, C81,84,86,88,91,97,102,106,107, C111,114,116,118,121,127,132, C136,137,141,144,146,148,150 C157,162,166,167,177,180,184,186 C187,192,194,197,215-229,231,233 C235-237,239,240,243,256,257,259 C260,262-289,292-307,311-316, C318-333,336,337

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
CERAMIC CAP cont'd.				
245-09876	CAPSM,CER,.01uF,50V,Z5U,20%	5		C12,38,39,338,339
245-09895	CAPSM,CER,10pF,50V,COG,10%	2		C334,335
245-10452	CAPSM,CER,390PF,50V,NPO,5%	1		C317
245-10562	CAPSM,CER,150pF,50V,10%	37		C1,2,6,7,40-47,169-172,199-214, C246,249,254,255,310
245-10588	CAPSM,CER,33pF,50V,COG,10%	2		C241,242
245-10976	CAPSM,CER,47pF,50V,NPO,5%	14		C17,18,52,53,82,83,112,113,142, C143,178,179,290,291
245-10977	CAPSM,CER,330PF,50V,NPO,5%	16	04/24/96•	C68-71,98-101,128-131,158-161
INDUCTORS				
270-00779	FERRITE,BEAD	22	•05/20/96	FB1-21,24
270-00779	FERRITE,BEAD	20	05/20/96•	FB3-21,24
270-06671	FERRITE CHOKE,2.5 TURN	2		FB22,23
DIODES				
300-01030	DIODE,1N4004 AND 4005	5		D5,24-27
300-10414	DIODE,VARACTOR,BB911	6		VRC1-6
300-10509	DIODESM,1N914,SOT23	4		D22,45,46,48
300-10563	DIODESM,DUAL,SERIES,GP,SOT23	20		D1-4,6-21
300-10564	DIODESM,SCHOTTKY,LOW VF,SOT23	1		D23
TRANSISTORS				
310-10422	TRANSISTORSM,2N4403,SOT23	2		Q1,2
310-10510	TRANSISTORSM,2N3904,SOT23	5		Q3,4,7,8,11
310-10565	TRANSISTORSM,2N3906,SOT23	5		Q6,9,12,14,15
310-10566	TRANSISTORSM,2N4401,SOT23	3		Q5,10,13
DIGITAL IC				
330-09239	ICSM,DIGITAL,74HC74,SOIC	3		U50,59,70
330-09350	IC,DIGITAL,LEXICHIP 2A	1		U98
330-09796	ICSM,DIGITAL,74AC00,SOIC	1		U4
330-09797	ICSM,DIGITAL,74AC04,SOIC	1		U92
330-09877	ICSM,DIGITAL,74HC174,SOIC	2		U99,100
330-09884	ICSM,DIGITAL,74AC32,SOIC	1		U75
330-09885	ICSM,DIGITAL,74AC74,SOIC	3		U3,76,91
330-09888	ICSM,DIGITAL,74ACT153,SOIC	1		U44
330-10372	ICSM,DIGITAL,74HC574,SOIC	1		U87
330-10417	ICSM,DIGITAL,74HC00,SOIC	1		U58
330-10506	ICSM,DIGITAL,74HC595,SOIC	4		U54,95-97
330-10522	ICSM,DIGITAL,74HC04,SOIC	1		U47
330-10523	ICSM,DIGITAL,74HCU04,SOIC	5		U2,6,9,10,72
330-10524	ICSM,DIGITAL,74HC08,SOIC	1		U48
330-10525	ICSM,DIGITAL,74HC14,SOIC	1		U61
330-10526	ICSM,DIGITAL,74HC32,SOIC	2		U38,60
330-10527	ICSM,DIGITAL,74HC138,SOIC	3		U63,65,66
330-10530	ICSM,DIGITAL,74HC165,SOIC	3		U55-57
330-10531	ICSM,DIGITAL,74AC175,SOIC	1		U68
330-10532	ICSM,DIGITAL,74HC175,SOIC	3		U49,52,53
330-10533	ICSM,DIGITAL,74HC245,SOIC	2		U73,80
330-10534	ICSM,DIGITAL,74HC259,SOIC	1		U64
330-10535	ICSM,DIGITAL,74AC273,SOIC	1		U74
330-10536	ICSM,DIGITAL,74HC273,SOIC	4		U78,82,84,85
330-10537	ICSM,DIGITAL,74HC541,SOIC	5		U40,79,81,83,86
330-10538	ICSM,DIGITAL,74AC08,SOIC	1		U71
330-10589	ICSM,DIGITAL,74HC161,SOIC	1		U5
330-11439	ICSM,DIGITAL,74AC161,SOIC	2		U45,46

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
LINEAR IC				
340-00742	IC,LINEAR,7805 (LM 340 T-5)	1		U43
340-01525	IC,LINEAR,7905,-5V REG	1		U42
340-10502	ICSM,LIN,LF353,DUAL OPAMP,SOIC	2		U32,33
340-10550	ICSM,LIN,CS3310,VOL CTL,SOIC	6		U12,16,20,24,28,29
340-10552	ICSM,LIN,MC33078,DU OPAMP,SOIC	9		U11,13,15,17,19,21,23,25,27
340-10567	ICSM,LIN,MC34164,+5V MON,SOIC	1		U41
INTERFACE IC				
345-09779	IC,INTER,CS8412,DIG I/O RCVR	1		U8
346-10508	ICSM,SS SWITCH,74HC4053,SOIC	1		U1
346-10548	ISCM,SS SWITCH,DG444,SOIC	2		U7,36
346-10549	ICSM,SS SWITCH,DG408,SOIC	4		U30,31,34,35
MEMORY IC				
350-10374	ICSM,DRAM,256KX4,80NS,SOJ	1		U94
350-10545	ICSM,SRAM,8KX8,80NS,SOP,50uA	1		U62
350-10593	ICSM,DRAM,64KX16,80NS,SOJ	1		U93
350-11215	IC,ROM,27C010,DC-1,BASE,V1.01	1	• 6/12/96	U77-BASE OPTION
350-11216	IC,ROM,27C010,DC-1,THX,V1.01	1	• 6/12/96	U77-THX OPTION
350-11217	IC,ROM,27C020,DC-1,AC-3,V1.00	1		U77-AC-3 OPTION
350-11218	ICSM,GAL,16V8,DC-1,SERIAL,V100	1		U51
350-11219	ICSM,GAL,16V8,DC-1,LEXI,V1.00	1		U90
350-11220	ICSM,GAL,20V8,DC-1,ZGAL,V1.00	1		U6 -BASE OPTION
350-11333	ICSM,GAL,20V8,DC-1,THX,ZG,V100	1		U69-THX/AC-3 OPTION
350-11720	IC,ROM,27C010,DC-1,BASE,V1.02	1	6/12/96 •	U77-BASEOPTION
350-11721	IC,ROM,27C010,DC-1,THX,V1.02	1	6/12/96 •	U77-THXOPTION
355-10551	ICSM,ADC,CS5338,16BIT,SOIC	1		U37
355-11085	ICSM,DAC,CS4329,20BIT,SSOP	4		U14,18,22,26
MICROPROC IC				
365-09883	ICSM,uPROC,Z80,CMOS,10MHz,QFP	1		U67
365-10541	ICSM,uPROC,56004,DSP,QFP	1		U89
365-11221	ICSM,uPROC,PIC16C54,DC-1,V1.01	1		U39
RESONATORS				
390-09075	RESONATOR,CER,11.3MHz	1		Y2
390-09076	RESONATOR,CER,12.3MHz	1		Y3
390-10511	RESONATOR,CER,1MHz	1		Y4
390-10514	CRYSTAL,22.900MHz,PAR	1		Y6
390-10515	CRYSTAL,10.0MHz,PAR	1		Y5
390-10590	CRYSTAL,6.144 MHz	1		Y1
RELAYS				
410-03584	RELAY,2P2T,LOW LEVEL,DIP,12V	4		RY1-4
LENS				
430-10419	LEDSM,INNER LENS,RED	10		D29,31,33,35,37,39,41,43,44,49
430-10420	LEDSM,INNER LENS,YEL	1		D47
430-10421	LEDSM,INNER LENS,GRN	8		D28,30,32,34,36,38 D40,42
PSH BUT SWITCH				
453-10418	SWSM,PBM,1P1T,6MMSQ,100GF,BRN	12		SW1-12
BATTERY				
460-04598	BATTERY,LITH,3V,FLAT	1		BAT1

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
CONNECTORS				
490-02356	CONN,JUMPER,.1X025,2FCG	1		W7 pin 1&2
490-02356	CONN,JUMPER,.1X025,2FCG	2	•05/20/96	W3,6
490-02356	CONN,JUMPER,.1X025,2FCG	4	05/20/96•	W3,6 W1-W2,Q3 SIDE W4-W5,Q4 SIDE
PC MNT CONN				
510-02899	CONN,POST,100X025,HDR,3MC	1		W7
510-03961	CONN,POST,100X025,HDR,2MCG	7		J13; W1-6
510-06168	CONN,POST,079,HDR,15MC	1		J12
510-06185	CONN,RCA,PCRA,1FCGX4,WHT/RED	7		J4-10
510-07579	CONN,OPTO,PCRA,RCVR,PANEL,F05	2		CP1,2
510-09765	CONN,POST,079,HDR,10MC	1		J19
510-09790	CONN,DIN,5FC@180DEG,PCRA,SHLD	1		J1
510-10546	CONN,POST,079,HDR,4MC	3		J15,17,18
510-10591	CONN,RCA,PCRA,1FCGX2,VERT,BLK	1		J3
510-10595	PHONE JACK,3.5MM,PCRA,3C,STER	1		J2
510-10984	CONN,JMP,.6X2.5MM,16FC,TRAP	1		LCD - J20
SOCKETS				
520-01361	IC SCKT,20 PIN,PC,LO-PRO	1		U88
520-04999	IC SCKT,32 PIN,PC,MACH,TIN	1		U77
520-10542	IC SCKTSM,PLCC,20 PIN	2		U51,90
520-10543	IC SCKTSM,PLCC,28 PIN	1		U69
520-11235	SCKT,SIMM,.100,30P,VERT,SMTEMP	1		P1 (AC3 BD)
LUGS				
620-10413	LUG,#2,INT STAR,RCA GND	8		J3-10 (RCA CONN)
680-10468	CABLE,HSG/ST&T,6C,35/12,SLV	1		PS TO MAIN (J11/14)

VIDEO BOARD

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
CARBON FLM RES				
202-09794	RESSM,RO,5%,1/10W,0 OHM	1		R77
202-09795	RESSM,RO,5%,1/10W,2.2K OHM	1		R50
202-09871	RESSM,RO,5%,1/10W,1K OHM	6		R86,87,90-93
202-09873	RESSM,RO,5%,1/10W,10K OHM	8		R67,76,83,94,95,97-99
202-09874	RESSM,RO,5%,1/10W,2.2M OHM	2		R20,84
202-09897	RESSM,RO,5%,1/10W,470 0HM	8		R2,5,49,55,58,61,65,96
202-10426	RESSM,RO,5%,1/10W,15K OHM	1		R89
202-10557	RESSM,RO,5%,1/10W,4.7K OHM	3		R12,56,73
202-10558	RESSM,RO,5%,1/10W,47K OHM	3		R21,22,25
202-10569	RESSM,RO,5%,1/10W,10 OHM	3		R19,28,64
202-10571	RESSM,RO,5%,1/10W,100K OHM	1	02/16/96•	R100
202-10573	RESSM,RO,5%,1/10W,470K OHM	4		R10,11,17,52
202-10943	RESSM,RO,5%,1/10W,22K OHM	5		R9,33,81,82,85
202-10944	RESSM,RO,5%,1/10W,33K OHM	2		R68,88
202-10945	RESSM,RO,5%,1/10W,1.5K OHM	4		R54,70,71,80
202-10946	RESSM,RO,5%,1/10W,3.3K OHM	4		R6,38,72,74
202-10947	RESSM,RO,5%,1/10W,680K OHM	1		R75
202-10948	RESSM,RO,5%,1/10W,390 OHM	1		R69
202-10949	RESSM,RO,5%,1/10W,1.2K OHM	1		R62
202-11496	RESSM,RO,0 OHM,1206	11		R14,18,24,27,31,32 R42,43,48,53,60

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
METAL FLM RES				
203-10560	RESSM,RO,1%,1/10W,75.0 OHM	8		R29,30,35,36,41,47,59,63
203-10837	RESSM,RO,1%,1/10W,475 OHM	6		R7,8,15,16,45,46
203-10838	RESSM,RO,1%,1/10W,68.1 OHM	1		R23
203-10839	RESSM,RO,1%,1/10W,1.33K OHM	1		R37
203-10840	RESSM,RO,1%,1/10W,750 OHM	1		R44
203-10896	RESSM,RO,1%,1/10W,1.00K OHM	4		R3,4,51,57
203-10992	RESSM,RO,1%,1/10W,6.04K OHM	2		R78,79
203-11497	RESSM,RO,1%,1/10W,71.5 OHM	1		R26
203-11498	RESSM,RO,1%,1/10W,73.2 OHM	2		R1,13
203-11499	RESSM,RO,1%,1/10W,499 OHM	1		R40
ELECTROLYT CAP				
240-00609	CAP,ELEC,10uF,16V,RAD	4		C17,25,48,49
240-07695	CAP,ELEC,1uF,50V,RAD	3		C4,14,40
240-09786	CAP,ELEC,100uF,25V,RAD,LOW ESR	3		C42,43,45
CERAMIC CAP				
245-09875	CAPSM,CER,.1uF,50V,Z5U,20%	19		C1-3,5-12,15,18,19,23,24,27,46,47
245-10416	CAPSM,CER,1000PF,50V,COG,5%	2		C29,34
245-10544	CAPSM,CER,220PF,50V,NPO,5%	2		C26,44
245-10561	CAPSM,CER,100pF,50V,COG,5%	4		C21,28,30,36
245-10588	CAPSM,CER,33pF,50V,COG,10%	3		C31,37,38
245-10972	CAPSM,CER,.068UF,50V,X7R,20%	1		C35
245-10973	CAPSM,CER,22PF,50V,NPO,5%	1		C32
245-10975	CAPSM,CER,3300PF,50V,X7R,10%	1		C22
245-10977	CAPSM,CER,330PF,50V,NPO,5%	1		C41
246-09419	CAP,TRIM,2.8-10pF,VAR	1		C39
INDUCTORS				
270-00779	FERRITE,BEAD	2		FB1,2
270-06320	INDUCTOR,22uH,SHIELDED	1		L1
DIODES				
300-10509	DIODESM,1N914,SOT23	3		D1,13,14
310-10510	TRANSISTORSM,2N3904,SOT23	6		Q1-3,5-7
310-10565	TRANSISTORSM,2N3906,SOT23	1		Q4
DIGITAL IC				
330-10505	ICSM,DIGITAL,74HC02,SOIC	1		U13
330-10506	ICSM,DIGITAL,74HC595,SOIC	2		U14,15
LINEAR IC				
340-10502	ICSM,LIN,LF353,DUAL OPAMP,SOIC	1		U11
340-11495	ICSM,LIN,LT1229,VID OPAMP,SOIC	2		U1,7
INTERFACE IC				
345-10503	ICSM,INTER,NJM2229,SYNSEP,SOIC	1		U9
345-10504	ICSM,INTER,NJM2246,VID SW,SOIC	2		U3,4
346-10507	ISCM,SS SWITCH,74HC4051,SOIC	2		U5,6
346-10508	ICSM,SS SWITCH,74HC4053,SOIC	3		U2,8,12
MICROPROC IC				
365-10500	ICSM,uPROC,MB90075,OSCD,SOP	1		U10

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
CRYSTALS				
390-10512	CRYSTAL,14.31818MHz,PAR	1		Y2
390-10513	CRYSTAL,17.73448MHz,PAR	1		Y3
390-10516	RESONATOR,CER,503KHz	1		Y1
PC MNT CONN				
510-10553	CONN,DIN,4FC,PCRA	2		J1,2
510-10554	CONN,DIN,4FC,PCRA,SWITCH	3		J4-6
510-10556	CONN,POST,100X025,HDR,14MC,THR	1		J7 TO RCA BD J508
CABLES				
680-07897	CABLE,079,SCKT/BICONN,15C,4.0"	1		J8 TO MAIN BD J12

VIDEO RCA BOARD

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
METAL FLM RES				
203-10560	RESSM,RO,1%,1/10W,75.0 OHM	5		R501-505
PC MNT CONN				
510-10555	CONN,RCA,PCRA,1FCG,YEL	7		J501-507

IR BOARD

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
CERAMIC CAP				
245-03609	CAP,CER,.1uF,50V,Z5U,AX	1		C501
INTERFACE IC				
345-06159	IC,INTER,GPIU5,38KHZ,IR DET	1		U501
LED				
430-03896	LED,GRN,RECT,.197X.079	1		D502
430-03898	LED,RED,RECT,.197X.079	1		D501
430-10594	LED,T1-3/4,IR	1		D503
SPACERS				
630-11285	SPCR,LED,RECT,.1X.2X.35"H,NYL	2		D501,502
680-09763	CABLE,079,SCKT/SCKTRA,10C,2.0"	1		J511-MAIN BD J19

AC-3 OPTION BOARD

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
CARBON FLM RES				
202-10558	RESSM,RO,5%,1/10W,47K OHM	1		R1
TANTALUM CAP				
241-09798	CAPSM,TANT,10uF,10V,20%	1		C27
CERAMIC CAP				
245-09105	CAPSM,CER,.027uF,50V,X7R,0805	20		C2-4,7-23
245-09875	CAPSM,CER,.1uF,50V,Z5U,20%	3		C24-26
245-10587	CAPSM,CER,18pF,50V,COG,10%	3		C1,5,6
INDUCTORS				
270-11289	INDUCTOR,SM,10UH,10%	1		L1
MEMORY IC				
350-11238	ICSM,SRAM,8KX8,25NS,SOJ	3		U2-4
350-11411	ICSM,GAL,16V8,DC-1,AC-3,V1.00	1		U5
MICROPROC IC				
365-11249	ICSM,uPROC,ZR38500,AC3,6CH,QFP	1		U1
CRYSTALS				
390-11290	CRYSTAL,SM,33.000MHz,PAR,18pF	1		Y1
HEATSINKS				
704-11236	HEATSINK,IC,1.01X.555,ADH	1		U1

ENCODER BOARD

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
SWITCHES/ENCODERS				
452-09762	SW,RTY,ENCODER,36 POS,VERT MNT	1		SW502
CABLES				
680-10547	CABLE,079,SCKT/SCKTRA,4C,4.0"	1		J510-MAIN BD J17

POWER SWITCH BOARD

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
SWITCHES/ENCO"DERS				
453-10418	SWSM,PBM,1P1T,6MMSQ,100GF,BRN	1		SW501
CABLES				
680-10547	CABLE,079,SCKT/SCKTRA,4C,4.0"	1		J509-MAIN BD J18

LOGO LED BOARD

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
LED				
430-11234	LEDSM,FLAT LENS,YEL	8		D504-511
CABLES				
680-10547	CABLE,079,SCKT/SCKTRA,4C,4.0"	1		J512-MAIN BD J15

MECHANICAL PARTS (2-Wire)

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
ADHESIVES				
120-11463	ADHESIVE,PLASTIC,PERMABOND#102	0	04/04/96•	LIGHT PIPES
DISPLAY/IND/LED				
430-10988	DISP,LCD,20X2,NEG,12:00,LED,YL	1		TO MAIN BD J20
ROCKER SW				
454-10435	SW,ROCKER,2P1T,16A@250,VER,1-0	1		PWR SW
CONNECTORS				
490-11397	CONN,AC,2C,SNAP,04TH,IEC,10A	1		
TIES				
530-02488	TIE,CABLE,NYL,.14"X5 5/8"	1		PS-MAIN BD CABLE
530-09382	CLIP,WIRE HRNS,.15DIA,ADH BAK	2		PS-MAIN BD CABLE
BUMPERS				
541-07547	BUMPER,FEET,.98DIAX.2,RVT MTG	4		
KNOBS				
550-10486	KNOB,1.25,6MM/FL,BLK	1		ENCODER
INSUL/SPACERS				
630-07846	SPCR,PCB/FOOT,.250,NYL	1		MAIN BD
630-09983	INSUL,SEMI,SIL RUB,ADH,1.95X1"	1		
630-11229	GASKET,BUTTONS,DC-1	1		
630-11233	SPCR,SNAP-IN,.18DX1.25L,NYL	1		MAIN/VIDEO BD
635-10970	SPCR,2-56X3/16,1/8HEX,S,ZN	4		DISPLAY-CHASSIS
MACHINE SCREWS				
640-01700	SCRW,4-40X1/2,PNH,PH,SS	2		CLAMP-HEATSINK
640-09698	SCRW,2-56X5/8,PNH,PH,ZN	4		DISPLAY-CHASSIS
640-10467	SCRW,M3X6MM,FH,PH,BZ	6		FP ASSY-CHASSIS
640-10489	SCRW,M4X10MM,FH,PH,BZ	4		END CAPS-CHASSIS
640-10498	SCRW,M3X6MM,PNH,PH,BZ	19		R.PANEL-CHAS(2);CVR-CHAS & REAR(5);VIDEO BD-REAR (5); VIDEO BDS-BRKT (7)
640-10499	SCRW,M3X8MM,PNH,PH,BZ	8		H/S-MAIN BD (2);PS-SUPPORT (4) IR BD-CHASSIS (2)

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
THRD-FRM SCREWS				
641-01703	SCRW,TAP,AB,4X1/4,PNH,PH,ZN-	5		MAIN BD-CHASSIS&SUPPORT
641-09699	SCRW,TAP,AB,#2X5/16,PNH,PH,ZN	1		DIN CONN-R PNL
641-10989	SCRW,TAP,AB,4X3/8,PNH,PH,BZ	11		RCA CONN-REAR PNL(8); REAR PANEL-CHASSIS(3)
NUTS				
643-01855	NUT,2-56,HEX,ZN	4		DISPLAY-CHASSIS
THRDLS FSTNR				
650-04896	POPRVT,5/32X1/8,REG PROT HD,AL	6		PS SUPP-CHASSIS
650-10427	RVT,SNAP-IN,.12DIA,NYL	4		PWR SW BD-CHAS(2); LOGO LED BD (2)
CABLES				
680-10469	CABLE,AC PWR,HSG/QDC,2C,18G,4"	1		PWR SW-PS
680-11398	CABLE,AC PWR,QDC,2C,18G,SLV,5"	1		AC CONN-PWR SW
CHASSIS/MECH				
700-10470	CHASSIS,DC-1	1		
700-10471	SUPPORT,PS,DC-1	1		
700-10472	COVER,TOP,2UX10.3	1		
700-10473	ENDCAP,DC-1	2		
BRACKETS				
701-09863	CLAMP,HEATSINK,TO-220	1		
701-10474	BRACKET,VIDEO BD,DC-1	1		
PANELS				
702-10475	PANEL,FRONT,DC-1	1		
702-10476	PANEL,REAR,DC-1	1		
702-11348	COVER,PROTECTIVE,PS,1.75X3.4	2		CHASS FLOOR,INSIDE TOP CVR
LENS				
703-10479	LENS,DC-1	1		
HEATSINK				
704-10481	HEATSINK,TO-220,DC-1	1		
LIGHT PIPES				
720-10453	LIGHT PIPE,RA,LED,SNAP-IN	19		LEDS
BUTTON ASSY				
750-10983	BUTTON,ASSY,.30X.75,BLK	13		
POWER SUPPLY				
750-11396	PWR SUP,+5V@3A,+-15V@2/.5A,40W	1		

MECHANICAL PARTS (3-WIRE)

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
ADHESIVES				
120-11463	ADHESIVE,PLASTIC,PERMABOND#102	0	•05/29/96	LIGHT PIPES
DISPLAY/IND/LED				
430-10988	DISP,LCD,20X2,NEG,12:00,LED,YL	1		TO MAIN BD J20
ROCKER SWITCH				
454-10435	SW,ROCKER,2P1T,16A@250,VER,1-0	1		PWR SW
PC MNT CONN				
490-11462	CONN,AC,3MC,SNAP,04TH,IEC,10A	1		
TIES				
530-02488	TIE,CABLE,NYL,.14"X5 5/8"	1		PS -MAIN BD CABLE
530-09382	CLIP,WIRE HRNS,.15DIA,ADH BAK	2		PS-MAIN BD CABLE
BUMPERS				
541-07547	BUMPER,FEET,.98DIAX.2,RVT MTG	4		
KNOBS				
550-10486	KNOB,1.25,6MM/FL,BLK	1		ENCODER
INSUL/SPACERS				
630-07846	SPCR,PCB/FOOT,.250,NYL	1		MAIN BD
630-09983	INSUL,SEMI,SIL RUB,ADH,1.95X1"	1		
630-11229	GASKET,BUTTONS,DC-1	1		
630-11233	SPCR,SNAP-IN,.18DX1.25L,NYL	1		MAIN/VIDEO BD
635-10970	SPCR,2-56X3/16,1/8HEX,S,ZN	4		DISPLAY-CHASSIS
MACHINE SCREWS				
640-01700	SCRW,4-40X1/2,PNH,PH,SS	2		CLAMP-HEATSINK
640-09698	SCRW,2-56X5/8,PNH,PH,ZN	4		DISPLAY-CHASSIS
640-10467	SCRW,M3X6MM,FH,PH,BZ	6		FP ASSY-CHASSIS
640-10489	SCRW,M4X10MM,FH,PH,BZ	4		END CAPS -CHASSIS
640-10498	SCRW,M3X6MM,PNH,PH,BZ	19		R PANEL-CHAS(2);CVR-CHAS & REAR (5); VID BD-REAR(5); VID BDS-BRKT (7)
MACHINE SCREWS cont'd.				
640-10499	SCRW,M3X8MM,PNH,PH,BZ	8		H/S-MAIN BD (2);PS TO SUPPORT (4);IR BD-CHASSIS (2)
THRD FRM SCREWS				
641-01703	SCRW,TAP,AB,4X1/4,PNH,PH,ZN	5		MAIN BD-CHASSIS&SUPPORT
641-09699	SCRW,TAP,AB,#2X5/16,PNH,PH,ZN	1		DIN CONN-R PANEL
641-10989	SCRW,TAP,AB,4X3/8,PNH,PH,BZ	11		RCA CONN-REAR PNL(8); R PNL-CHASS(3)
NUTS				
643-01855	NUT,2-56,HEX,ZN	4		DISPLAY-CHASSIS
643-10492	NUT,M4X.7MM,KEP,ZN	1		CHASSIS GND
WASHERS				
644-10494	WSHR,FL,M4CLX9ODX.8MM THK	1		CHASSIS GND

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
THRDLS FSTNRS				
650-04896	POPRVT,5/32X1/8,REG PROT HD,AL	6		PS SUPPORT-CHASS
650-10427	RVT,SNAP-IN,.12DIA,NYL	4		PWR SW BD-CHAS(2) LOGO LED BD (2)
650-11747	RVT,SNAP-IN,.10DIA,NYL	4	05/29/96•	LIGHT PIPE ARRAY
CABLES/CORDS				
680-10469	CABLE,AC PWR,HSG/QDC,2C,18G,4"	1		PWR SW-PS
680-11398	CABLE,AC PWR,QDC,2C,18G,SLV,5"	1		AC CONN-PWR SW
680-11461	WIRE,18G,G/Y,2.5",187QDC/LUG#8	1		CHASSIS GND
CHASSIS/MECH				
700-10470	CHASSIS,DC-1	1	•05/29/96	
700-10471	SUPPORT,PS,DC-1	1		
700-10472	COVER,TOP,2UX10.3	1		
700-10473	ENDCAP,DC-1	2		
700-11748	CHASSIS,DC-1,LPA	1	05/29/96•	
CLAMPS				
701-09863	CLAMP,HEATSINK,TO-220	1		
701-10474	BRACKET,VIDEO BD,DC-1	1		
PANELS				
702-10475	PANEL,FRONT,DC-1	1		
702-10476	PANEL,REAR,DC-1	1		
702-11348	COVER,PROTECTIVE,PS,1.75X3.4	2		CHASS FLOOR,INSIDE TOP CVR
LENS				
703-10479	LENS,DC-1	1		
HEATSINK				
704-10481	HEATSINK,TO-220,DC-1	1		
LIGHT PIPES				
720-10453	LIGHT PIPE,RA,LED,SNAP-IN	19	•05/29/96	LEDS
720-11749	LIGHT PIPE,RA,ARRAY,LEDX19,2PC	1	05/29/96•	LEDS
BUTTON ASSY				
750-10983	BUTTON,ASSY,.30X.75,BLK	13		
POWER SUPPLY				
750-11396	PWR SUP,+5V@3A,+-15V@2/.5A,40W	1		

POWER CORDS (2-Wire)

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
680-11408	CORD,POWER,IEC,2C,POL,2M,US	1		N.AMER
680-11409	CORD,POWER,IEC,2C,2M,EUR	1		
680-11410	CORD,POWER,IEC,2C,5A,2M,UK	1		
680-10096	CORD,POWER,IEC,6A,2M,AUSTRALIA	1		
680-11438	CORD,POWER,IEC,2C,2M,JAPAN	1		

POWER CORDS (3-Wire)

PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
680-08830	CORD,POWER,IEC,6A,2M,EURO	1		EURO,SINGAPORE
680-09149	CORD,POWER,NA/IEC,SVT,VW-1,10A	1		N.AMER.
680-10093	CORD,POWER,IEC,5A,2M,UK	1		UK
680-10094	CORD,POWER,IEC,6A,2M,ITALY	1		ITALY
680-10095	CORD,POWER,IEC,6A,2M,SWISS	1		SWITZERLAND
680-10096	CORD,POWER,IEC,6A,2M,AUSTRALIA	1		AUSTRALIA
680-10097	CORD,POWER,IEC,6A,2M,JAPAN	1		JAPAN
680-10098	CORD,POWER,IEC,6A,2M,UNIVERSAL	1		UNIVERSAL

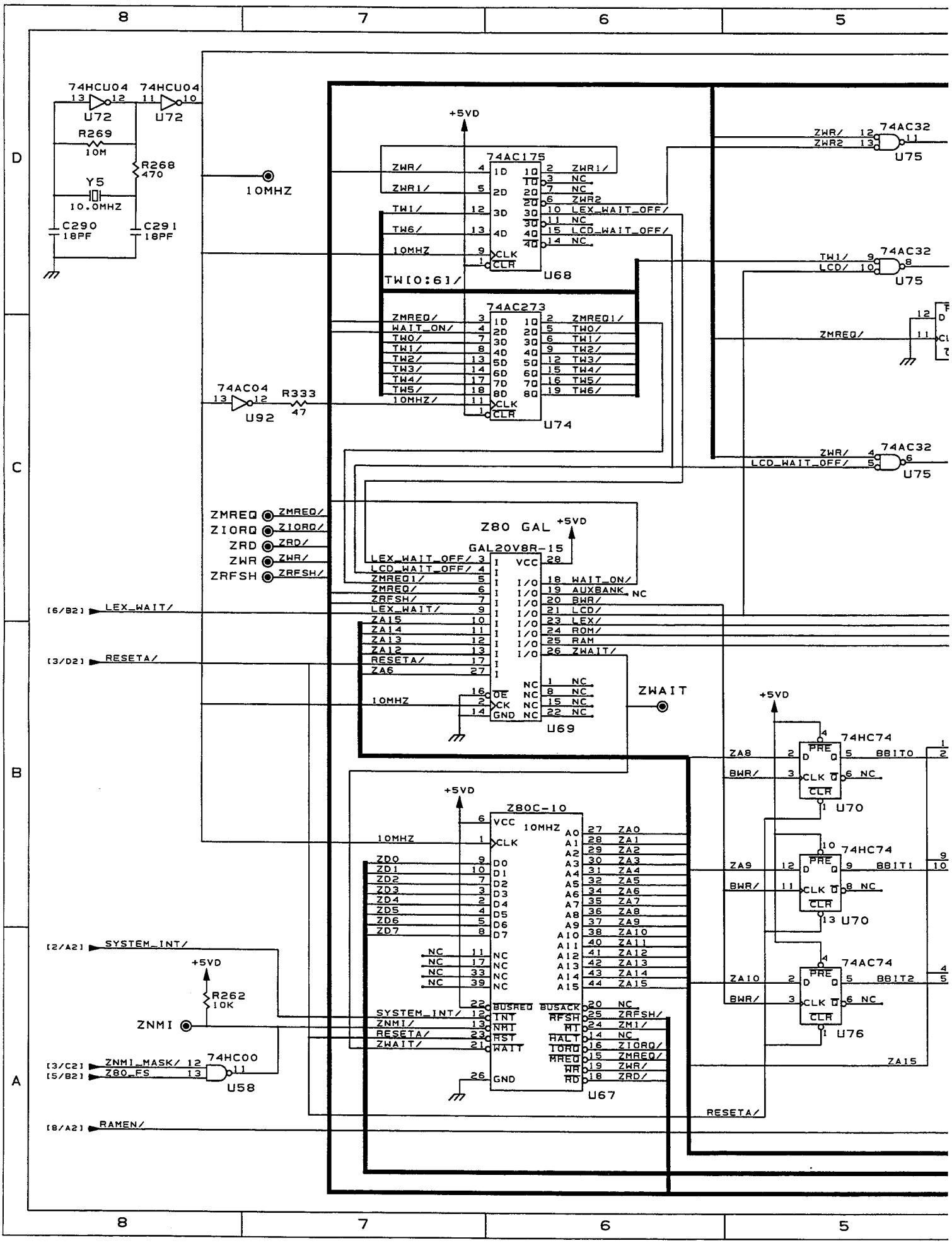
SHIPPING MATERIAL

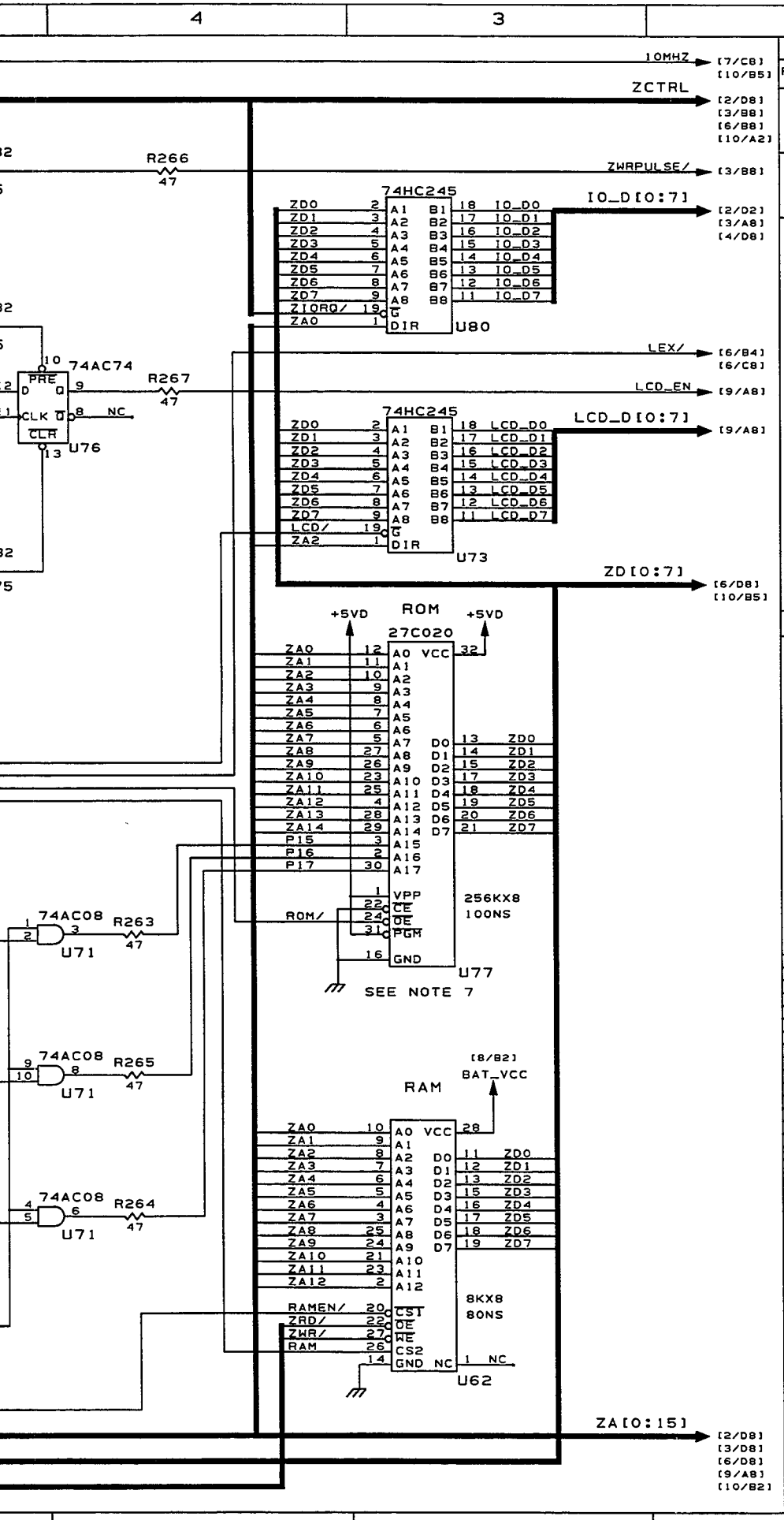
PART NO.	DESCRIPTION	QTY	EFF•INACT	REFERENCE
460-08452	BAT,ALK,AAA	2		
530-10324	TIE,CABLE,PPR,1WIRE,.25"WX16"L	1		PWR CRD/REMOTE
730-11280	BOX,20X5.75X17.5	1		INNER BOX
730-11281	BOX,20.25X6X18.75	1		OUTER BOX
730-11282	INSERT,CORR,2UX11.38	2	•04/08/96	END CAPS
730-11388	INSERT,CORR,ACC,19.75X5.38	1		PWR CRD/REMOTE
730-11464	INSERT,FOAM,ENDCAP,2UX11.3	2	04/08/96•	END CAPS
750-10978	REMOTE CONTROL,DC-1,38KHZ	1		

7

Schematics and Assembly Drawings

060-10448	Schematic, Main Board
	Main Bd Component Layout
060-10463	Schematic, Video Board
	Video/RCA/SW/LED Component Layout
060-10465	Schematic, SW/LED Boards
060-11273	Schematic, IR Enc Board
	IR Enc Component Layout
060-11248	Schematic, AC-3 Board
	AC-3 Component Layout
080-10483	Assy Dwg Chassis


8
7
6
5
D
C
B
A
74HCU04
U72
R269
10M
R268
470
Y5
10.0MHZ
C290
18PF
C291
18PF
10MHZ
74AC04
U92
R333
47
+5VD
74AC175
U68
ZWR/
ZWR1/
TW1/
TW6/
10MHZ
TW[0:6]/
74AC273
U74
ZMREQ/
WAIT_ON/
TWO/
TW1/
TW2/
TW3/
TW4/
TW5/
10MHZ/
74AC32
U75
ZWR/
ZWR2
TW1/
LCD/
ZMREQ/
LCD_WAIT_OFF/
ZMREQ
ZIORQ
ZRD
ZWR
ZRFSH
Z80 GAL
GAL20V8R-15
LEX_WAIT_OFF/
LCD_WAIT_OFF/
ZMREQ1/
ZA15
ZA14
ZA13
ZA12
RESETA/
ZA6
WAIT_ON/
AUXBANK
BWR/
LCD/
LEX/
ROM/
RAM
ZWAIT/
U69
ZWAIT
[6/B2] LEX_WAIT/
[3/D2] RESETA/
Z80C-10
ZD0
ZD1
ZD2
ZD3
ZD4
ZD5
ZD6
ZD7
ZA0
ZA1
ZA2
ZA3
ZA4
ZA5
ZA6
ZA7
ZA8
ZA9
ZA10
ZA11
ZA12
ZA13
ZA14
ZA15
SYSTEM_INT/
ZNMI/
RESETA/
ZWAIT/
BUSREQ
BUSACK
RFSH/
M1/
HALT
IORQ/
MREQ/
WR/
RD/
U67
74HC74
U70
ZA8
ZA9
ZA10
BWR/
B81T0
B81T1
B81T2
74AC74
U76
[2/A2] SYSTEM_INT/
R262
10K
ZNMI
[3/C2] ZNMI_MASK/
[5/B2] Z80_FS
74HC00
U58
[8/A2] RAMEN/



REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.
1	REVISED SHEETS 14 & 15 PER ECO 960419-00; REVISED SHEETS 5, 8, 14 & 15 PER ECO 960510-00	RWH 4/24/96	CW 5/24/96
		AF 5/24/96	AF 5/24/96
2	REVISED SHEET 17 PER ECO 960812-01	RWH 9/10/96	CW 9/10/96
		AF 9/10/96	AF 9/10/96

NOTES

1 UNLESS OTHERWISE INDICATED, RESISTORS ARE 1/10W
2 UNLESS OTHERWISE INDICATED, RESISTORS ARE 5%
3 UNLESS OTHERWISE INDICATED, CAPACITORS ARE UF/V
4 DIGITAL GROUND, ANALOG GROUND, CHASSIS GROUND, POWER GROUND
5 [XX/XX] DENOTES [SHEET NUMBER/SECTOR]
6 LAST REFERENCE DESIGNATORS USED: BAT1, C339, CP2, D49, FB24, J20, P1, Q15, R371, RY4, SW12, U100, VRC6, W8, Y6
7 U77 IS A 27C010 FOR BASE & THX VERSIONS; 27C020 FOR AC-3 VERSION ONLY.

