

*MicroVerb*<sup>®</sup>**4**

PRESET/PROGRAMMABLE 18 BIT SIGNAL PROCESSING

**NanoVerb**<sup>™</sup>

18 BIT DIGITAL EFFECTS PROCESSOR

## Service Manual

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**Alesis**  
**MicroVerb 4 And NanoVerb Stereo Effects Processors**  
**Service Manual V1.00**

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T.J. Goodwin Editor

## PREFACE

This document is intended to assist the service technician in the operation, maintenance and repair of the MicroVerb IV and NanoVerb Stereo Effects Processors. Together with their respective Reference Manuals, this document provides a complete description of the functionality and serviceability of these units. Any comments or suggestions you may have pertaining to the document are welcome and encouraged.

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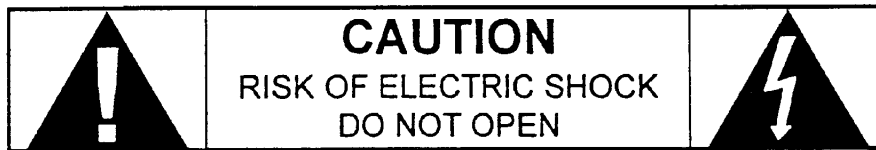
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The exclamation point inside a triangle is intended to alert the user to the presence of important operating, maintenance and servicing instructions in the literature which accompanies the product.

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Carefully read the applicable items of the operating instructions and these safety suggestions before using this product. Use extra care to follow the warnings written on the product itself and in the operating instructions. Keep the operating instructions and safety suggestions for reference in the future.

1. Power Source. The product should only be connected to a power supply which is described either in the operating instructions or in markings on the product.
2. Power Cord Protection. AC power supply cords should be placed such that no one is likely to step on the cords and such that nothing will be placed on or against them.
3. Periods of Non-use. If the product is not used for any significant period of time, the product's AC power supply cord should be unplugged from the AC outlet.
4. Foreign Objects and Liquids. Take care not to allow liquids to spill or objects to fall into any openings of the product.
5. Water or Moisture. The product should not be used near any water or in moisture.
6. Heat. Do not place the product near heat sources such as stoves, heat registers, radiators or other heat producing equipment.
7. Ventilation. When installing the product, make sure that the product has adequate ventilation. Improperly ventilating the product may cause overheating, which may damage the product.
8. Mounting. The product should only be used with a rack which the manufacturer recommends. The combination of the product and rack should be moved carefully. Quick movements, excessive force or uneven surfaces may overturn the combination which may damage the product and rack combination.
9. Cleaning. The product should only be cleaned as the manufacturer recommends.
10. Service. The user should only attempt the limited service or upkeep specifically described in the operating instructions for the user. For any other service required, the product should be taken to an authorized service center as described in the operating instructions.
11. Damage to the Product. Qualified service personnel should service the unit in certain situations including without limitation when:
  - a. Liquid has spilled or objects have fallen into the product,
  - b. The product is exposed to water or excessive moisture,
  - c. The AC power supply plug or cord is damaged,
  - d. The product shows an inappropriate change in performance or does not operate normally, or
  - e. The enclosure of the product has been damaged.

## General Troubleshooting

While this manual assumes that the reader has a fundamental understanding of electronics and basic troubleshooting techniques, a review of some of the techniques used by our staff may help.

1. Visual Inspection - A short visual inspection of the unit under test will often yield results without the need of complex signal analysis (burnt, or loose components are a dead giveaway).
2. Self Test - Alesis products that utilize microprocessor control contain built in test software which exercises many of the units' primary circuit functions. Self test should always be done following any repair to ensure basic functionality.
3. Environmental Testing - Applying heat and cold (heat gun/freeze spray) will often reveal thermally intermittent components (Clock crystals, I.C.s, and capacitors are particularly prone to this type of failure).
4. Burn in Testing - Leaving a unit running overnight often reveals intermittent failures such as capacitors that begin to leak excess current after a significant amount of time.
5. Cable Checks - Wiggling cables can reveal intermittent failures such as loose cables or poorly soldered headers. Remember to check power supply cables as well.
6. Flexing the PC Board - Poor solder joints and broken traces can often be found by pressing the PC Board in various places.
7. Tapping Components - Sometimes tapping on a component (particularly crystals) will cause it to fail.
8. Power Down/up - Turning the unit off and back on rapidly several times may reveal odd reset and/or power supply failures.
9. Reset Threshold - A Variac (variable transformer) can be used to check reset threshold levels. This can be particularly useful in helping customers with low line problems.
10. Compressors - Using a compressor/limiter is often helpful when attempting to solve low level noise problems, as well as assisting with DAC adjustments.
11. Sweep Tests - Sweep generators are very useful in checking the frequency response envelopes of anti-aliasing filters.
12. Piggybacking - Piggybacking I.C.s is particularly useful when troubleshooting large sections of logic. This is especially true when working with older units.

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## 1.00 General Description

The Alesis MicroVerb IV is the latest in the line of popular effects processors of the micro series. Similar in performance to the MicroVerb, the NanoVerb is a scaled down version. Combining the well known power of Alesis custom processing with small size and affordability, the MicroVerb IV (Product Code C4) and NanoVerb (Product Code NV) are based largely on the design of the MidiVerb IV. The MidiVerb IV custom chip set, along with the latest ADC and DAC technology help make the C4 and NV two of the most powerful signal processors in their price ranges. Particularly in the NV the use of surface mount technology helps push the envelope of size and weight verses performance. Reference designators for the C4 are taken from the Rev. C schematic. Reference designators for the NV are taken from the Rev. B schematic and are denoted by brackets {} when components are functionally similar to the C4. Note that for both of these units there are several different main PCB revisions. There are no functional differences between these revisions. However, it should be noted that older PCB revisions will have some wire jumpers that later rev.s incorporated into the PCBs. Figure 1 shows the simplified block diagram of the C4. As the NanoVerb is even simpler, there is no need to simplify it beyond the schematic.

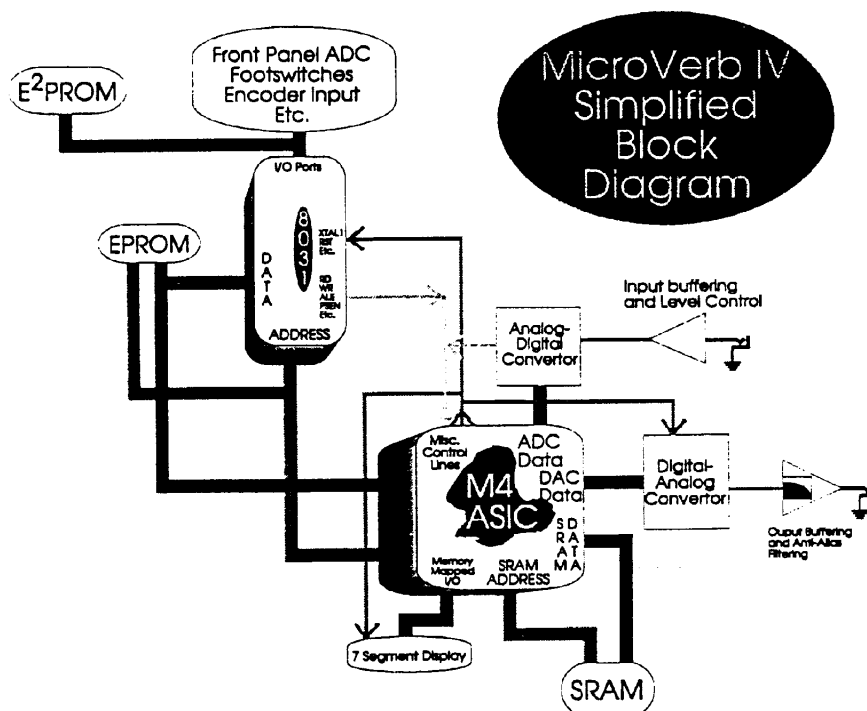


Figure 1

As the NanoVerb is even simpler, there is no need to simplify it beyond the schematic.

## 2.00 Power Supplies

### 2.10 C4 Power Supply

The C4 power supply begins with the 9 Volt A.C. adapter (Alesis P3 type). Input from J9 is R.F. filtered by C31. From there it is split for the +12V, -12V, and +5V rails. The +12V rail consists of a voltage doubler (C54, C56 and D4, D3), a 78L12 regulator, and a filter capacitor (C51). The -12V rail is a "mirror" of the +12V rail, consisting of voltage doubler (C55, C57, and D5, D6), a 79L12 regulator, and a filter capacitor (C52). The +5V rail consists of a rectifier diode (D2), an input filter capacitor (C53), a 7805 (U12) regulator, an output filter capacitor (C53) and a multitude of 0.1 $\mu$ F bypass capacitors.

### 2.10 NV Power Supply

The NanoVerb power supply is slightly different from the C4 in that it only uses +5V and -5V. The NV power supply begins with the 9 Volt A.C. adapter (Alesis P3 type). Input from J1. The +5V rail consists of rectifier diode {D1}, input filter capacitor {C2}, 7805 regulator {U5}, and



output filter capacitor {C4}. In addition, the power on LED {D4} and it's current limiting resistor {R23} are also attached to the output of U5.

### **3.00 Analog Signal Paths**

#### **3.10 Input Section**

The signal(s) from input jacks J3 {J4} (right) and J4 {J3} (left/mono) are current limited by R25 {R19}, R30 {R22}, and have their impedances set at 1M $\Omega$  (stereo), and 500K $\Omega$  (mono) by resistors R23 {R20} and R24 {R21}. These signals are then buffered by U1A {U9A} and U1D {U9D} respectively, before being sent to the input level 1X-10X control stage (U1B, U1C) {U9B, U9C} via A.C. coupling capacitors C36 {C30} and C35 {C32}. The signals are then passed along to the ADC (U3) {U1} for further processing, as well as to the dry side of mix control R54 {R33}.

#### **3.20 C4 Output Section**

The differential outputs of the DAC (U4) are converted to a single ended mode, as well as buffered and low pass filtered, via U2B and U2C and their surrounding circuitry. These signals are then A.C. coupled by C41 and C44 before being sent to the mix control potentiometer (R54). The wiper of the mix potentiometer is fed to the output level (1X-10X) gain stage U2D and U2A before being sent to the output jacks (J1 and J2). The output impedance of the unit is fixed at approximately 220 $\Omega$  by resistors R1 and R6.

#### **3.30 NV Output Section**

The single ended outputs of the DAC {U4} are passively filtered by RC networks {R15, R16, C28, C43} right, and {R11, R12, C26, C38}. The signal is then buffered {U8C, U8D} and passed along to the wet side of mix control {R33}. The wiper of {R33} is sent to the output gain/buffer stage {U8B, U8A}, and impedance fixed at 270 $\Omega$  by {R25} and {R14}. Finally, the signal is R.F. filtered {C12,C7} and output via Jacks {J6, J5}.

### **4.00 Digital Signal Paths**

#### **4.10 The 8031**

The 80C31 (U6) {U2} is responsible for most system control and user interface functions. These functions include display and user data storage, as well as continuously updating algorithm data for the M4 ASIC (U8) {U3}. Note that the 8031 data buss serves a dual purpose. This buss multiplexes between low order addresses (1st 8 bits), and data. A latch contained in the M4 ASIC is used to hold the low order address half, during 8031 read and write cycles. The EPROM (U9) {no equivalent - the NanoVerb utilizes an 80C51 which contains an internal EPROM} is used to hold both program information and algorithm data. The E<sup>2</sup>PROM (U5) {no equivalent} holds user program data. {There is no user storage capability in the NV.} In the C4 the 12MHz 8031 clock is supplied by (Z1) via the M4 ASIC. {The NV derives it's clock from the M4C internal VCO. [See Section 5.30]}. MIDI I/O is handled through the 8031's built in RXD [Read Serial Data], and TXD [Transmit Serial Data] ports. {There is no MIDI capability in the NV.} Front panel buttons and shaft encoder decoding is handled through the 8031's built in I/O ports.

#### 4.11 Reset

System reset is another function handled largely by the M4 ASIC. (C49) {C14} and (R42) {R4} are the only external components. Forming an RC time constant during the power up of the 5 volt line, this deceptively simple circuit performs the crucial task of ensuring that the 5V line is fully regulated before any system operations begin. Poor operation of this circuit can lead to data corruption and 'odd' crashes as well as intermittent operation or complete lock ups. While many 'Dead' units can often be attributed to a faulty reset circuit, the reduced parts count offered by the M4 ASIC should significantly reduce this type of failure over previous designs.

#### 4.12 C4 Memory Mapped I/O

While the term M4 ASIC may seem a bit overused at this point, this versatile device once again comes to the rescue. Memory mapped I/O is the process of making input/output hardware functions more compatible with software by making those functions (LEDs, 7 segment display, etc.) appear to the microprocessor as unused memory locations. It accomplishes this task by decoding the address buss (looking for specific address combinations), waiting until the processor signals a  $\overline{WR}$ ite or  $\overline{RE}$ ad condition at which time it strobes a latch whose data lines are tied to the processor data buss. The C4's only need for this ability is in controlling the display functions, so only the  $\overline{WR}$ ite line need be considered here. The 7-segment display and VU-ladder are maintained with U7 holding row values (mapped I/O) and the 8031 strobing each column in turn via it's built in I/O ports.

#### 4.13 C4 User Program Storage (The E<sup>2</sup>PROM)

The Xicor X24022 E<sup>2</sup>PROM (U5) is a serial transfer device arranged internally as 256X8 bits. Serial Data (pin 5) and Serial Clock (pin 6) are the only control lines necessary in this application. Since multiple devices aren't required here, all address lines are tied to ground. All PROM functions are controlled by the 8031 I/O ports 3.4 and 3.5 (pins 10 and 11) using the protocols established by XICOR. {There is no user program storage capability in the NV.}

#### 4.20 C4 MIDI I/O

MIDI I/O is handled directly through the 8031's built in I/O ports TXD (Transmit serial data-pin 5) and RXD (Read serial data-pin 7). MIDI out is run directly from TXD to MIDI OUT Jack J6. MIDI in passes through opto-isolator U10 (6N138) before continuing to RXD. Diode D1 provides added protection from reverse currents on the input. {There is no MIDI capability in the NV.}

### 5.00 Analog-Digital/Digital-Analog

#### 5.10 A-D

The SAA7366 is a CMOS 128 times oversampling sigma-delta A-D converter. (R20, C12, and C43) {R5, C20, and C24} decouple and filter the analog supply to the I.C.. (R21, C43, and C15) {R1, C23, and C17} provide the same for the digital supply. (R18, R19) {R3, R6}, with (C11) {C19} for filtering, define the maximum non clipping signal level. (R26, C18) {R7, C11} and (R17, C10) {R9, C22} define the gain characteristics of the devices internal buffer amplifiers. The internal high pass filter is enabled (HPEN pin 11=1) to eliminate external anti-aliasing circuitry. Control lines for the serial clock (SCK pin 9), left/right control (SWS pin 8),

and the 12 MHz Clock (CKIN pin 4) are directed by the M4 ASIC. Digital data is sent to the M4 ASIC serially via SD0 (pin 7).

### **5.20 C4 D-A**

The digital to analog converter is U4 which is an AKM 4319 DAC. Like the A to D, this D to A is a high performance over sampling stereo device. The over sampling nature and significant internal improvements in the 4319 over it's predecessors significantly reduce output filter requirements. The analog supply is filtered by (C46, C16) digital supply is filtered by (C39, C13) All digital signals originate from the M4 ASIC. Differential analog outputs are fed to the C4 output section (See Section 3.20).

### **5.30 NV D-A**

The Crystal CS4330 {U4} is an 18 bit, oversampling, stereo device. It is capable of operating with only a single +5V supply. All digital signals originate from the M4 ASIC. Differential analog outputs are fed to the NV output section (See Section 3.30).

### **5.40 M4C ASIC**

It should be noted here the both of these units employ the latest revision of M4 ASIC (Rev. C). This new device incorporates a charge pump ADC for potentiometer encoding that was made up of discrete components in previous designs. The I.C. also now contains an internal VCO. whose frequency is determined by the current flow of pin 58 (See Also Section 8.10).

## **6.00 The C4 Front Panel**

### **6.10 C4 Buttons And Data Wheel**

The 2 front panel buttons ("BANK/MIDI" and "STORE") and the two lines of the data wheel encoder are tied directly to 8031's I/O ports (pins 44, 3, 1, and 2 respectively). Internal pullups in the 8031 ensure that the value reads high until the switch actually pulls the line low.

### **6.20 Edit Knob Encoding**

The C4 utilizes a charge pump A-D converter for decoding the edit knobs. Since speed is not an issue (as it is in audio) this approach has the advantage of a reduced parts count while maintaining precise software control. This ADC was composed of discrete components in older designs. It is now incorporated into the M4C ASIC for an even further reduction in discrete componentry. For the technician it means that troubleshooting is reduced to checking for mechanical failures such as poor solder, broken traces, or faulty potentiometer. Since everything else is contained in the ASIC, it's replacement should solve all other faults. The one exception known to date is software revision 1.00 of the C4. The software portion of the ADC wasn't quite calibrated and consequently some of the beta units would only show an Edit Knob value in the self test mode (See Section 7.00). The solution to this problem was to install V1.01 software.

### **6.30 C4 Display**

The 7 segment display and the VU meter are arranged as a simple row column matrix controlled by the 8031 via memory mapped (See Section 4.12 for details) latch U7. Q1 through

Q8 (arranged as 4 Darlington pairs) provide the switchable current supplies necessary to run multiple LEDs on each column and are switched directly by the 8031's built in I/O ports.

## 7.00 Test Procedures

### 7.10 C4 Self Test

The MicroVerb 4 has two self test modes which allow the user to run diagnostic tests. In **Individual Test** mode, the user can select particular tests to run. In **All Test** mode, the MicroVerb 4 runs all of the tests in series.

#### *To enter Individual Test mode:*

- ▶▶▶▶ - Power up the unit while holding down the **Bank** button.
- ▶▶▶▶ - Use the **Value Dial** to select which test to run (each test is described below).
- ▶▶▶▶ - Press **Store** to execute the test. When the test is complete, you can either select another test to run or exit Individual Test mode by holding **Bank** and pressing **Store**.

#### *To enter All Test mode:*

- ▶▶▶▶ - Power up the unit while holding down the **Store** button.

### 7.20 C4 Individual Test Descriptions

- 4 **t0: ROM Test.** If the unit passes, the MicroVerb 4 will display "P0" and exit the test automatically. If the unit fails, the MicroVerb 4 will display "F0" and won't exit the test. In this case, the user must press **Bank** to exit.
- 4 **t1: EEPROM Test.** If the unit passes, the MicroVerb 4 will display "P1" and exit the test automatically. If the unit fails, the MicroVerb 4 will display "F1" and won't exit the test. In this case, the user must press **Bank** to exit.
- 4 **t2: LED Test.** Lights up all the LEDs (first, column by column; then row by row). The C4 automatically exits this test.
- 4 **t3: Switch/Encoder Test.** Checks the buttons and the rotary encoder. The user must press every button AND rotate the encoder in both directions in order for the test to pass. After doing this, the user should hold **Bank** and press **Store**. If at this point all of the buttons have been pressed (i.e., the unit passed), then the MicroVerb 4 will display "P3" and exit the test. If instead not all of the buttons have been pressed, the MicroVerb 4 will display "F3". The user can either restart the test (by pressing **Store**) or exit the test (by pressing **Bank**.)
- 4 **t4: Edit Knob Test.** Checks the Edit A/B knobs. The user must rotate each knob to show all values (0 to 127) in order for the test to pass. To exit the test, press **Bank**.
- 4 **t5: MIDI In/Out Test.** Before running this test the user must connect a MIDI cable from the MIDI Out to the MIDI In of the unit. If the unit passes, the MicroVerb 4 will display "P5" and exit the test. If the unit fails, the MicroVerb 4 will display "F5" and won't exit the test. In this case, the user must press **Bank** to exit.
- 4 **t6: DSP RAM Test.** If the unit passes, the MicroVerb 4 will display "P6" and exit the test automatically. If the unit fails, the MicroVerb 4 will display "F6" and won't exit the test. In this case, the user must press **Bank** to exit.

### 7.30 Additional Test Procedures

**Audio Test.** Plug an audio source into the Left Input. Don't plug anything into the Right Input. Verify that audio is passed through (the Input meters should light). Next, test the Right Input (with nothing in the Left Input). Finally, plug a different audio source into each of the Inputs. Verify that the Left Output passes audio from the Left Input and verify that the Right Output passes audio from the Right Input. In addition, all knobs should be turned through the entire range to ensure 1. Audio potentiometers are smooth and there are no audio dropouts or "scratching" noises heard, and 2. Edit knobs/data wheels correctly switch/change the corresponding parameters in accordance with the unit's User Reference Manual.

## 8.00 Updates and Corrections

### 8.10 C4 Change To Revision C

In order to increase reliability and reduce the overall parts count, several discrete component hardware functions were incorporated into the M4 ASIC. This new device incorporates a charge pump ADC for potentiometer encoding that was made up of discrete components in previous designs. The I.C. also now contains an internal VCO. whose frequency is determined by the current flow of pin 58. While these changes are relatively minor, it means that the 2 different versions are incompatible. Since the original M4 ASIC is no longer in production and available, circuit faults traced to an original M4 ASIC are only repairable by updating to a Revision C Main PCB or higher.

### 8.20 NV Revision B Hum

Figure 2 shows the "cut and jump" necessary to eliminate a 60Hz hum problem that resulted from the change in layout. This modification does not affect any other board revisions.