DOCUMENT CONTROL BLOCK: #060-10448

SHEET NUMBER	REVISION NUMBER
1 OF 19	2
2 OF 19	0
3 OF 19	0
4 OF 19	0
5 OF 19	1
6 OF 19	0
7 OF 19	0
8 OF 19	1
9 OF 19	0
10 OF 19	0
11 OF 19	0
12 OF 19	0
13 OF 19	0
14 OF 19	1
15 OF 19	1
16 OF 19	0
17 OF 19	1
18 OF 19	0
19 OF 19	0

CONTRACT NO.

Lexicon
100 BEAVER STREET, WALTHAM, MA 02154

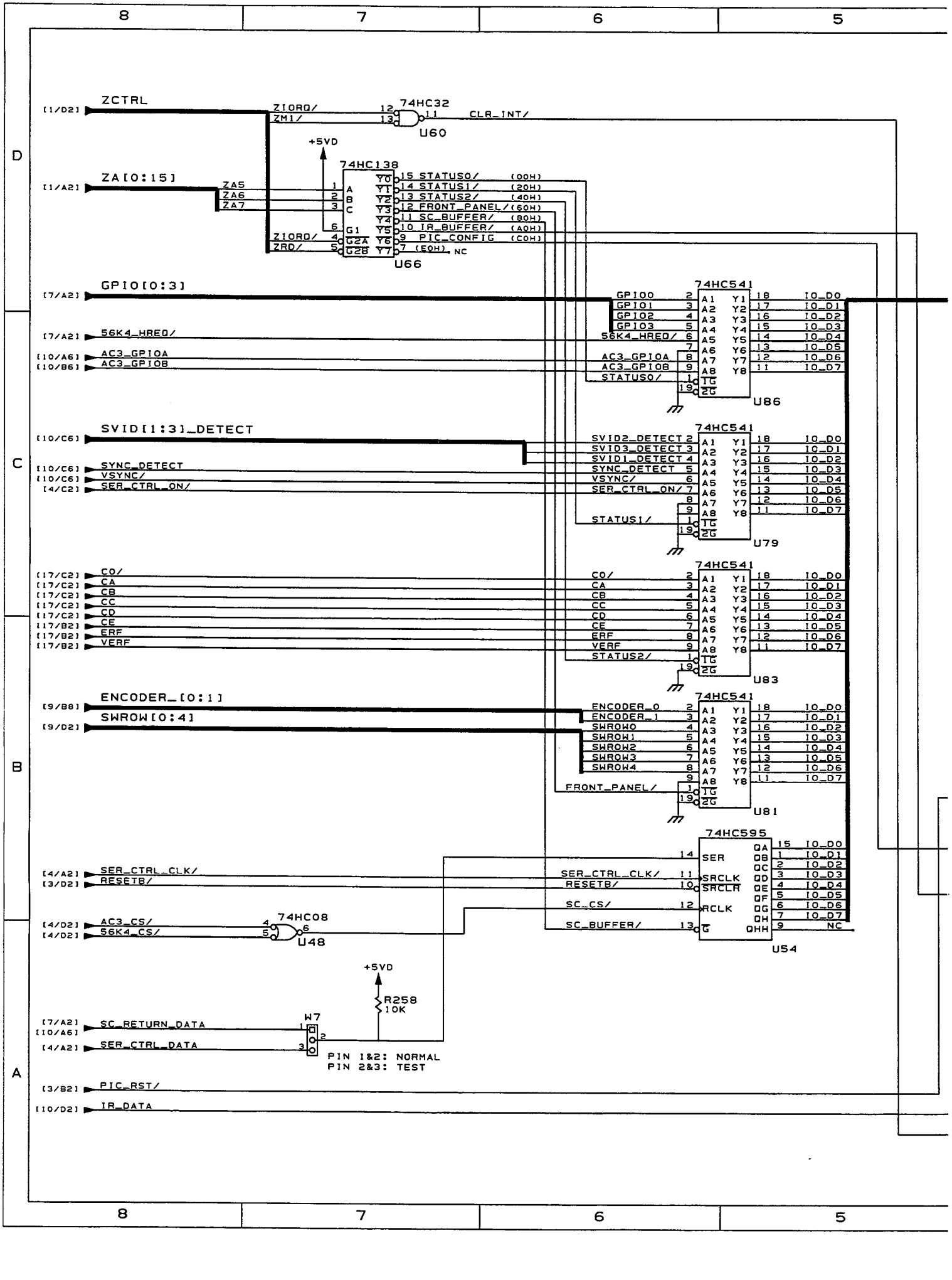
APPROVALS	DATE
DRAWN RWH	1/4/96
CHECKED ECM	3/20/96
Q.C. CW	3/20/96
ISSUED AF	3/20/96

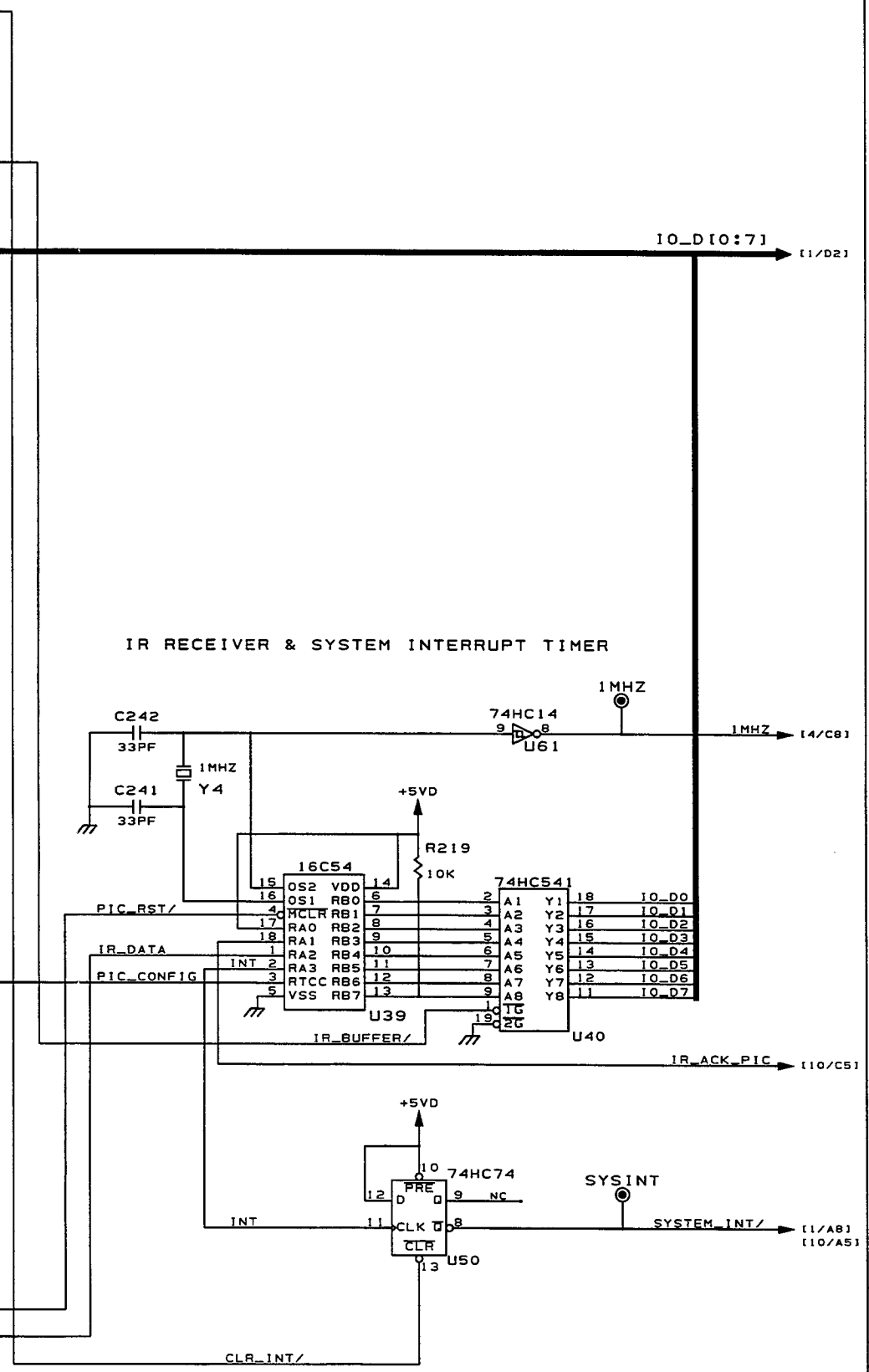
TITLE: SCHEM,MAIN BD,DC-1 Z80

SIZE	CODE	NUMBER	REV
B		060-10448	2

FILE NAME: 10448-2.1
SHEET 1 OF 19

9-11-1996_16:15

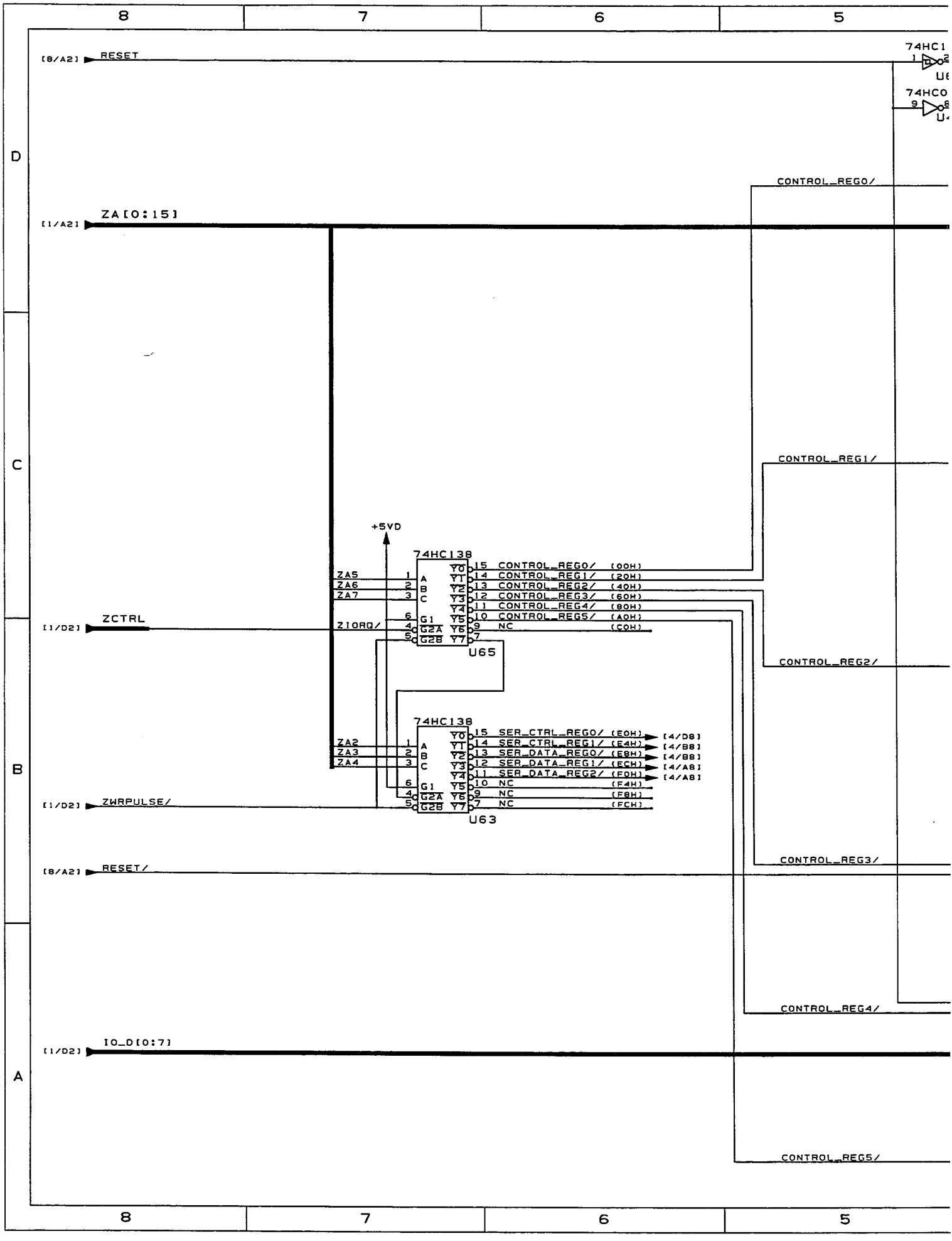

8
7
6
5
D
C
B
A
ZCTRL
[1/D2]
ZIORQ/
ZM1/
74HC32
U60
CLR_INT/
+5VD
74HC138
ZA[0:15]
[1/A2]
ZA5
ZA6
ZA7
Y0 15 STATUS0/ (00H)
Y1 14 STATUS1/ (20H)
Y2 13 STATUS2/ (40H)
Y3 12 FRONT_PANEL/ (60H)
Y4 11 SC_BUFFER/ (80H)
Y5 10 IR_BUFFER/ (A0H)
Y6 9 PIC_CONFIG (C0H)
Y7 7 (E0H) NC
ZIORQ/
ZRD/
U66
GPIO[0:3]
[7/A2]
74HC541
GPIO0
GPIO1
GPIO2
GPIO3
56K4_HREQ/
AC3_GPIOA
AC3_GPIOB
STATUS0/
IO_D0
IO_D1
IO_D2
IO_D3
IO_D4
IO_D5
IO_D6
IO_D7
U86
SVID[1:3]_DETECT
[10/C6]
SVID2_DETECT
SVID3_DETECT
SVID1_DETECT
SYNC_DETECT
VSYNC/
SER_CTRL_ON/
STATUS1/
U79
C0/
CA
CB
CC
CD
CE
ERF
VERF
STATUS2/
U83
ENCODER_[0:1]
[9/B8]
SWROW[0:4]
[9/D2]
ENCODER_0
ENCODER_1
SWROW0
SWROW1
SWROW2
SWROW3
SWROW4
FRONT_PANEL/
U81
74HC595
SER
SRCLK
SRCLR
RCLK
G
QA
QB
QC
QD
QE
QF
QG
QH
QHH
NC
SER_CTRL_CLK/
[4/A2]
RESETB/
[3/D2]
SC_CS/
SC_BUFFER/
U54
AC3_CS/
[4/D2]
56K4_CS/
74HC08
U48
R258
10K
W7
SC_RETURN_DATA
[7/A2]
[10/A6]
SER_CTRL_DATA
[4/A2]
PIN 1&2: NORMAL
PIN 2&3: TEST
PIC_RST/
[3/B2]
IR_DATA
[10/D2]

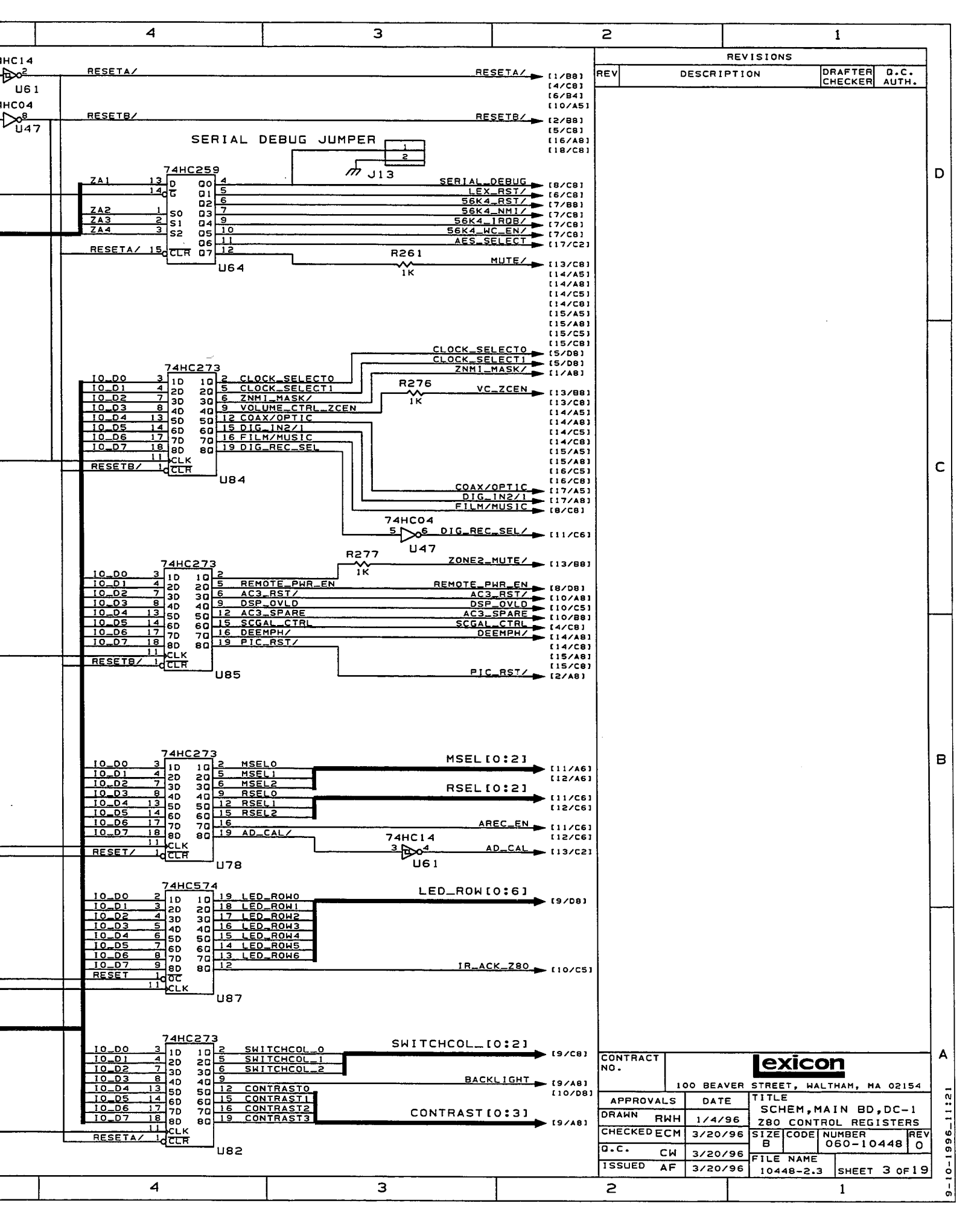


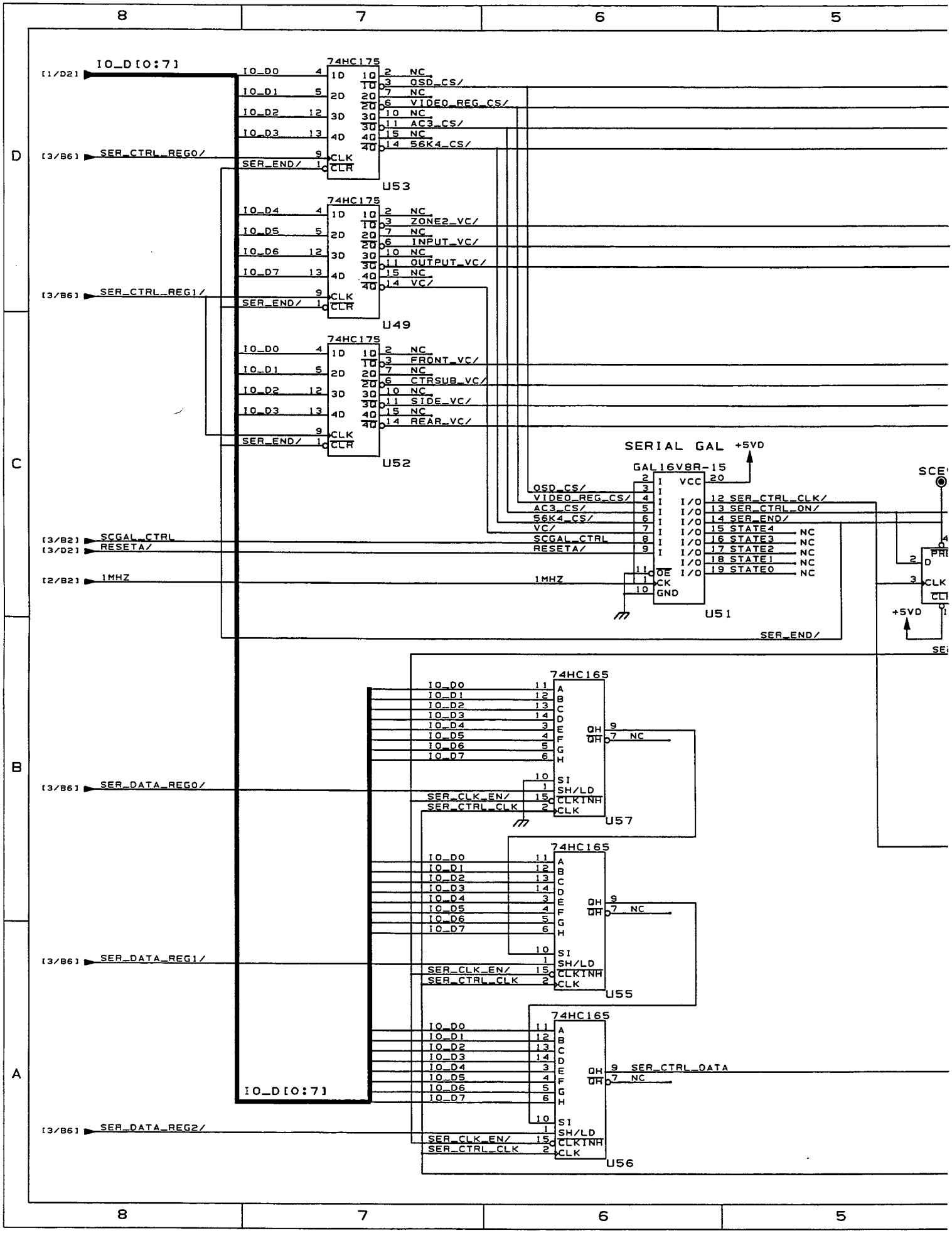
REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

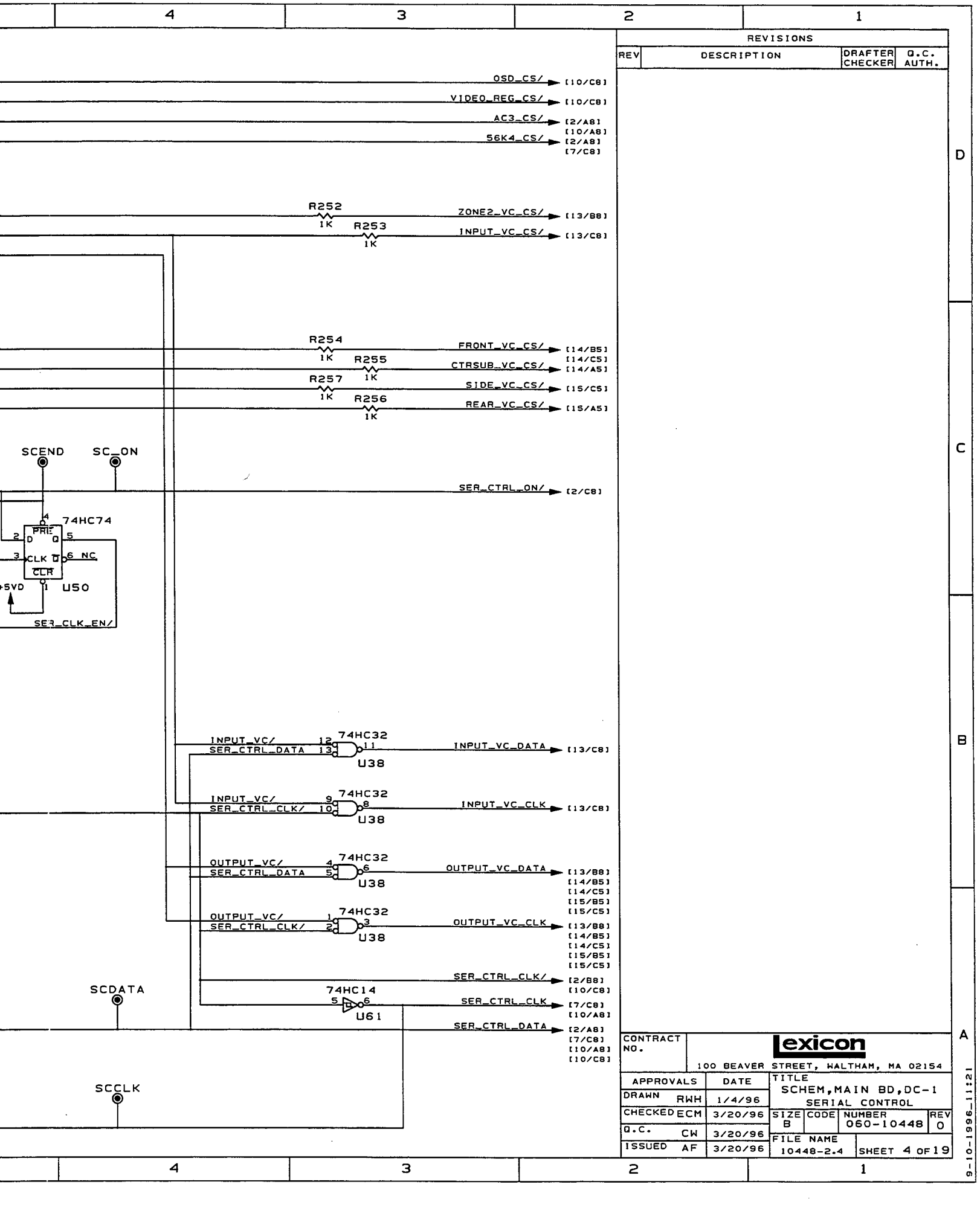
CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154	
APPROVALS	DATE	TITLE: SCHEM, MAIN BD, DC-1 Z80 STATUS BUFFERS
DRAWN RWH	1/4/96	
CHECKED ECM	3/20/96	SIZE B | CODE | NUMBER 060-10448 | REV 0
Q.C. CW	3/20/96	
ISSUED AF	3/20/96	FILE NAME 10448-2.2 | SHEET 2 OF 19

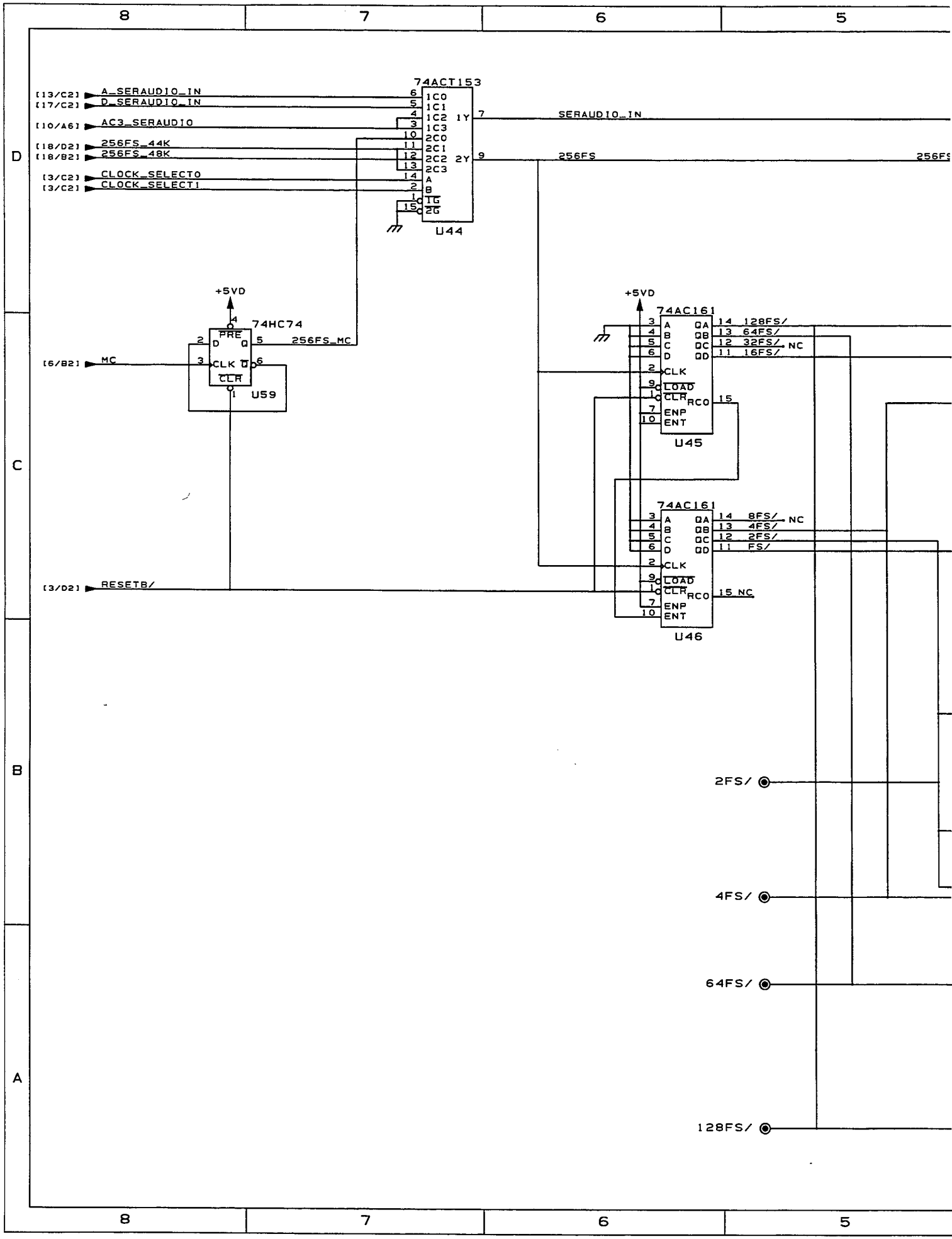
9-10-1996_11:20

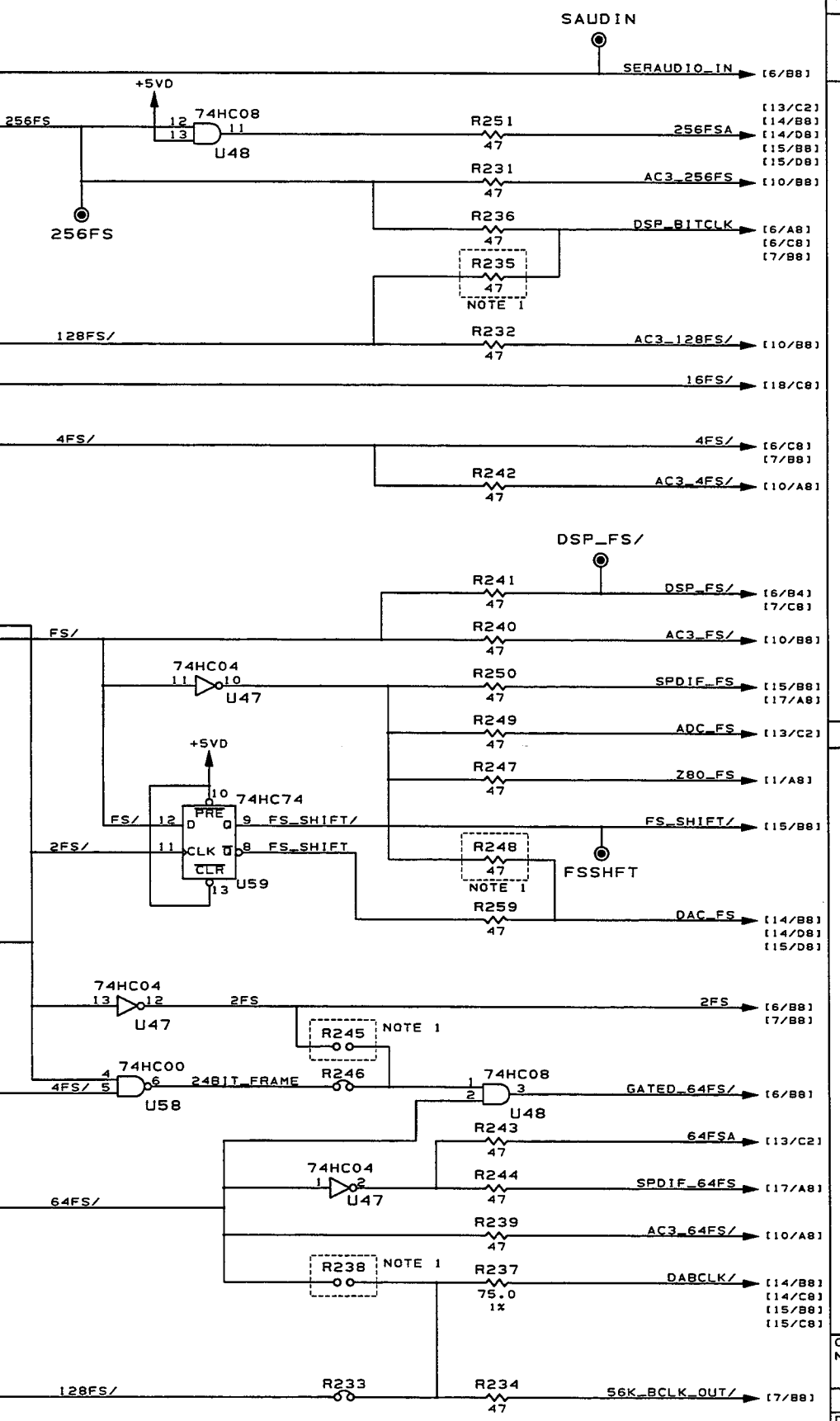

8
7
6
5
D
C
B
A
[8/A2] RESET
74HC1
U6
74HCO
U4
CONTROL_REG0/
[1/A2] ZA[0:15]
CONTROL_REG1/
+5VD
74HC138
ZA5
ZA6
ZA7
A
B
C
G1
G2A
G2B
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
15 CONTROL_REG0/ (00H)
14 CONTROL_REG1/ (20H)
13 CONTROL_REG2/ (40H)
12 CONTROL_REG3/ (60H)
11 CONTROL_REG4/ (80H)
10 CONTROL_REG5/ (A0H)
9 NC (C0H)
7
U65
[1/D2] ZCTRL
Z1ORQ/
CONTROL_REG2/
74HC138
ZA2
ZA3
ZA4
15 SER_CTRL_REG0/ (E0H) [4/D8]
14 SER_CTRL_REG1/ (E4H) [4/B8]
13 SER_DATA_REG0/ (E8H) [4/B8]
12 SER_DATA_REG1/ (ECH) [4/A8]
11 SER_DATA_REG2/ (F0H) [4/A8]
10 NC (F4H)
9 NC (F8H)
7 NC (FCH)
U63
[1/D2] ZWRPULSE/
CONTROL_REG3/
[8/A2] RESET/
CONTROL_REG4/
[1/D2] IO_D[0:7]
CONTROL_REG5/


4
3
2
1
REVISIONS
REV
DESCRIPTION
DRAFTER CHECKER
Q.C. AUTH.
HC14
U61
HC04
U47
RESETA/
RESETB/
SERIAL DEBUG JUMPER
J13
74HC259
U64
R261
1K
SERIAL_DEBUG
LEX_RST/
56K4_RST/
56K4_NMI/
56K4_IROB/
56K4_WC_EN/
AES_SELECT
MUTE/
74HC273
U84
R276
1K
CLOCK_SELECT0
CLOCK_SELECT1
ZNMI_MASK/
VOLUME_CTRL_ZCEN
VC_ZCEN
COAX/OPTIC
DIG_IN2/1
FILM/MUSIC
74HC04
U47
DIG_REC_SEL/
74HC273
U85
R277
1K
ZONE2_MUTE/
REMOTE_PWR_EN
AC3_RST/
DSP_OVLD
AC3_SPARE
SCGAL_CTRL
DEEMPH/
PIC_RST/
74HC273
U78
MSEL[0:2]
RSEL[0:2]
AREC_EN
AD_CAL/
74HC14
U61
AD_CAL
74HC574
U87
LED_ROW[0:6]
IR_ACK_Z80
74HC273
U82
SWITCHCOL_[0:2]
BACKLIGHT
CONTRAST0
CONTRAST1
CONTRAST2
CONTRAST3
CONTRAST[0:3]
CONTRACT NO.
Lexicon
100 BEAVER STREET, WALTHAM, MA 02154
APPROVALS
DATE
DRAWN RWH 1/4/96
CHECKED ECM 3/20/96
Q.C. CW 3/20/96
ISSUED AF 3/20/96
TITLE
SCHEM,MAIN BD,DC-1
Z80 CONTROL REGISTERS
SIZE B
CODE
NUMBER 060-10448
REV 0
FILE NAME 10448-2.3
SHEET 3 OF 19
9-10-1996_11:21


8
7
6
5
D
C
B
A
IO_D[0:7]
[1/D2]
74HC175
IO_D0
IO_D1
IO_D2
IO_D3
SER_END/
[3/B6] SER_CTRL_REG0/
NC
OSD_CS/
NC
VIDEO_REG_CS/
NC
AC3_CS/
NC
56K4_CS/
U53
IO_D4
IO_D5
IO_D6
IO_D7
[3/B6] SER_CTRL_REG1/
NC
ZONE2_VC/
NC
INPUT_VC/
NC
OUTPUT_VC/
NC
VC/
U49
IO_D0
IO_D1
IO_D2
IO_D3
SER_END/
NC
FRONT_VC/
NC
CTRSUB_VC/
NC
SIDE_VC/
NC
REAR_VC/
U52
SERIAL GAL
+5VD
GAL16V8R-15
OSD_CS/
VIDEO_REG_CS/
AC3_CS/
56K4_CS/
VC/
SCGAL_CTRL
RESETA/
1MHZ
[3/B2] SCGAL_CTRL
[3/D2] RESETA/
[2/B2] 1MHZ
SER_CTRL_CLK/
SER_CTRL_ON/
SER_END/
STATE4
STATE3
STATE2
STATE1
STATE0
NC
U51
SER_END/
74HC165
IO_D0
IO_D1
IO_D2
IO_D3
IO_D4
IO_D5
IO_D6
IO_D7
SER_CLK_EN/
SER_CTRL_CLK
[3/B6] SER_DATA_REG0/
U57
[3/B6] SER_DATA_REG1/
U55
[3/B6] SER_DATA_REG2/
SER_CTRL_DATA
U56
IO_D[0:7]