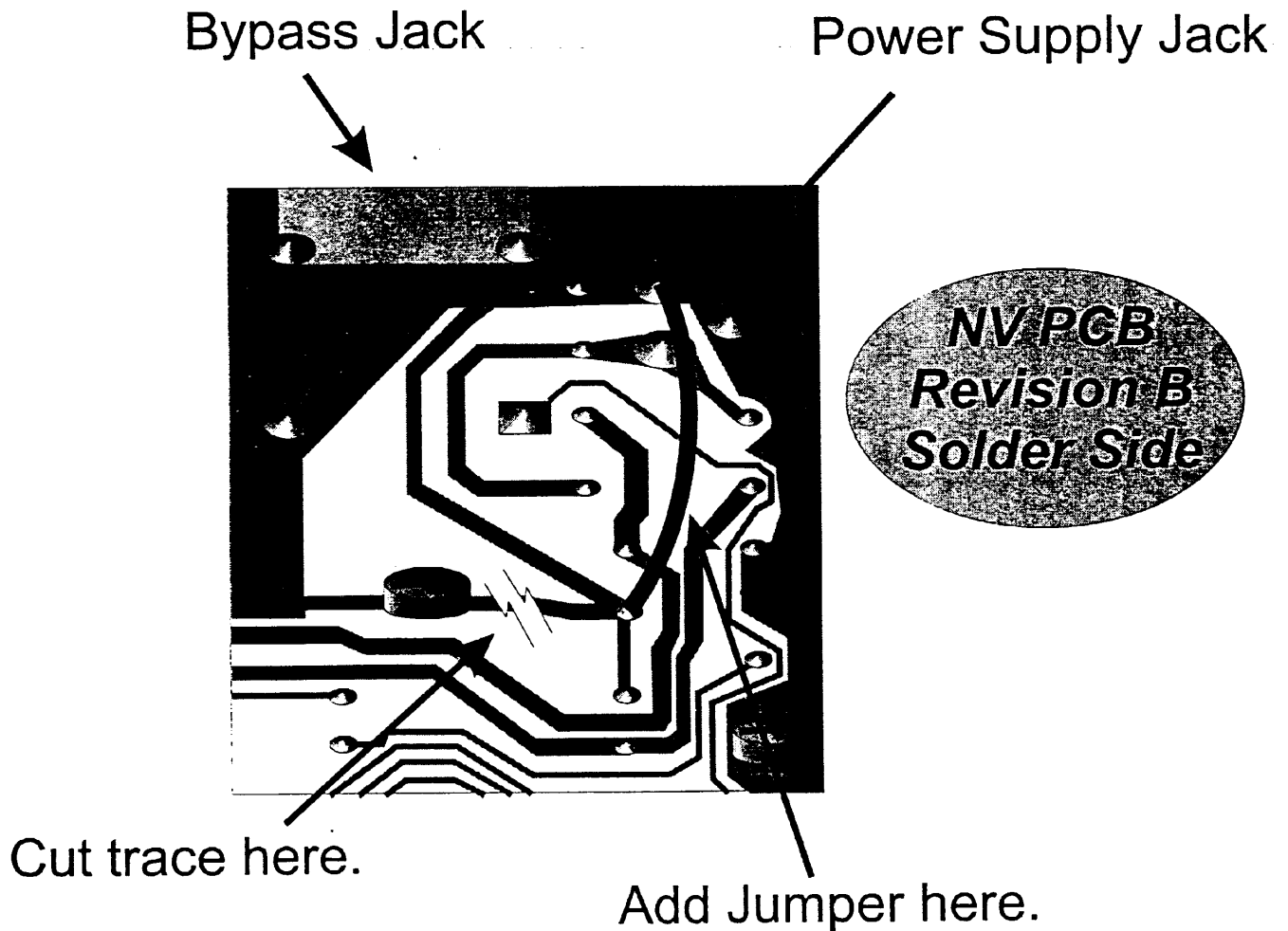


Figure 2

### 8.20 NV Software Change

A bug exists in Version 1.00 NV software in which the unit will power up in bypass mode if the Plate 1 Reverb is selected during the power up. The unit will begin to operate correctly if

the data knob is turned, or if any other program was selected during power up. This is extremely minor, however, in the interest of perfection, V1.01 solves this problem. While this is a software error, the change will require the replacement of the 8051 which is soldered directly to the PCB. Therefore it is included here as a hardware change for completeness.

## 9.00 Troubleshooting

The charts below were created in an effort to relieve the beleaguered technician from having to "discover" some of the common faults we have seen. Please note that we only cover the most likely causes, not all of them.

C4 Symptom	Possible Cause	Solution
No Lights, No Sound. (Dead).	Faulty AC adapter.	Replace and retest.
	Problem in power supply. (Most likely C34, C55, or diodes)	Troubleshoot and repair as necessary.
	Loose front panel cable.	Troubleshoot and repair as necessary.
No wet (effects) signal:	Faulty ASIC (U8)	Replace and retest.
	Faulty DRAM (U11)	Replace and retest.
	Faulty Crystal (Z1)	Replace and retest.
	Faulty DAC (U4)	Troubleshoot and repair as necessary.
	Faulty ADC (U3)	Troubleshoot and repair as necessary.
Distortion.	Faulty Power Supply Rail	Troubleshoot and repair as necessary.
	Faulty op-amp	Troubleshoot and repair as necessary.
	Faulty DAC (U4)	Troubleshoot and repair as necessary.
	Faulty ADC (U3)	Troubleshoot and repair as necessary.
Programs not changing.	Faulty shaft encoder.	Replace and retest.
Intermittent operation.	Faulty Crystal (Z1)	Replace and retest.
	Faulty potentiometer(s)	Replace and retest.
	Poor through hole Solder	Check all through hole solder connections, particularly near the power supply area.

NV Symptom	Possible Cause	Solution
No Lights, No Sound. (Dead).	Faulty AC adapter.	Replace and retest.
	Problem in power supply. (Most likely C2, C13, or diodes)	Troubleshoot and repair as necessary.
No wet (effects) signal.	Faulty ASIC (U3)	Replace and retest.
	Faulty DRAM (U7)	Replace and retest.
	Faulty DAC (U4)	Troubleshoot and repair as necessary.
	Faulty ADC (U1)	Troubleshoot and repair as necessary.
Distortion.	Faulty Power Supply Rail	Troubleshoot and repair as necessary.
	Faulty op-amp	Troubleshoot and repair as necessary.
	Faulty DAC (U4)	Troubleshoot and repair as necessary.
	Faulty ADC (U1)	Troubleshoot and repair as necessary.
Programs not changing.	Faulty shaft encoder.	Replace and retest.
	Faulty M4C ASIC.	Replace and retest.
Intermittent operation.	Faulty potentiometer(s)	Replace and retest.
	Poor through hole Solder	Check all through hole solder connections, particularly near the power supply area.

## 10.00 MIDI Implementation

### **MicroVerb 4 System Exclusive Format Software Version 1.00 September 11, 1995**

#### OVERVIEW

All MicroVerb 4 system exclusive messages have the following format:

\$F0	System Exclusive status
\$00 \$00 \$0E	Alesis manufacturer ID
\$12	MicroVerb 4 ID
nn	Channel
cc	Opcode
dd	Data
⋮	⋮
⋮	⋮
\$F7	End of Exclusive

#### THE CHANNEL BYTE

For messages originating from the MicroVerb 4 the system exclusive channel will always be the same as the standard MIDI channel, and can be adjusted by the user via the front panel. If the user has enabled Omni mode the MicroVerb 4 will respond to system exclusive messages on ANY channel and transmit on channel 1, just as it does for ordinary channel messages (note, controller, program change, etc.) when Omni mode is enabled.

If a transmitting device such as a computer does not know the MIDI channel of a MicroVerb 4 it can use transmit the MIDI universal system exclusive inquiry message with the channel byte set to \$7F (ALL CALL). The MicroVerb 4 will respond with a universal system exclusive identity message with the channel byte set to the current MIDI channel (0-15). This is the recommended technique for closed loop systems as it allows software programs to confirm the MicroVerb 4's software version and revision while it finds the channel.

#### THE OPCODE BYTE

Opcodes are divided into two categories: Requests and Dumps. The values for Request opcodes are closely related to their corresponding Dump opcodes -- they are simply the Dump opcode with bit 6 set.

Only one of the Request opcodes has a data byte -- the Single Program request. The data byte specifies which User Program (00-99) it is requesting.

Dump Opcode	Request Opcode	Function Description	Dump Message Size (in bytes)
\$00	\$40	Edit Buffer	12
\$01	\$41	All User Programs	308
\$02	\$42	Single Program	12
\$03	None	Store Program	8



## EDIT BUFFER DATA

The Edit Buffer data is defined as follows:

Program number 0-99  
Program Data Block

The Program Data Block is defined as follows:

Program Data Block

Edit A Value 0aaaaaaaa  
Edit B Value 0bbbbbbb  
Origin Bank 0000000c (c = 0 means Preset, c = 1 means User)

## ALL USER PROGRAMS DATA

The All User Programs data consists of 100 Program Data Blocks, defined above.

## SINGLE PROGRAM DATA

The Single Program data is defined as follows:

Program number 0-99 (selects User 100-199)  
Program Data Block

## STORE PROGRAM DATA

This message has no corresponding request and contains zero bytes of data. It instructs the MicroVerb 4 to store the current contents of the Edit Buffer.

## **11.00 Software Histories**

### **11.10 C4 History**

V1.01 27C512 EPROM First Production Release

### **11.20 NV History**

V1.00 80C51 Processor First Production Release

V1.01 80C51 Processor Fixed bug in which unit powered up in bypass mode if Plate 1 Selected.

**12.00 Service Parts List**  
**12.10 C4 Service Parts List**

Group	AIPartNo	Description	Qty	PCB	Ref. Designator	Comment
ASY	9-79-0160	ASSY PCB MAIN C4	1			
ASY	9-79-0161	ASSY PCB F/P C4	1			
CAB	4-19-0012	CABLE 20 PIN DIL 2.54mm SPC 70mm STAKED RIBBON PROC. TO ADA CD	1		J5	
CAB	4-19-1403	CABLE 3-LEAD 40MM STRIPPED & TINNED	1			
CAP	1-07-0010	CAP 10 uF ELEC 35V	18	Main	C38-55.	
CAP	1-08-0228	CAP 2200 uF ELEC 16V	1	Main	C56	
CAP	1-09-0221	CAP 220 uF ELEC 25V	4	Main	C57-60	
CFD	2-99-4003	DIODE POWER 1N4003	5	Main	D3-7	
HDR	4-15-2001	HEADER 20-PIN 0.1 SPC DIL IDC SMD	1			
HDW	5-00-0020	SCREW M-3 x 7mm PHIL SLOT	6			
IC	2-11-7805	REG 7805 +5V TO220 NATIONA	1	Main	U15	
IC	2-13-7812	REG 78L12 +12V TO92 NATION	1	Main	U16	
IC	2-13-7912	REG 79L12 -12V TO92 NATION	1	Main	U17	
IC	2-24-0138	IC 6N138 OPTO ISO HEWLETT	1		U14	
JAC	4-00-0001	JACK 5-PIN DIN (MIDI)	2	Main	J6, 7	
JAC	4-02-0001	JACK 1/4 MONO CLIFF	4		J1-4	
JAC	4-03-0001	JACK 1/4 STEREO	1		J8	
JAC	4-16-0002	JACK 3.5MM BARREL (P3)	1		J9	
LED	3-02-0007	LED ORG 2x5MM RECT.	2			
LED	3-02-0009	LED GRN 2x5mm RECT.	6			
LED	3-04-0004	LED 7 SEGMENT C4	1			
LIT	7-51-1171	CHART PROGRAM C4	1			
LIT	7-51-1172	CHART QUICK SET-UP C4	1		Lit pack	
LIT	7-51-1176	MANUAL REFERENCE C4	1			
ME	7-01-0009	CRYSTAL 12 MHz	1		Z1	
MIS	9-00-1011	ENCODER DATA (ALPS EC11B 15mm w/o SWITCH)	1			
MIS	9-23-1014	STRIP FOAM (F/P) 7 x 185mm	2			
MIS	9-23-1017	STRIP FOAM (SIDE) 7x95mm D4	4			
MTL	9-03-1036	LUG SOLDER PCB MNT	5			
MTL	9-03-1165	CLIP STRIP RETAINER	4			
MTL	9-04-0003	PANEL FRONT EXTRUSION C4	1			
MTL	9-08-0001	CASE C4	1			
MTL	9-58-1009	PANEL SIDE/RACK EAR 100mm	2			
PKG	7-81-0007	FOAM MOLDED C3/C4	1			
PKG	7-81-0085	BOX GIFT C4	1			
PLS	9-00-0001	KNOB F/P C4	5			
PLS	9-10-0007	BEZEL FRONT PANEL C4	1			
PLS	9-10-0008	BEZEL DISPLAY C4	1			
PLS	9-10-0009	BEZEL POTS C4	2			
PLS	9-10-0010	BEZEL SMOKE C4	1			
PLS	9-11-1039	BEZEL VU Q2	1			
PLS	9-13-1022	STRIP RETAINING POLYETHYLENE C4	1			
PLS	9-15-0087	KNOB DATA M4	2			
			1			