4
3
2
1
REVISIONS
REV
DESCRIPTION
DRAFTER CHECKER
Q.C. AUTH.
OSD_CS/ [10/C8]
VIDEO_REG_CS/ [10/C8]
AC3_CS/ [2/A8] [10/A8]
56K4_CS/ [2/A8] [7/C8]
R252 1K
ZONE2_VC_CS/ [13/B8]
R253 1K
INPUT_VC_CS/ [13/C8]
R254 1K
FRONT_VC_CS/ [14/B5]
R255 1K
CTRSUB_VC_CS/ [14/C5] [14/A5]
R257 1K
SIDE_VC_CS/ [15/C5]
R256 1K
REAR_VC_CS/ [15/A5]
SCEND
SC_ON
SER_CTRL_ON/ [2/C8]
74HC74
PRE
D
Q
CLK
CLR
NC
+5VD
U50
SER_CLK_EN/
INPUT_VC/
SER_CTRL_DATA
74HC32
U38
INPUT_VC_DATA [13/C8]
INPUT_VC/
SER_CTRL_CLK/
INPUT_VC_CLK [13/C8]
OUTPUT_VC/
SER_CTRL_DATA
OUTPUT_VC_DATA [13/B8] [14/B5] [14/C5] [15/B5] [15/C5]
OUTPUT_VC/
SER_CTRL_CLK/
OUTPUT_VC_CLK [13/B8] [14/B5] [14/C5] [15/B5] [15/C5]
SER_CTRL_CLK/ [2/B8] [10/C8]
SCDATA
74HC14
U61
SER_CTRL_CLK [7/C8] [10/A8]
SER_CTRL_DATA [2/A8] [7/C8] [10/A8] [10/C8]
SCCLK
D
C
B
A
CONTRACT NO.
Lexicon
100 BEAVER STREET, WALTHAM, MA 02154
APPROVALS
DATE
DRAWN RWH 1/4/96
CHECKED ECM 3/20/96
Q.C. CW 3/20/96
ISSUED AF 3/20/96
TITLE
SCHEM, MAIN BD, DC-1
SERIAL CONTROL
SIZE B
CODE
NUMBER 060-10448
REV 0
FILE NAME 10448-2.4
SHEET 4 OF 19
9-10-1996 11:21


8
7
6
5
D
C
B
A
74ACT153
[13/C2] A_SERAUDIO_IN
[17/C2] D_SERAUDIO_IN
[10/A6] AC3_SERAUDIO
[18/D2] 256FS_44K
[18/B2] 256FS_48K
[3/C2] CLOCK_SELECT0
[3/C2] CLOCK_SELECT1
1C0
1C1
1C2
1C3
2C0
2C1
2C2
2C3
A
B
1G
2G
1Y
2Y
SERAUDIO_IN
256FS
U44
+5VD
74HC74
PRE
D
Q
CLK
CLR
256FS_MC
[6/B2] MC
U59
74AC161
A
B
C
D
QA
QB
QC
QD
CLK
LOAD
CLR
RCO
ENP
ENT
128FS/
64FS/
32FS/
16FS/
NC
U45
8FS/
4FS/
2FS/
FS/
15 NC
U46
[3/D2] RESETB/
2FS/
4FS/
64FS/
128FS/



REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.
1	REVISED R237 VALUE PER ECO 960510-00	RWH 5/22/96	CW 5/24/96
		AF 5/24/96	AF 5/24/96

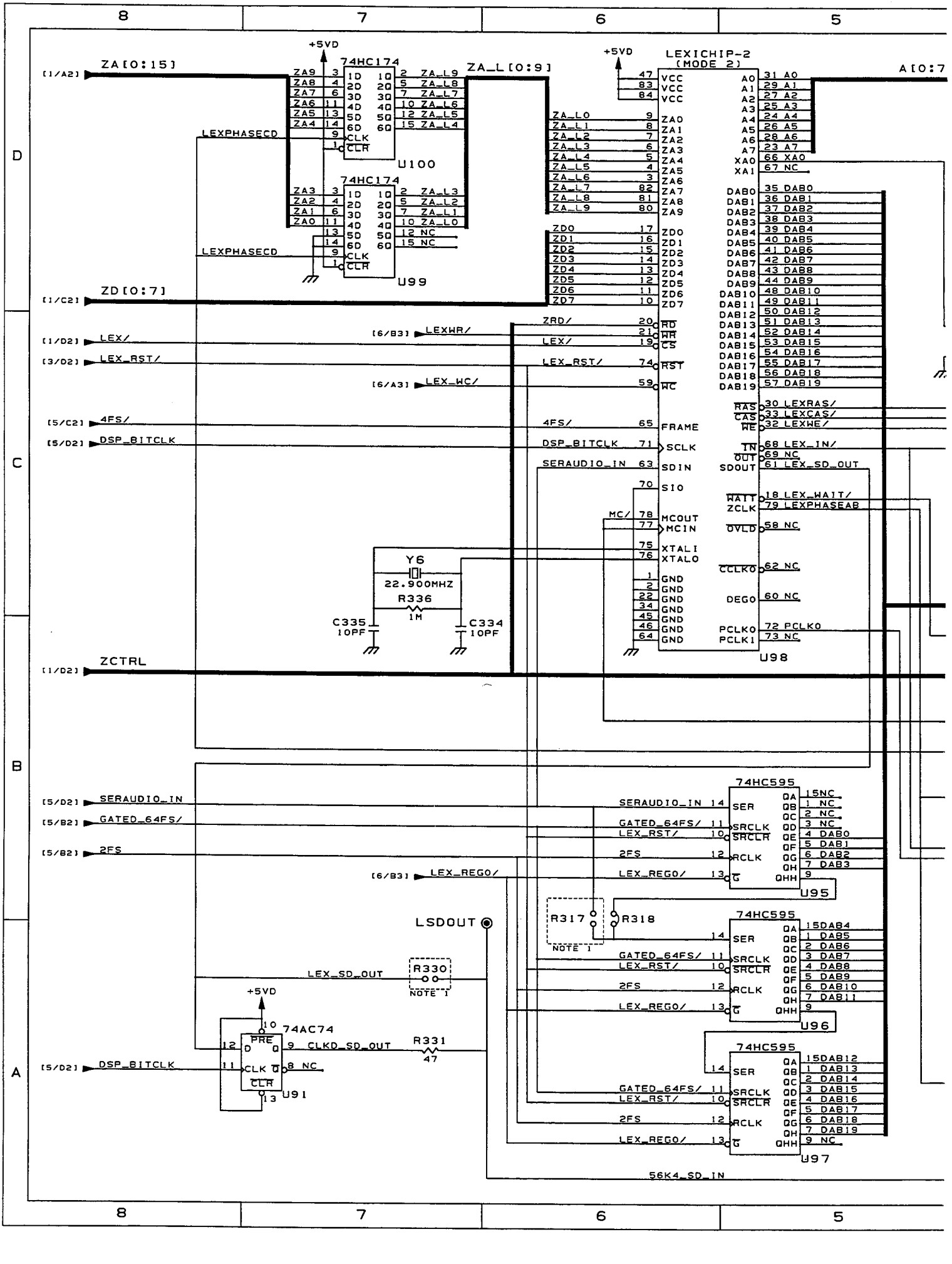
NOTES

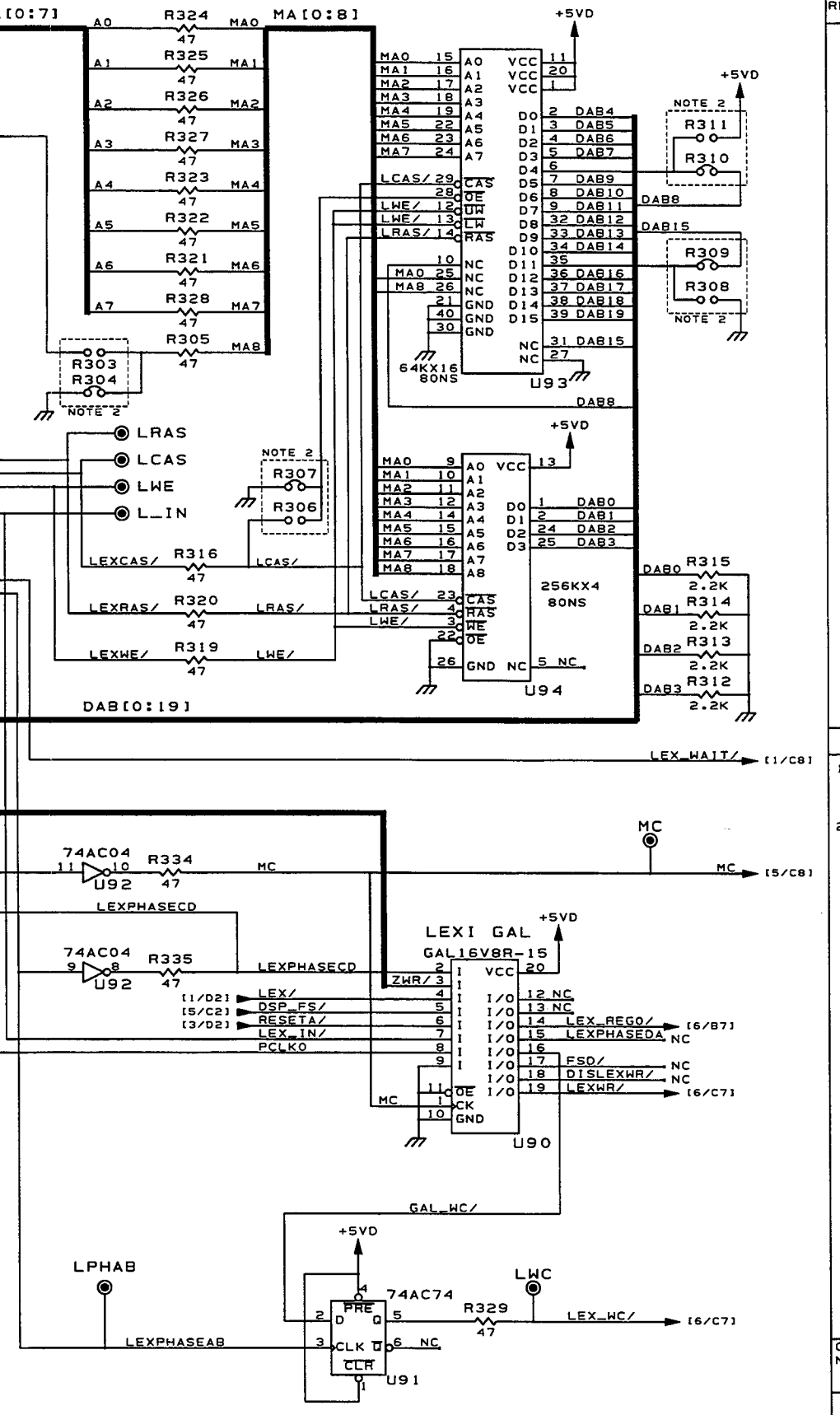
1 NOT INSTALLED: INSTALLED COUNTERPART:

R235	R236
R248	R259
R245	R246
R238	R233

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154	
APPROVALS	DATE	TITLE: SCHEM, MAIN BD, DC-1 DSP CLOCKS
DRAWN RWH	1/4/96	
CHECKED ECM	3/20/96	SIZE B; CODE; NUMBER 060-10448; REV 1
Q.C. CW	3/20/96	
ISSUED AF	3/20/96	FILE NAME 10448-2.5; SHEET 5 OF 19

9-10-1996 11:21


8
7
6
5
D
C
B
A
ZA[0:15]
[1/A2]
+5VD
74HC174
U100
U99
ZA_L[0:9]
LEXPHASECD
ZD[0:7]
[1/C2]
LEXICHIP-2
(MODE 2)
U98
[1/D2] LEX/
[3/D2] LEX_RST/
[6/A3] LEX_WC/
[6/B3] LEXWR/
[5/C2] 4FS/
[5/D2] DSP_BITCLK
SERAUDIO_IN
ZRD/
Y6
22.900MHZ
R336
1M
C335
10PF
C334
10PF
ZCTRL
[1/D2]
74HC595
U95
U96
U97
[5/D2] SERAUDIO_IN
[5/B2] GATED_64FS/
[5/B2] 2FS
[6/B3] LEX_REGO/
LSDOUT
R317
R318
NOTE 1
R330
LEX_SD_OUT
74AC74
U91
R331
47
CLKD_SD_OUT
[5/D2] DSP_BITCLK
56K4_SD_IN



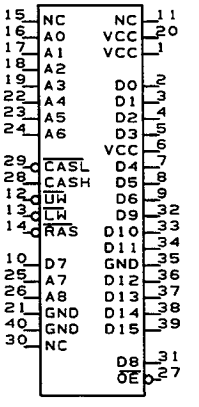
REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

NOTES

1 NOT INSTALLED: INSTALLED COUNTERPART:
R330 R331
R317 R318

2 DRAM DUAL LAYOUT
64KX16 - INSTALL 0 OHM RESISTORS
R304, R307, 309, 310
256KX16 - INSTALL 0 OHM RESISTORS
R303, R306, 308, 311

256KX16



CONTRACT NO.

Lexicon
100 BEAVER STREET, WALTHAM, MA 02154

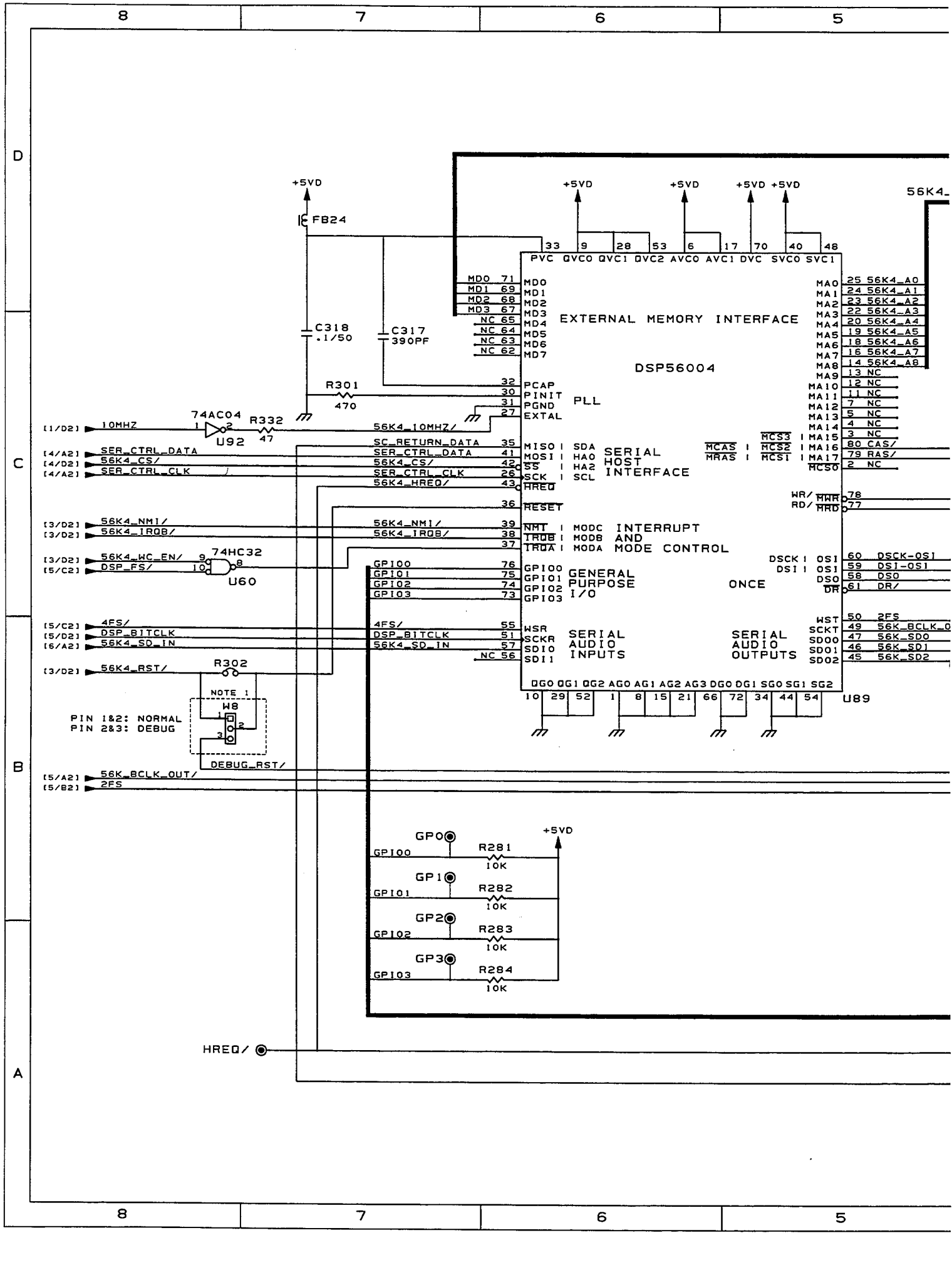
APPROVALS		DATE
DRAWN	RWH	1/4/96
CHECKED	ECM	3/20/96
Q.C.	CW	3/20/96
ISSUED	AF	3/20/96

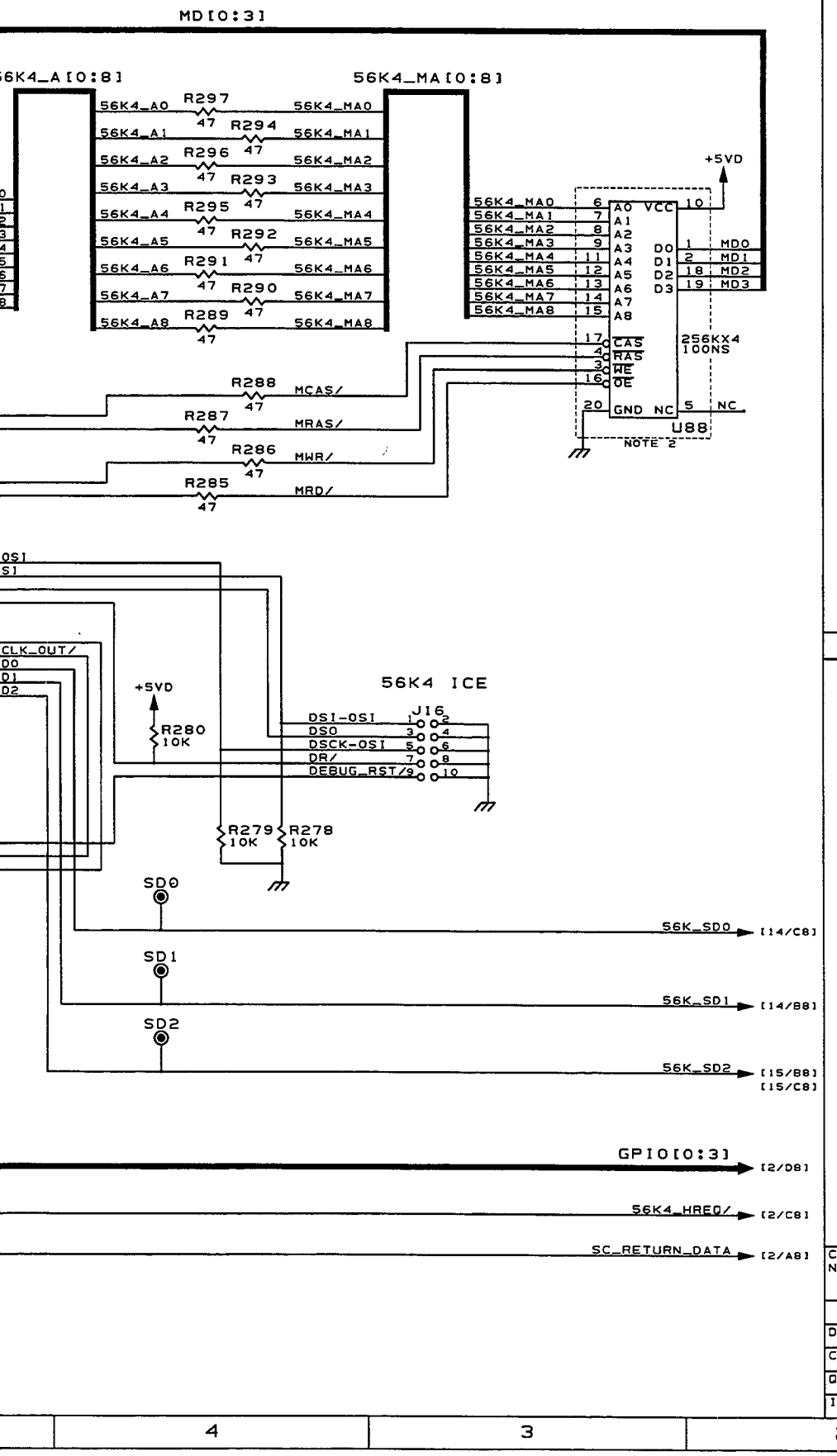
TITLE: SCHEM,MAIN BD,DC-1
LEXICHIP

SIZE	CODE	NUMBER	REV
B		060-10448	0

FILE NAME: 10448-2.6
SHEET 6 OF 19

9-10-1996_11:21


8
7
6
5
D
C
B
A
+5VD
FB24
C318
.1/50
C317
390PF
R301
470
74AC04
U92
R332
47
10MHZ
56K4_10MHZ/
DSP56004
EXTERNAL MEMORY INTERFACE
PLL
SERIAL HOST INTERFACE
INTERRUPT AND MODE CONTROL
GENERAL PURPOSE I/O
SERIAL AUDIO INPUTS
SERIAL AUDIO OUTPUTS
ONCE
SC_RETURN_DATA
SER_CTRL_DATA
56K4_CS/
SER_CTRL_CLK
56K4_HREQ/
RESET
56K4_NMI/
56K4_IRQB/
74HC32
U60
56K4_WC_EN/
DSP_FS/
4FS/
DSP_BITCLK
56K4_SD_IN
R302
56K4_RST/
NOTE 1
W8
PIN 1&2: NORMAL
PIN 2&3: DEBUG
DEBUG_RST/
56K_BCLK_OUT/
2FS
GP0
GP1
GP2
GP3
R281
R282
R283
R284
10K
HREQ/
56K4_
U89



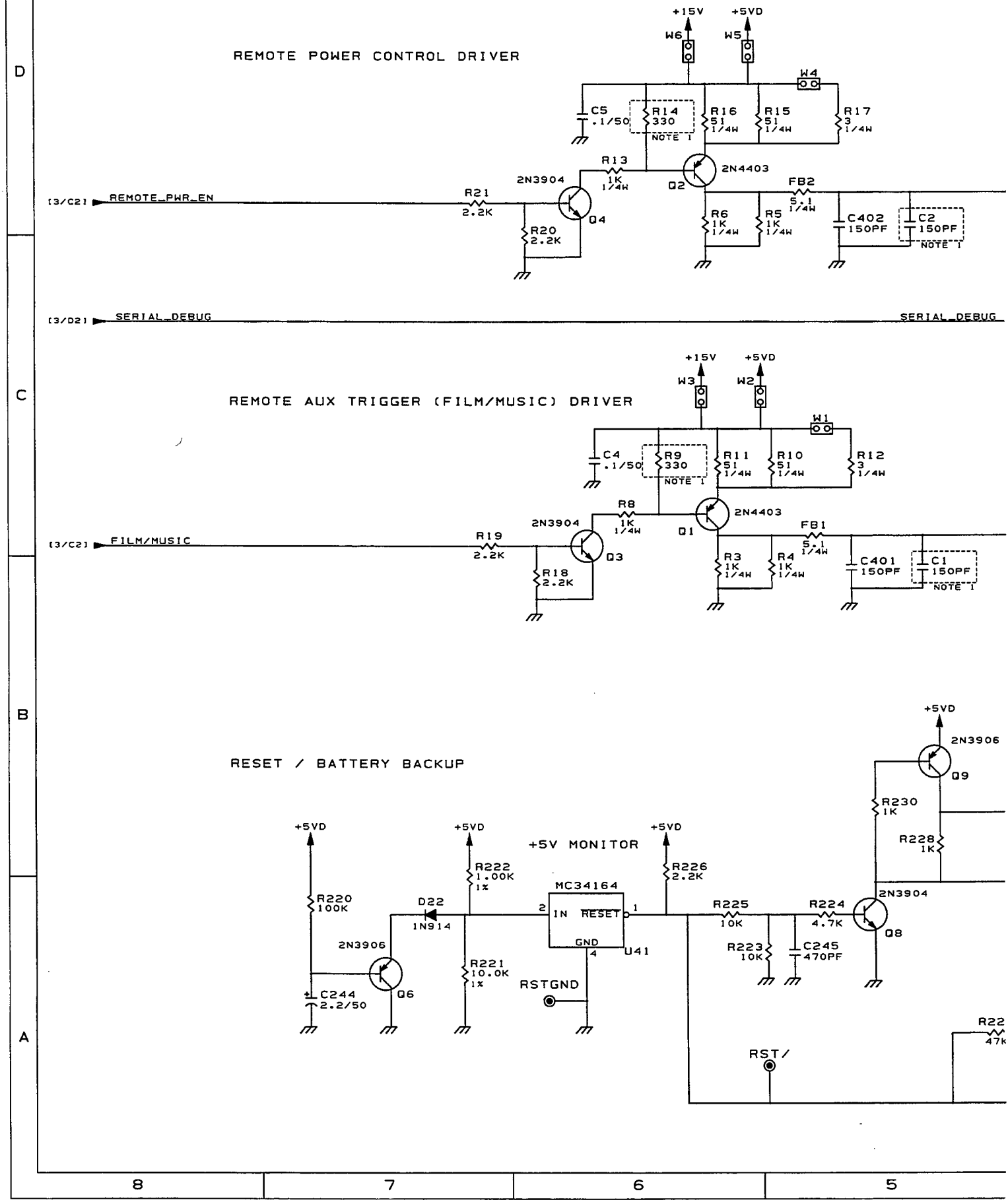
REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

NOTES

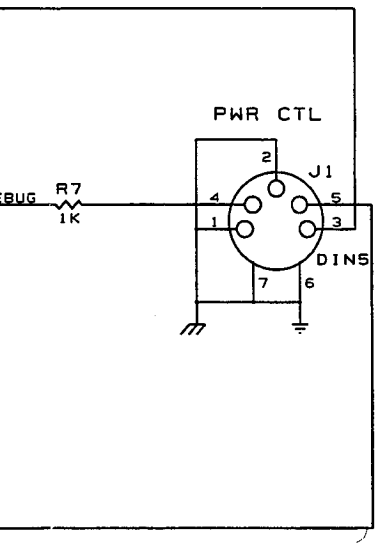
1 NOT INSTALLED: W8
2 OPTIONAL: U88

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE: SCHEM, MAIN BD, DC-1 56K4	
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B / CODE / NUMBER 060-10448	REV O
Q.C. CW	3/20/96		
ISSUED AF	3/20/96	FILE NAME 10448-2.7	SHEET 7 OF 19

9-10-1996_11:22

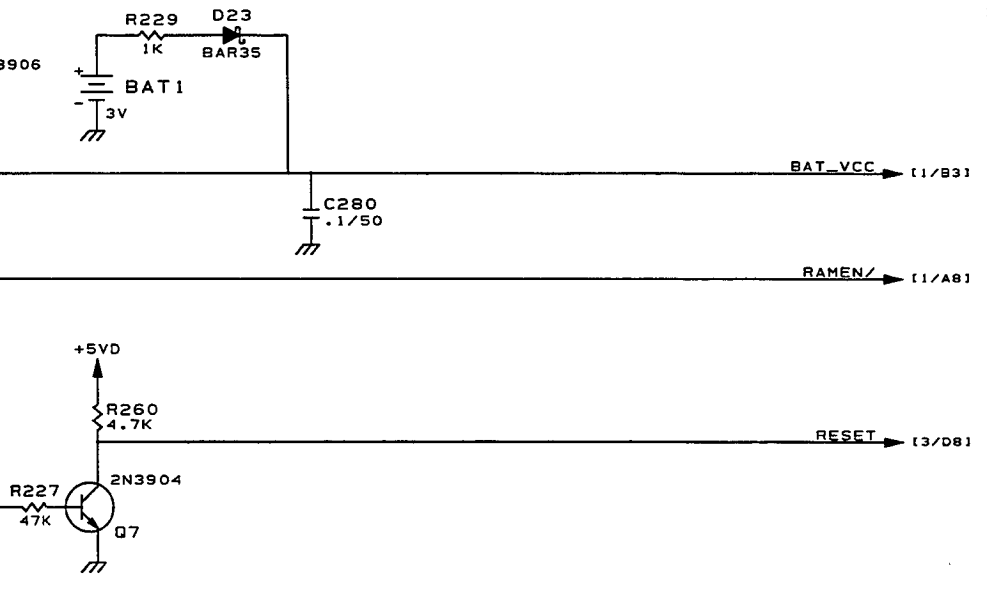

8
7
6
5
D
C
B
A
REMOTE POWER CONTROL DRIVER
+15V
+5VD
W6
W5
W4
C5
.1/50
R14
330
NOTE 1
R16
51
1/4W
R15
51
1/4W
R17
3
1/4W
R13
1K
1/4W
2N3904
2N4403
Q2
FB2
5.1
1/4W
[3/C2]
REMOTE_PWR_EN
R21
2.2K
Q4
R20
2.2K
R6
1K
1/4W
R5
1K
1/4W
C402
150PF
C2
150PF
NOTE 1
[3/D2]
SERIAL_DEBUG
SERIAL_DEBUG
REMOTE AUX TRIGGER (FILM/MUSIC) DRIVER
+15V
+5VD
W3
W2
W1
C4
.1/50
R9
330
NOTE 1
R11
51
1/4W
R10
51
1/4W
R12
3
1/4W
R8
1K
1/4W
2N3904
2N4403
Q1
FB1
5.1
1/4W
[3/C2]
FILM/MUSIC
R19
2.2K
Q3
R18
2.2K
R3
1K
1/4W
R4
1K
1/4W
C401
150PF
C1
150PF
NOTE 1
RESET / BATTERY BACKUP
+5VD
2N3906
Q9
R230
1K
R228
1K
+5VD
+5VD
+5V MONITOR
+5VD
R220
100K
R222
1.00K
1%
MC34164
R226
2.2K
D22
1N914
2
IN
RESET
1
R225
10K
R224
4.7K
2N3904
Q8
GND
4
U41
R223
10K
C245
470PF
2N3906
Q6
R221
10.0K
1%
RSTGND
C244
2.2/50
R22
47k
RST/

REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.
1	ADDED RES TO FB1, FB2, DEPOPULATED R9, R14, PER ECO 960510-00	RWH 5/22/96	CW 5/24/96
		AF 5/24/96	AF 5/24/96



REMOTE CONTROL VOLTAGES:
POWER CONTROL - PIN 3
AUX TRIGGER (FILM/MUSIC) - PIN 5

NOTE:
FOR +5V TRIGGER VOLTAGE:
INSTALL JUMPERS W1 & W2, W4 & W5
FOR +12V TRIGGER VOLTAGE:
INSTALL JUMPERS W3, W6

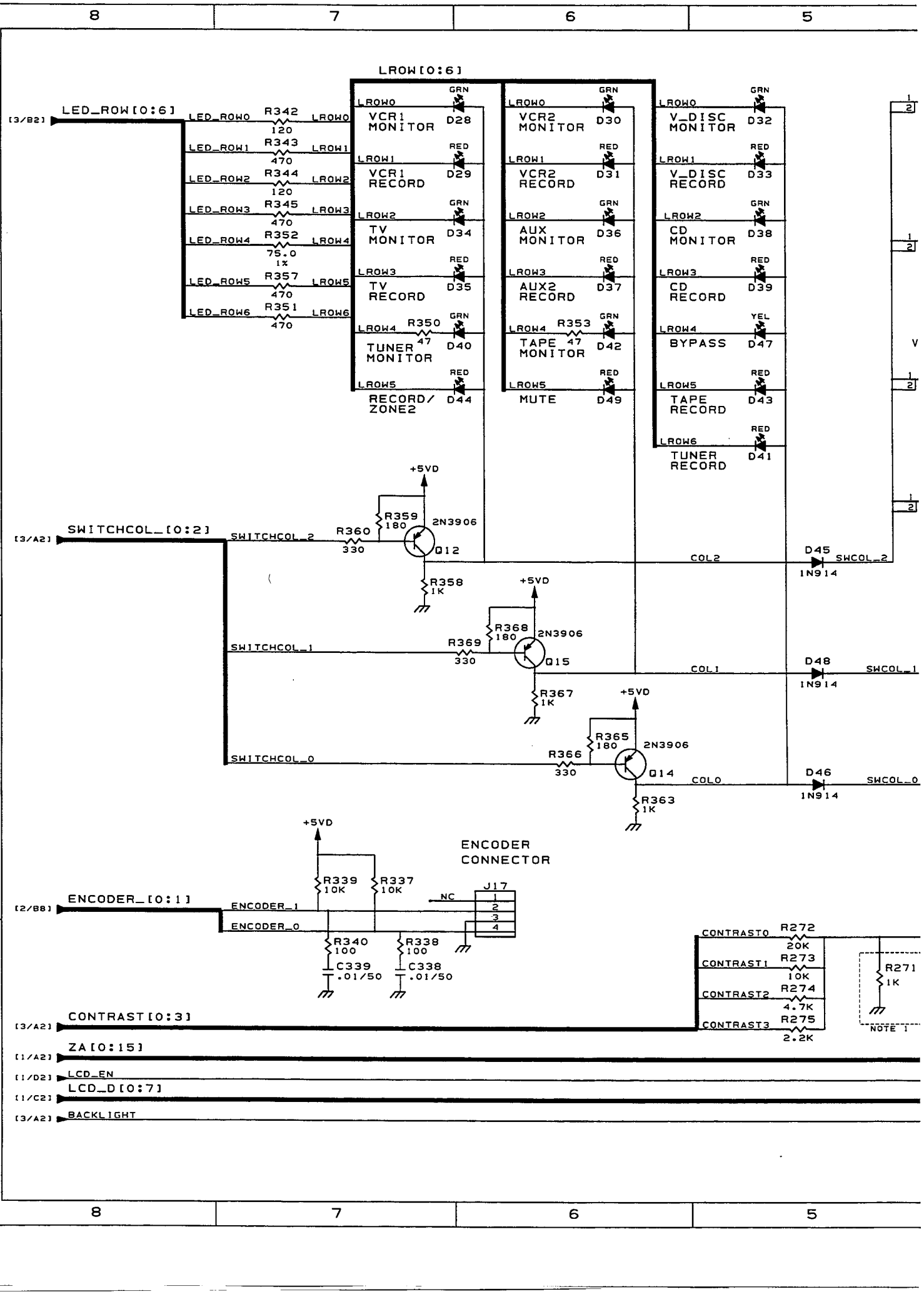


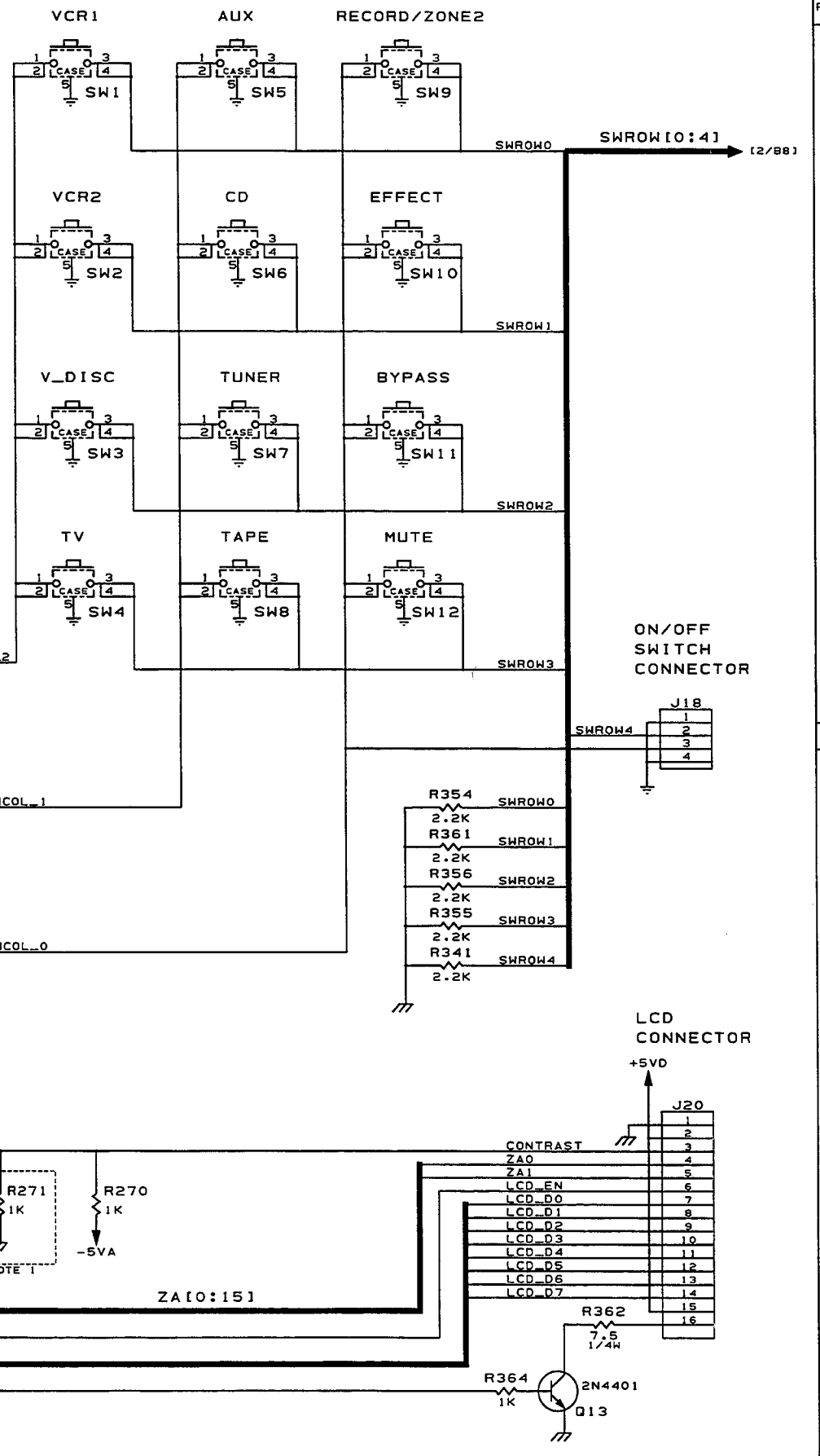
NOTES

1 NOT INSTALLED: C1,C2, R9,R14

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE SCHEM,MAIN BD,DC-1 PWR CTL CONN, RESET	
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B	CODE	NUMBER 060-10448	REV 1
Q.C. CW	3/20/96	FILE NAME 10448-2.8	SHEET 8 OF 19
ISSUED AF	3/20/96		

9-10-1996_11:22


8
7
6
5
D
C
B
A
LROW[0:6]
LED_ROW[0:6]
[3/B2]
LED_ROW0
LED_ROW1
LED_ROW2
LED_ROW3
LED_ROW4
LED_ROW5
LED_ROW6
R342 120
R343 470
R344 120
R345 470
R352 75.0 1%
R357 470
R351 470
LROW0
LROW1
LROW2
LROW3
LROW4
LROW5
LROW6
VCR1 MONITOR D28
VCR1 RECORD D29
TV MONITOR D34
TV RECORD D35
R350 47
TUNER MONITOR D40
RECORD/ ZONE2 D44
VCR2 MONITOR D30
VCR2 RECORD D31
AUX MONITOR D36
AUX2 RECORD D37
R353 47
TAPE MONITOR D42
MUTE D49
V_DISC MONITOR D32
V_DISC RECORD D33
CD MONITOR D38
CD RECORD D39
BYPASS D47
TAPE RECORD D43
TUNER RECORD D41
GRN
RED
YEL
+5VD
SWITCHCOL_[0:2]
[3/A2]
SWITCHCOL_2
SWITCHCOL_1
SWITCHCOL_0
R359 180
R360 330
2N3906
Q12
R358 1K
R368 180
R369 330
Q15
R367 1K
R365 180
R366 330
Q14
R363 1K
COL2
COL1
COL0
D45
D48
D46
1N914
SWCOL_2
SWCOL_1
SWCOL_0
ENCODER CONNECTOR
ENCODER_[0:1]
[2/B8]
ENCODER_1
ENCODER_0
R339 10K
R337 10K
J17
NC
R340 100
R338 100
C339 .01/50
C338 .01/50
CONTRAST[0:3]
[3/A2]
CONTRAST0
CONTRAST1
CONTRAST2
CONTRAST3
R272 20K
R273 10K
R274 4.7K
R275 2.2K
R271 1K
NOTE 1
ZA[0:15]
[1/A2]
LCD_EN
[1/D2]
LCD_D[0:7]
[1/C2]
BACKLIGHT
[3/A2]



REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

NOTES

1 NOT INSTALLED: R271

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE	SCHEM, MAIN BD, DC-1 SWITCHES & LEDS, LCD
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B / CODE / NUMBER 060-10448 / REV 0	
Q.C. CW	3/20/96		
ISSUED AF	3/20/96	FILE NAME 10448-2.9	SHEET 9 OF 19

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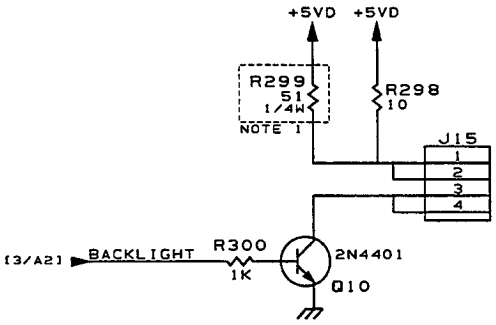
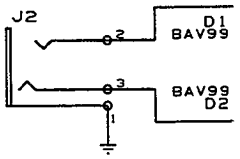
LOGO LED BOARD CONNECTOR



IR IN

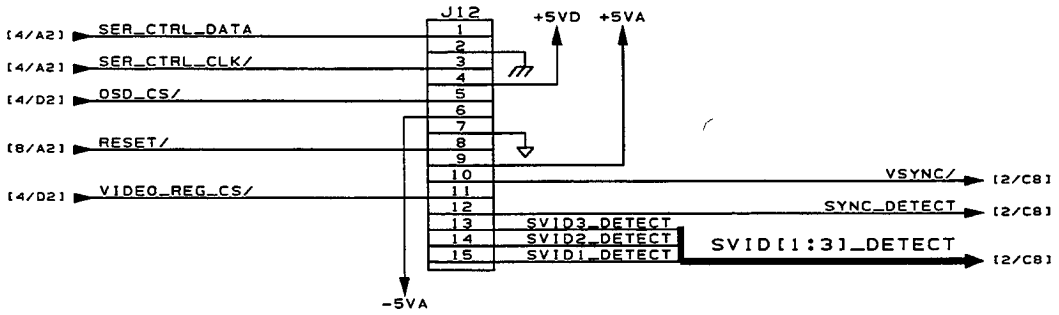


[2/B2] IR_AC

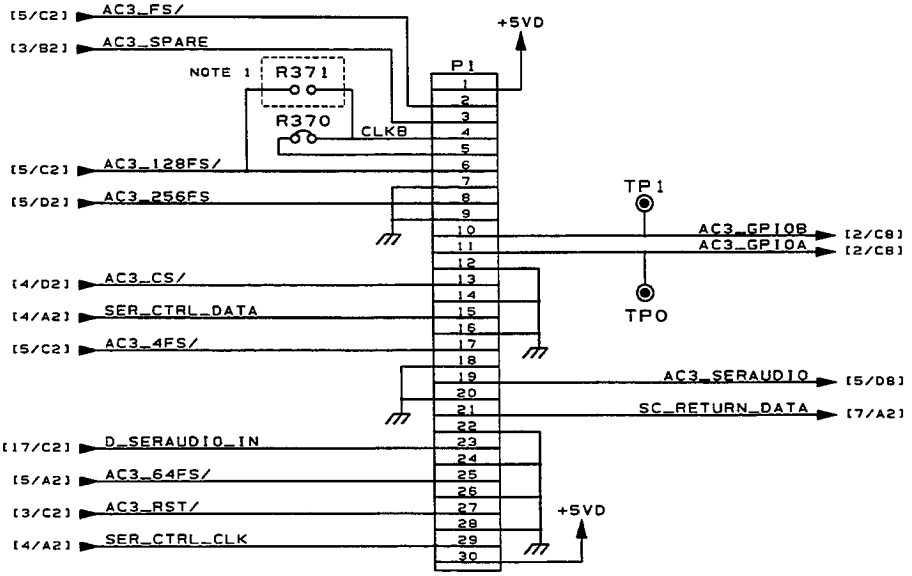
[3/A2] IR_AC

[3/C2] DSP_C

VIDEO BOARD CONNECTOR



DISCRETE DIGITAL DECODER CONNECTOR



[1/D2] [illegible]

[1/C2] [illegible]

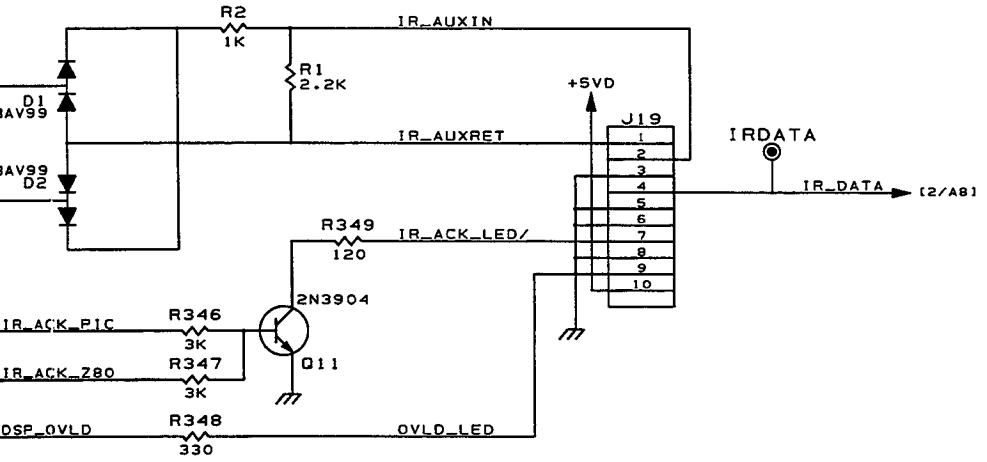
[2/A2] S

[1/A7] Z

[3/D2] R

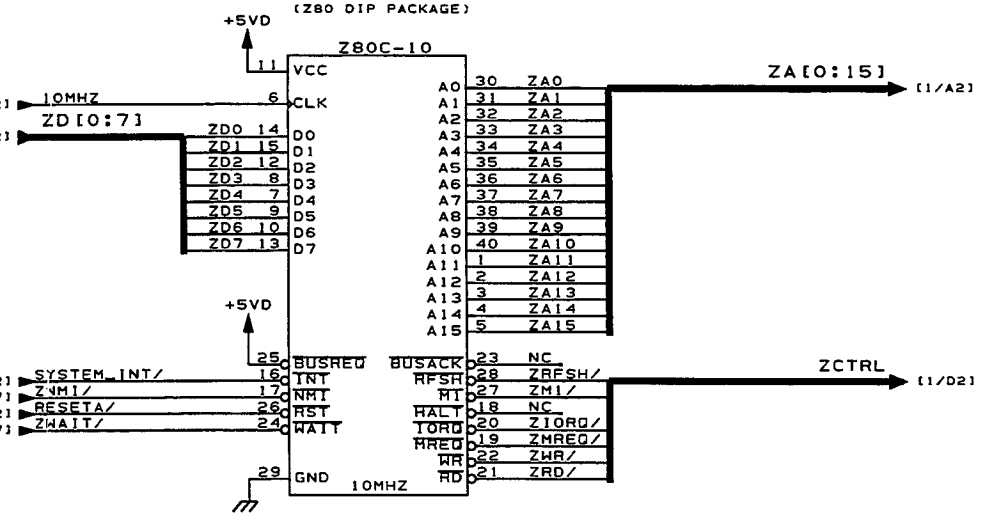
[1/A7] Z

IR INPUT CONNECTOR



Z80-ADAPTER

(Z80 DIP PACKAGE)



REVISIONS

REV	DESCRIPTION	DRAFTER CHECKER	D.C. AUTH.

NOTES

1 NOT INSTALLED: R371, R299 — INSTALLED COUNTERPART: R370

CONTRACT NO.

Lexicon
100 BEAVER STREET, WALTHAM, MA 02154

APPROVALS	DATE
DRAWN RWH	1/4/96
CHECKED ECM	3/20/96
D.C. CW	3/20/96
ISSUED AF	3/20/96

TITLE: SCHEM, MAIN BD, DC-1. MISC. CONNECTORS

SIZE	CODE	NUMBER	REV
B		060-10448	0

FILE NAME: 10448-2.10

SHEET 10 OF 19

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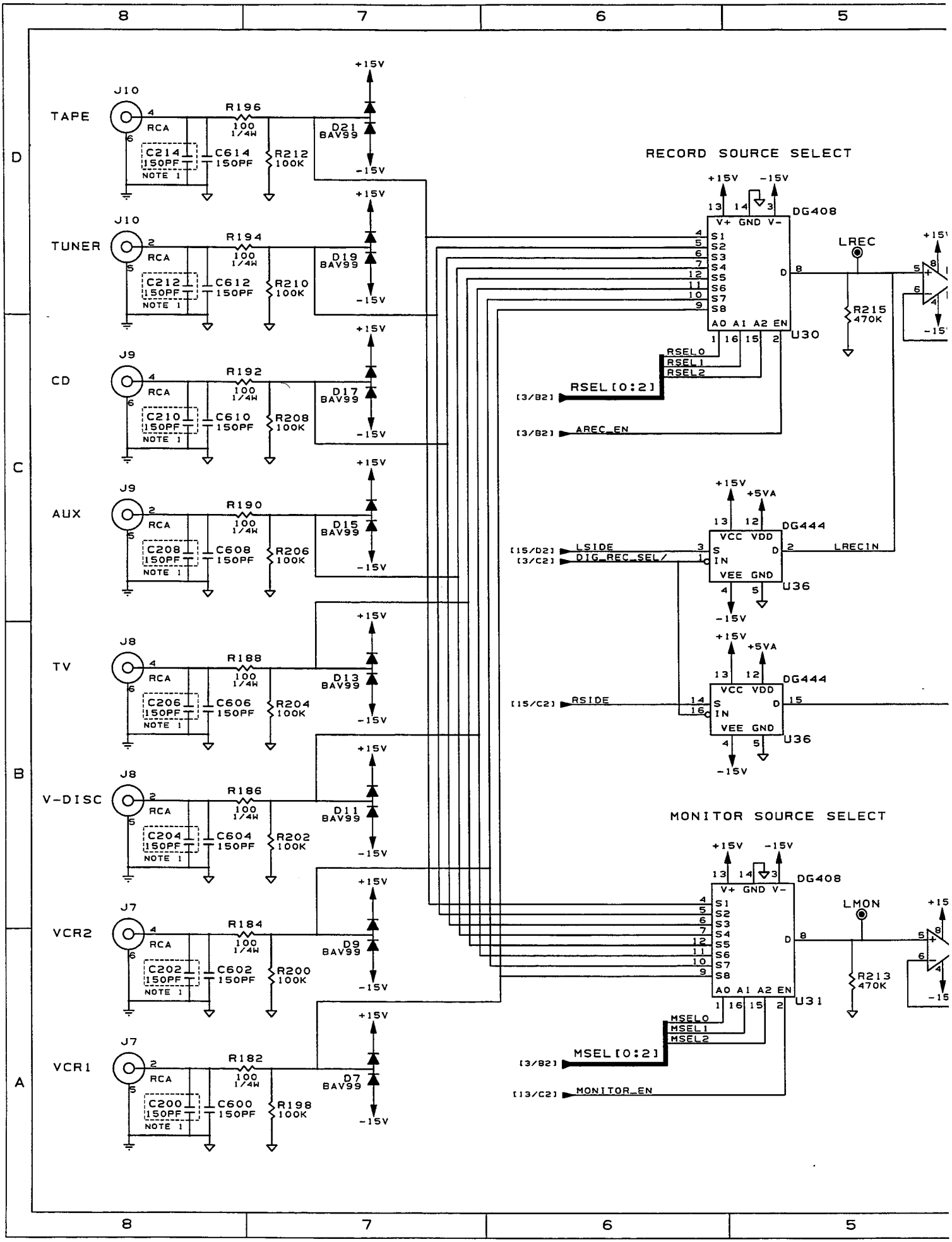
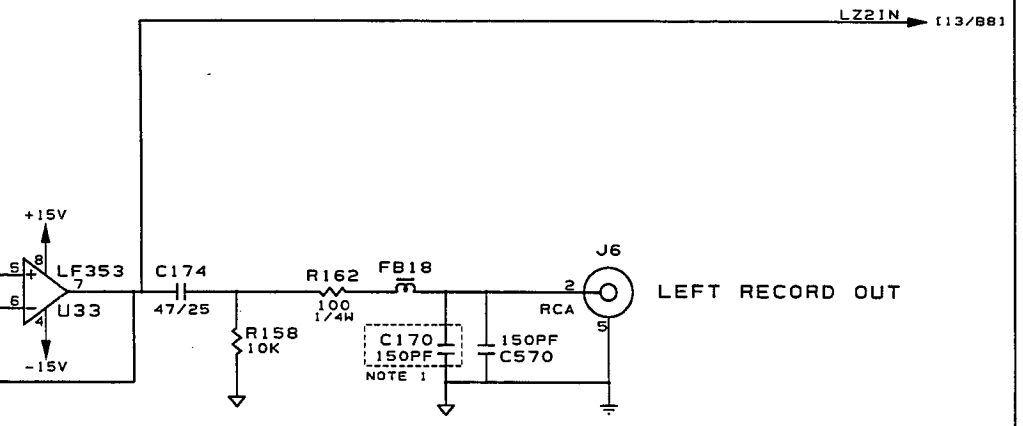
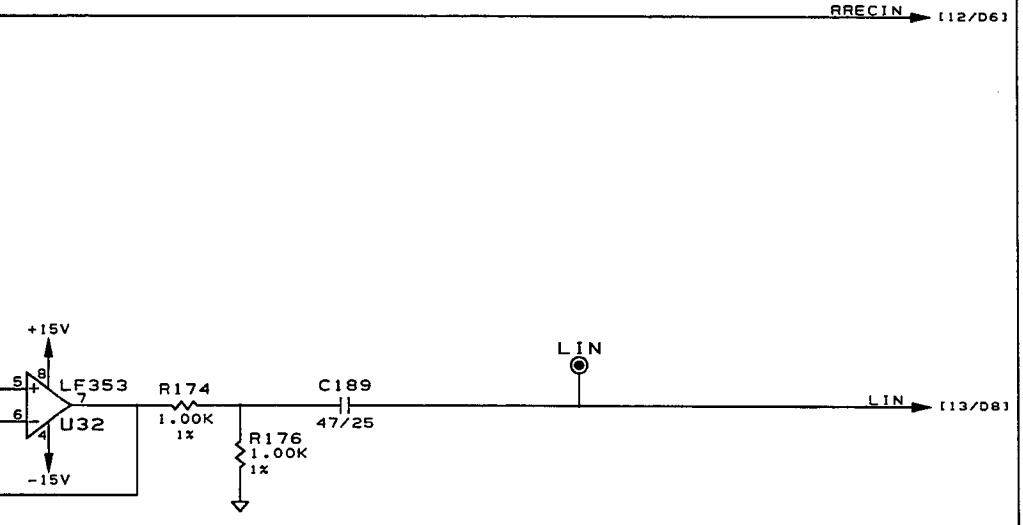

8
7
6
5
D
C
B
A
TAPE
J10
R196
100
1/4W
D21
BAV99
C214
150PF
NOTE 1
C614
150PF
R212
100K
TUNER
J10
R194
D19
C212
C612
R210
CD
J9
R192
D17
C210
C610
R208
AUX
J9
R190
D15
C208
C608
R206
TV
J8
R188
D13
C206
C606
R204
V-DISC
J8
R186
D11
C204
C604
R202
VCR2
J7
R184
D9
C202
C602
R200
VCR1
J7
R182
D7
C200
C600
R198
RCA
+15V
-15V
RECORD SOURCE SELECT
DG408
V+ GND V-
S1
S2
S3
S4
S5
S6
S7
S8
A0 A1 A2 EN
U30
LREC
R215
470K
RSEL0
RSEL1
RSEL2
RSEL[0:2]
[3/B2]
AREC_EN
DG444
+5VA
VCC VDD
VEE GND
U36
[15/D2]
LSIDE
[3/C2]
DIG_REC_SEL/
LRECIN
[15/C2]
RSIDE
MONITOR SOURCE SELECT
U31
LMON
R213
MSEL0
MSEL1
MSEL2
MSEL[0:2]
[13/C2]
MONITOR_EN



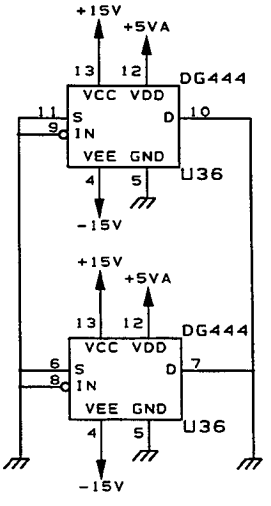


REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

NOTES

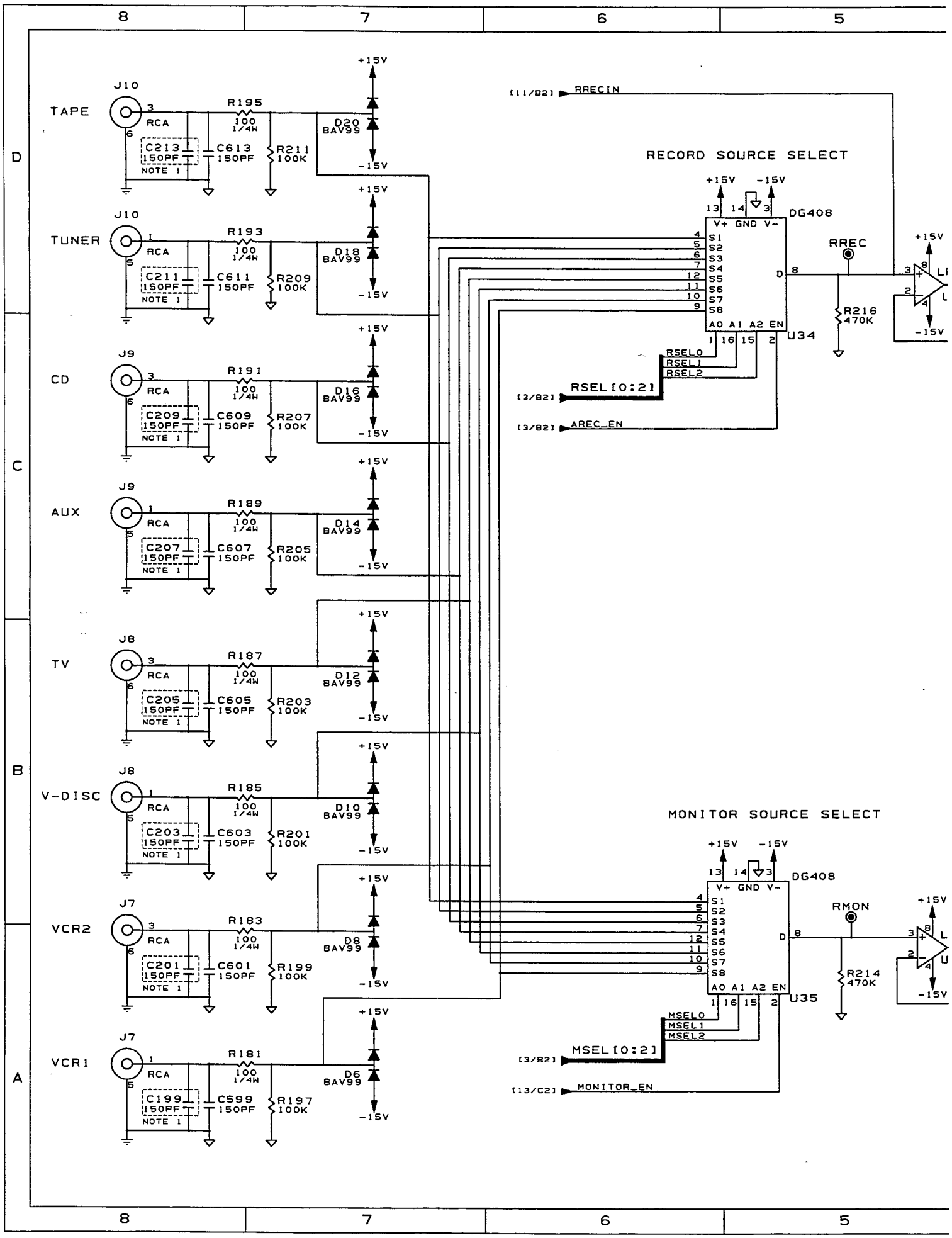
1 NOT INSTALLED:
C170,C200,C202,C204,C206
C208,C210,C212,C214

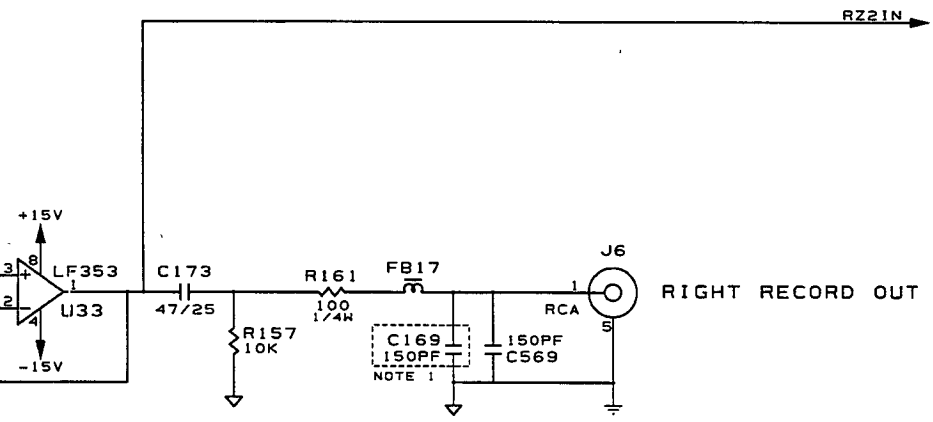
SPARES

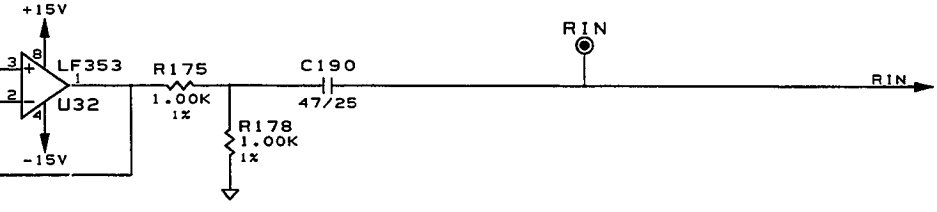


CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE SCHEM,MAIN BD,DC-1 LEFT ANALOG INPUTS	
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B / CODE / NUMBER 060-10448	REV 0
Q.C. CW	3/20/96	FILE NAME 10448-2.11	SHEET 11 OF 19
ISSUED AF	3/20/96		

9-10-1996_11:22


8
7
6
5
D
C
B
A
TAPE
J10
R195
100
1/4W
D20
BAV99
C213
150PF
NOTE 1
C613
150PF
R211
100K
TUNER
J10
R193
D18
C211
C611
R209
CD
J9
R191
D16
C209
C609
R207
AUX
J9
R189
D14
C207
C607
R205
TV
J8
R187
D12
C205
C605
R203
V-DISC
J8
R185
D10
C203
C603
R201
VCR2
J7
R183
D8
C201
C601
R199
VCR1
J7
R181
D6
C199
C599
R197
RCA
+15V
-15V
[11/B2] RRECIN
RECORD SOURCE SELECT
DG408
V+ GND V-
S1
S2
S3
S4
S5
S6
S7
S8
D
A0 A1 A2 EN
U34
RSEL0
RSEL1
RSEL2
RSEL[0:2]
[3/B2]
[3/B2] AREC_EN
RREC
R216
470K
MONITOR SOURCE SELECT
U35
MSEL0
MSEL1
MSEL2
MSEL[0:2]
[13/C2] MONITOR_EN
RMON
R214
470K





REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

NOTES

1 NOT INSTALLED:
C169,C199,C201,C203,C205
C207,C209,C211,C213

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE SCHEM,MAIN BD,DC-1 RIGHT ANALOG INPUTS	
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B / CODE / NUMBER 060-10448	REV 0
Q.C. CW	3/20/96		
ISSUED AF	3/20/96	FILE NAME 10448-2.12	SHEET 12 OF 19

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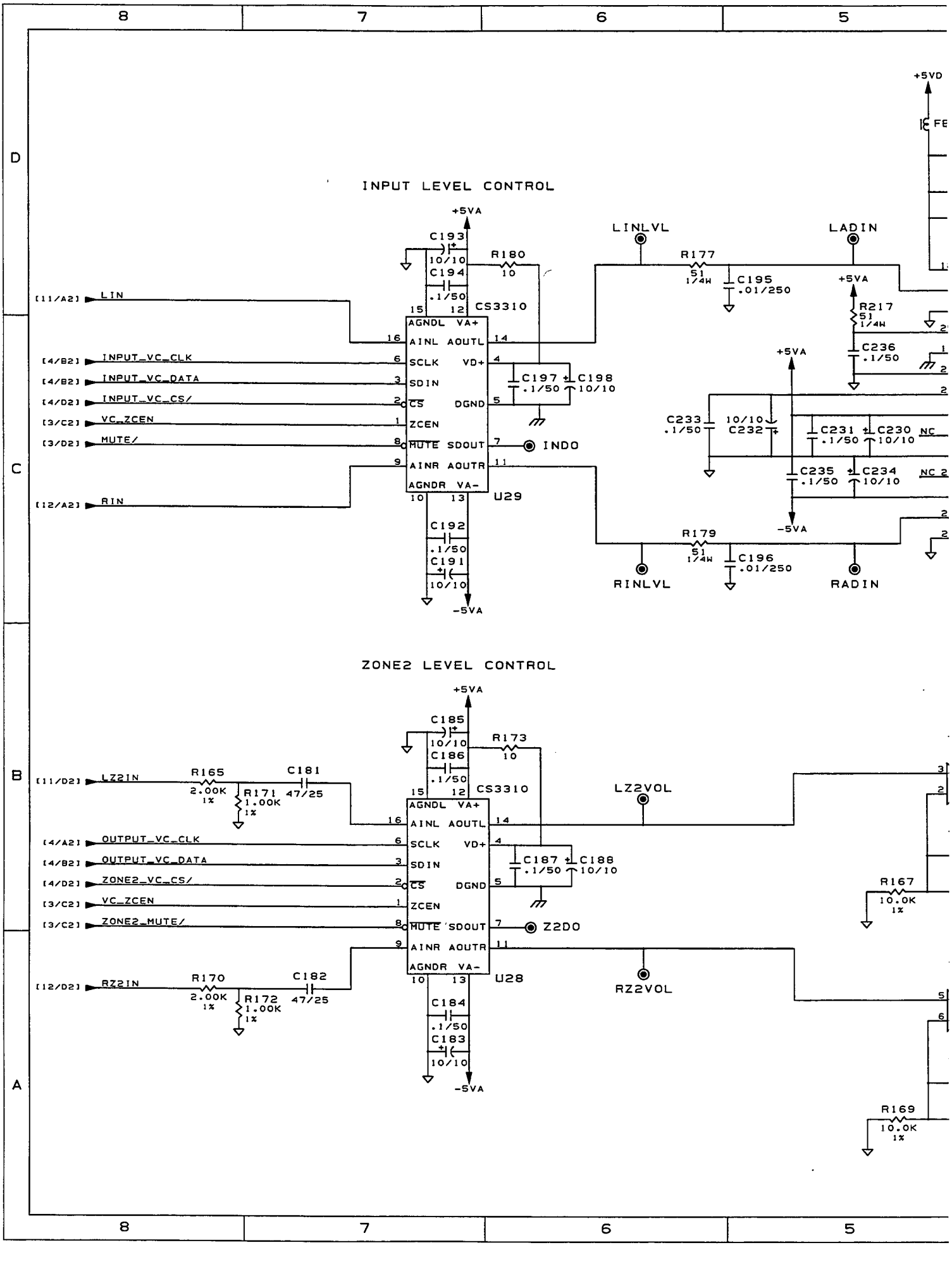
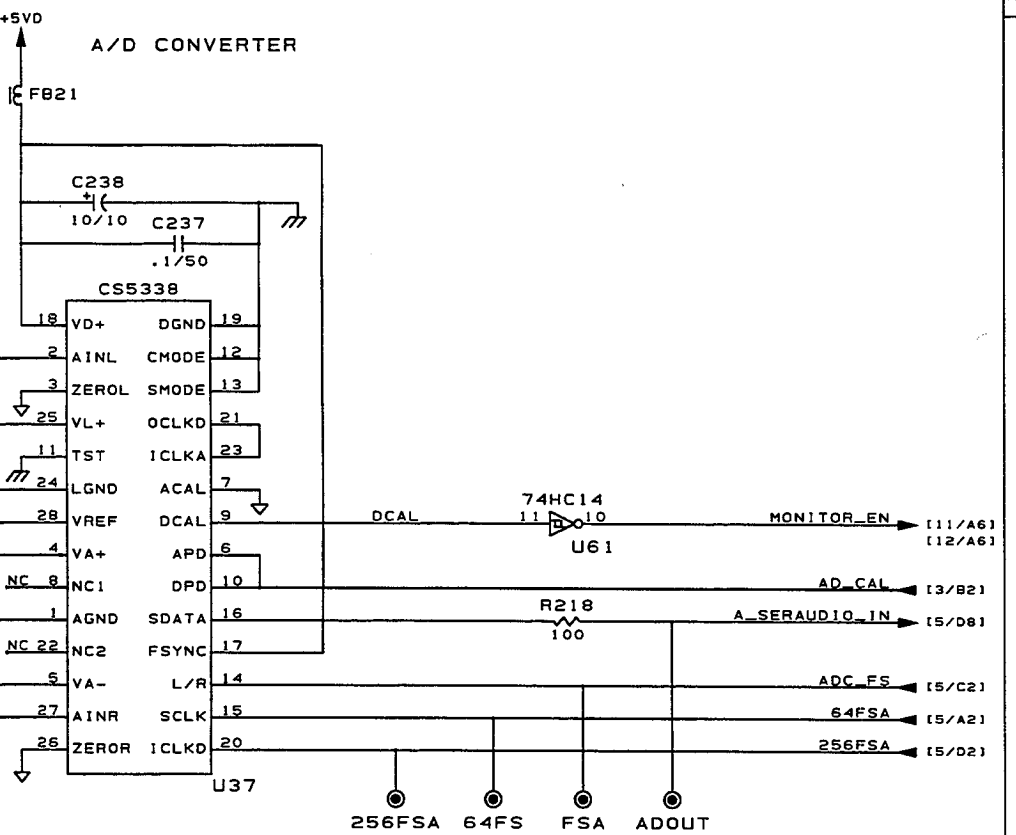
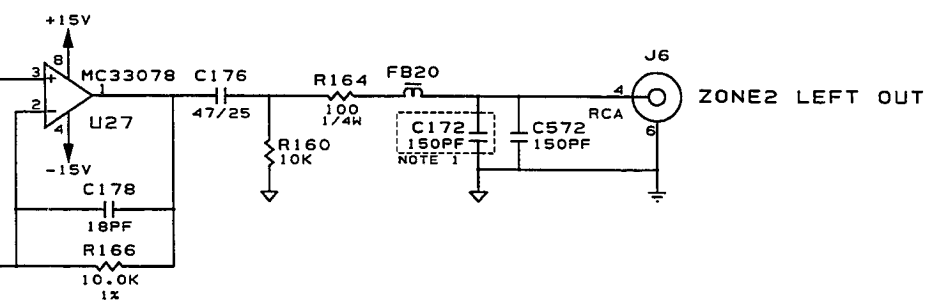
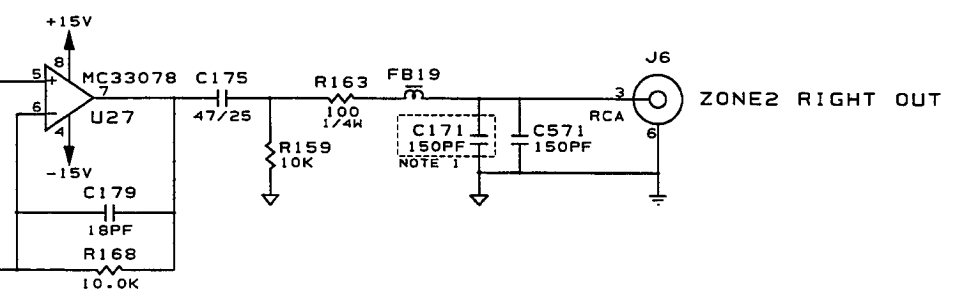

INPUT LEVEL CONTROL
+5VA
C193
10/10
C194
.1/50
R180
10
CS3310
AGNDL VA+
AINL AOUTL
SCLK VD+
SDIN
CS DGND
ZCEN
MUTE SDOUT
AINR AOUTR
AGNDR VA-
U29
C197 .1/50
C198 10/10
C192 .1/50
C191 10/10
-5VA
[11/A2] LIN
[4/B2] INPUT_VC_CLK
[4/B2] INPUT_VC_DATA
[4/D2] INPUT_VC_CS/
[3/C2] VC_ZCEN
[3/D2] MUTE/
[12/A2] RIN
INDO
LINLVL
LADIN
R177 51 1/4W
C195 .01/250
R217 51 1/4W
C236 .1/50
C233 .1/50
C232 10/10
C231 .1/50
C230 10/10
NC
C235 .1/50
C234 10/10
NC 2
R179 51 1/4W
C196 .01/250
RINLVL
RADIN
ZONE2 LEVEL CONTROL
C185 10/10
C186 .1/50
R173 10
C187 .1/50
C188 10/10
C184 .1/50
C183 10/10
[11/D2] LZ2IN
R165 2.00K 1%
R171 1.00K 1%
C181 47/25
[12/D2] RZ2IN
R170 2.00K 1%
R172 1.00K 1%
C182 47/25
[4/A2] OUTPUT_VC_CLK
[4/B2] OUTPUT_VC_DATA
[4/D2] ZONE2_VC_CS/
[3/C2] VC_ZCEN
[3/C2] ZONE2_MUTE/
Z2DO
LZ2VOL
RZ2VOL
R167 10.0K 1%
R169 10.0K 1%







REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

NOTES

1 NOT INSTALLED: C171,C172

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE SCHEM,MAIN BD,DC-1 A/D CONVERTER, ZONE2	
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B / CODE / NUMBER 060-10448 / REV 0	
Q.C. CW	3/20/96		
ISSUED AF	3/20/96	FILE NAME 10448-2.13 / SHEET 13 OF 19	

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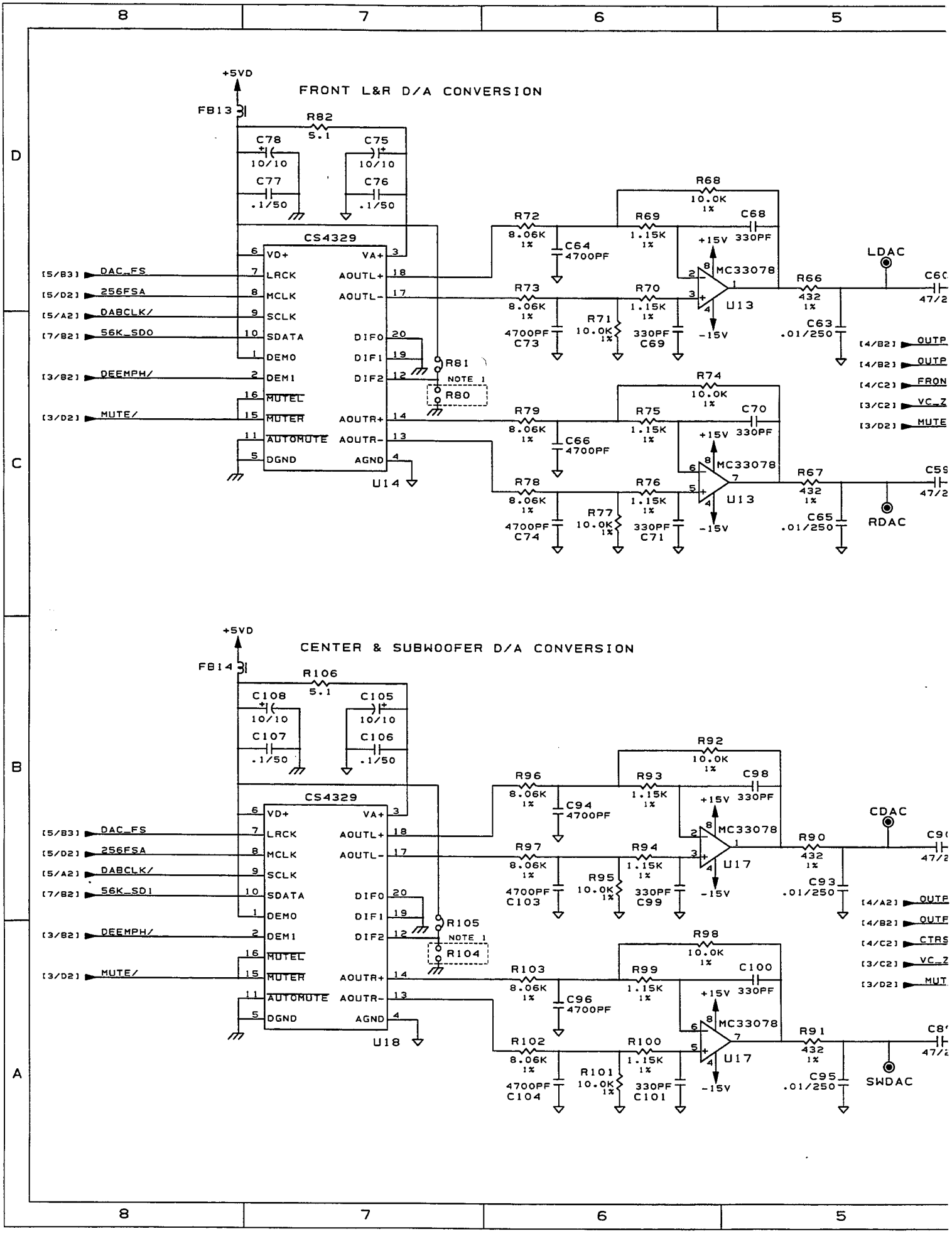
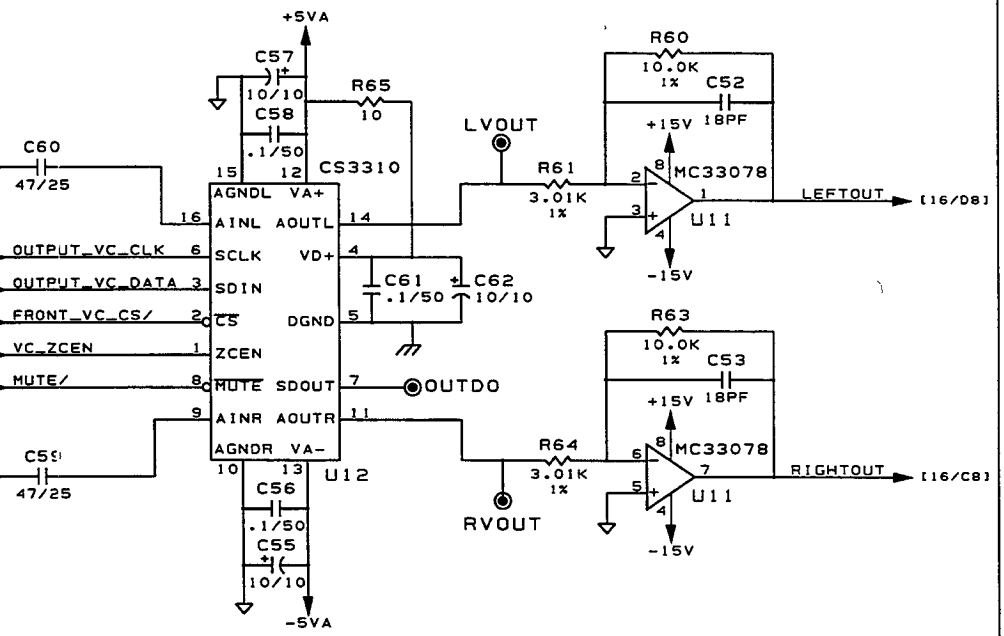

FRONT L&R D/A CONVERSION
+5VD
FB13
R82
5.1
C78
10/10
C75
10/10
C77
.1/50
C76
.1/50
CS4329
VD+
VA+
LRCK
AOUTL+
MCLK
AOUTL-
SCLK
SDATA
DIF0
DEM0
DIF1
DEM1
DIF2
MUTEL
MUTER
AOUTR+
AUTOMUTE
AOUTR-
DGND
AGND
U14
[5/B3] DAC_FS
[5/D2] 256FSA
[5/A2] DABCLK/
[7/B2] 56K_SDO
[3/B2] DEEMPH/
[3/D2] MUTE/
R81
NOTE 1
R80
R72
8.06K
1%
R73
8.06K
1%
C64
4700PF
C73
4700PF
R71
10.0K
1%
R68
10.0K
1%
R69
1.15K
1%
R70
1.15K
1%
C68
330PF
C69
330PF
+15V
-15V
MC33078
U13
R66
432
1%
C63
.01/250
LDAC
[4/B2] OUTP
[4/B2] OUTP
[4/C2] FRON
[3/C2] VC_Z
[3/D2] MUTE
R74
10.0K
1%
R79
8.06K
1%
R78
8.06K
1%
C66
4700PF
C74
4700PF
R77
10.0K
1%
R75
1.15K
1%
R76
1.15K
1%
C70
330PF
C71
330PF
R67
432
1%
C65
.01/250
RDAC
CENTER & SUBWOOFER D/A CONVERSION
+5VD
FB14
R106
5.1
C108
10/10
C105
10/10
C107
.1/50
C106
.1/50
CS4329
U18
[5/B3] DAC_FS
[5/D2] 256FSA
[5/A2] DABCLK/
[7/B2] 56K_SDI
[3/B2] DEEMPH/
[3/D2] MUTE/
R105
NOTE 1
R104
R96
8.06K
1%
R97
8.06K
1%
C94
4700PF
C103
4700PF
R95
10.0K
1%
R92
10.0K
1%
R93
1.15K
1%
R94
1.15K
1%
C98
330PF
C99
330PF
+15V
-15V
MC33078
U17
R90
432
1%
C93
.01/250
CDAC
[4/A2] OUTP
[4/B2] OUTP
[4/C2] CTRS
[3/C2] VC_Z
[3/D2] MUT
R98
10.0K
1%
R103
8.06K
1%
R102
8.06K
1%
C96
4700PF
C104
4700PF
R101
10.0K
1%
R99
1.15K
1%
R100
1.15K
1%
C100
330PF
C101
330PF
R91
432
1%
C95
.01/250
SWDAC

REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	D.C. AUTH.
1	REVISED LOW PASS FILTER RC VALUES PER ECO 960419-00; REVISED R82,106 VALUES PER ECO 960510-00	RWH 4/24/96	CW 5/24/96
		AF 5/24/96	AF 5/24/96

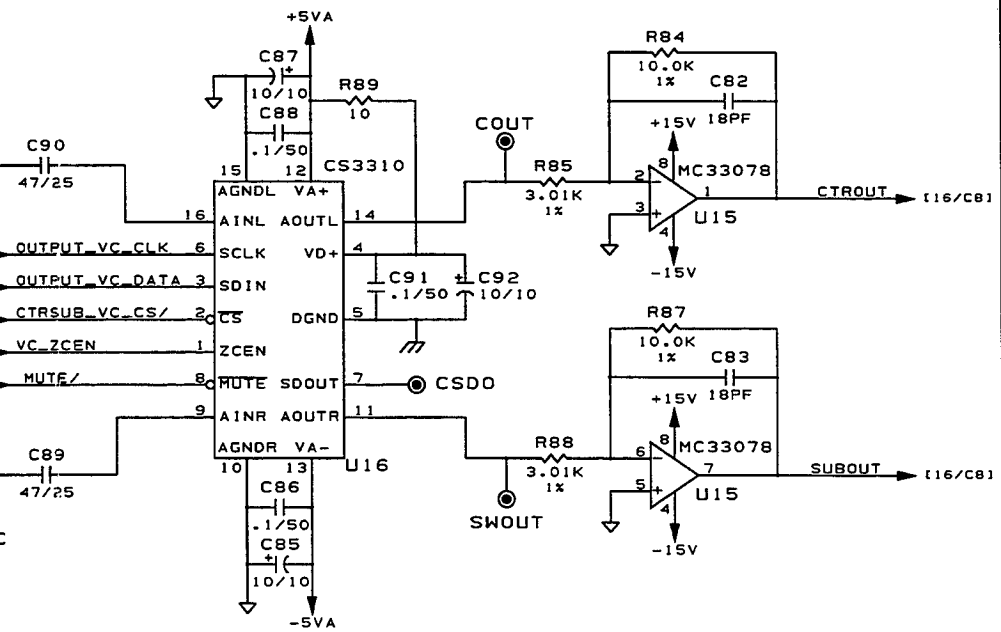
FRONT L&R
LEVEL CONTROL

FRONT L&R
OUTPUT AMPS



CENTER & SUBWOOFER
LEVEL CONTROL

CENTER & SUBWOOFER
OUTPUT AMPS



NOTES

1 NOT INSTALLED: R80,R104

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE SCHEM,MAIN BD,DC-1 FRONT, CTR & SUB DACS	
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B	CODE NUMBER 060-10448 REV 1
D.C. CW	3/20/96	FILE NAME 10448-2.14	SHEET 14 OF 19
ISSUED AF	3/20/96		

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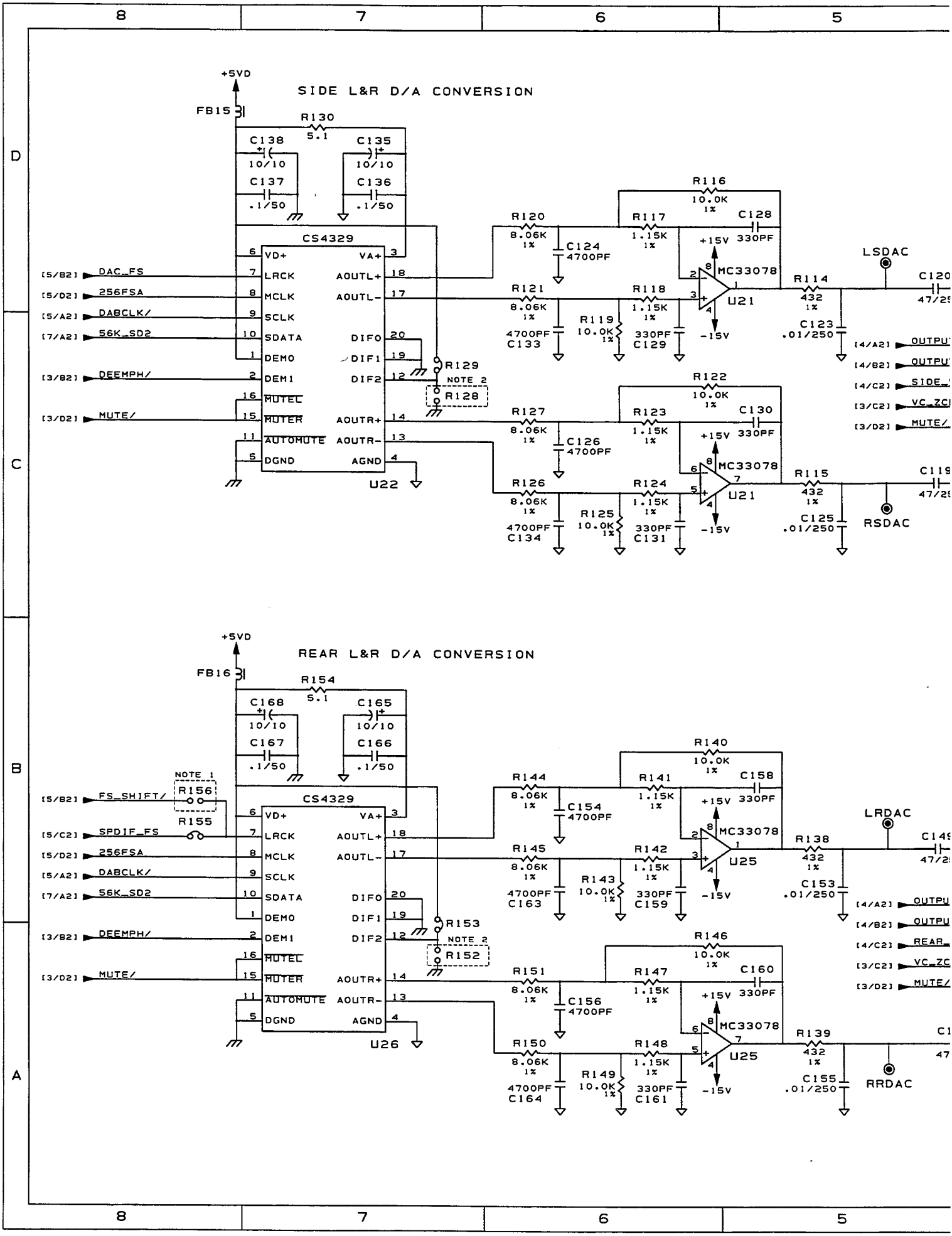
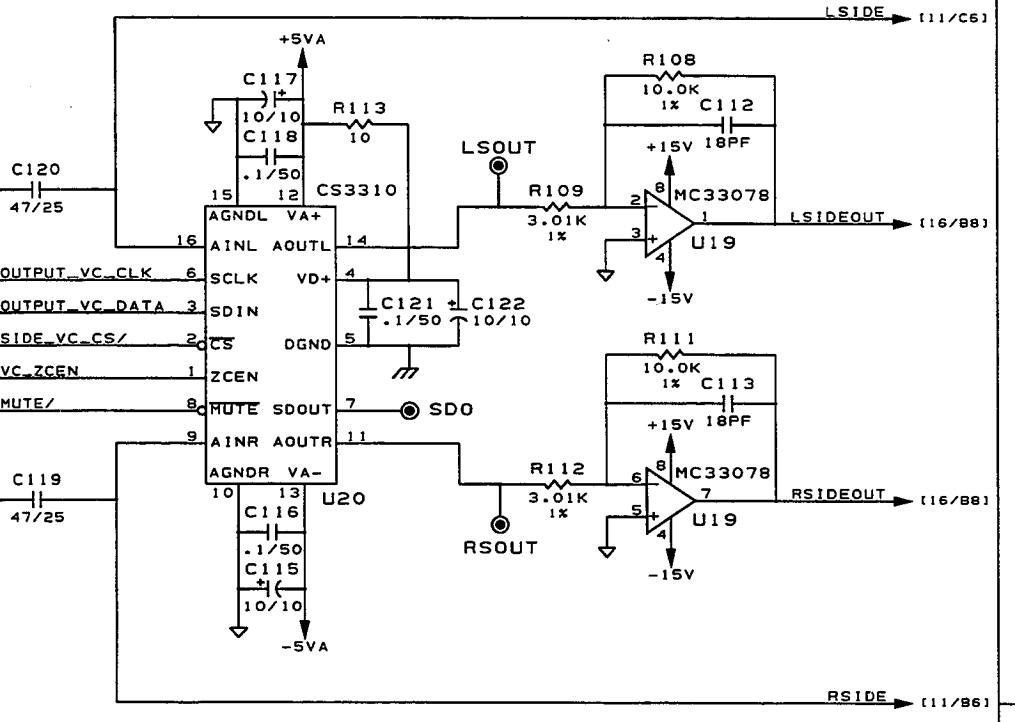

SIDE L&R D/A CONVERSION
REAR L&R D/A CONVERSION
+5VD
FB15
FB16
CS4329
U22
U26
MC33078
U21
U25
-15V
+15V
LSDAC
RSDAC
LRDAC
RRDAC
DAC_FS
256FSA
DABCLK/
56K_SD2
DEEMPH/
MUTE/
FS_SHIFT/
SPDIF_FS
OUTPU
SIDE_
REAR_
VC_ZC
NOTE 1
NOTE 2

REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	D.C. AUTH.
1	REVISED LOW PASS FILTER RC VALUES PER ECO 960419-00; REVISED R130,154 VALUES PER ECO 960510-00	RWH 4/24/96	CW 5/24/96
		AF 5/24/96	AF 5/24/96

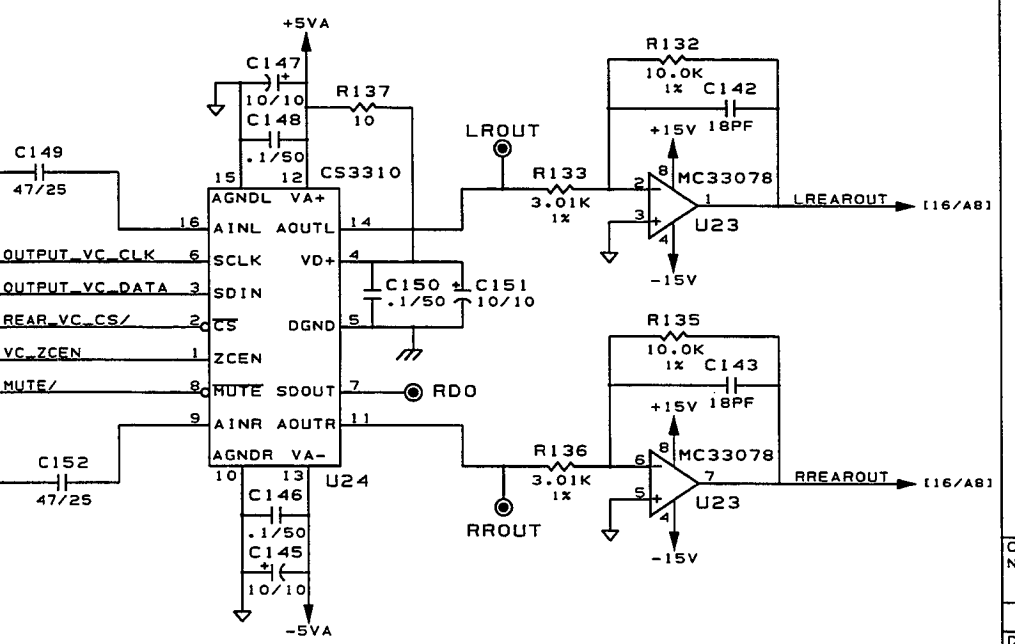
SIDE L&R LEVEL CONTROL

SIDE L&R OUTPUT AMPS



REAR L&R LEVEL CONTROL

REAR L&R OUTPUT AMPS



NOTES

1 NOT INSTALLED: R156 INSTALLED COUNTERPART: R155

2 NOT INSTALLED: R128,R152

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE: SCHEM,MAIN BD,DC-1 SIDE & REAR DACS	
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B / CODE / NUMBER 060-10448 / REV 1	
Q.C. CW	3/20/96	FILE NAME 10448-2.15	SHEET 15 OF 19
ISSUED AF	3/20/96		

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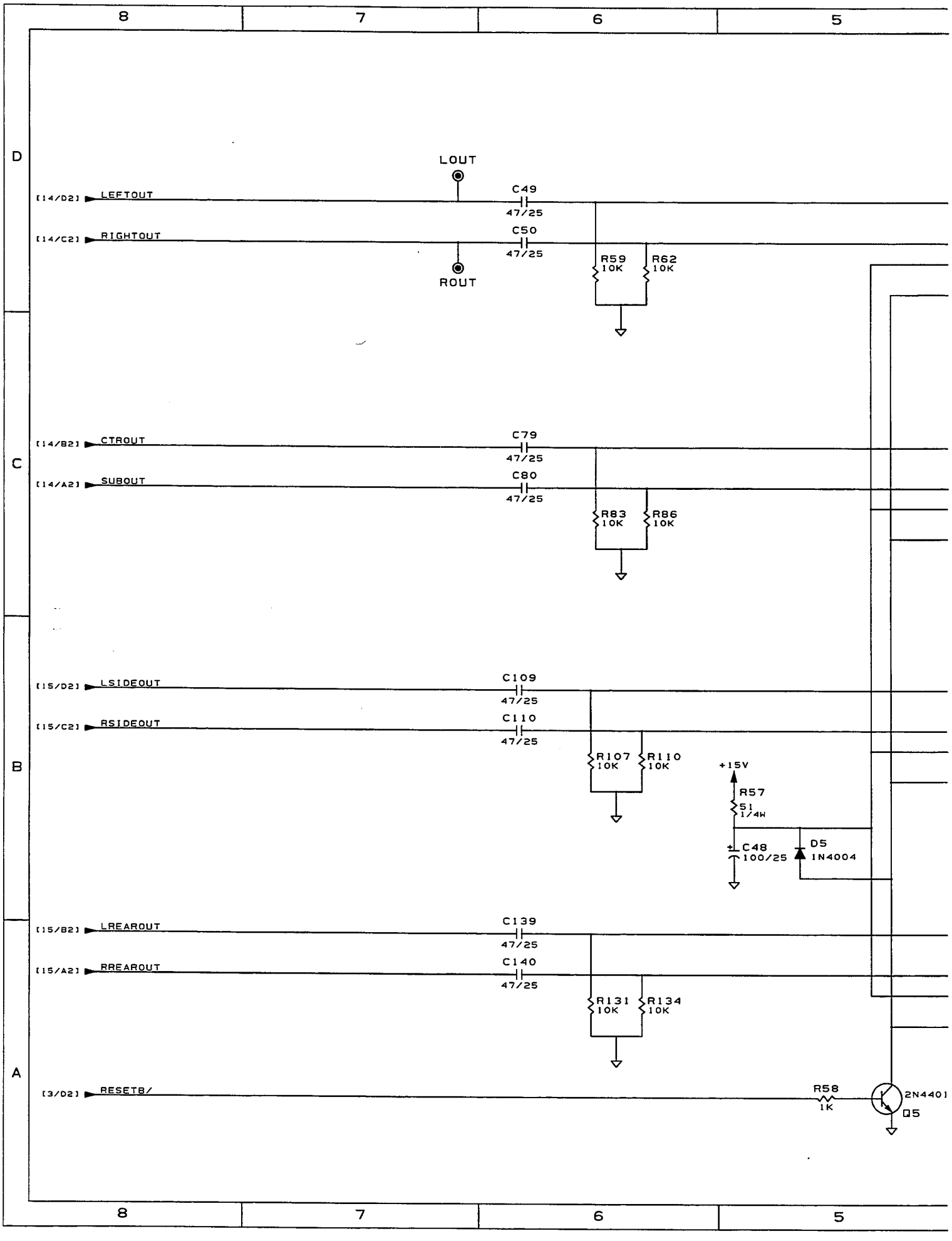
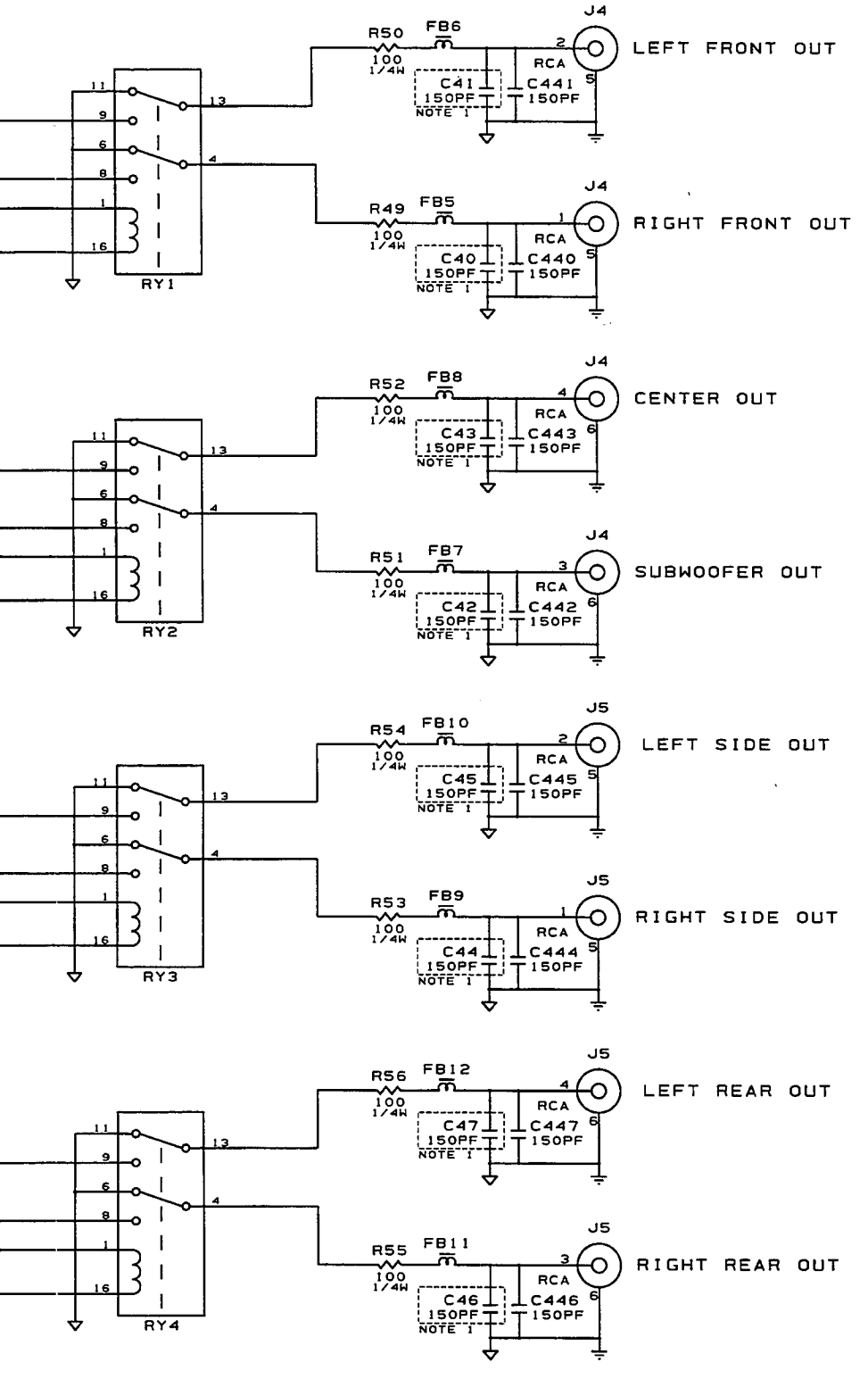

8
7
6
5
D
C
B
A
LOUT
ROUT
[14/D2] LEFTOUT
[14/C2] RIGHTOUT
C49
47/25
C50
47/25
R59
10K
R62
10K
[14/B2] CTROUT
[14/A2] SUBOUT
C79
47/25
C80
47/25
R83
10K
R86
10K
[15/D2] LSIDEOUT
[15/C2] RSIDEOUT
C109
47/25
C110
47/25
R107
10K
R110
10K
+15V
R57
51
1/4W
C48
100/25
D5
1N4004
[15/B2] LREAROUT
[15/A2] RREAROUT
C139
47/25
C140
47/25
R131
10K
R134
10K
[3/D2] RESETB/
R58
1K
2N4401
Q5



2N4401

Q5

REVISIONS

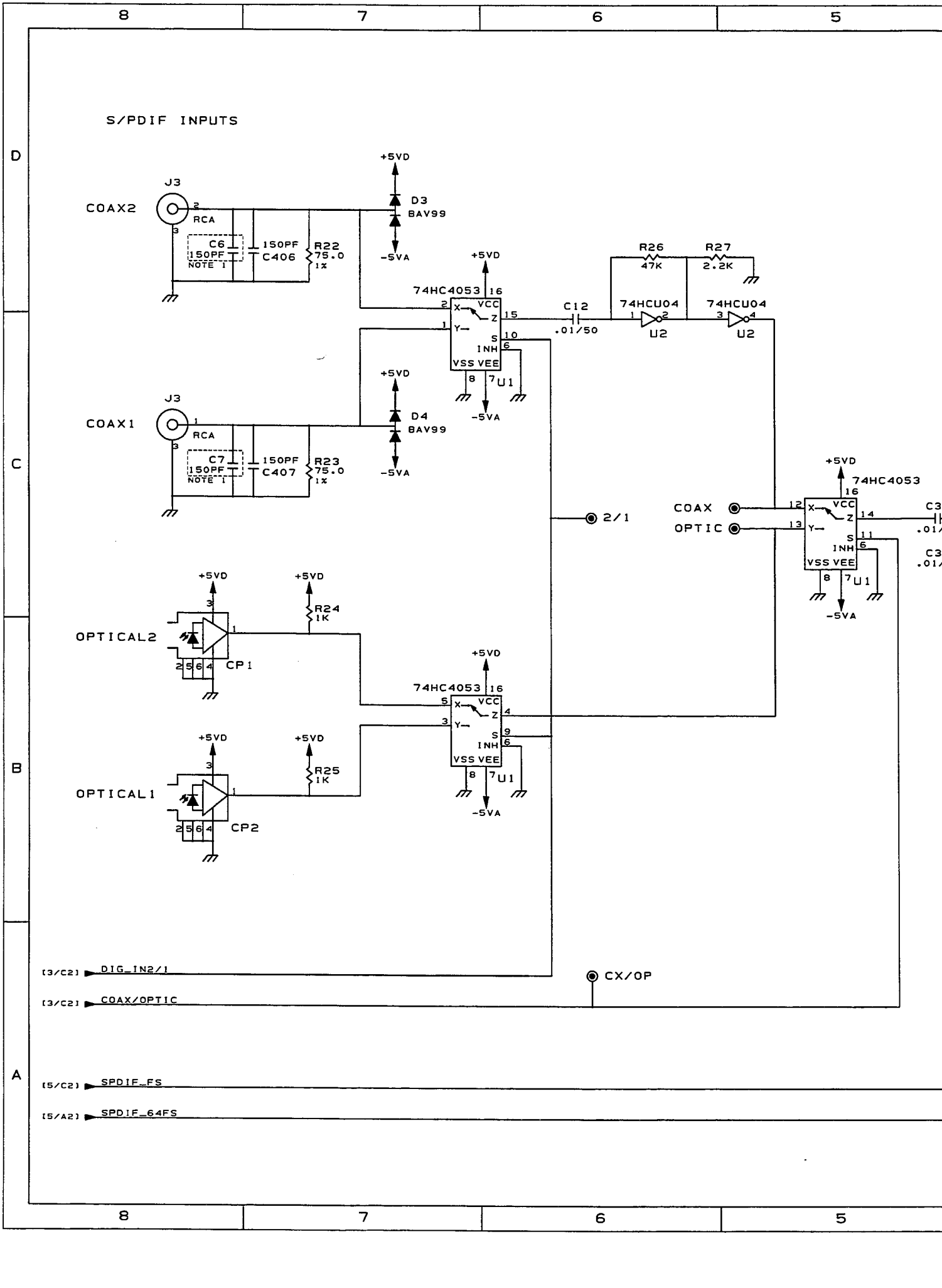
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

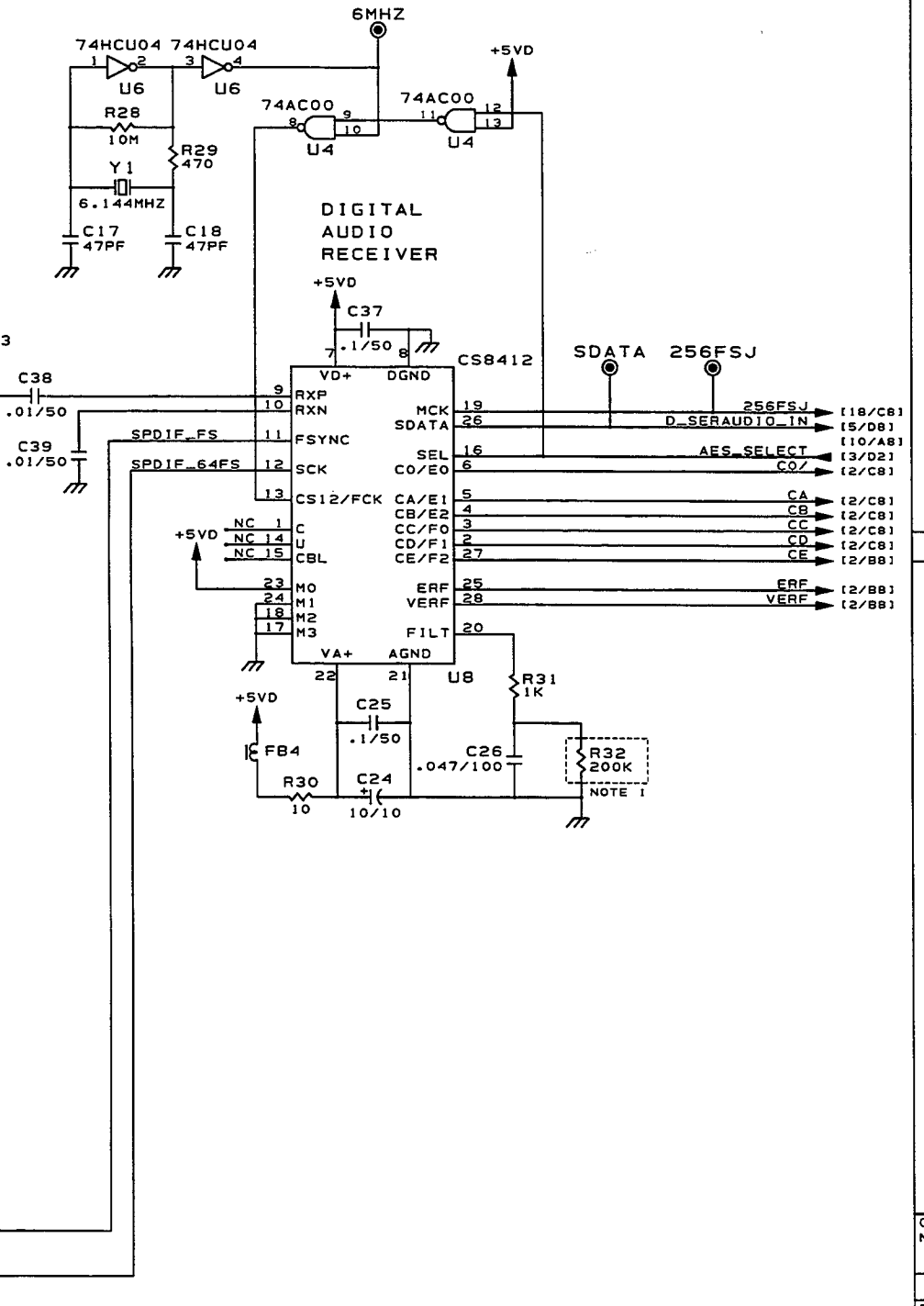
NOTES

1 NOT INSTALLED: C40-C47

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE: SCHEM, MAIN BD, DC-1 ANALOG OUTPUTS	
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B / CODE / NUMBER 060-10448	REV 0
Q.C. CW	3/20/96		
ISSUED AF	3/20/96	FILE NAME 10448-2.16	SHEET 16 OF 19

9-10-1996_11:25


S/PDIF INPUTS
COAX2
J3
RCA
C6
150PF
NOTE 1
150PF
C406
R22
75.0
1%
D3
BAV99
+5VD
-5VA
74HC4053
VCC
VSS VEE
U1
C12
.01/50
74HCU04
U2
R26
47K
R27
2.2K
COAX1
C7
C407
R23
D4
2/1
COAX
OPTIC
C3
OPTICAL2
CP1
R24
1K
OPTICAL1
CP2
R25
[3/C2] DIG_IN2/1
[3/C2] COAX/OPTIC
CX/OP
[5/C2] SPDIF_FS
[5/A2] SPDIF_64FS



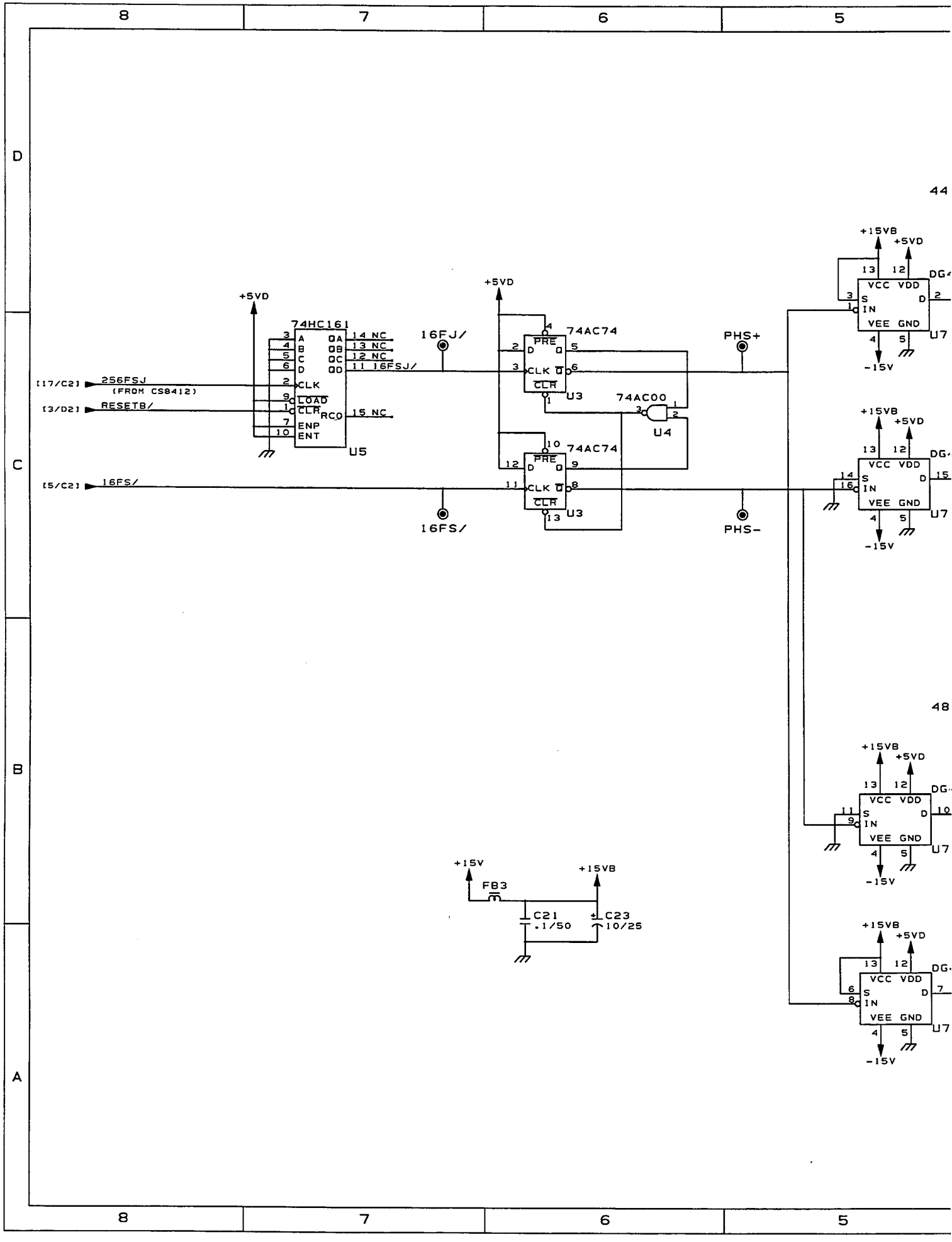
REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.
1	REVISED C17,18 VALUE PER ECO 960812-01	RWH 9/10/96	CW 9/10/96
		AF 9/10/96	AF 9/10/96

NOTES

1 NOT INSTALLED: C6,C7,R32

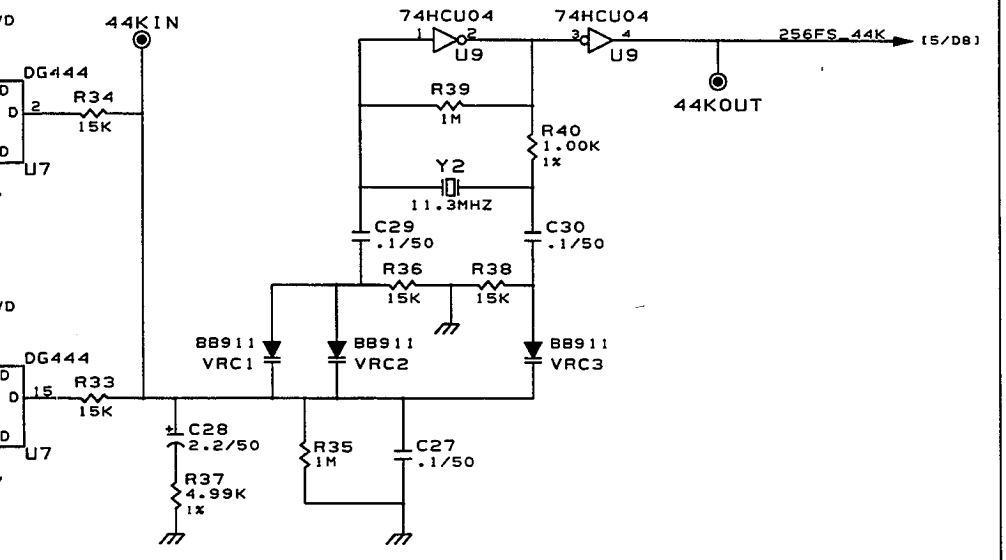
CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154	
APPROVALS	DATE	TITLE: SCHEM,MAIN BD,DC-1 S/PDIF INPUTS
DRAWN RWH	1/4/96	
CHECKED ECM	3/20/96	SIZE B | CODE | NUMBER 060-10448 | REV 1
Q.C. CW	3/20/96	FILE NAME 10448-2.17 | SHEET 17 OF 19
ISSUED AF	3/20/96	

9-11-1996_16:14

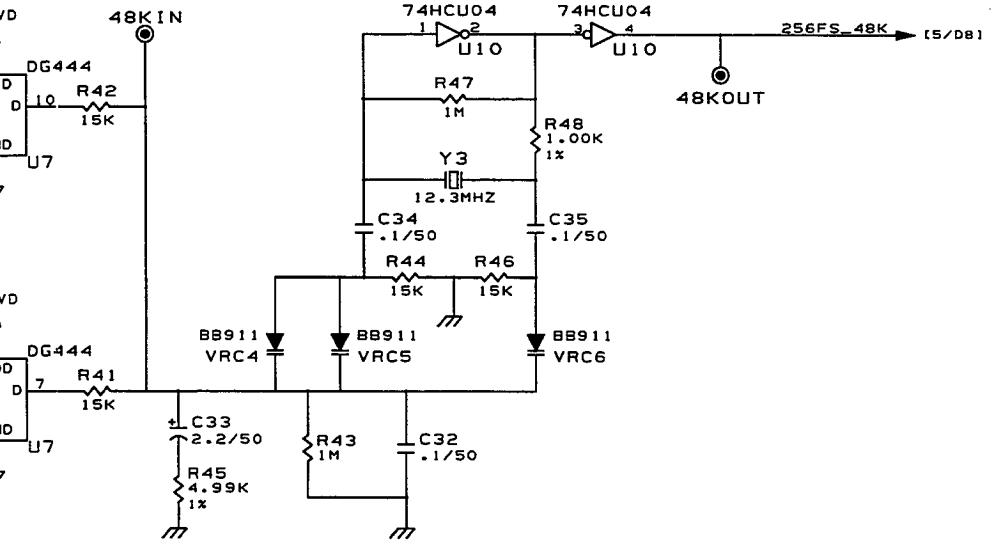

8
7
6
5
D
C
B
A
+5VD
74HC161
A
B
C
D
QA
QB
QC
QD
14 NC
13 NC
12 NC
11 16FSJ/
CLK
LOAD
CLR
RCO
15 NC
ENP
ENT
U5
[17/C2]
256FSJ
(FROM CS8412)
[3/D2]
RESETB/
16FJ/
74AC74
PRE
CLR
U3
74AC00
U4
PHS+
[5/C2]
16FS/
PHS-
+15VB
VCC VDD
S
IN
D
VEE GND
-15V
U7
+15V
FB3
C21
.1/50
C23
10/25

REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

44.1K JITTER REDUCTION



48K JITTER REDUCTION



CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE: SCHEM, MAIN BD, DC-1 JITTER REDUCTION	
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B / CODE / NUMBER 060-10448 / REV 0	
Q.C. CW	3/20/96		
ISSUED AF	3/20/96	FILE NAME 10448-2.18 / SHEET 18 OF 19	

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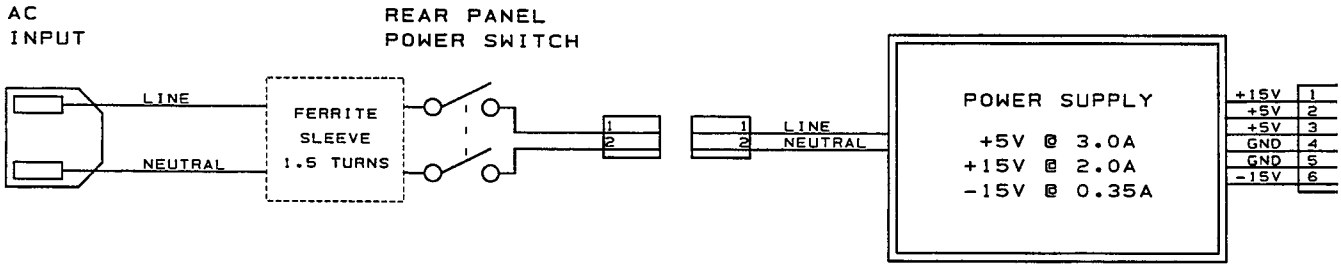
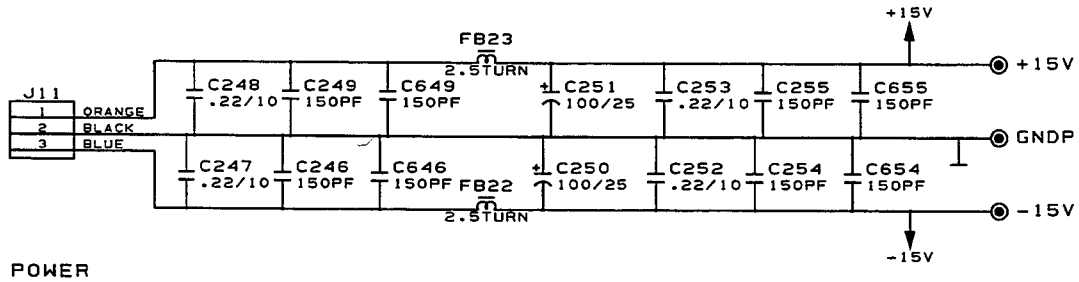
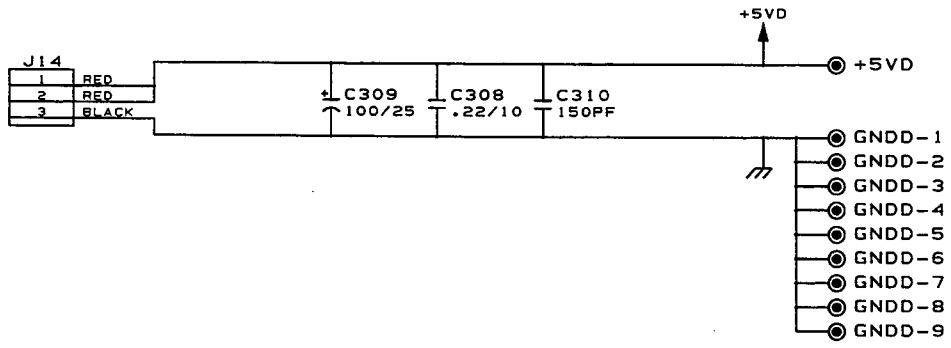
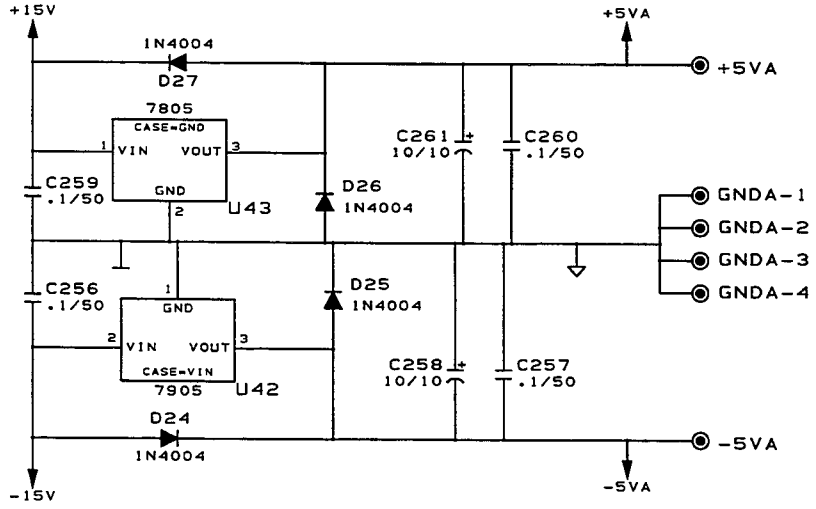
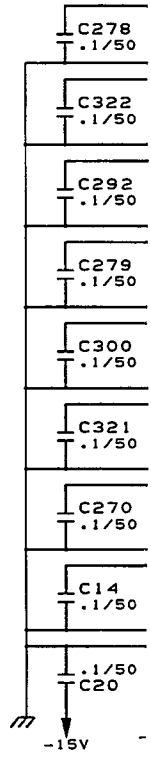


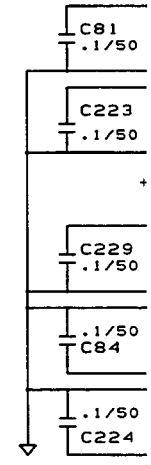


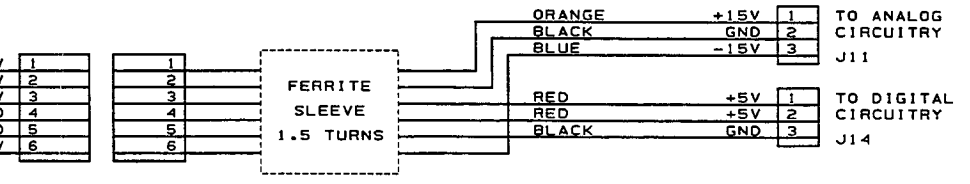
POWER
CONNECTORS



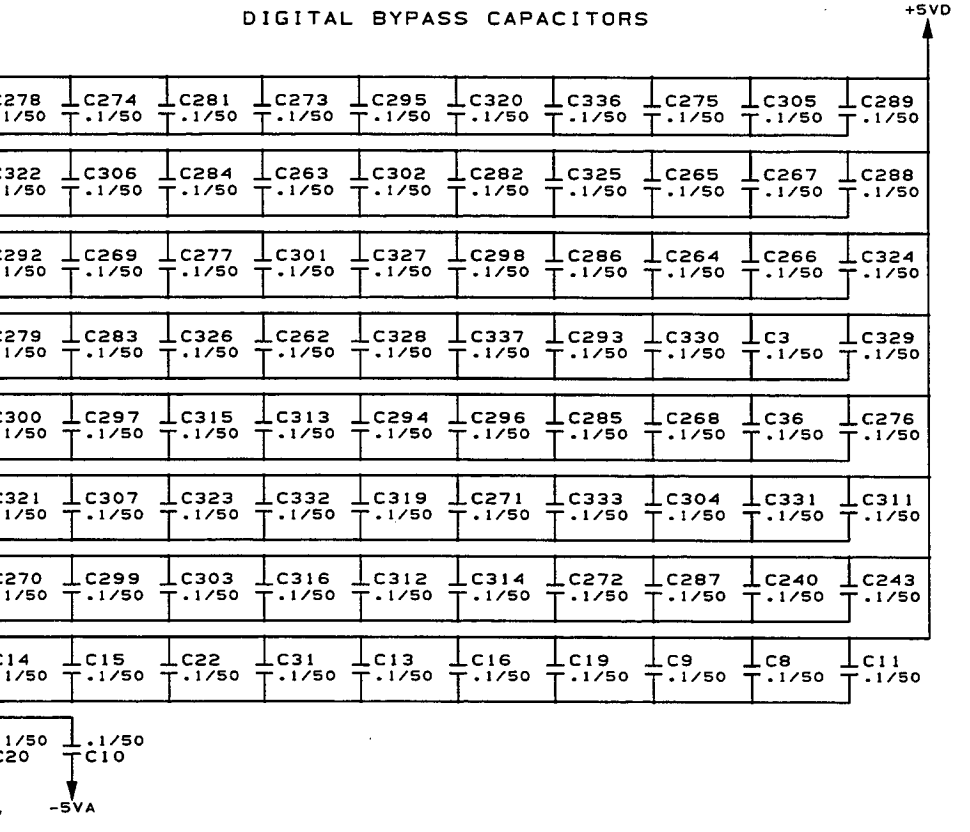




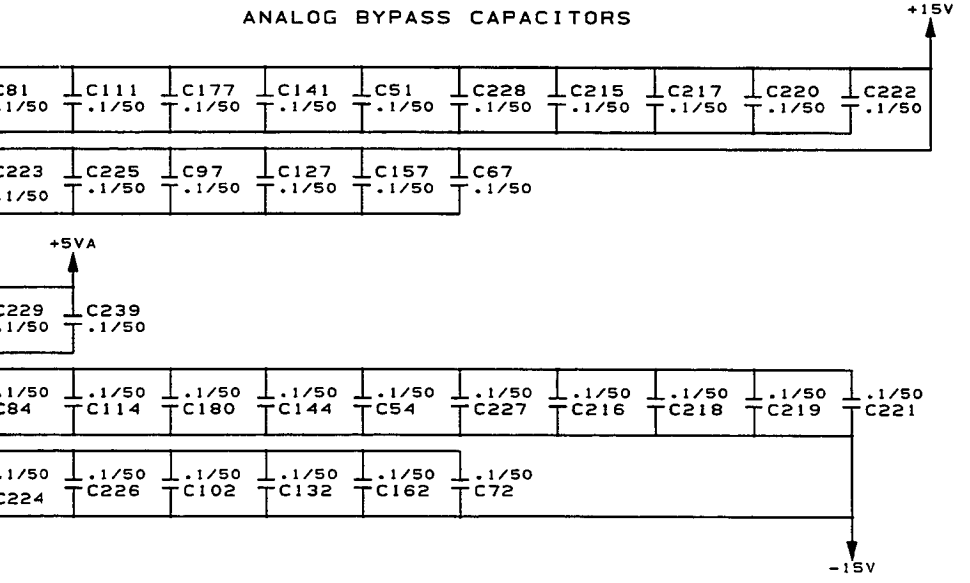




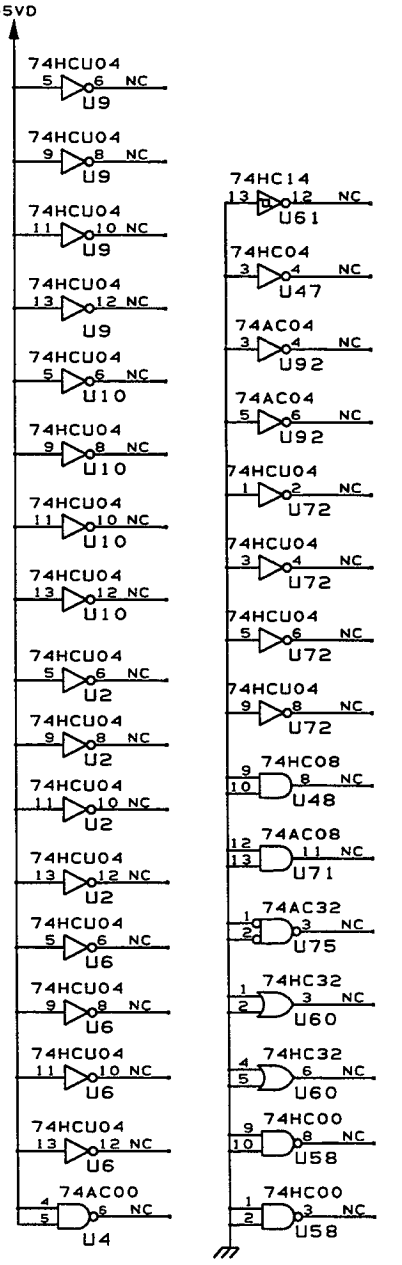
DIGITAL BYPASS CAPACITORS



ANALOG BYPASS CAPACITORS



SPARES



REVISIONS

REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE: SCHEM, MAIN BD, DC-1 POWER SUPPLY	
DRAWN RWH	1/4/96		
CHECKED ECM	3/20/96	SIZE B / CODE / NUMBER 060-10448 / REV 0	
Q.C. CW	3/20/96	FILE NAME 10448-2.19 / SHEET 19 OF 19	
ISSUED AF	3/20/96		

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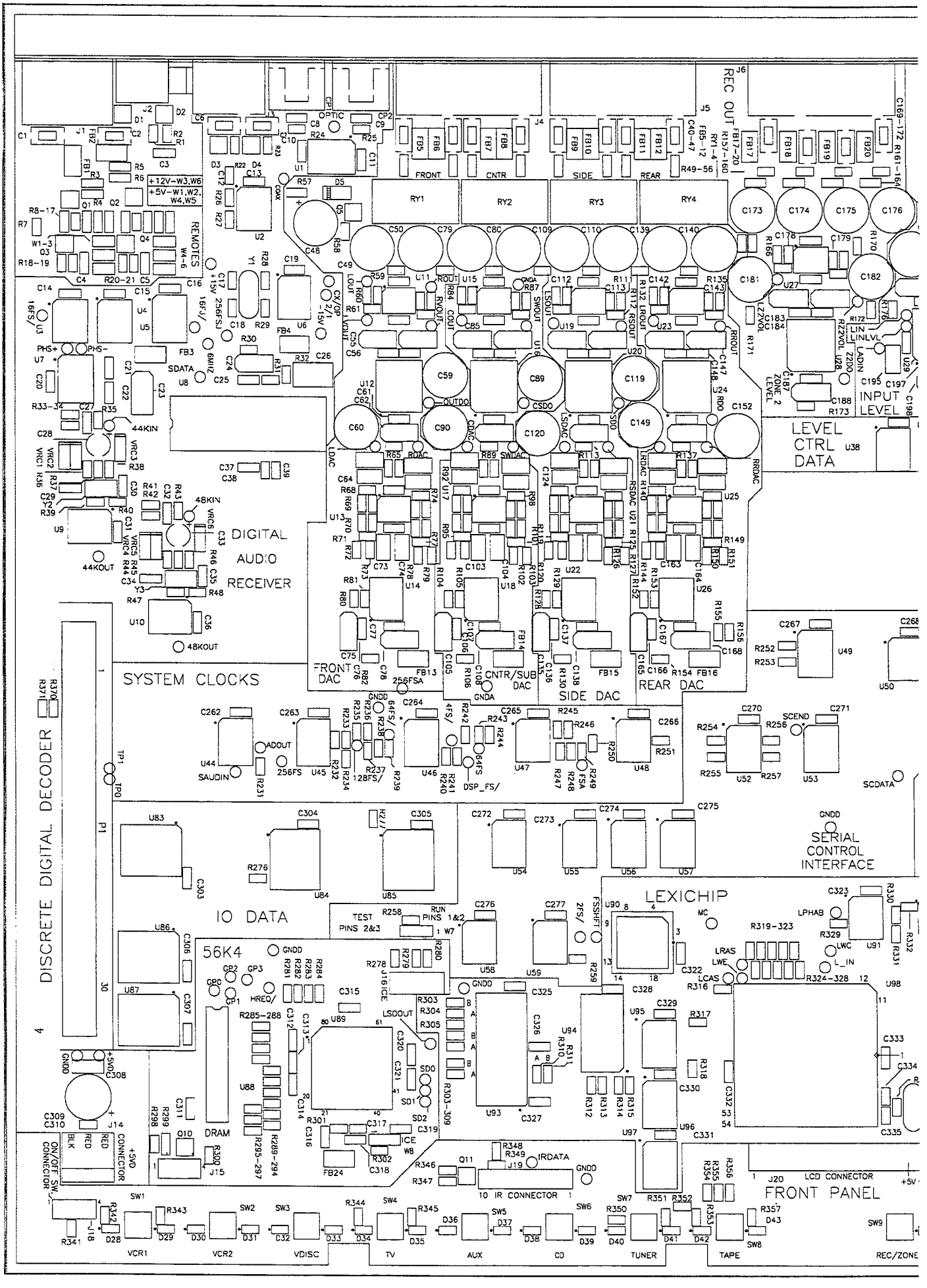
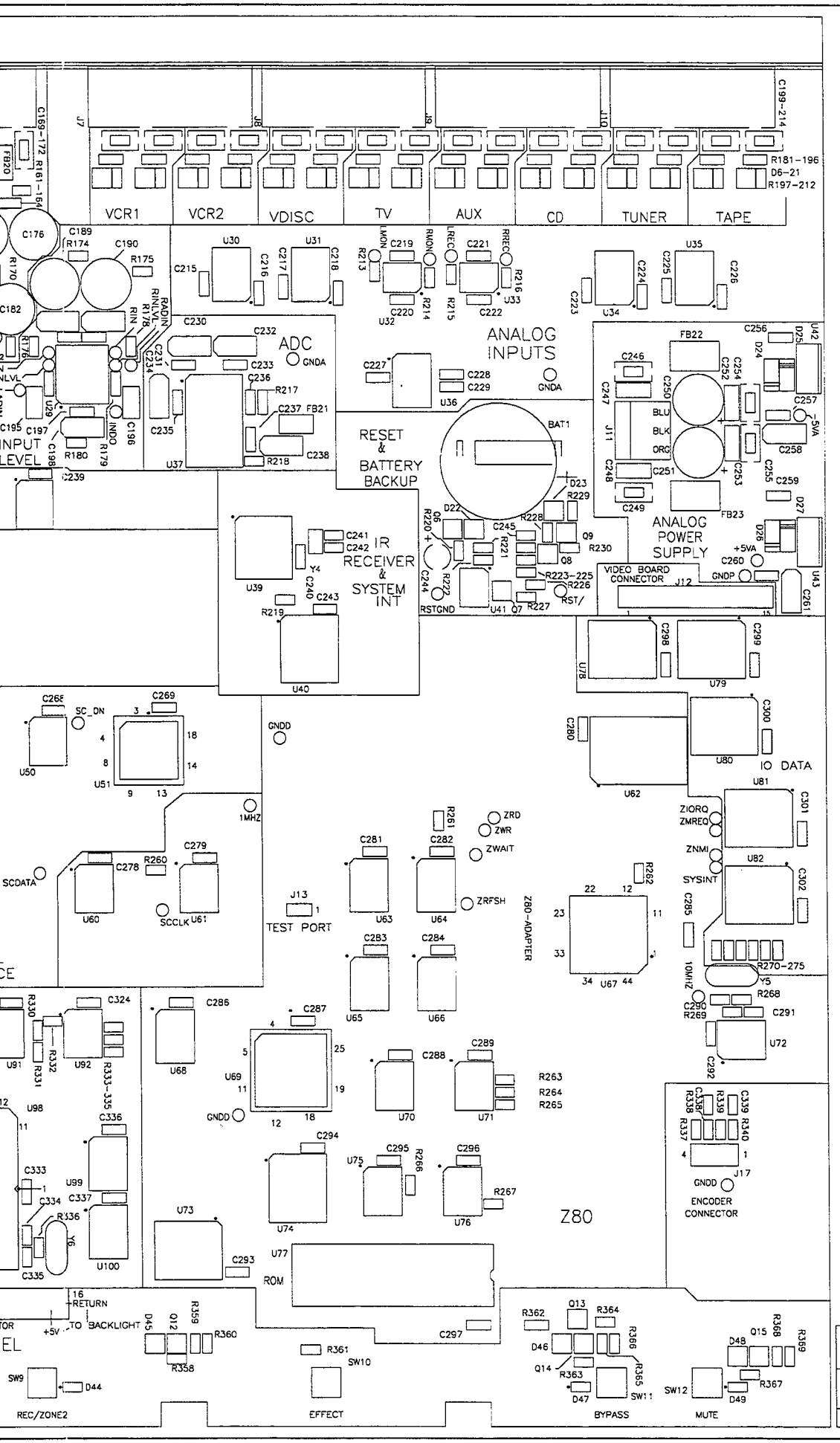
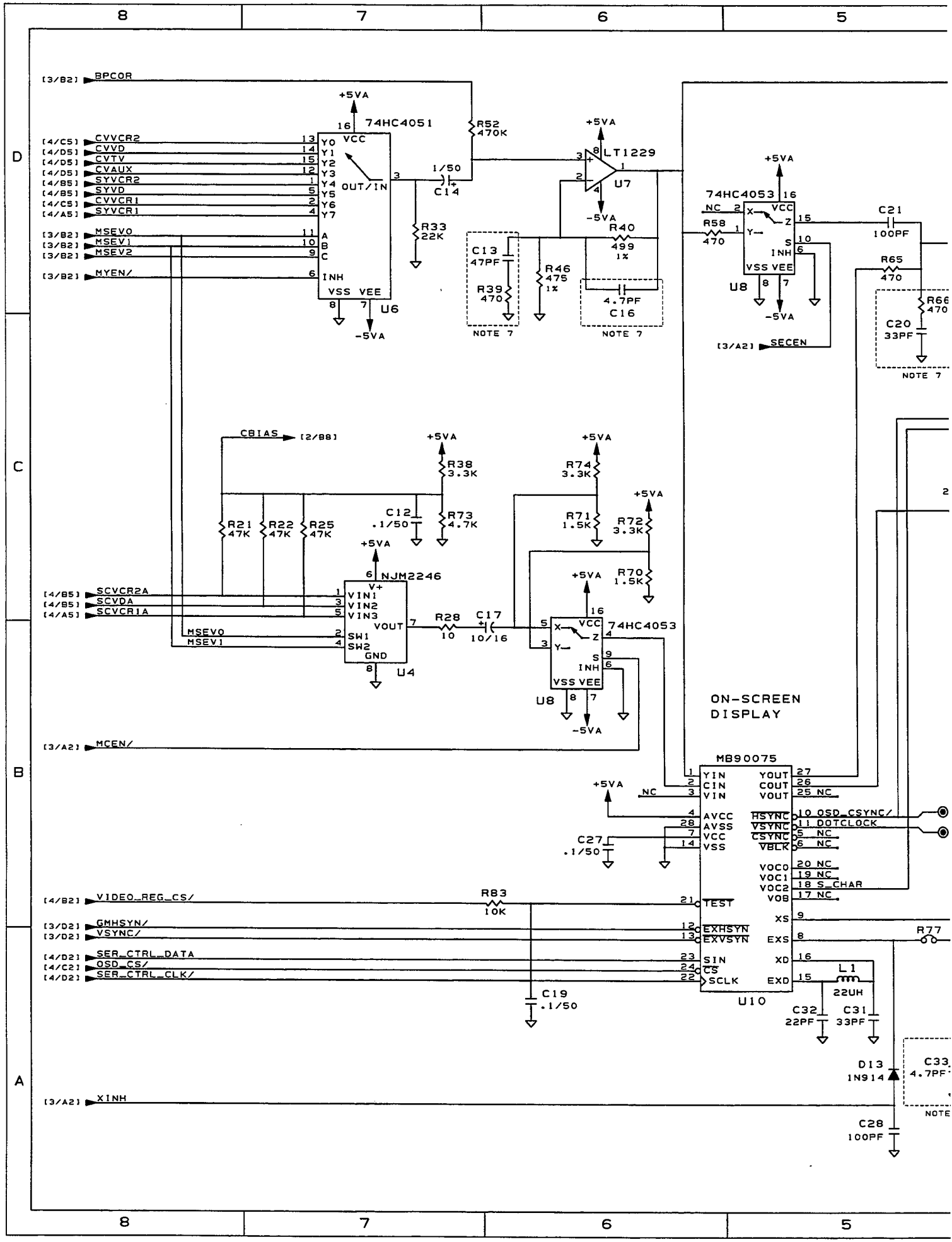
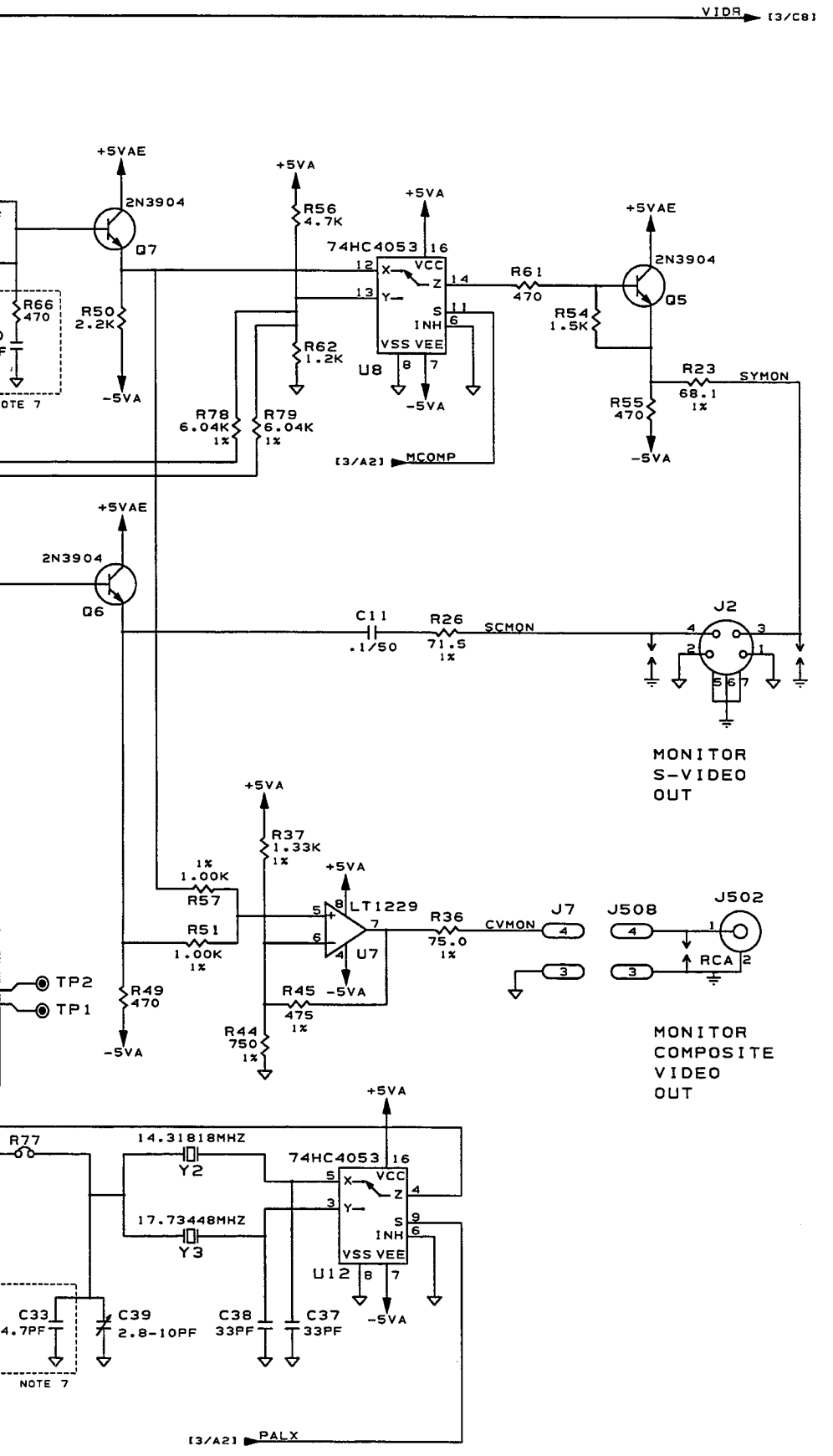

REC OUT
J6
J5
J4
FRONT
CNTR
SIDE
REAR
OPTIC
COAX
+12V-W3,W6
+5V-W1,W2,
W4,W5
REMOTES
W1-3
W4-6
RY1
RY2
RY3
RY4
LEVEL
CTRL
DATA
U38
INPUT
LEVEL
ZONE 2
LEVEL
DIGITAL
AUDIO
RECEIVER
44KIN
44KOUT
48KIN
48KOUT
SYSTEM CLOCKS
FRONT
DAC
CNTR/SUB
DAC
SIDE DAC
REAR DAC
DISCRETE DIGITAL DECODER
P1
IO DATA
56K4
DRAM
LEXICHIP
SERIAL
CONTROL
INTERFACE
SCDATA
ON/OFF SW
CONNECTOR
+5VD
CONNECTOR
10 IR CONNECTOR
LCD CONNECTOR
FRONT PANEL
VCR1
VCR2
VDISC
TV
AUX
CD
TUNER
TAPE
REC/ZONE



exicon

DC-1 MAIN BD COMPONENT LAYOUT	REV 4
SCALE N/A	SHEET 1 OF 1


8
7
6
5
D
C
B
A
[3/B2] BPCOR
+5VA
74HC4051
16 VCC
CVVCR2 13 Y0
CVVD 14 Y1
CVTV 15 Y2
CVAUX 12 Y3
SYVCR2 1 Y4
SYVD 5 Y5
CVVCR1 2 Y6
SYVCR1 4 Y7
MSEV0 11 A
MSEV1 10 B
MSEV2 9 C
MYEN/ 6 INH
VSS VEE
8 7
U6
-5VA
OUT/IN
3
R52 470K
1/50
C14
R33 22K
LT1229
U7
R40 499 1%
C13 47PF
R39 470
NOTE 7
R46 475 1%
4.7PF
C16
NOTE 7
74HC4053
U8
R58 470
C21 100PF
R65 470
R66 470
C20 33PF
NOTE 7
[3/A2] SECEN
CBIAS [2/B8]
R38 3.3K
R74 3.3K
R71 1.5K
R72 3.3K
R70 1.5K
R21 47K
R22 47K
R25 47K
C12 .1/50
R73 4.7K
NJM2246
[4/B5] SCVCR2A
[4/B5] SCVDA
[4/A5] SCVCR1A
MSEV0
MSEV1
VIN1
VIN2
VIN3
VOUT
SW1
SW2
GND
U4
R28 10
C17 10/16
ON-SCREEN
DISPLAY
[3/A2] MCEN/
MB90075
YIN
CIN
VIN
AVCC
AVSS
VCC
VSS
YOUT
COUT
VOUT
HSYNC
VSYNC
CSYNC
VBLK
VOC0
VOC1
VOC2
VOB
TEST
EXHSYN
EXVSYN
SIN
CS
SCLK
XS
EXS
XD
EXD
U10
C27 .1/50
[4/B2] VIDEO_REG_CS/
R83 10K
[3/D2] GMHSYN/
[3/D2] VSYNC/
[4/D2] SER_CTRL_DATA
[4/C2] OSD_CS/
[4/D2] SER_CTRL_CLK/
C19 .1/50
L1 22UH
C32 22PF
C31 33PF
D13 1N914
C28 100PF
R77
[3/A2] XINH



REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.
1	ADD R100 (SHEET 3) PER ECO 960126-01; UPDATE SIGNAL NAMES PER DCR 960314-00	CW 3/14/96 ECM 3/18/96	RWH 3/19/96 AF 3/19/96

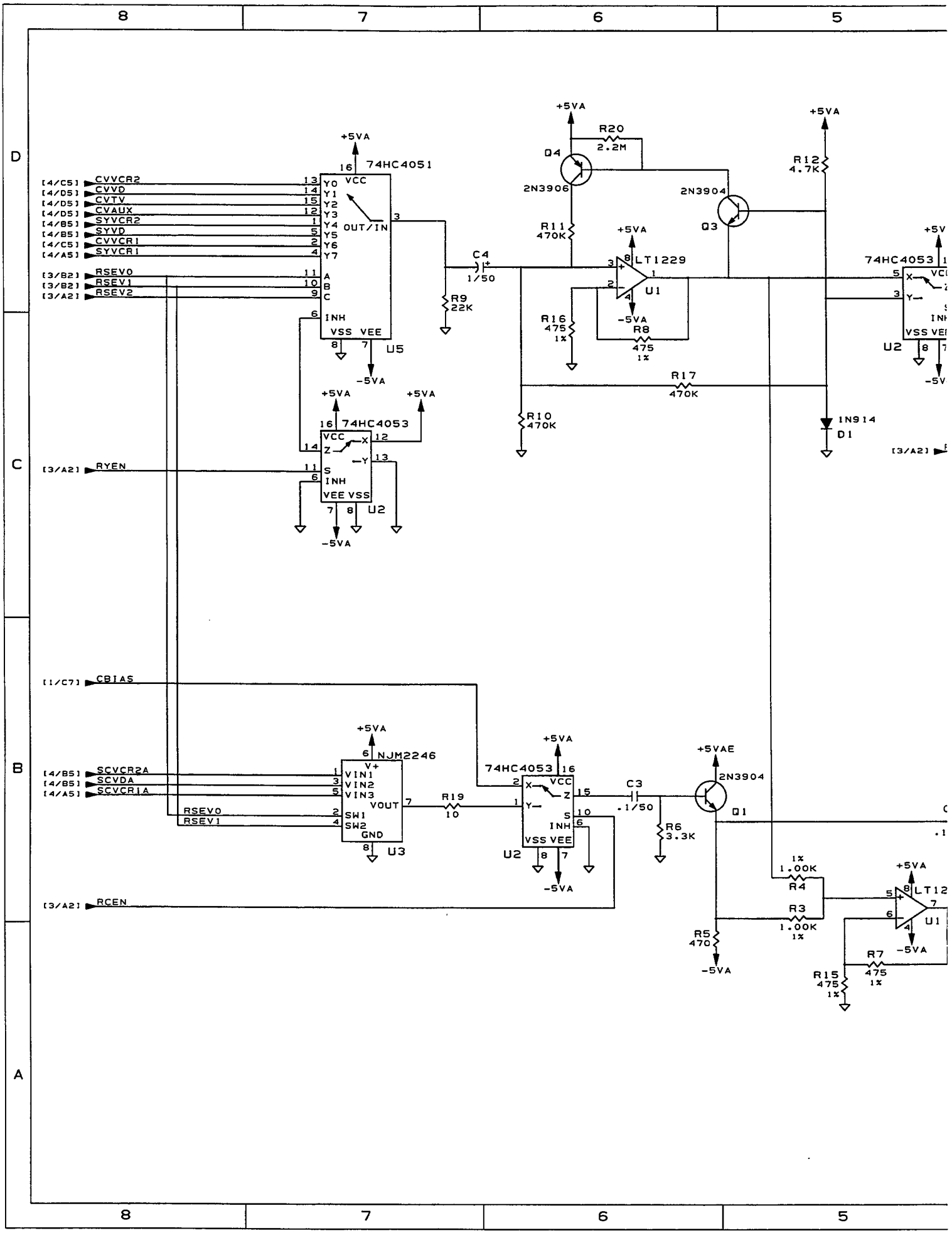
NOTES

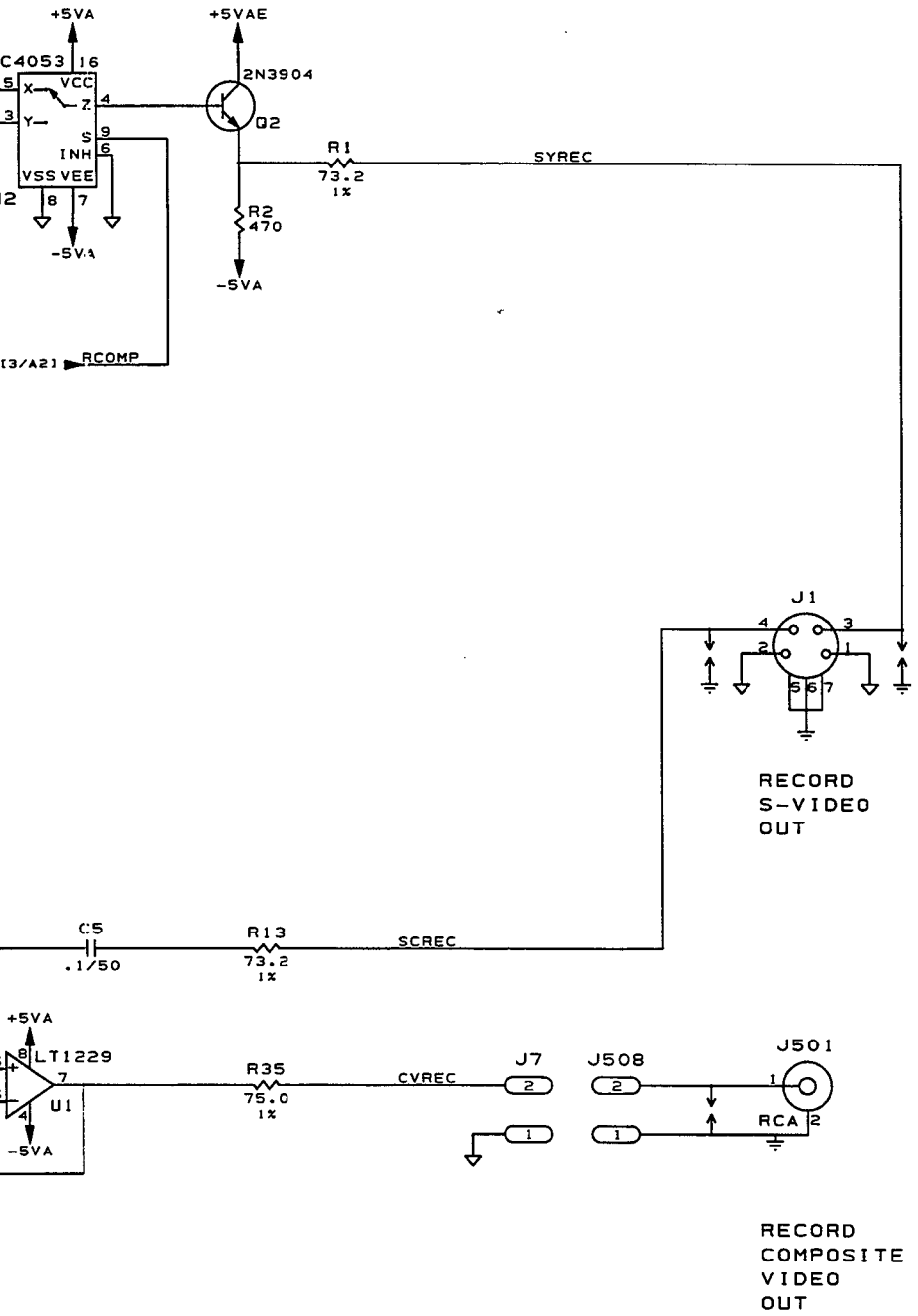
1. UNLESS OTHERWISE INDICATED, RESISTORS ARE 1/10W
2. UNLESS OTHERWISE INDICATED, RESISTORS ARE 5%
3. UNLESS OTHERWISE INDICATED, CAPACITORS ARE UF/V.
4. DIGITAL GROUND, ANALOG GROUND, CHASSIS GROUND
5. [XX/XX] DENOTES [SHEET NUMBER/SECTOR]
6. LAST REFERENCE DESIGNATORS USED ON VIDEO BOARD: C49, D14, FB2, J8, L1, Q7 R100, TP6, U15, Y3
7. NOT INSTALLED:
   C13, C16, C20, C33
   R39, R66