Group	AlPartNo	Description	Qty	PCB	Ref.Designator	Comment
POT	0-09-1001	POT 10KA DUAL CONTROL	2		R53, 55	
POT	0-09-1002	POT 1KB DUAL CONTROL	1		R54	
POT	0-09-1006	POT 10KB SINGLE CONTROL 18mm SHFT	2	Main	R56, 57	
SMC	1-50-0104	CAP 0.1 uF NPO 1206	1	Main	C37	
SMC	1-50-0220	CAP 22 PF NPO 1206	2	Main	C26,28	
SMC	1-50-0221	CAP 220 PF NPO 1206	4	Main	C4-6,8	
SMC	1-50-0511	CAP 510 PF NPO 1206	1	Main	C35	
SMC	1-50-0680	CAP 68 PF NPO 1206	2	Main	C10, 18	
SMC	1-51-0104	CAP 0.1 uF X7R 1206	27	Main	C1-3,7,9,11-17,19-25,27,29-34,36	
SMI	2-27-0031	ASIC DIG FX M4	1		U9	
SMI	2-31-0063	IC SOFTWARE EPROM C4 V-1.01	1	MAIN		
SMI	2-64-0574	IC 74HC574 OCTAL D FF SMD	2	Main	U7,8	
SMI	2-64-7400	IC 74HC00 QUAD 2-IN POS-NAND GATE	1	Main	U10	
SMI	2-67-1288	IC 128K X 8 SRAM C4	1	MAIN	U11	
SMI	2-69-4022	IC 2K EEPROM XICOR X24022	1		U5	
SMI	2-70-8032	IC 80C31 PQFP SMD	1		U6	
SMI	2-71-0084	IC TL084 QUAD OPAMP SMD	2		U1, 2	
SMI	2-72-0339	IC LM339 ANALOG COMP SMD	1	Main	U12	
SMI	2-75-7366	IC SAA7366 DUAL 18-BIT ADC PHILIPS	1		U3	
SMI	2-76-4319	IC AKM4319 DAC	1		U4	
SMM	2-50-4148	DIODE SIGNAL 1N4148 SMD	2	Main	D1, 2	
SMM	2-51-4401	TRANS 2N4401 NPN SMD	5	Main	Q1-5	
SMR	0-10-0047	RES 4.7 OHM 1/8W 5% 1206	2	Main	R19, 20	
SMR	0-10-0100	RES 10 OHM 1/8W 5% 1206	8	Main	R29-36	
SMR	0-10-0102	RES 1K OHM 1/8W 5% 1206	7	Main	R2, 3, 23, 28, 50-52	
SMR	0-10-0103	RES 10K OHM 1/8W 5% 1206	15	Main	R4,5,7-12,15, 16,24,25,37,40,47	
SMR	0-10-0105	RES 1M OHM 1/8W 5% 1206	3	Main	R22,27,39	
SMR	0-10-0202	RES 2K OHM 1/8W 5% 1206	2	Main	R13,14	
SMR	0-10-0221	RES 220 OHM 1/8W 5% 1206	6	Main	R1,6,45,46, 48, 49	
SMR	0-10-0271	RES 270 OHM 1/8W 5% 1206	2	Main	R17,18	
SMR	0-10-0333	RES 33K OHM 1/8W 5% 1206	1	Main	R26	
SMR	0-10-0471	RES 470 OHM 1/8W 5% 1206	6	Main	R21,38,41-44	
SOC	4-06-0028	SOCKET 28-PIN DIP 0.6	1		U13	
SWT	6-02-0011	SWITCH TACT	2	F/P		

### 12.20 NV Service Parts List

Group	ALPARTNO	Description	QNTY	Ref.Designator
ASY	9-78-1250	ASSY PCB MAIN NV (Thru-Hole Config.)	1	
ASY	9-96-1276	ASSY KNOB NV	5	ASSEMBLED FROM (1)19-15-0129 & (1)19-15-1108
CAP	1-02-0681	CAP 680PF CERDISC 10%	2	C38, C43
CAP	1-07-0010	CAP 10uF ELEC 35V	10	C4-5, C9, C14, C20-21, C23, C27, C41, C45
CAP	1-08-0228	CAP 2200uF ELEC 16V	1	C2
CAP	1-08-0474	CAP 47uF ELEC 16V 2x5x11mm	6	C26, C28-32
CAP	1-09-0221	CAP 220uF ELEC 25V	1	C13
CER	1-02-0103	CAP 0.01uF CERDISC 10%	2	C7, C12
CER	1-02-0104	CAP 0.1uF CERDISC 10% 30"DIA. 50V	18	C1, C8, C10, C15-19, C24-25, C33-37, C39, C42, C44
CER	1-02-0221	CAP 220PF CERDISC 10%	2	C3, C6

Group	ALPARTNO	Description	QNTY	Ref. Designator
CER	1-02-0222	CAP 2200PF CERDISC 10%	1	C40
CER	1-02-0680	CAP 68PF CERDISC 10%	2	C11, C22
DIO	2-01-4003	DIODE POWER 1N4003	2	D1-2
HDW	5-00-0016	SCREW 6.32 x 1/4 PPZ	1	FOR REGULATOR STANDOFF
HDW	5-00-0103	SCREW M3 x 7mm PPZ	2	(2) MAIN PCB TO CHASSIS
HDW	5-00-0151	SCREW M3 x 7 PPB	4	(4) CHASSIS
HDW	5-00-0506	SCREW M5 x 6 PPB (BAGGED 1-PER)	1	(1) MOUNTS NANOVERB TO OEM TRAY
HDW	5-02-6320	NUT KEP 6-32	1	
IC	2-11-7805	REG 7805 +5V TO220 NATIONA	1	U6
IC	2-13-7906	REG 79L05 -5V TO92 NATIONA	1	U5
IC	2-16-4256	IC 256Kx4 DRAMVIT AD	1	U7
IC	2-21-0084	IC TL084 QUAD OPAMP TI	2	U8-9
IC	2-32-0012	IC MPU PROGRAMMED (V1 0) NV	1	U2
IC	9-96-0044	ASSY ASIC 64-PIN PQFP MAC (TESTED)	1	U3
JAC	4-02-0001	JACK 1/4 MONO CLIFF	5	J2-6
JAC	4-16-0002	JACK 3 5MM BARREL (P3)	1	J1
LED	3-02-0021	LED GRN KINGBRITE L934GC/B	1	D4
LED	3-03-0001	LED TRI-STATE	1	D3
LIT	7-51-1196	MANUAL REFERENCE NV	1	5.50W x 8.50H
LIT	7-51-1203	CHART QUICK SETUP NV (5.5' x 8.5')	1	
ME	6-00-1001	SHAFT ENCODER 16	1	S1
MIS	9-13-1041	GASKET FACE PLATE NV	1	
MTL	9-03-1186	CHASSIS MAIN NV (BTM/SIDE/REAR)	1	
MTL	9-03-1187	PANEL SUB NV	1	
MTL	9-03-1188	COVER (TOP/SIDE) NV	1	
PCB	9-40-1250-A	PCB MAIN NV (REV A)	1	PCB
PLS	9-15-0130	FACEPLATE NV	1	
PLS	9-15-1225	LENS POWER/SIGNAL NV	2	
POT	0-09-1001	POT DUAL 10KA	2	R32, R34
POT	0-09-1002	POT 1KB DUAL CONTROL	1	R33
POT	0-09-1006	POT 10KB SINGLE CONTROL PCB-MNT 18mm-SHFT	1	R31
RES	0-00-0102	RES 1K OHM 1/8W 5%	5	R13, R19, R22, R27-28
RES	0-00-0103	RES 10K OHM 1/8W 5%	5	R4, R7-10
RES	0-00-0105	RES 1M OHM 1/8W 5%	2	R20-21
RES	0-00-0151	RES 150 OHM 1/8W 5%	2	R17-18
RES	0-00-0242	RES 2 4K OHM 1/8W 5%	2	R11, R15
RES	0-00-0271	RES 270 OHM 1/8W 5%	5	R3, R6, R14, R23, R26
RES	0-00-0332	RES 3 3K OHM 1/8W 5%	1	R24
RES	0-00-0333	RES 33K OHM 1/8W 5%	1	R2
RES	0-00-0472	RES 4 7K OHM 1/8W 5%	2	R29-30
RES	0-00-0476	RES 4 7 OHM 1/8W 5%	2	R1, R5
RES	0-00-0683	RES 68K OHM 1/8W 5%	2	R12, R16
RES	0-01-0113	RES 11K OHM 1/8W 1%	1	R25
RUB	9-23-1071	FOOT RUBBER NV	4	
SMI	2-75-4330	IC CS4330 CRYSTAL DAC	1	U2
SMI	2-75-7366	IC SAA7366 DUAL 18-BIT ADC PHILIPS	1	U1

# 13.00 Service Manual History

V1.00 10/29/96 1st Release

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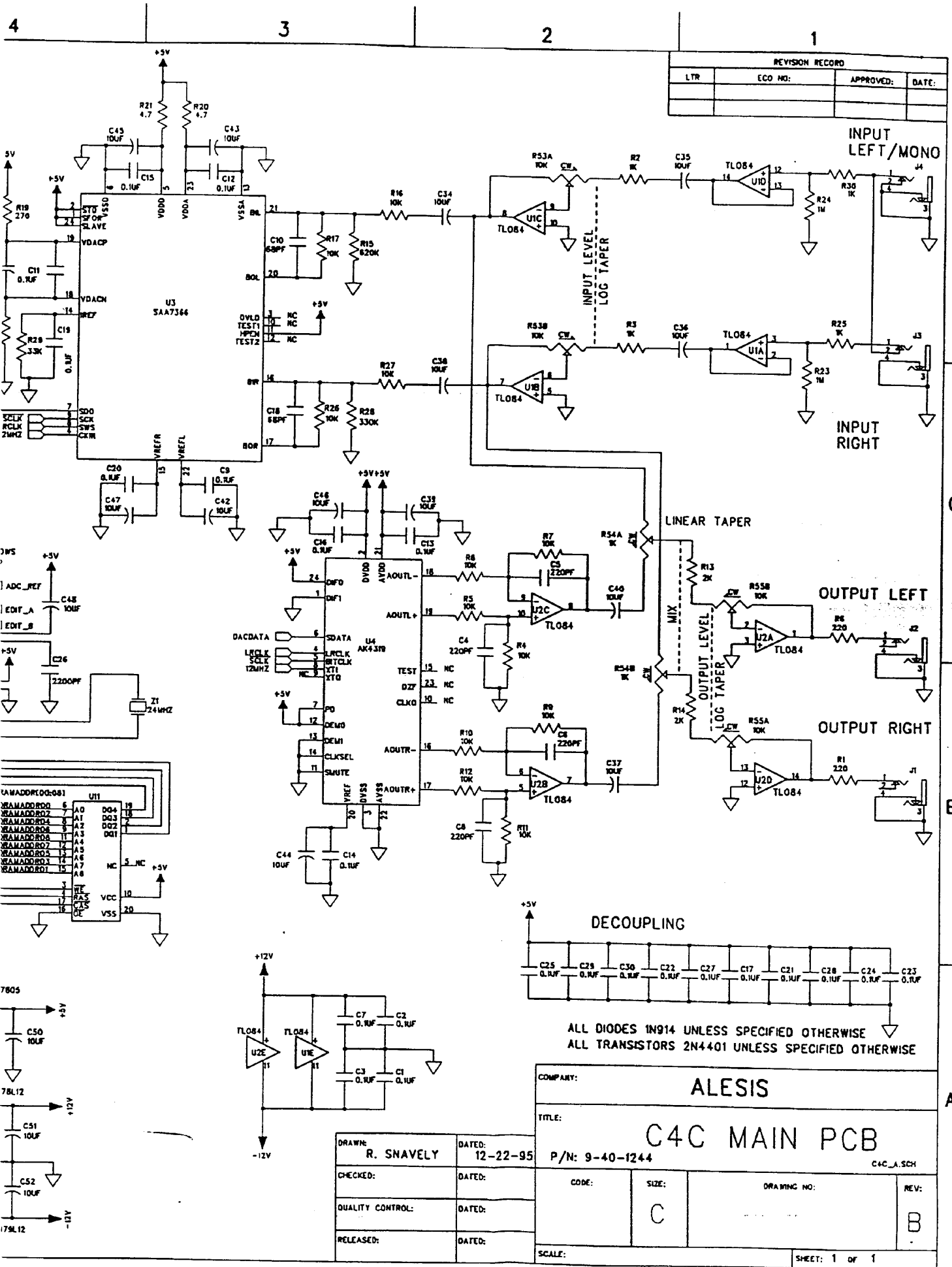


# NOTES

### 13.00 Schematics and Component I.D.s

This manual should contain the following schematics and comp. I.D.s:

UNIT	Schematic Rev.	Comp. I.D.
C4	B	2 Pages
C4	C	2 Pages
NV	A	N.A.
NV	B	N.A.



REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

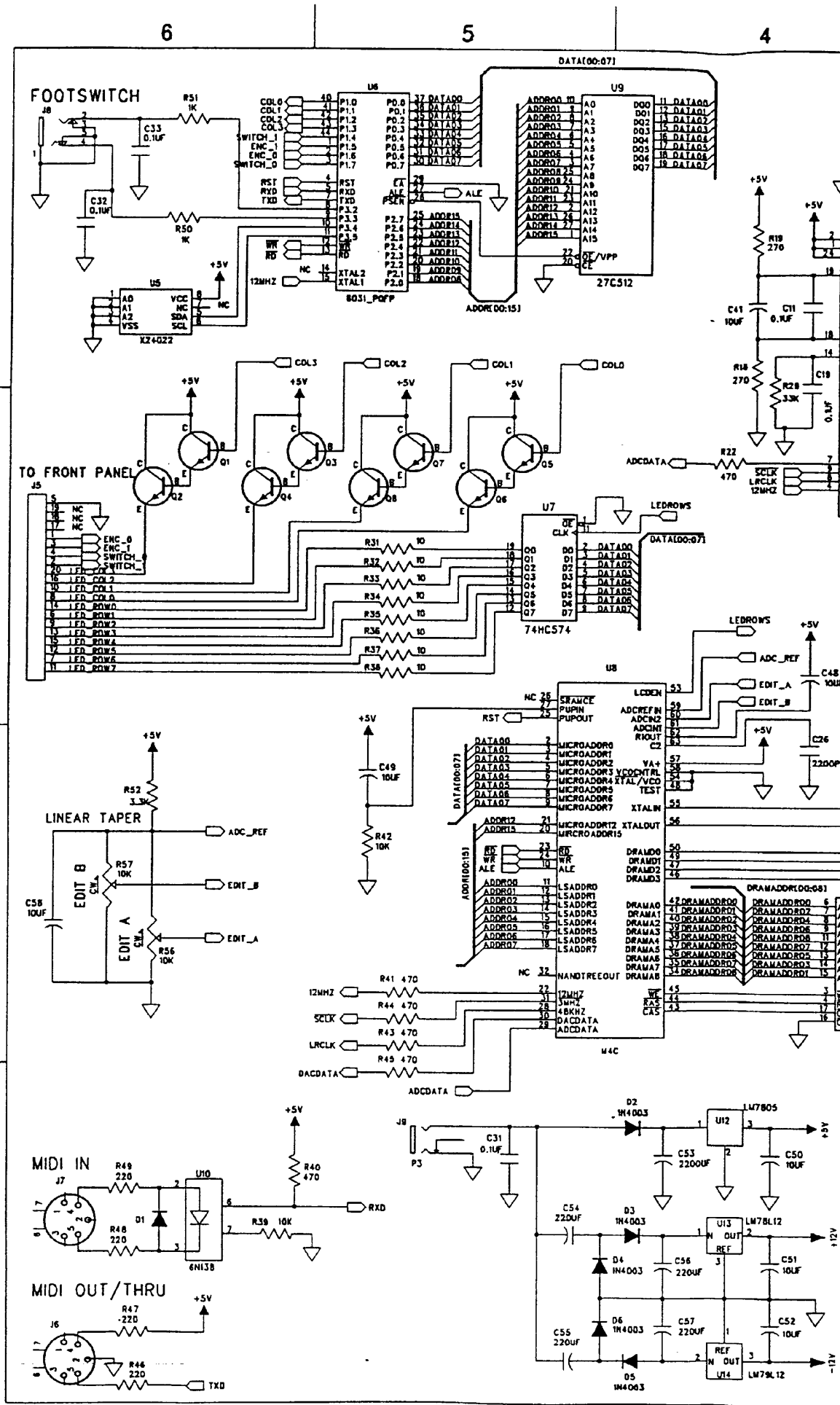
DECOUPLING

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ALL DIODES 1N914 UNLESS SPECIFIED OTHERWISE  
 ALL TRANSISTORS 2N4401 UNLESS SPECIFIED OTHERWISE

COMPANY: ALESIS			
TITLE: C4C MAIN PCB			
P/N: 9-40-1244			
CODE:	SIZE:	DRAWING NO:	REV:
	C		B
SCALE:			SHEET: 1 OF 1

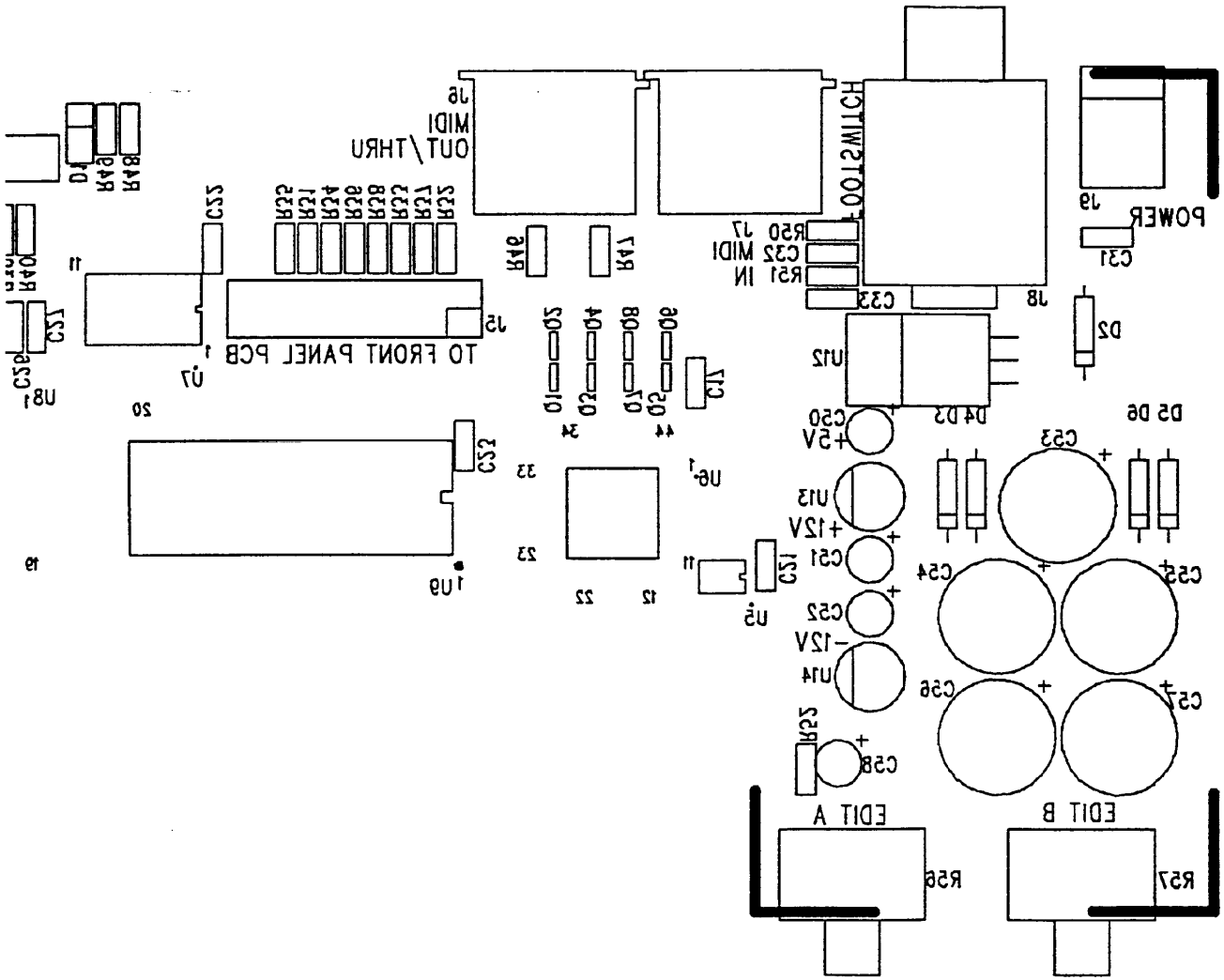
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CHECKED:	DATED:
QUALITY CONTROL:	DATED:
RELEASED:	DATED:

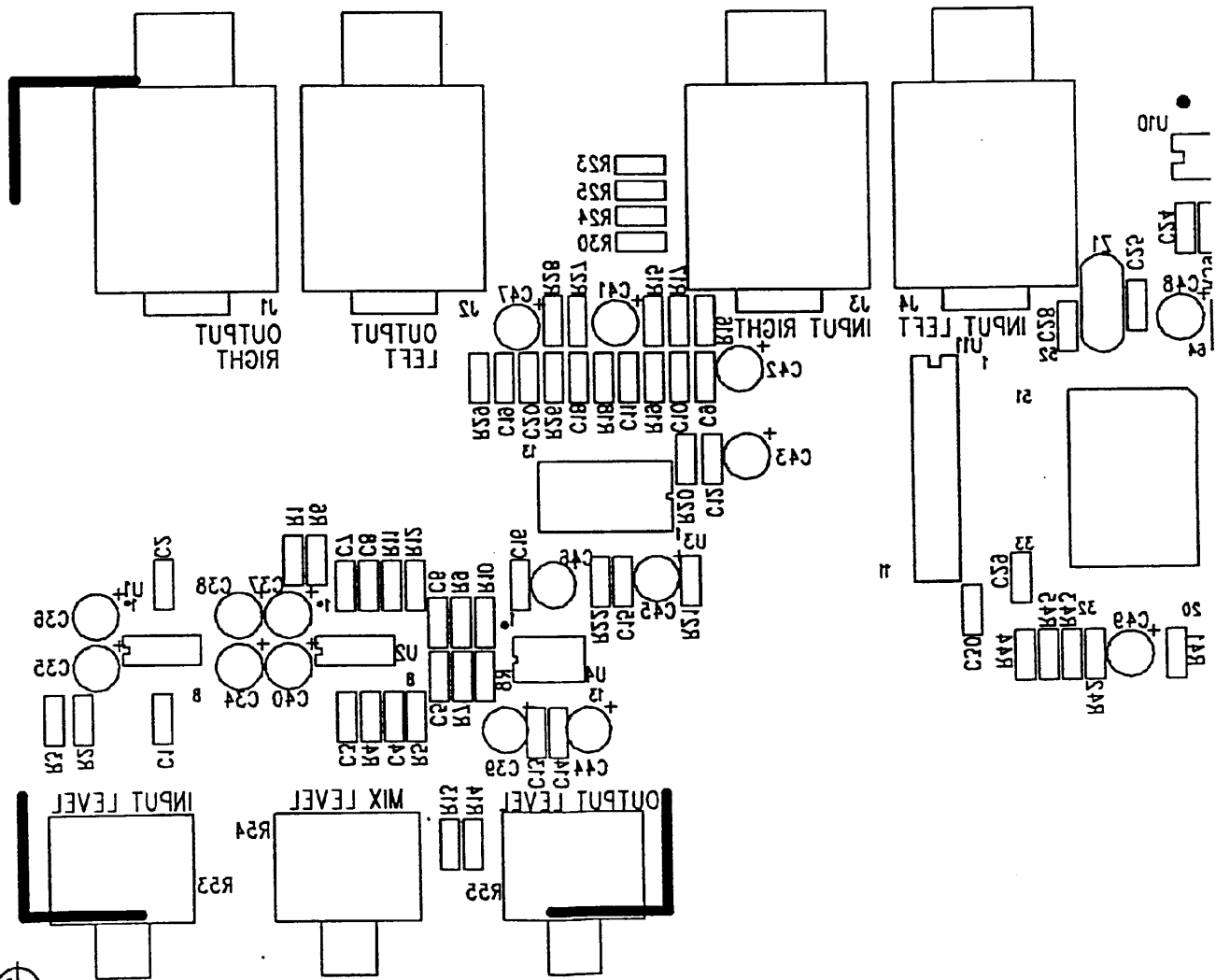


A\W 9-40-1544 REV.B "BOTSIK"