DOCUMENT CONTROL BLOCK: #060-10463	
SHEET NUMBER	REVISION NUMBER
1 OF 4	1
2 OF 4	1
3 OF 4	1
4 OF 4	1

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE: SCHEM, VIDEO BD, DC-1 MONITOR, OSD	
DRAWN CW	1/5/96		
CHECKED ECM	3/18/96	SIZE B / CODE / NUMBER 060-10463 / REV 1	
Q.C. RWH	3/19/96	FILE NAME 10463-1.1	SHEET 1 OF 4
ISSUED AF	3/19/96		

3-19-1996_11:09


8
7
6
5
D
C
B
A
74HC4051
U5
74HC4053
U2
NJM2246
U3
LT1229
U1
2N3906
Q4
2N3904
Q3
2N3904
Q1
IN914
D1
R20
2.2M
R12
4.7K
R11
470K
R16
475
1%
R8
475
1%
R17
470K
R10
470K
R9
22K
C4
1/50
C3
.1/50
R6
3.3K
R19
10
R4
1.00K
1%
R3
1.00K
1%
R5
470
R7
475
1%
R15
475
1%
+5VA
-5VA
+5VAE
CVVCR2
CVVD
CVTV
CVAUX
SYVCR2
SYVD
CVVCR1
SYVCR1
RSEV0
RSEV1
RSEV2
RYEN
CBIAS
SCVCR2A
SCVDA
SCVCR1A
RCEN

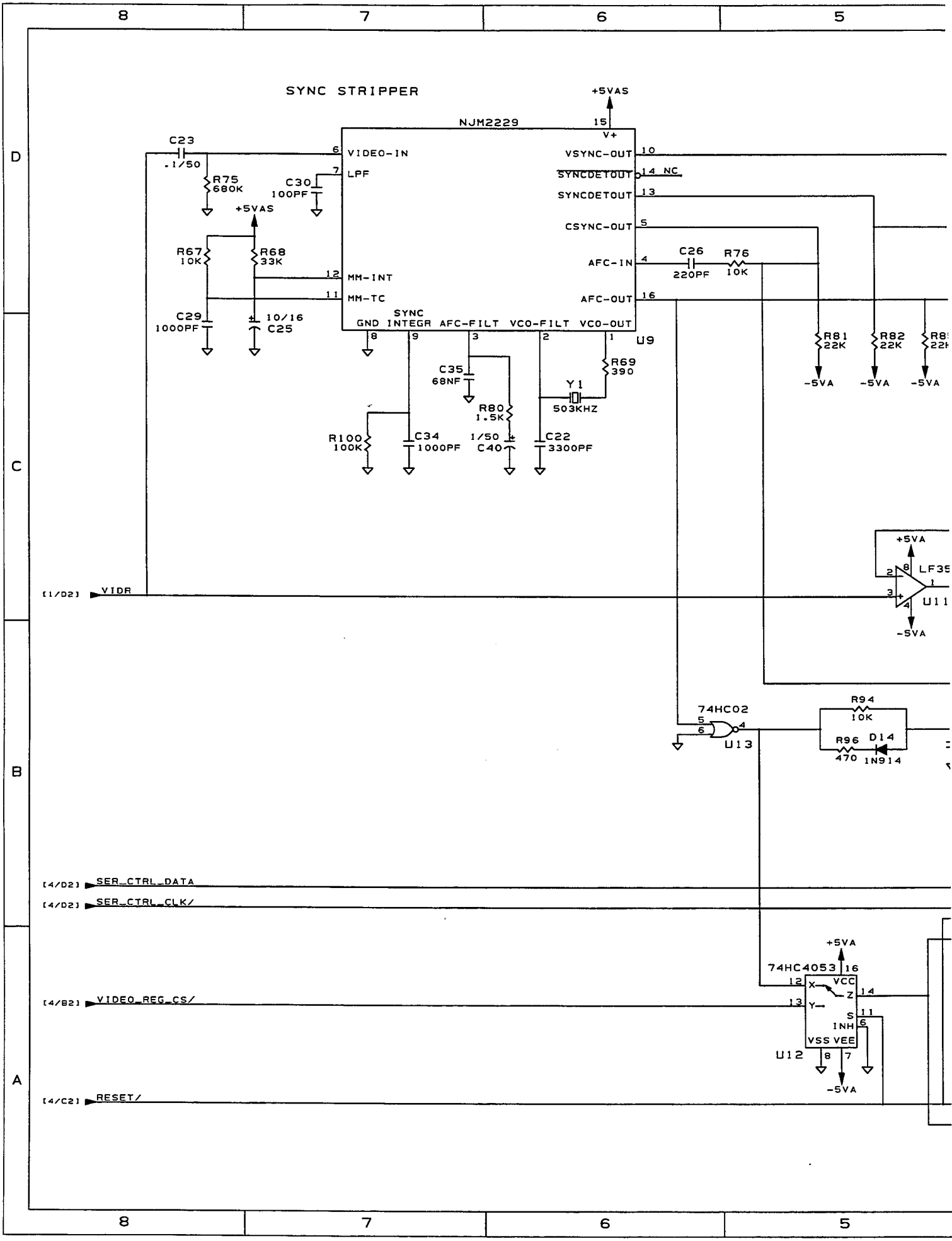


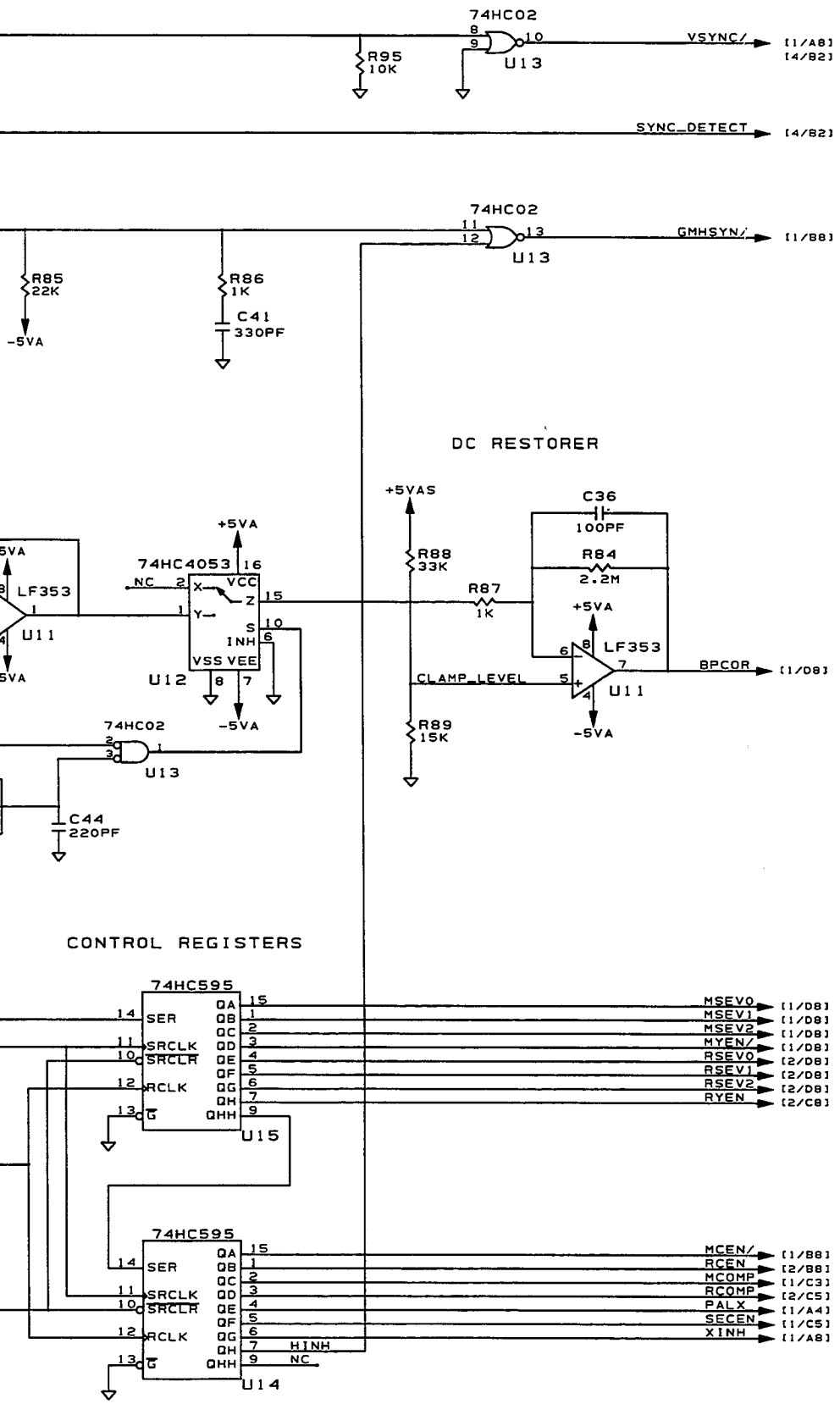
REVISIONS

REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.
1	UPDATE SIGNAL NAMES PER DCR 960314-00	CW 3/14/96 ECM 3/18/96	RWH 3/19/96 AF 3/19/96

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154	
APPROVALS	DATE	TITLE: SCHEM, VIDEO BD, DC-1 RECORD SELECT
DRAWN CW	1/5/96	
CHECKED ECM	3/18/96	SIZE B / CODE / NUMBER 060-10463 / REV 1
Q.C. RWH	3/19/96	FILE NAME 10463-1.2 / SHEET 2 OF 4
ISSUED AF	3/19/96	

3-19-1996 11:21

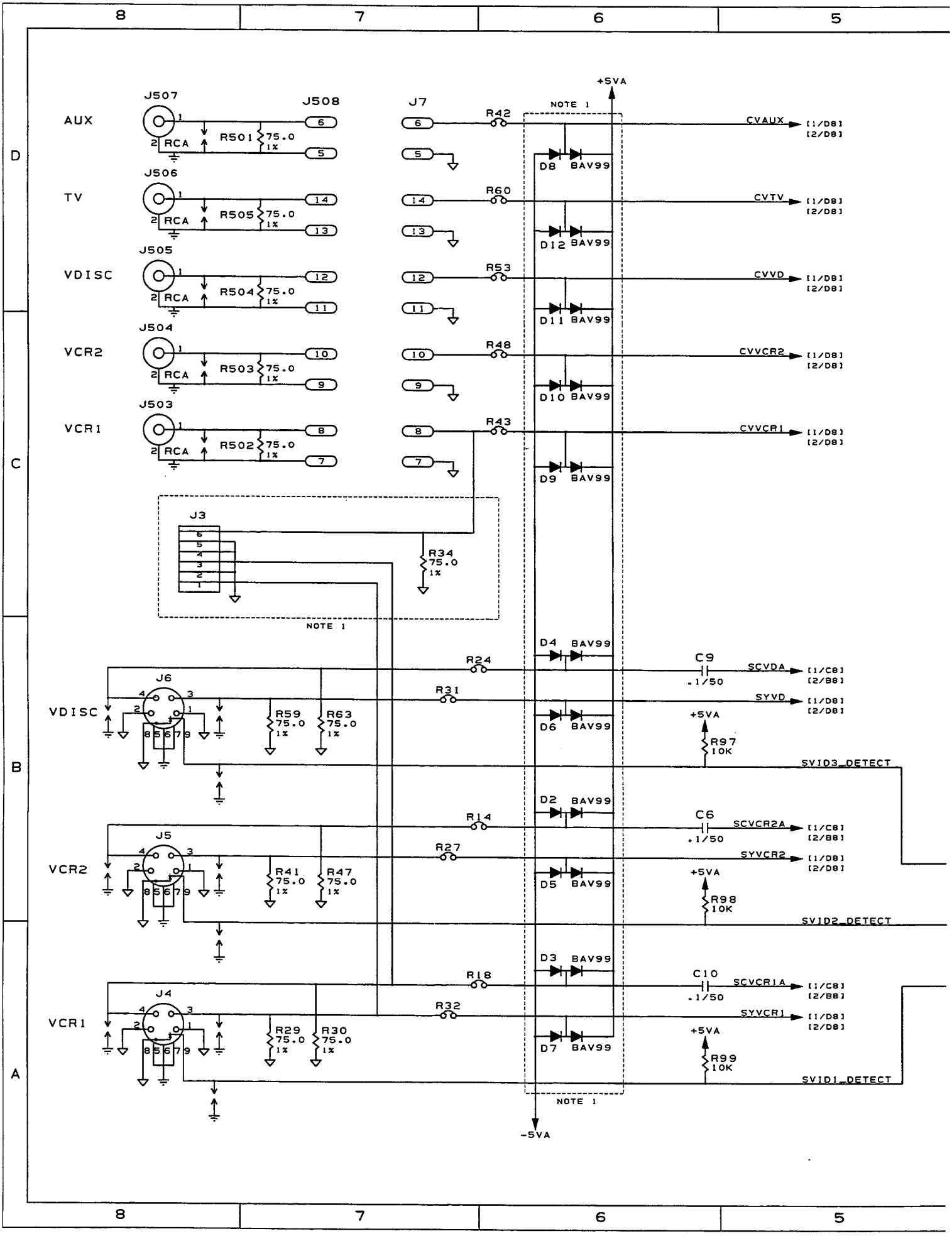

SYNC STRIPPER
NJM2229
+5VAS
V+
15
C23
.1/50
6
VIDEO-IN
7
LPF
R75
680K
C30
100PF
+5VAS
R67
10K
R68
33K
12
MM-INT
11
MM-TC
C29
1000PF
10/16
C25
SYNC
GND INTEGR AFC-FILT VCO-FILT VCO-OUT
8
9
3
2
1
U9
VSYNC-OUT
10
SYNCDETOUT
14 NC
SYNCDETOUT
13
CSYNC-OUT
5
AFC-IN
4
C26
220PF
R76
10K
AFC-OUT
16
R81
22K
R82
22K
-5VA
-5VA
-5VA
C35
68NF
R80
1.5K
Y1
503KHZ
R69
390
R100
100K
C34
1000PF
1/50
C40
C22
3300PF
[1/D2]
VIDR
+5VA
LF35
U11
-5VA
74HC02
5
6
4
U13
R94
10K
R96
470
D14
1N914
[4/D2]
SER_CTRL_DATA
[4/D2]
SER_CTRL_CLK/
+5VA
74HC4053
16
VCC
12
X
Z
14
13
Y
S
11
INH
6
VSS VEE
U12
8
7
-5VA
[4/B2]
VIDEO_REG_CS/
[4/C2]
RESET/

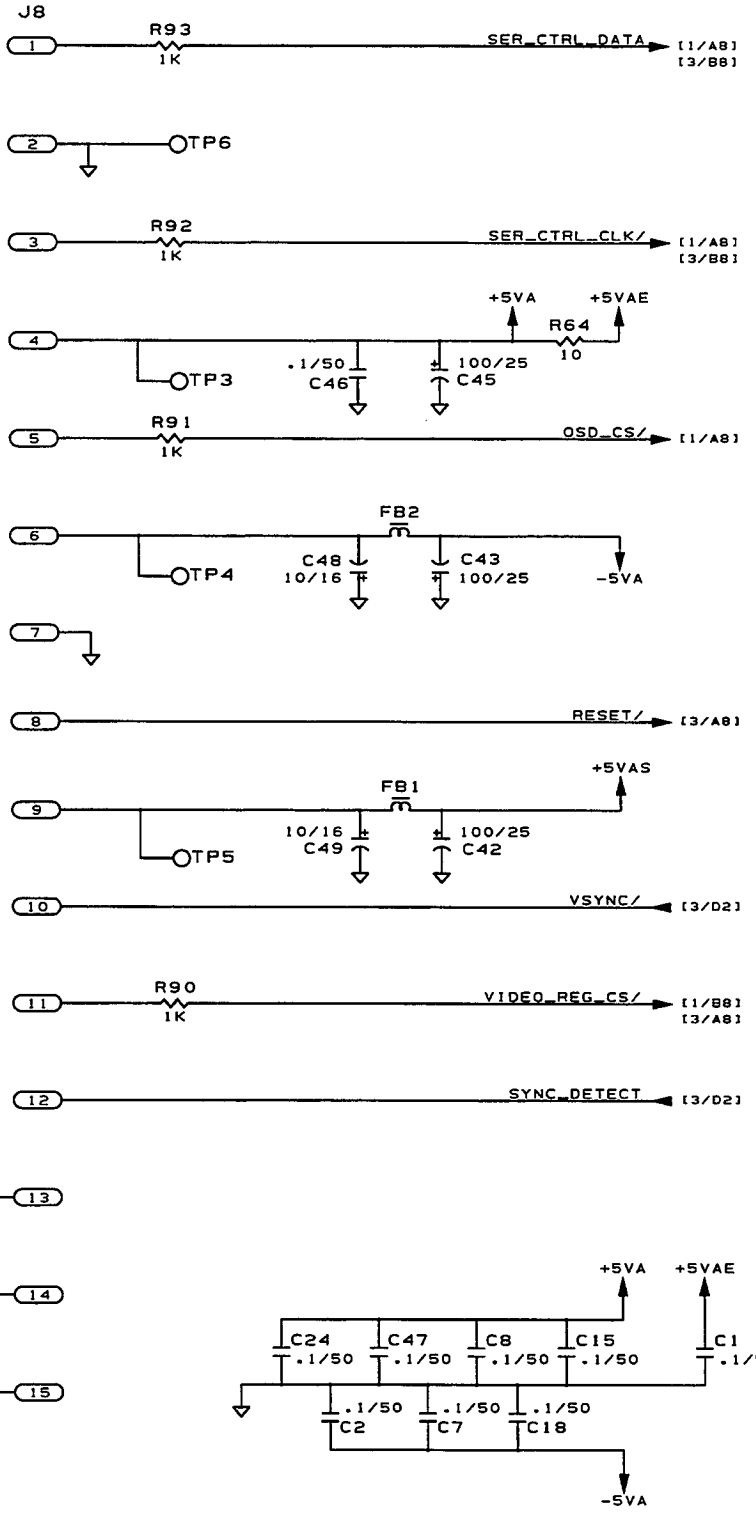


REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.
1	ADD R100 PER ECO 960126-01; UPDATE SIGNAL NAMES PER DCR 960314-00	CW 3/14/96 ECM 3/18/96	RWH 3/19/96 AF 3/19/96

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE	SCHEM, VIDEO BD, DC-1 SYNC, CONTROL REGS
DRAWN CW	1/5/96		
CHECKED ECM	3/18/96	SIZE B / CODE / NUMBER 060-10463 / REV 1	
Q.C. RWH	3/19/96	FILE NAME 10463-1.3	SHEET 3 OF 4
ISSUED AF	3/19/96		

3-19-1996_11:23


8
7
6
5
D
C
B
A
AUX
TV
VDISC
VCR2
VCR1
J507
J508
J506
J505
J504
J503
J7
J3
J6
J5
J4
RCA
R501 75.0 1%
R505 75.0 1%
R504 75.0 1%
R503 75.0 1%
R502 75.0 1%
R34 75.0 1%
R59 75.0 1%
R63 75.0 1%
R41 75.0 1%
R47 75.0 1%
R29 75.0 1%
R30 75.0 1%
+5VA
-5VA
NOTE 1
R42
R60
R53
R48
R43
R24
R31
R14
R27
R18
R32
D8 BAV99
D12 BAV99
D11 BAV99
D10 BAV99
D9 BAV99
D4 BAV99
D6 BAV99
D2 BAV99
D5 BAV99
D3 BAV99
D7 BAV99
C9 .1/50
C6 .1/50
C10 .1/50
R97 10K
R98 10K
R99 10K
CVAUX
CVTV
CVVD
CVVCR2
CVVCR1
SCVDA
SYVD
SCVCR2A
SYVCR2
SCVCR1A
SYVCR1
SVID3_DETECT
SVID2_DETECT
SVID1_DETECT
[1/D8]
[2/D8]
[1/C8]
[2/B8]



MAIN BOARD CONNECTOR

BYPASS CAPACITORS

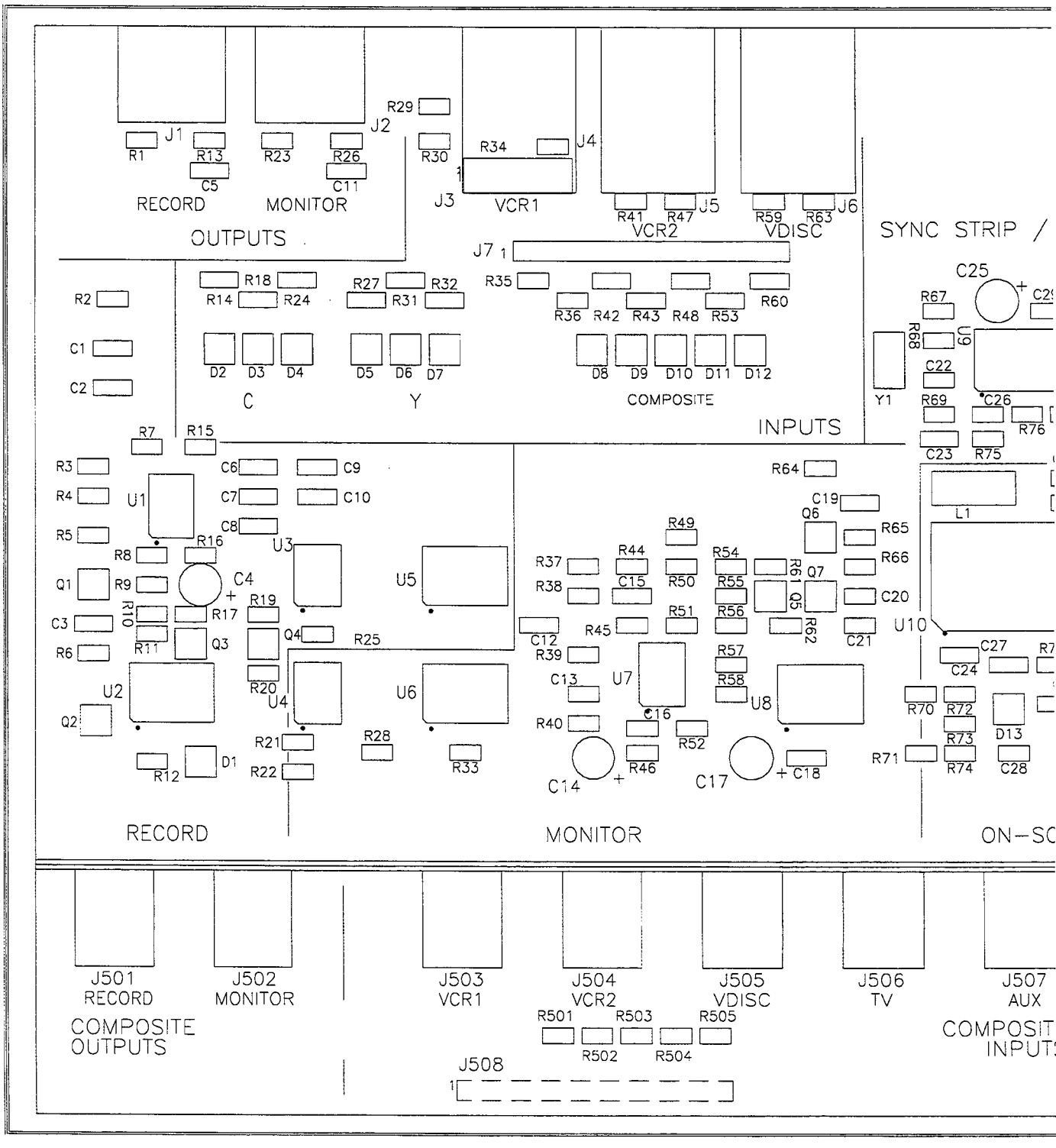
REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.
1	UPDATE SIGNAL NAMES PER DCR 960314-00	CW 3/14/96 ECM 3/18/96	RWH 3/19/96 AF 3/19/96

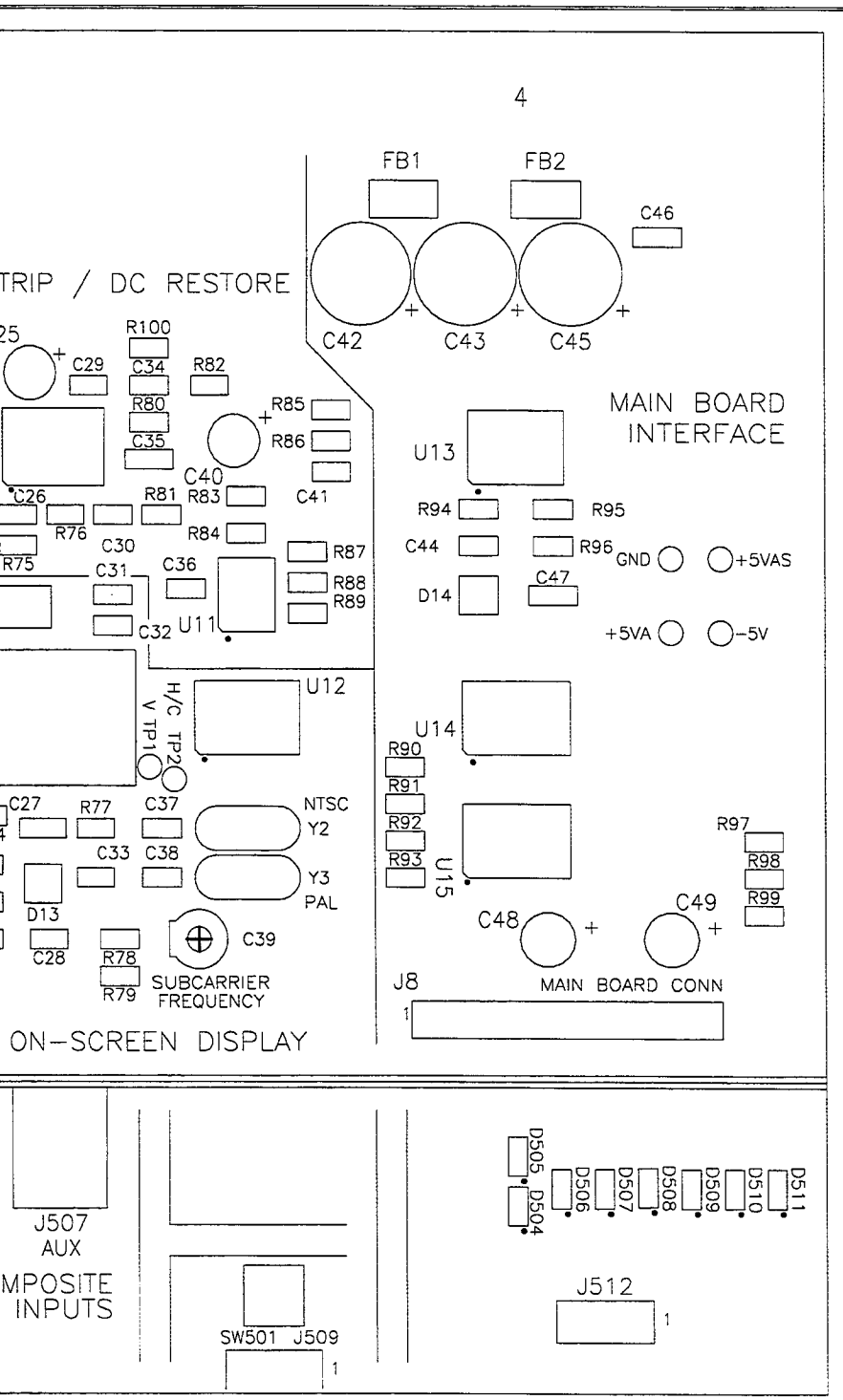
NOTES

1 NOT INSTALLED:
D2-D12
J3, R34

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154	
APPROVALS	DATE	TITLE: SCHEM, VIDEO BD, DC-1 INPUTS, MAIN BD CONN
DRAWN CW	1/5/96	
CHECKED ECM	3/18/96	SIZE B; CODE; NUMBER 060-10463; REV 1
Q.C. RWH	3/19/96	FILE NAME 10463-1.4; SHEET 4 OF 4
ISSUED AF	3/19/96	

3-19-1996-12:25

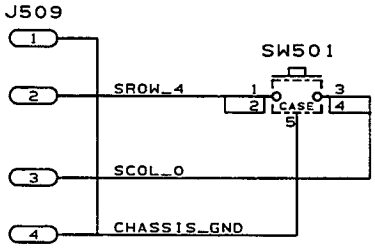

J1
J2
J3
J4
J5
J6
J7
R29
R34
R1
R13
R23
R26
R30
R41
R47
R59
R63
C5
C11
RECORD
MONITOR
VCR1
VCR2
VDISC
OUTPUTS
SYNC STRIP /
R2
C1
C2
R18
R14
R24
R27
R32
R31
R35
R36
R42
R43
R48
R53
R60
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
C
Y
COMPOSITE
INPUTS
C25
R67
R68
U9
C22
Y1
R69
C26
R76
C23
R75
R7
R15
R3
R4
R5
C6
C7
C8
C9
C10
U1
U3
U5
R16
R8
R9
R10
R11
C4
R19
R17
Q1
Q3
Q4
C3
R6
R25
U2
U4
U6
Q2
R20
R21
R22
R28
R33
R12
D1
R64
C19
Q6
R65
L1
R49
R44
R54
R61
Q7
R37
R38
R50
R55
R66
C15
C20
R51
R56
R62
C21
U10
R45
C12
R39
C13
U7
U8
R57
R58
C16
R40
R52
R46
C14
C17
C18
C27
C24
R70
R72
R73
D13
R71
R74
C28
MONITOR
ON–SC
J501
RECORD
J502
MONITOR
J503
VCR1
J504
VCR2
J505
VDISC
J506
TV
J507
AUX
COMPOSITE
OUTPUTS
R501
R503
R505
R502
R504
J508
COMPOSIT
INPUT



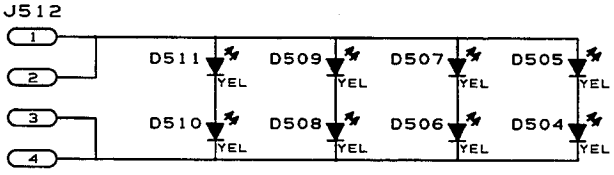
lexicon

DC-1 VIDEO/RCA/SW/LED BDS COMPONENT LAYOUT	REV 4
SCALE N/A	SHEET 1 OF 1

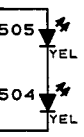
ON/OFF SWITCH BOARD



LOGO LED BOARD



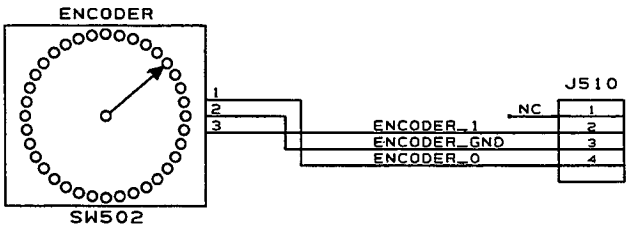
REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.



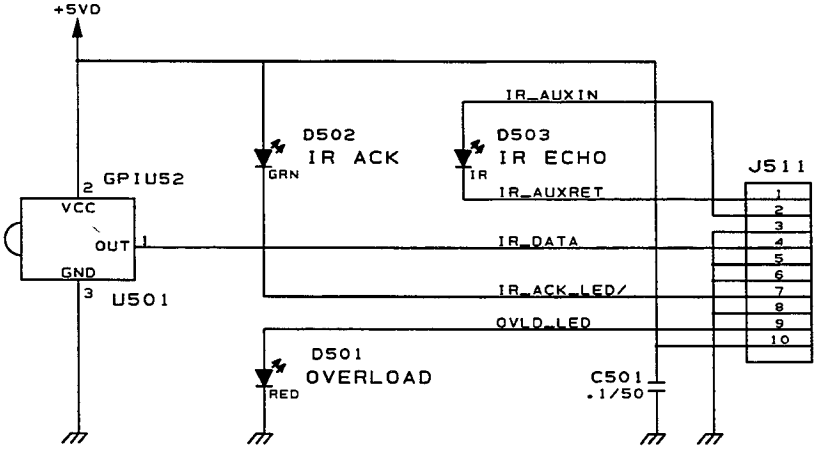
CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154		
APPROVALS	DATE	TITLE	
DRAWN CW	1/5/96	SCHEM, SW/LED BD, DC-1	
CHECKED ECM	3/18/96	SIZE B / CODE / NUMBER 060-10465 / REV O	
Q.C. RWH	3/19/96	FILE NAME 10463-1.5	SHEET 1 OF 1
ISSUED AF	3/19/96		

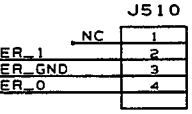
3-19-1996 11:34

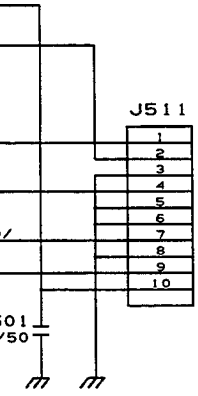
ROTARY ENCODER BOARD



IR REMOTE RECEIVER BOARD







REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.

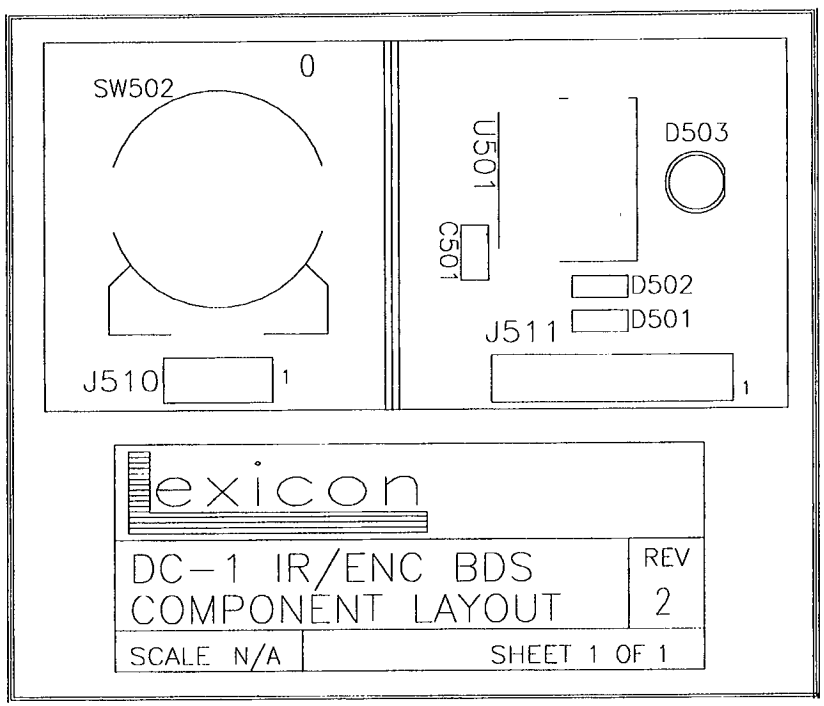
NOTES

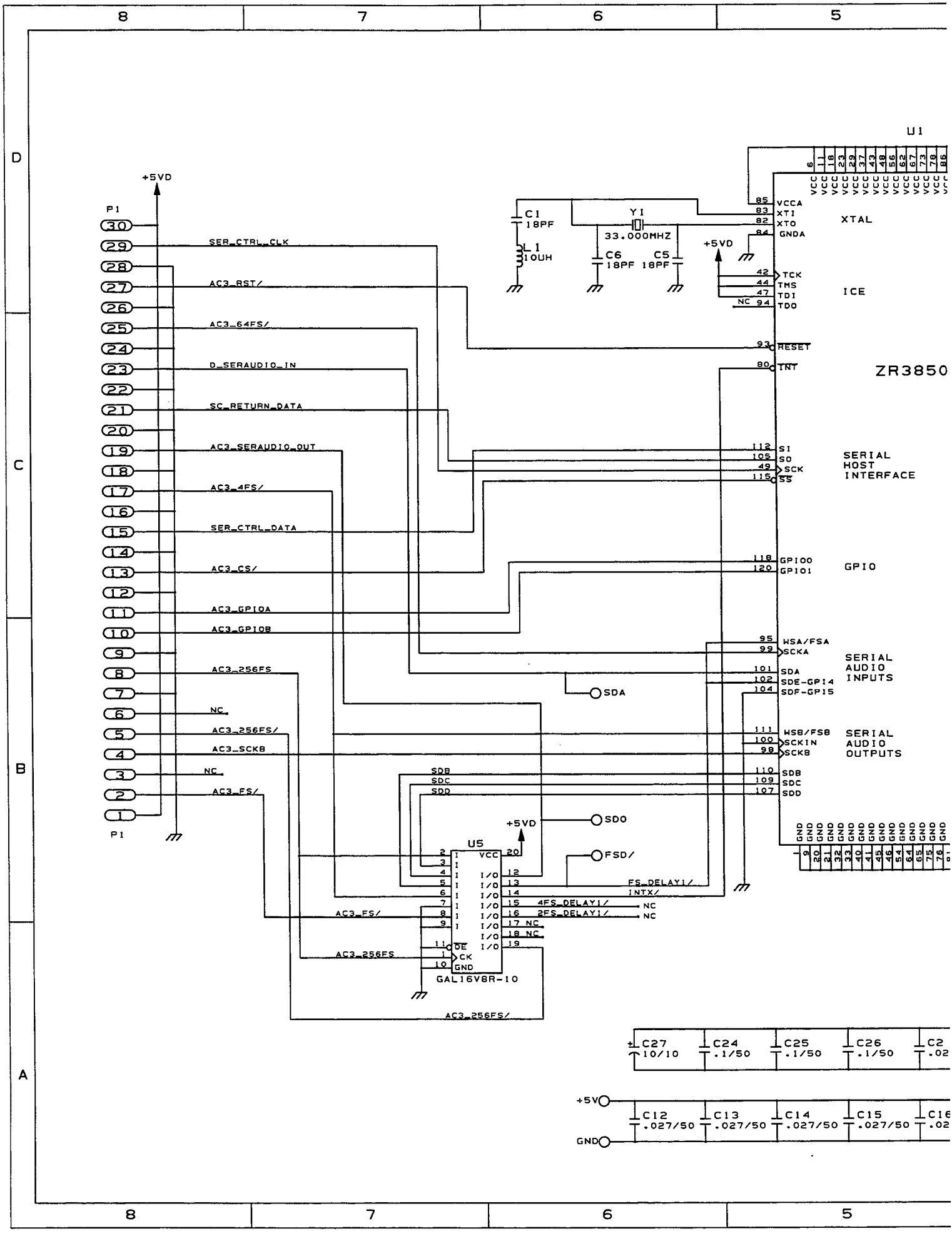
1 UNLESS OTHERWISE INDICATED, CAPACITORS ARE UF/V.

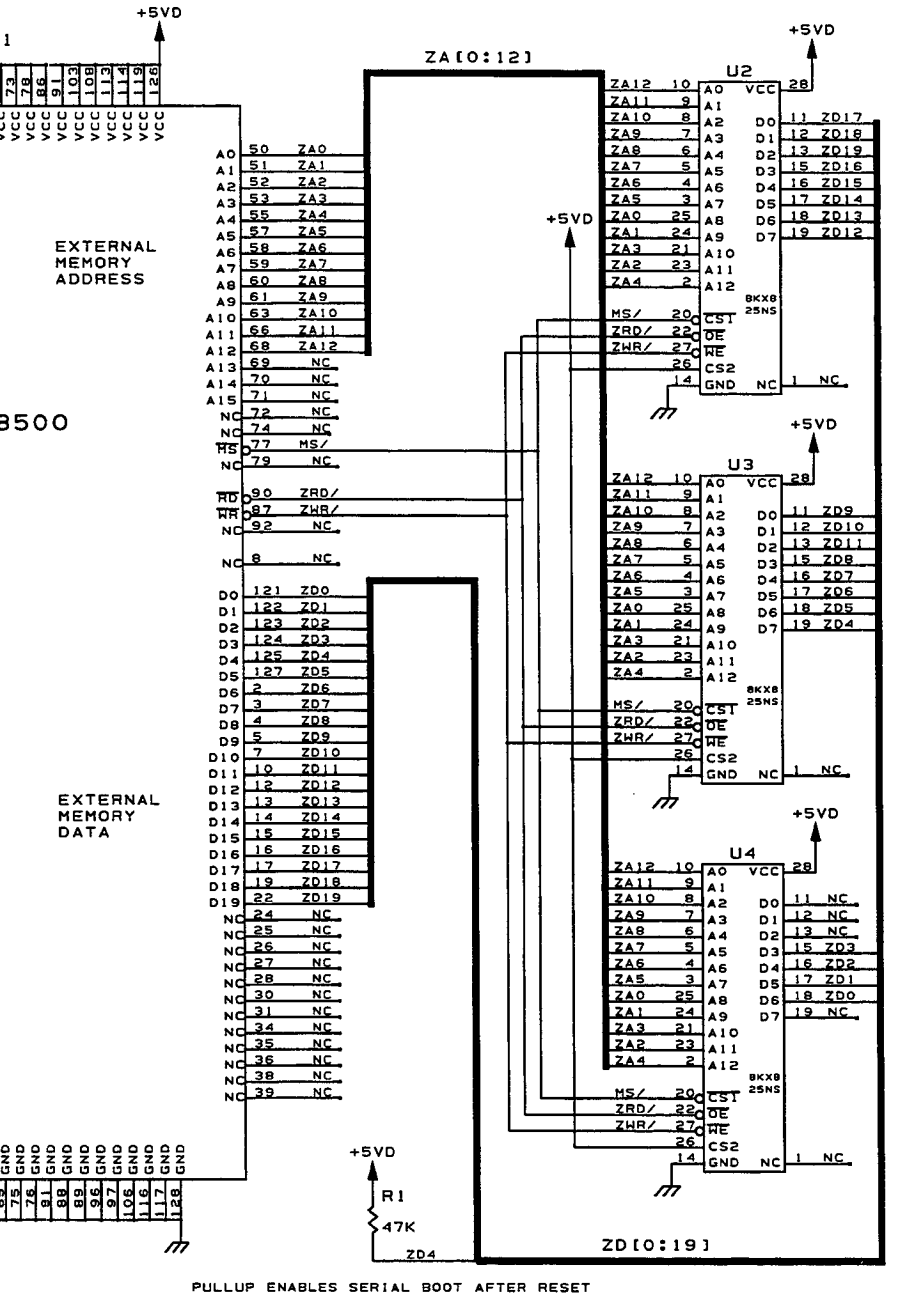
2 DIGITAL GROUND ANALOG GROUND CHASSIS GROUND

CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154			
APPROVALS	DATE	TITLE		
DRAWN CW	1/5/96	SCHEM, IR/ENC BDs, DC-1		
CHECKED ECM	3/18/96	SIZE B	CODE	NUMBER 060-11273 REV O
Q.C. RWH	3/19/96	FILE NAME 11273-0.1		SHEET 1 OF 1
ISSUED AF	3/19/96			

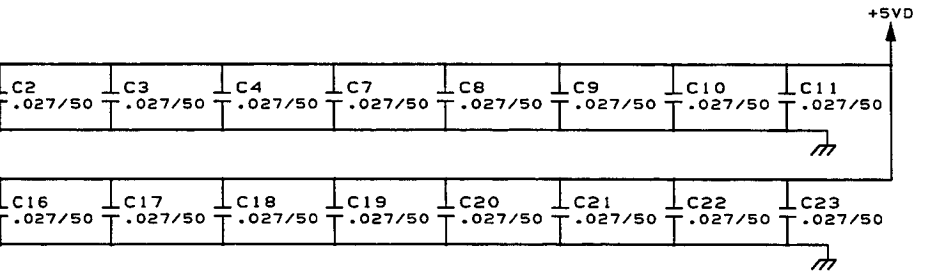
3-19-1996 11:49


SW502
0
U501
C501
D503
D502
D501
J511
1
J510
1
lexicon
DC-1 IR/ENC BDS
COMPONENT LAYOUT
REV
2
SCALE N/A
SHEET 1 OF 1


U1
ZR3850
XTAL
ICE
SERIAL HOST INTERFACE
GPIO
SERIAL AUDIO INPUTS
SERIAL AUDIO OUTPUTS
P1
U5
GAL16V8R-10
+5VD
SER_CTRL_CLK
AC3_RST/
AC3_64FS/
D_SERAUDIO_IN
SC_RETURN_DATA
AC3_SERAUDIO_OUT
AC3_4FS/
SER_CTRL_DATA
AC3_CS/
AC3_GPIOA
AC3_GPIOB
AC3_256FS
NC
AC3_256FS/
AC3_SCKB
NC
AC3_FS/
SDA
SDO
FSD/
SDB
SDC
SDD
INTX/
AC3_FS/
AC3_256FS
AC3_256FS/
C1 18PF
L1 10UH
Y1 33.000MHZ
C6 18PF
C5 18PF
C27 10/10
C24 .1/50
C25 .1/50
C26 .1/50
C12 .027/50
C13 .027/50
C14 .027/50
C15 .027/50
GND



PULLUP ENABLES SERIAL BOOT AFTER RESET



REVISIONS			
REV	DESCRIPTION	DRAFTER CHECKER	Q.C. AUTH.
1	CORRECT Y1 VALUE PER DCR 961122-04	CW 12/20/96 ECM 12/23/96	RWH 12/20/96 AF 12/20/96

NOTES:

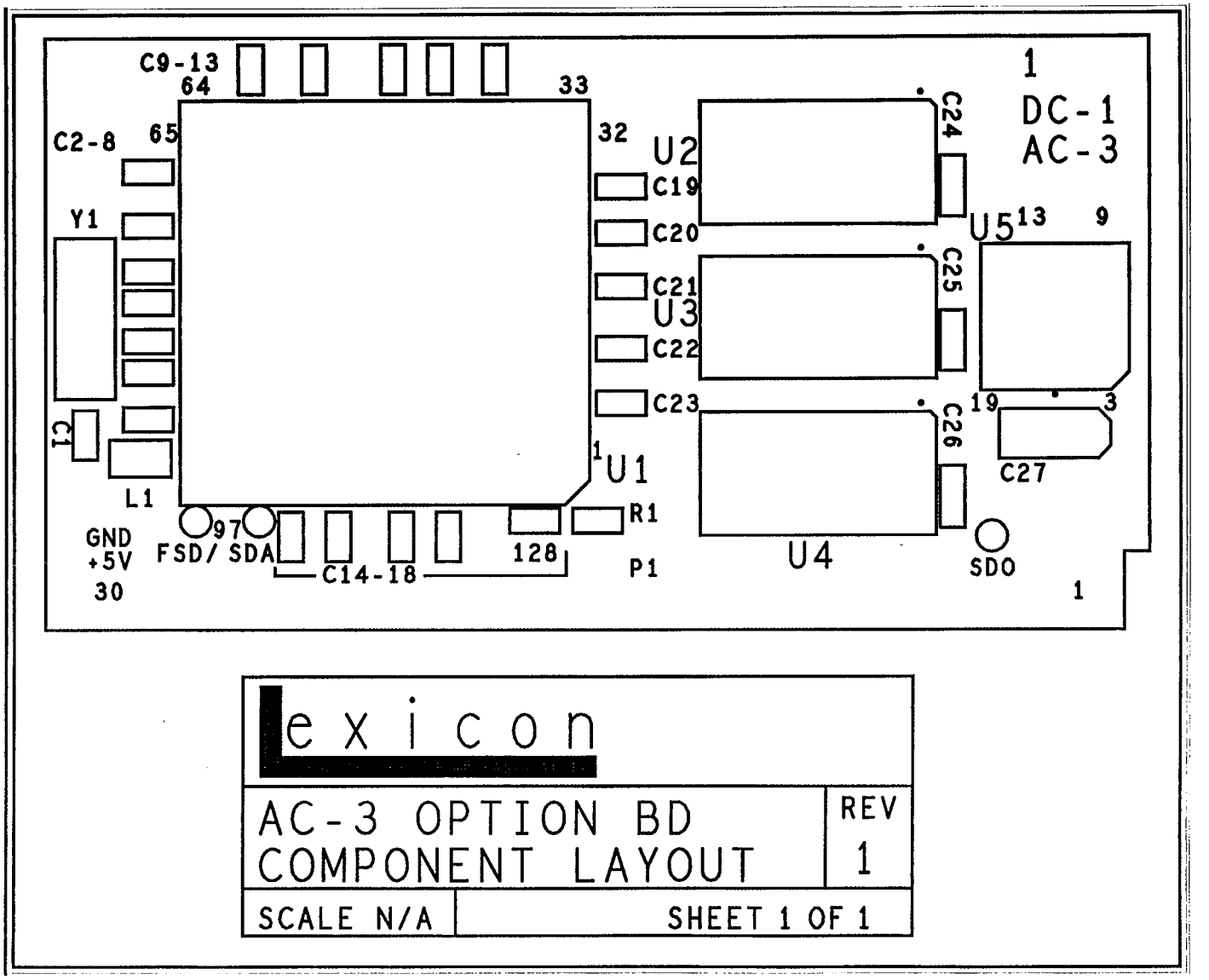
1 UNLESS OTHERWISE INDICATED, CAPACITORS ARE uF/V.

2 DIGITAL GROUND ANALOG GROUND CHASSIS GROUND

3 LAST REFERENCE DESIGNATORS USED: C27, L1, P1, R1, U5, Y1

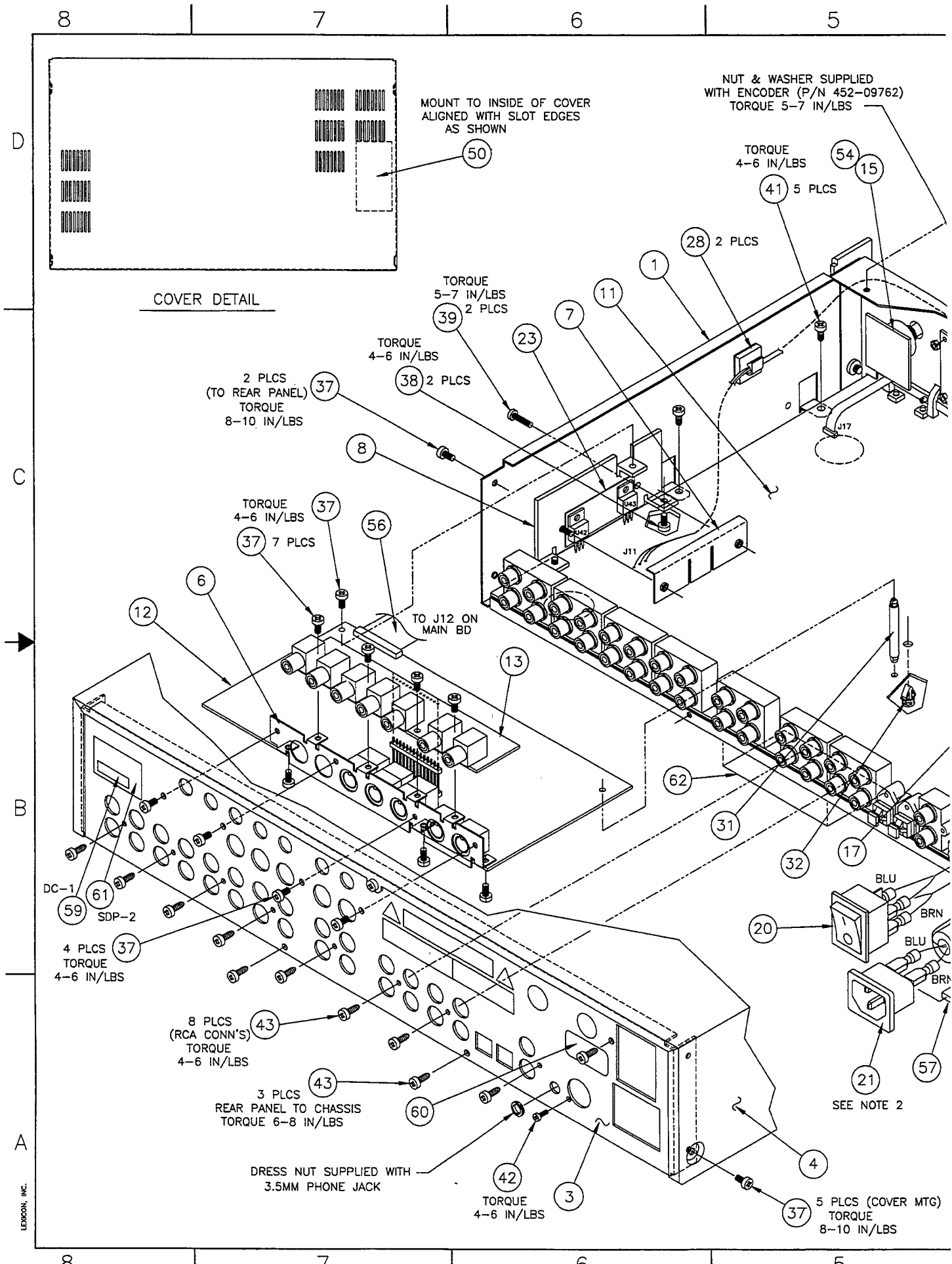
CONTRACT NO.	Lexicon 100 BEAVER STREET, WALTHAM, MA 02154			
APPROVALS	DATE	TITLE		
DRAWN RWH	6/13/96	SCHEM, DAUGHTER BD, AC-3		
CHECKED KB	6/14/96	SIZE B	CODE	NUMBER 060-11248 REV 1
Q.C. CW	6/14/96	FILE NAME 11248-1.1		SHEET 1 OF 1
ISSUED AF	6/14/96			

12-24-1996_9:59

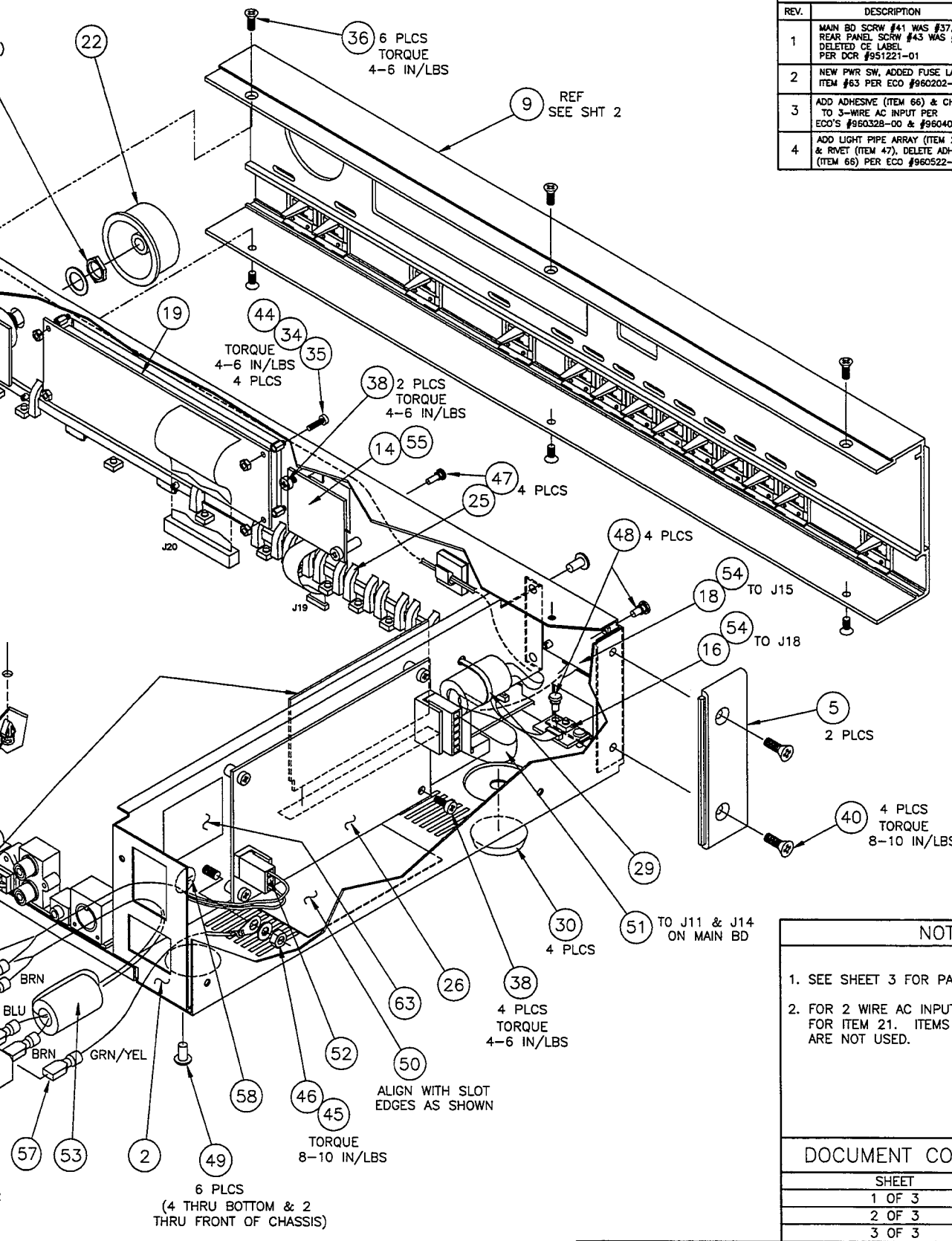


Lexicon

AC-3 OPTION BD COMPONENT LAYOUT	REV 1
SCALE N/A	SHEET 1 OF 1


COVER DETAIL
MOUNT TO INSIDE OF COVER ALIGNED WITH SLOT EDGES AS SHOWN
50
NUT & WASHER SUPPLIED WITH ENCODER (P/N 452-09762) TORQUE 5-7 IN/LBS
TORQUE 4-6 IN/LBS
54
15
41 5 PLCS
28 2 PLCS
1
11
7
23
TORQUE 5-7 IN/LBS
39 2 PLCS
TORQUE 4-6 IN/LBS
38 2 PLCS
2 PLCS (TO REAR PANEL) TORQUE 8-10 IN/LBS
37
8
J17
J43
J42
J11
TORQUE 4-6 IN/LBS
37
37 7 PLCS
56
TO J12 ON MAIN BD
6
12
13
62
31
32
17
BLU
BRN
BLU
BRN
20
DC-1
59
61
SDP-2
4 PLCS TORQUE 4-6 IN/LBS
37
8 PLCS (RCA CONN'S) TORQUE 4-6 IN/LBS
43
3 PLCS REAR PANEL TO CHASSIS TORQUE 6-8 IN/LBS
43
60
21
SEE NOTE 2
57
DRESS NUT SUPPLIED WITH 3.5MM PHONE JACK
42
TORQUE 4-6 IN/LBS
3
4
37
5 PLCS (COVER MTG) TORQUE 8-10 IN/LBS
LEXICON, INC.

REVISIONS			
REV.	DESCRIPTION	DWR/CHKD	Q.C./AUTH
1	MAIN BD SCRW #41 WAS #37, REAR PANEL SCRW #43 WAS #37, DELETED CE LABEL PER DCR #951221-01	AN 12/21/95 MK 12/21/95	CW 1/16/96 AF 1/16/96
2	NEW PWR SW, ADDED FUSE LABEL ITEM #63 PER ECO #960202-00	AN 2/12/96 MK 2/22/96	CW 2/23/96 AF 2/23/96
3	ADD ADHESIVE (ITEM 66) & CHANGE TO 3-WIRE AC INPUT PER ECO'S #960328-00 & #960408-00	AN 4/11/96 MK 5/8/96	CW 5/9/96 AF 5/9/96
4	ADD LIGHT PIPE ARRAY (ITEM 25) & RIVET (ITEM 47), DELETE ADHESIVE (ITEM 66) PER ECO #960522-00	AN 5/31/96 MK 5/31/96	CW 6/3/96 AF 6/3/96



NOTES

1. SEE SHEET 3 FOR PARTS LIST.
2. FOR 2 WIRE AC INPUT USE P/N 490-11397 FOR ITEM 21. ITEMS 45, 46, 57 & 58 ARE NOT USED.

DOCUMENT CONTROL BLOCK

SHEET	REV.
1 OF 3	4
2 OF 3	1
3 OF 3	4

	SDP-2
	DC-1
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
DECIMALS: .XX ±.010 .XXX ±.005 ANGLES: ±1/2°
MATERIAL
FINISH
DO NOT SCALE DRAWING

ACAD REL 13 FILE NAME 10483-41

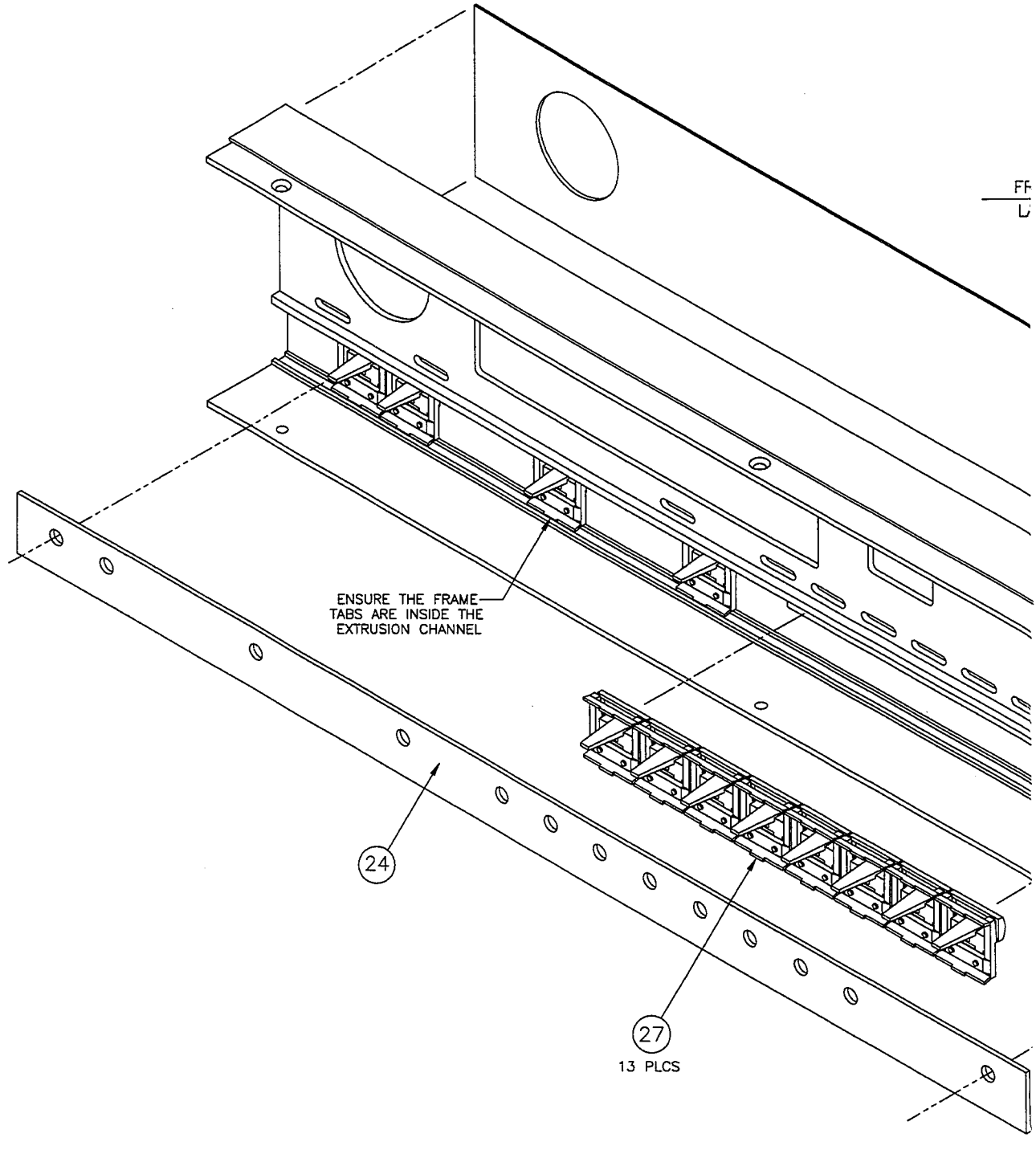
APPROVALS		DATE
DRAWN	AN	5/25/95
CHECKED	MK	11/21/95
Q.C.	CW	11/22/95
ISSUED	AF	11/22/95

Lexicon

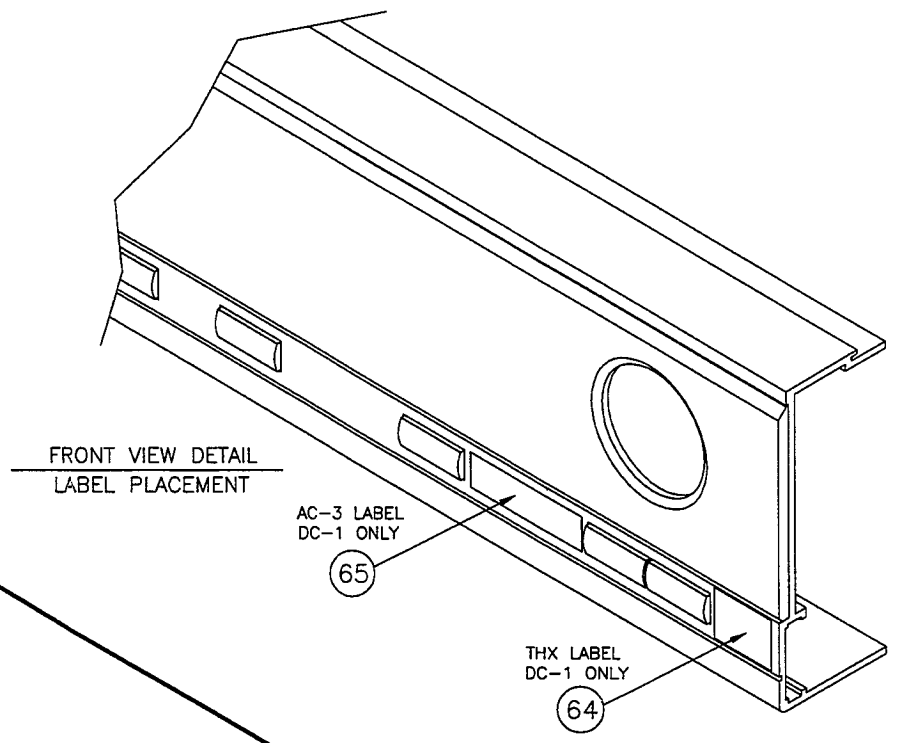
TITLE ASSY DWG, CHASSIS DC-1/SDP-2

SIZE	FSCM NO.	DWG. NO.	REV.
B		080-10483	4

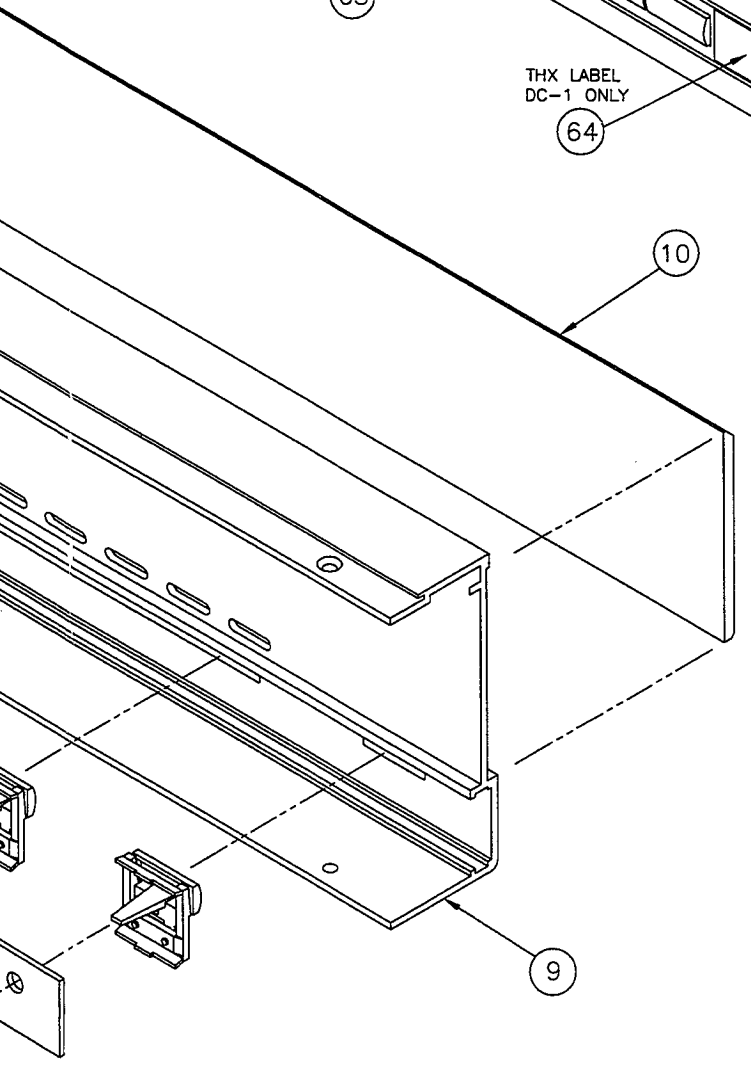
SCALE NONE SHEET 1 OF 3


ENSURE THE FRAME TABS ARE INSIDE THE EXTRUSION CHANNEL
24
27
13 PLCS

REVISIONS			
REV.	DESCRIPTION	DWR/CHKD	Q.C./AUTH
1	ADD "DC-1 ONLY" TO AC-3 LABEL (ITEM 65) PER DCR #960209-02	AN 2/22/96 MK 2/22/96	CW 2/23/96 AF 2/23/96



FRONT VIEW DETAIL
LABEL PLACEMENT



NOTES

1. SEE SHEET 3 FOR PARTS LIST.

	SDP-2
	DC-1
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
DECIMALS: .XX ±.010 .XXX ±.005
ANGLES: ±1/2°
MATERIAL
FINISH
DO NOT SCALE DRAWING

ACAD REL 13 FILE NAME
10483-12

APPROVALS		DATE
DRAWN	AN	5/25/95
CHECKED	MK	11/21/95
Q.C.	CW	11/22/95
ISSUED	AF	11/22/95

lexicon

TITLE: ASSY DWG, CHASSIS DC-1/SDP-2

SIZE	FSCM NO.	DWG. NO.	REV.
B		080-10483	1
SCALE NONE			SHEET 2 OF 3

ITEM#	PART#	DESCRIPTION	QTY	WHERE USED
1.	700-10470	CHASSIS, DC-1	1	
	700-11748	CHASSIS, DC-1, LPA		
2.	700-10471	SUPPORT, PS	1	
3.	702-10476	PANEL, REAR, DC-1	1	
	702-11386	PANEL, REAR, SDP-2		
4.	700-10472	COVER, TOP, 2U X 10.3	1	
5.	700-10473	ENDCAP	2	
6.	701-10474	BRACKET, VIDEO BD	1	
7.	701-09863	CLAMP, HEATSINK, TO-220	1	
8.	704-10481	HEATSINK, TO-220	1	
9.	702-10475	PANEL, FRONT	1	
10.	703-10479	LENS, DC-1	1	
	703-11334	LENS, SDP-2		
11.	023-10404	PL, MAIN BD ASSY, DC-1	1	
	023-11204	PL, THX MAIN BD ASSY, DC-1		
	023-11209	PL, AC-3 MAIN BD ASSY, DC-1		
	023-11433	PL, AC-3 MAIN BD ASSY, SDP-2		
12.	024-10406	PL, VIDEO MAIN BD ASSY	1	
13.	024-10407	PL, VIDEO RCA BD ASSY	1	
14.	024-10408	PL, IR BD	1	
15.	024-10409	PL, ENCODER BD	1	
16.	024-10410	PL, PWR SWITCH BD	1	
17.	024-11237	PL, AC-3 DGTR BD ASSY	1	AC-3 OPTION
18.	024-11275	PL, LOGO LED BD	1	DC-1 ONLY
19.	430-10988	DISP, LCD, 20X2, NEG, 12:00, LED, YEL	1	
20.	454-10435	SW, ROCKER, 2P1T, 16A@250, VER, I-O	1	PWR SW
21.	490-11462	CONN, AC, 3C, SNAP, IEC, 10A	1	3 WIRE AC INPUT
	490-11397	CONN, AC, 2C, SNAP, IEC, 10A		2 WIRE AC INPUT
22.	550-10486	KNOB, 1.25, 6MM/FL, BLK	1	ENCODER
23.	630-09983	INSUL, SEMI, SIL RUB, ADH, 1.95 X 1.00	1	
24.	630-11229	GASKET, BUTTONS	1	
25.	720-10453	LIGHT PIPE, RA, LED, SNAP-IN	19	CHASSIS #700-10470 ONLY
	720-11749	LIGHT PIPE, RA, ARRAY, LED X 19, 2 PC	1 (SET)	CHASSIS #700-11748 ONLY
26.	750-11396	PWR SUP,+5V@3A,+15V@2A/-15@.5A,40W	1	
27.	750-10983	BUTTON ASSY, .30 X .75, BLK	13	
28.	530-09382	CLIP, WIRE HRNS, .15DIA, ADH BAK	2	PS TO MAIN BD CABLE
29.	530-02488	TIE, CABLE, NYL, .14"X5 5/8"	1	PS TO MAIN BD CABLE
30.	541-07547	BUMPER, FEET, .98DIA X .2, RVT MTG	4	CHASSIS
31.	630-11233	SPCR, SNAP-IN, .18D X 1.25L, NYL	1	VIDEO BD TO MAIN BD
32.	630-07846	SPCR, PCB/FOOT, .250, NYL	1	MAIN BD
33.				
34.	635-10970	SPCR, 2-56 X 3/16, 1/8 HEX, S, ZN	4	DISPLAY TO CHASSIS
35.	640-09698	SCRW, 2-56X5/8, PNH, PH, ZN	4	DISPLAY TO CHASSIS
36.	640-10467	SCRW, M3X6MM, FH, PH, BZ	6	FP ASSY TO CHASSIS
37.	640-10498	SCRW, M3X6MM, PNH, PH, BZ	19	VIDEO BD TO REAR PANEL & B REAR PANEL TO CHASSIS (2) COVER TO CHASSIS & REAR PL
38.	640-10499	SCRW, M3X8MM, PNH, PH, BZ	8	HEATSINK TO MAIN BD (2) PWR SUP TO SUPPORT (4) IR BD TO CHASSIS (2)
39.	640-01700	SCRW, 4-40X1/2, PNH, PH, SS	2	CLAMP TO HEATSINK
40.	640-10489	SCRW, M4X10MM, FH, PH, BZ	4	END CAPS TO CHASSIS
41.	641-01703	SCRW, TAP, AB, #4 X 1/4, PNH, PH, ZN	5	MAIN BD TO CHASSIS & SUPPO
42.	641-09699	SCRW, TAP, AB, #2 X 5/16, PNH, PH, ZN	1	DIN CONN TO REAR PANEL
43.	641-10989	SCRW, TAP, AB, #4 X 3/8, PNH, PH, BZ	11	RCA CONN TO REAR PANEL (8) REAR PANEL TO CHASSIS (3)
44.	643-01855	NUT, 2-56, HEX, ZN	4	DISPLAY TO CHASSIS
45.	643-10492	NUT, M4X.7MM, KEP, ZN	1	CHASSIS GND
46.	644-10494	WSHR, FL, M4 CL X 9 OD X .8MM THK	1	CHASSIS GND
47.	650-11747	RVT, SNAP-IN, .10DIA, NYL	4	LIGHT PIPE ARRAY ONLY TO CH
48.	650-10427	RVT, SNAP-IN, .12DIA, NYL	4	PWR SW BD TO CHASSIS (2) LOGO LED BD. TO CHASSIS (2)
49.	650-04896	POPRVT, 5/32X1/8, REG PROT HD, AL	6	SUPPORT TO CHASSIS
50.	702-11348	COVER, PROTECTIVE, PS, 1.75 X 3.4	2	CHASSIS FLOOR, INSIDE TOP CO

ITEM#
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63.
64.
65.
66.

REVISIONS			
REV.	DESCRIPTION	DWR/CHKD	Q.C./AUTH
1	ADD ITEM 41, QTY CHG ITEMS 37 & 43, DELETE CE LABEL PER DCR #951221-01	AN 12/21/95 MK 12/21/95	CW 1/16/96 AF 1/16/96
2	NEW PWR SW & FUSE LABEL PER ECO #960202-00 DELETE SDP-2 THX VERSION PER DCR #960209-02	AN 2/12/96 MK 2/22/96	CW 2/23/96 AF 2/23/96
3	ADD ADHESIVE (ITEM 66) PER ECO #960328-00 CHG TO 3C AC IN (ITEM 21). ADD ITEMS 45, 46, 57 & 58 PER ECO #960408-00	AN 4/11/96 MK 5/8/96	CW 5/9/96 AF 5/9/96
4	ADD LIGHT PIPE ARRAY, NEW CHASSIS (ITEMS 25 & 1), ADD ITEM 47, DELETE ITEM 66 PER ECO #960522-00	AN 5/31/96 MK 5/31/96	CW 6/3/96 AF 6/3/96

ITEM#	PART#	DESCRIPTION	QTY	WHERE USED
51.	680-10468	CABLE, HSG/ST&T, 6C, 35/12, SLV	1	PS TO MAIN BD
52.	680-10469	CABLE, AC PWR, HSG/QDC, 2C, 18G, 4"	1	PWR SW TO PS
53.	680-11398	CABLE, AC PWR, QDC, 2C, 18G, SLV, 4"	1	AC CONN TO PWR SW
54.	680-10547	CABLE, .079, SCKT/SCKTRA, 4C, 4.0"	3	SW, ENC'R, LOGO BDS TO MAIN BD
55.	680-09763	CABLE, .079, SCKT/SCKTRA, 10C, 2.0"	1	IR DET BD TO MAIN BD
56.	680-07897	CABLE, .079, SCKT/BICONN, 15C, 4.0"	1	VIDEO BD TO MAIN BD
57.	680-11461	WIRE, 18G, G/Y, 2.5", .187 QDC/LUG #8	1	AC CONN TO CHASSIS GND
58.	740-08556	LABEL, GROUND SYMBOL, 0.5" DIA	1	PS SUPPORT
59.	740-09538	LABEL, S/N, CHASSIS	1	REAR PANEL (DC-1 ONLY)
60.	740-08558	LABEL, TUV CERTIFIED, BAYERN	1	REAR PANEL
61.	740-11366	LABEL, PRODUCT ID, SDP-2	1	REAR PANEL (SDP-2 ONLY)
62.	740-11369	LABEL, DOLBY/THX/AC-3 LICENSE	1	CHASSIS BOTTOM
63.	740-11480	LABEL, FUSE, CAUTION, F1, 3.15A	1	PS SUPPORT
64.	740-11226	LABEL, THX	1	FRONT PANEL DC-1 THX/AC-3 ONLY
65.	740-11224	LABEL, AC-3	1	FRONT PANEL DC-1 AC-3 ONLY
66.				

ILY
ILY

L & BRACKET (12)
(2)
AR PL (5)
)
4)

SUPPORT
L
EL (8)
(3)

TO CHASSIS
(2)
S (2)

OP COVER

NOTES

1. PART NUMBER LISTING IS FOR REFERENCE ONLY AND DOES NOT SUPERSEDE THE BILLS OF MATERIAL:

3 WIRE AC INPUT

#023-11611	CHASSIS KIT, COMMON
#023-10610	DC-1, BASE
#023-11622	DC-1, THX
#023-11208	DC-1, AC-3
#023-11432	SDP-2, AC-3

2 WIRE AC INPUT (REF)

#023-11228	CHASSIS KIT, COMMON
#023-10412	DC-1, BASE
#023-11203	DC-1, THX

	SDP-2
	DC-1
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
.XX +/-.010
.XXX +/-.005
MATERIAL
FINISH
DO NOT SCALE DRAWING

ACAD REL 13 FILE NAME
10483-43

APPROVALS		DATE
DRAWN	AN	10/4/94
CHECKED	MK	11/21/95
Q.C.	CW	11/22/95
ISSUED	AF	11/22/95

lexicon

TITLE: ASSY DWG, CHASSIS DC-1 / SDP-2

SIZE	FSCM NO.	DWG. NO.	REV.
B		080-10483	4

SCALE NONE SHEET 3 OF 3