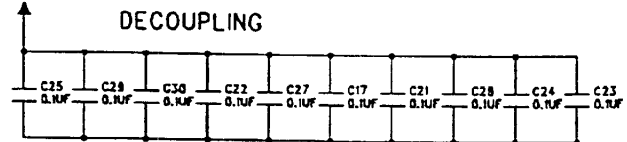
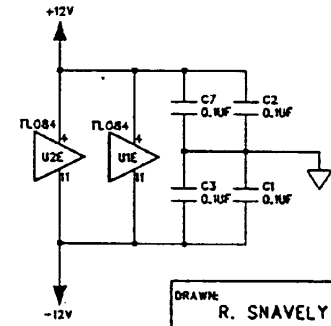
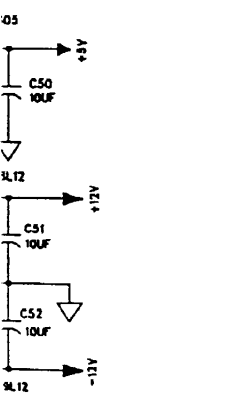
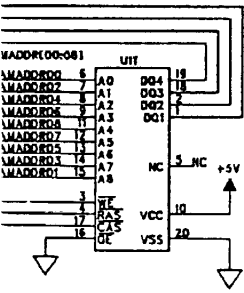
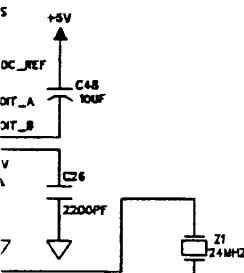
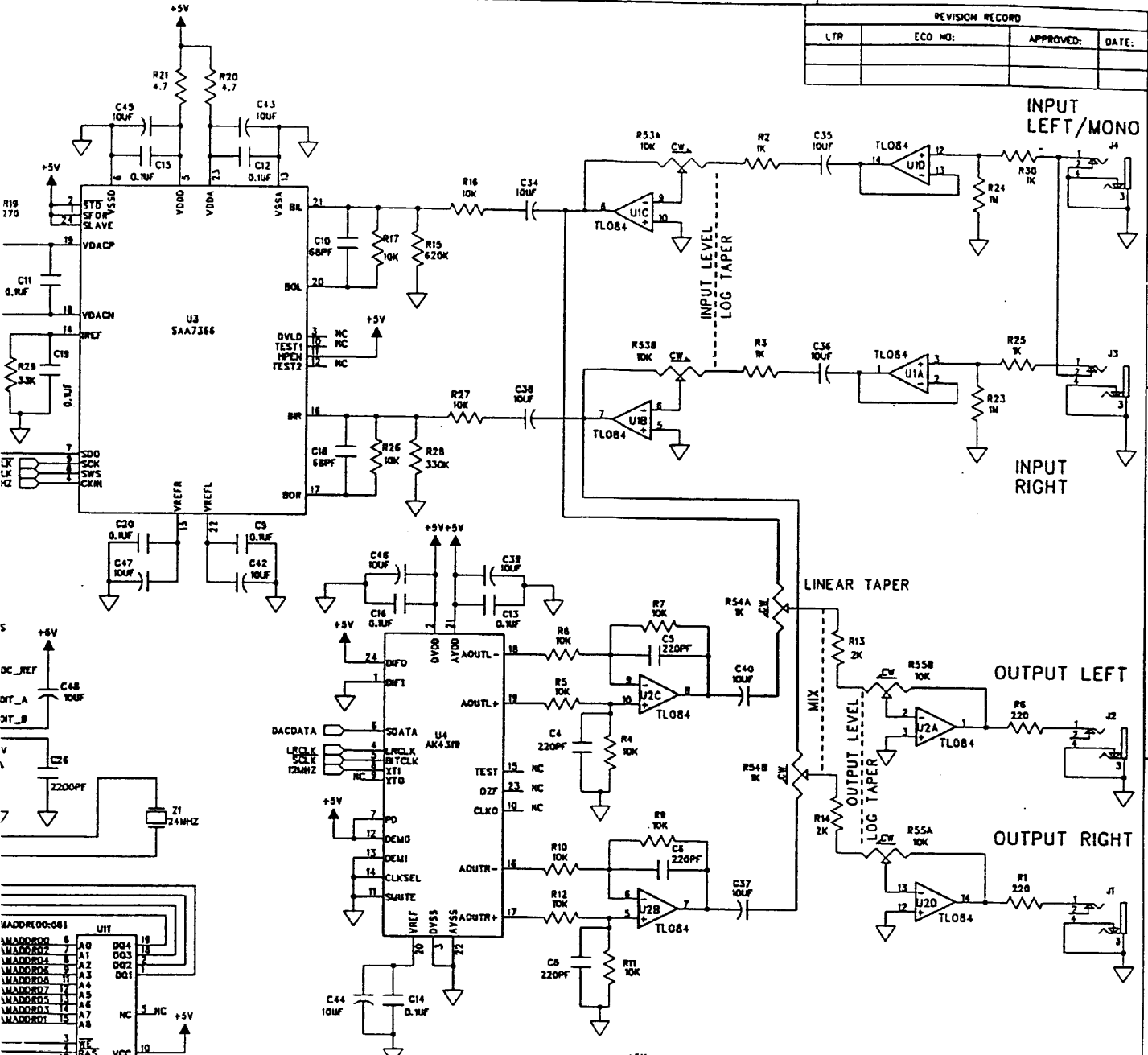


### ALESIS "C4 MAIN PCB REV.B"





REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

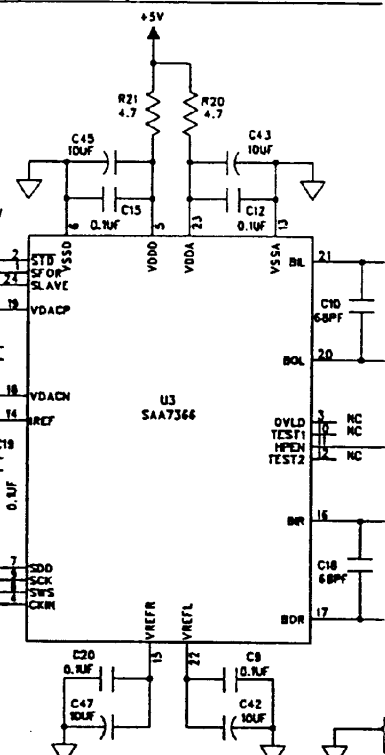
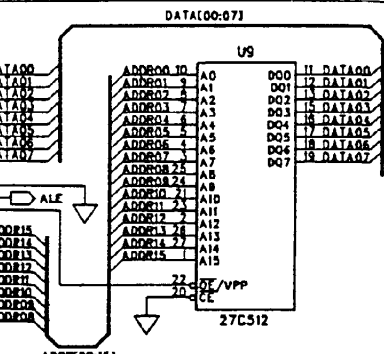
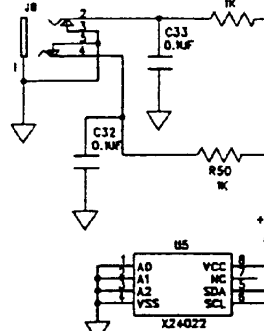


ALL DIODES 1N914 UNLESS SPECIFIED OTHERWISE  
 ALL TRANSISTORS 2N4401 UNLESS SPECIFIED OTHERWISE

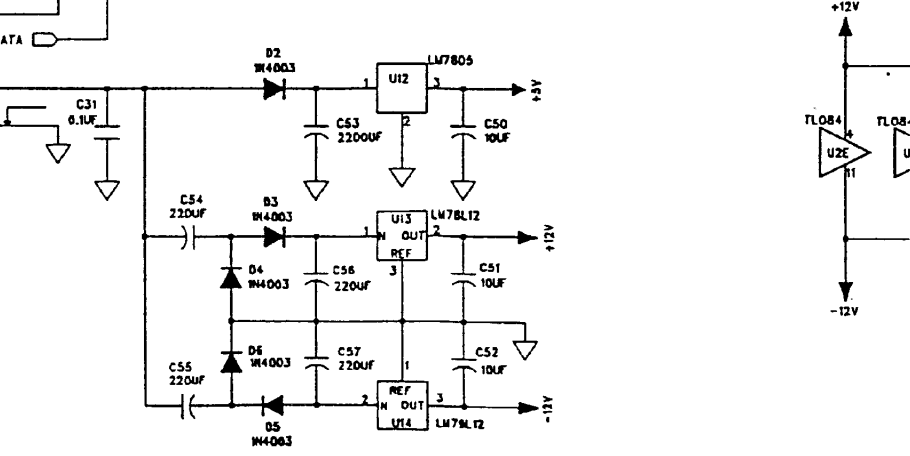
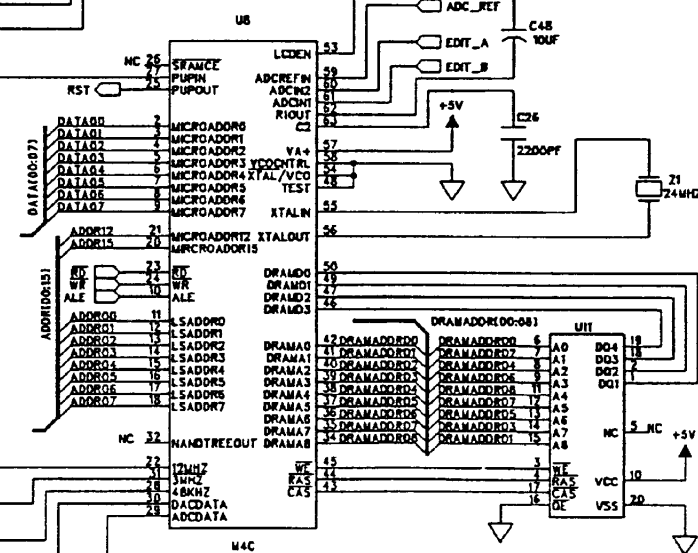
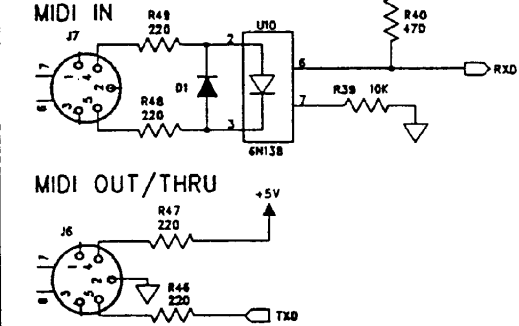
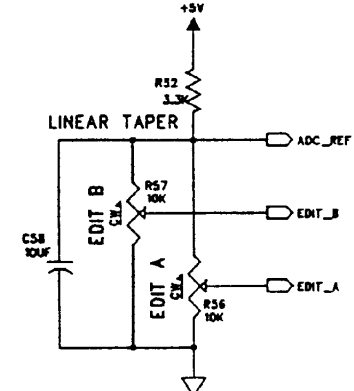
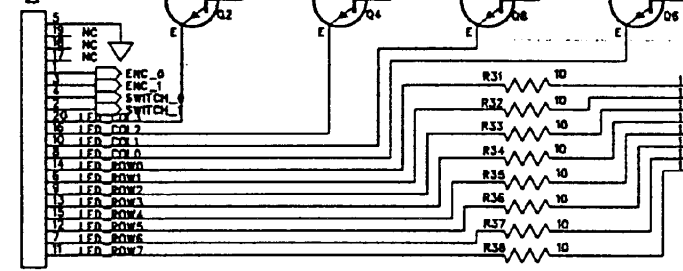
DRAWN: R. SNAVELY	DATED: 12-22-95
CHECKED:	DATED:
QUALITY CONTROL:	DATED:
RELEASED:	DATED:

COMPANY: <b>ALESIS</b>			
TITLE: <b>C4C MAIN PCB</b>			
P/N: 9-40-1244			
CODE:	SIZE: <b>C</b>	DRAWING NO:	REV: <b>C</b>
SCALE:			SHEET: 1 of 1

FOOTSWITCH



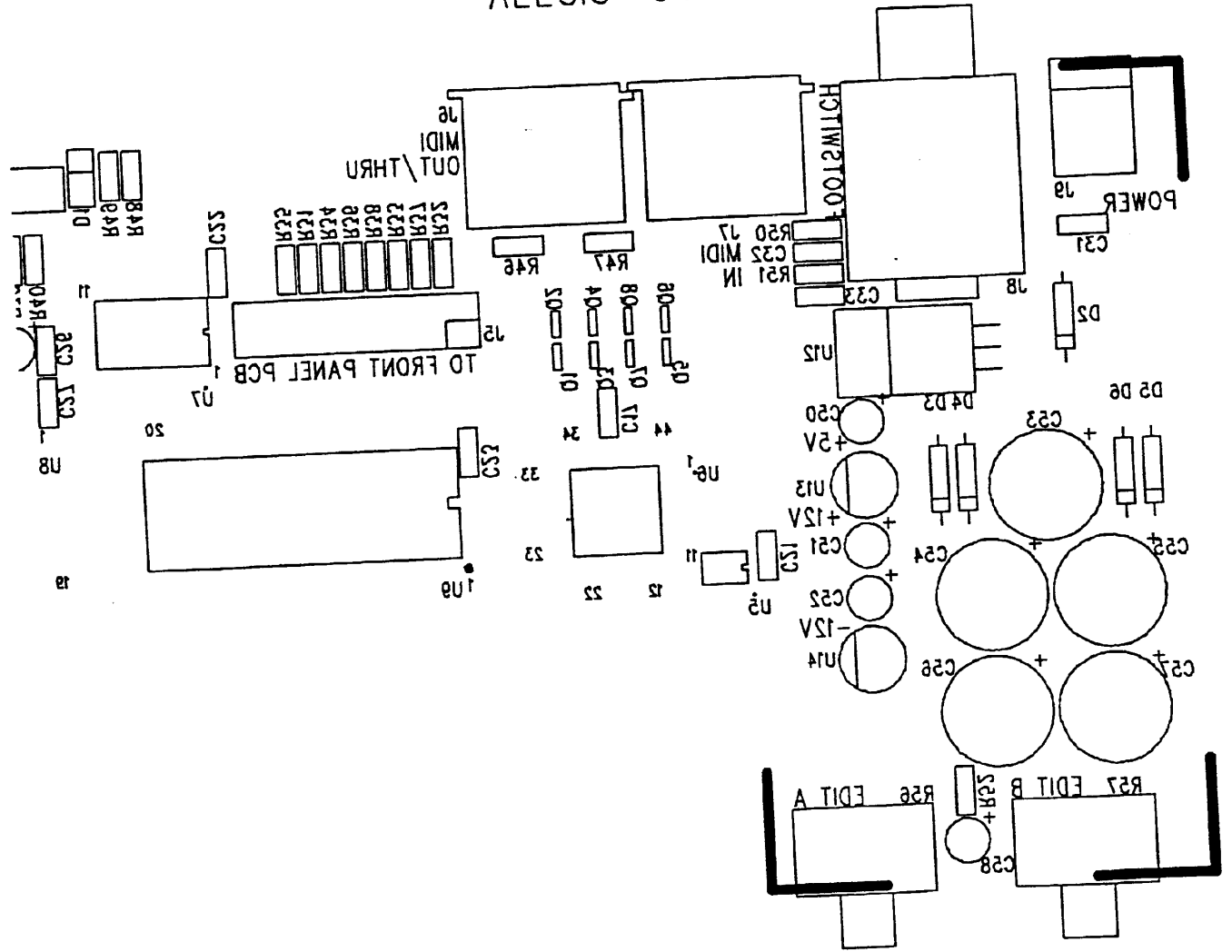
TO FRONT PANEL

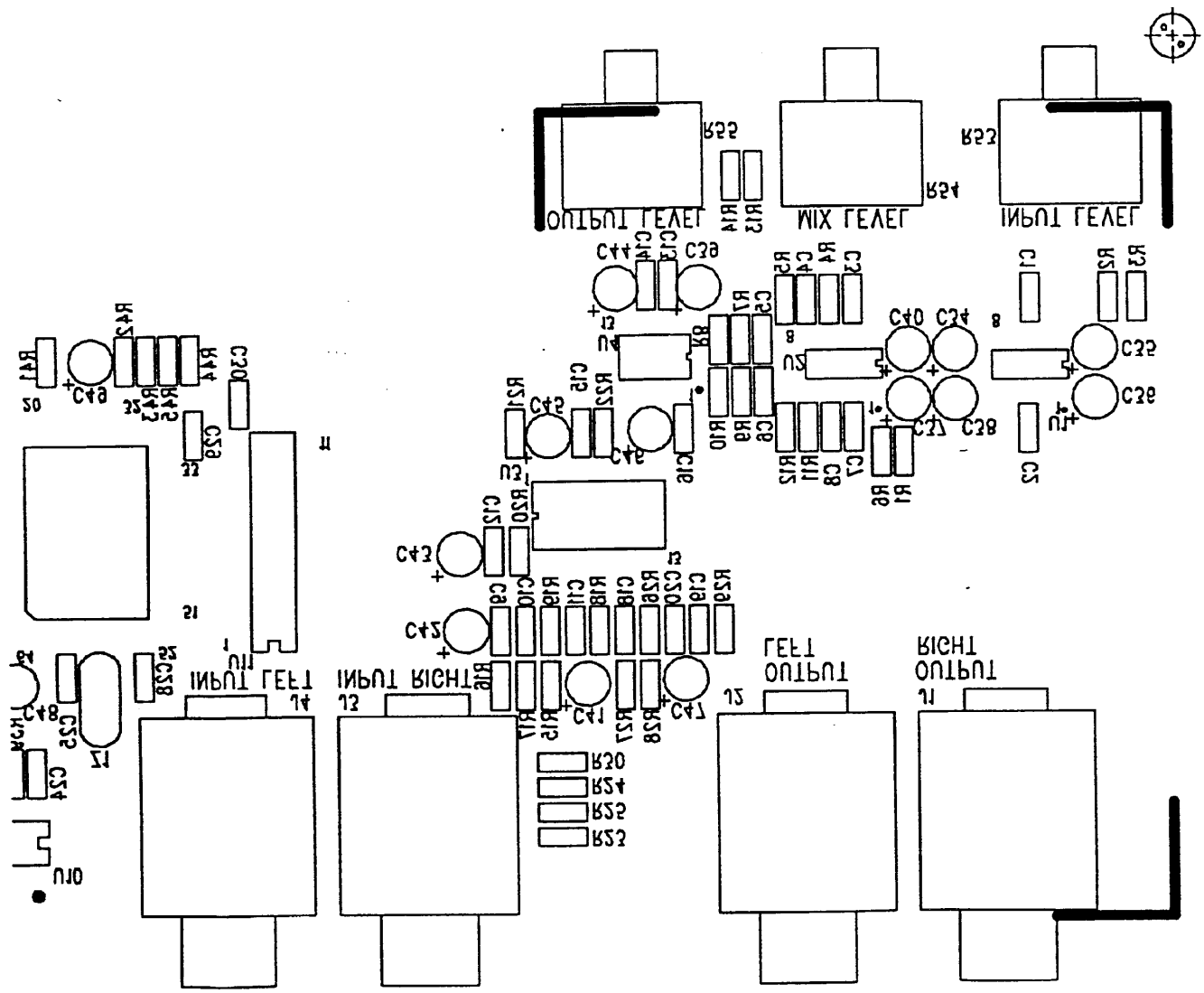




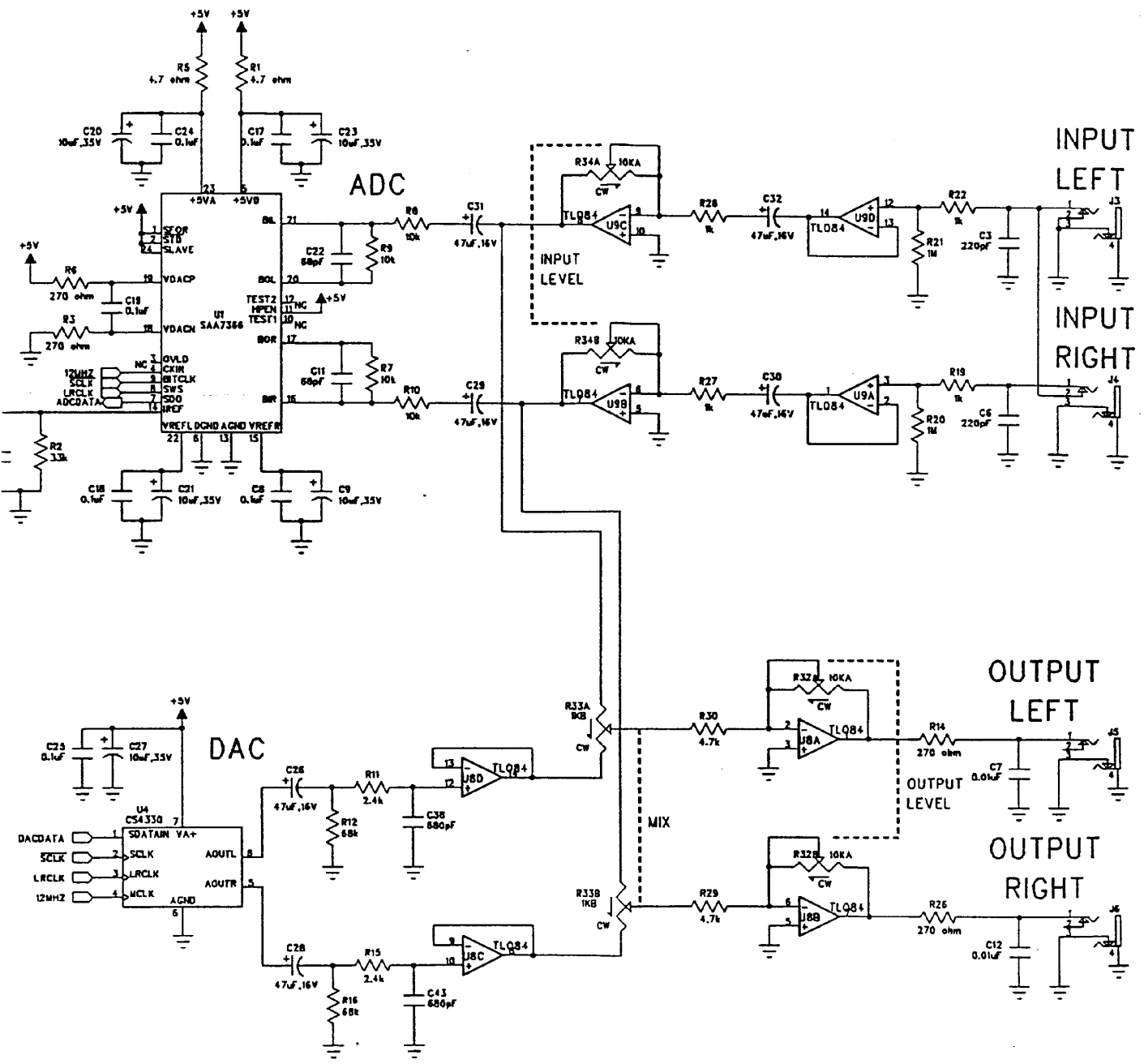
A/W 9-40-1544 REV.C "BOTSIK"

# ALESIS "C4 MAIN PCB REV.C"





REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:



D

C

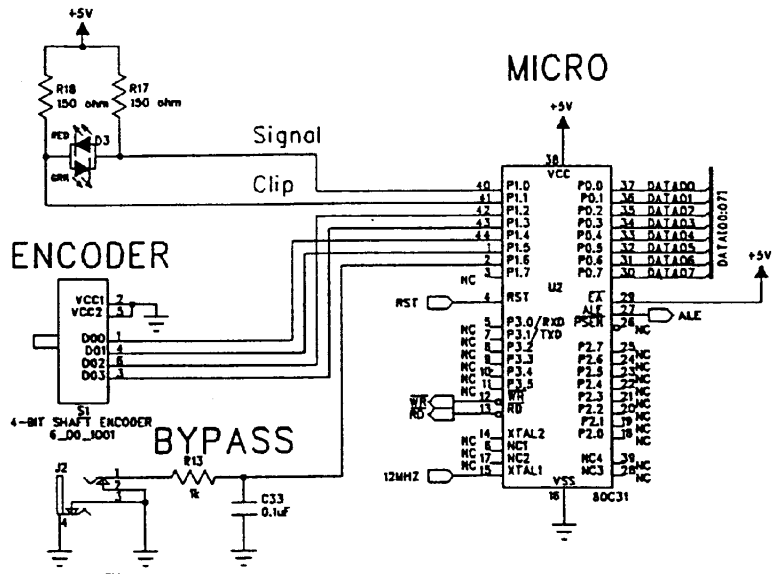
B

A

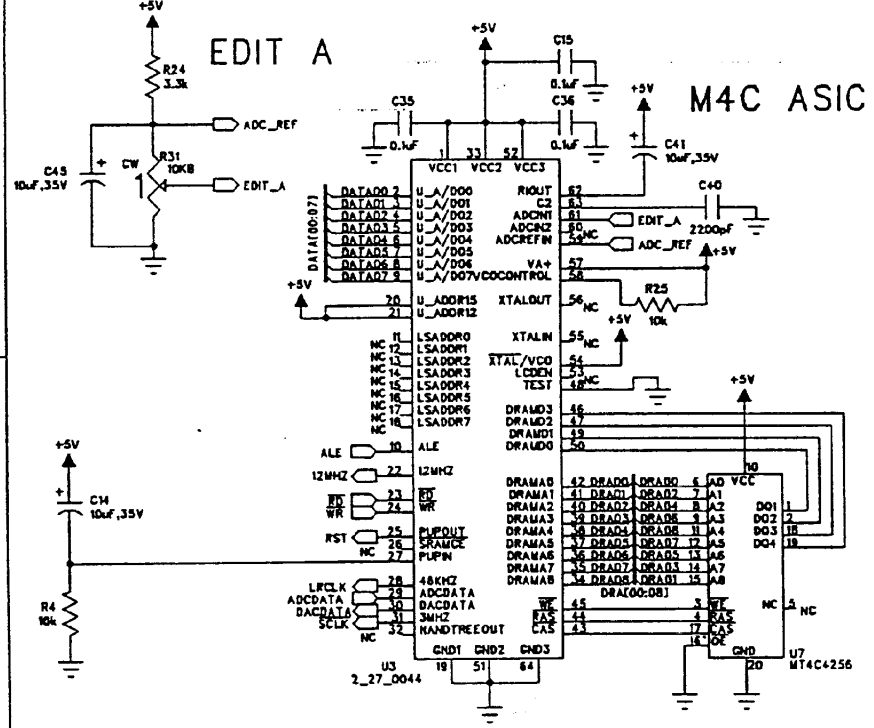
COMPANY: Alesis Corporation			
TITLE: NanoVerb Main PCB			
P/N: 0-40-1250		www.alex.com	
CODE:	SIZE:	DRAWING NO:	REV:
	C		A
SCALE:			SHEET: 1 of 1

DRAWN: John Hancock	DATED: 3/4/96
CHECKED:	DATED:
QUALITY CONTROL:	DATED:
RELEASED:	DATED:

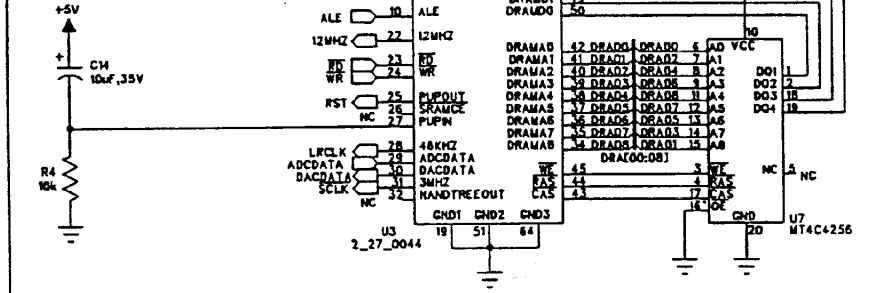
D



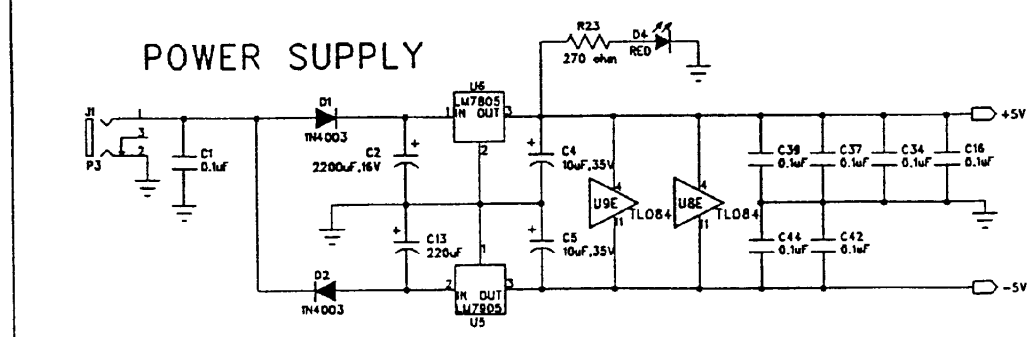
C



B



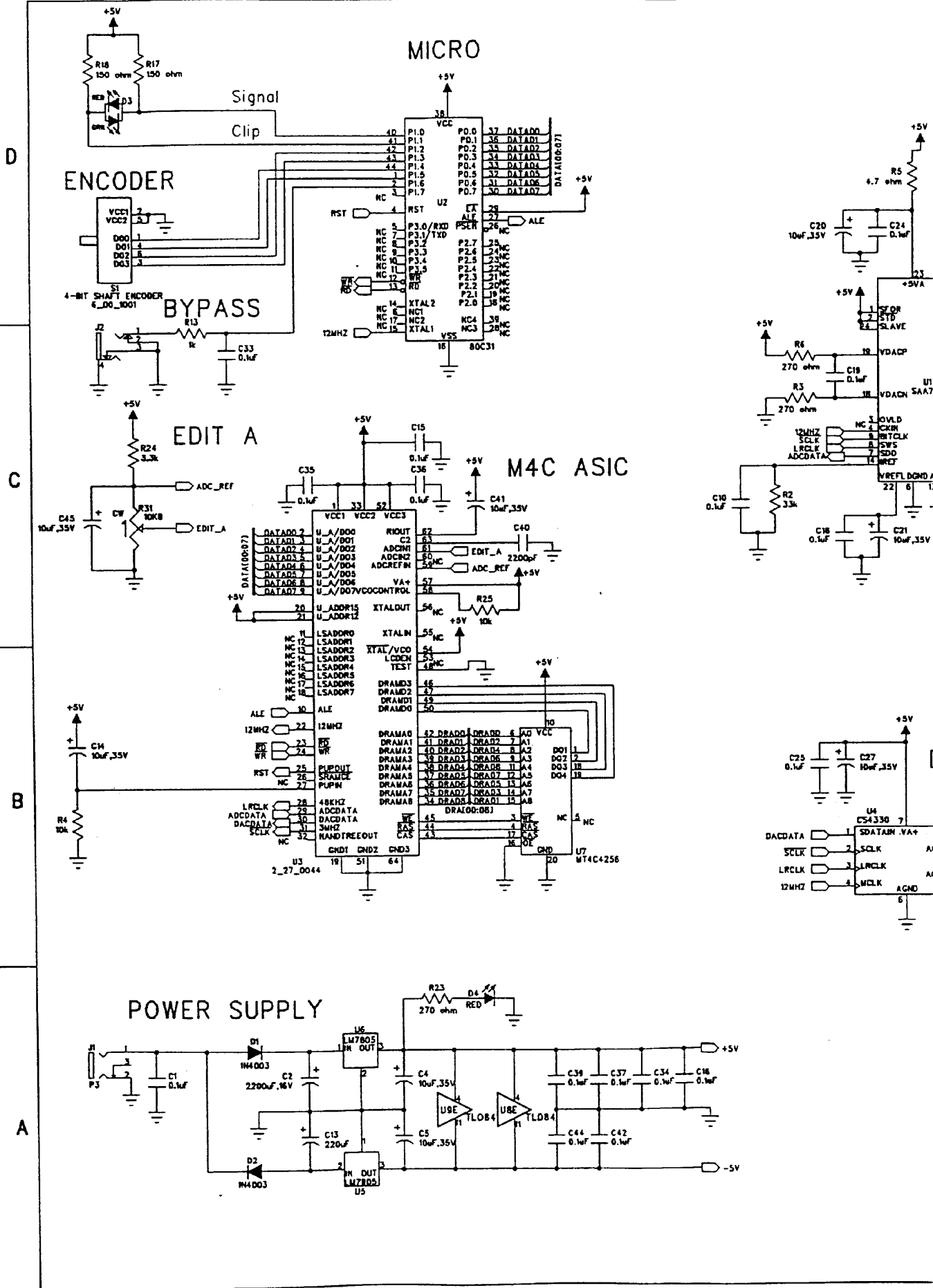
A



6

5

4



### MICRO

### ENCODER

### EDIT A

### M4C ASIC

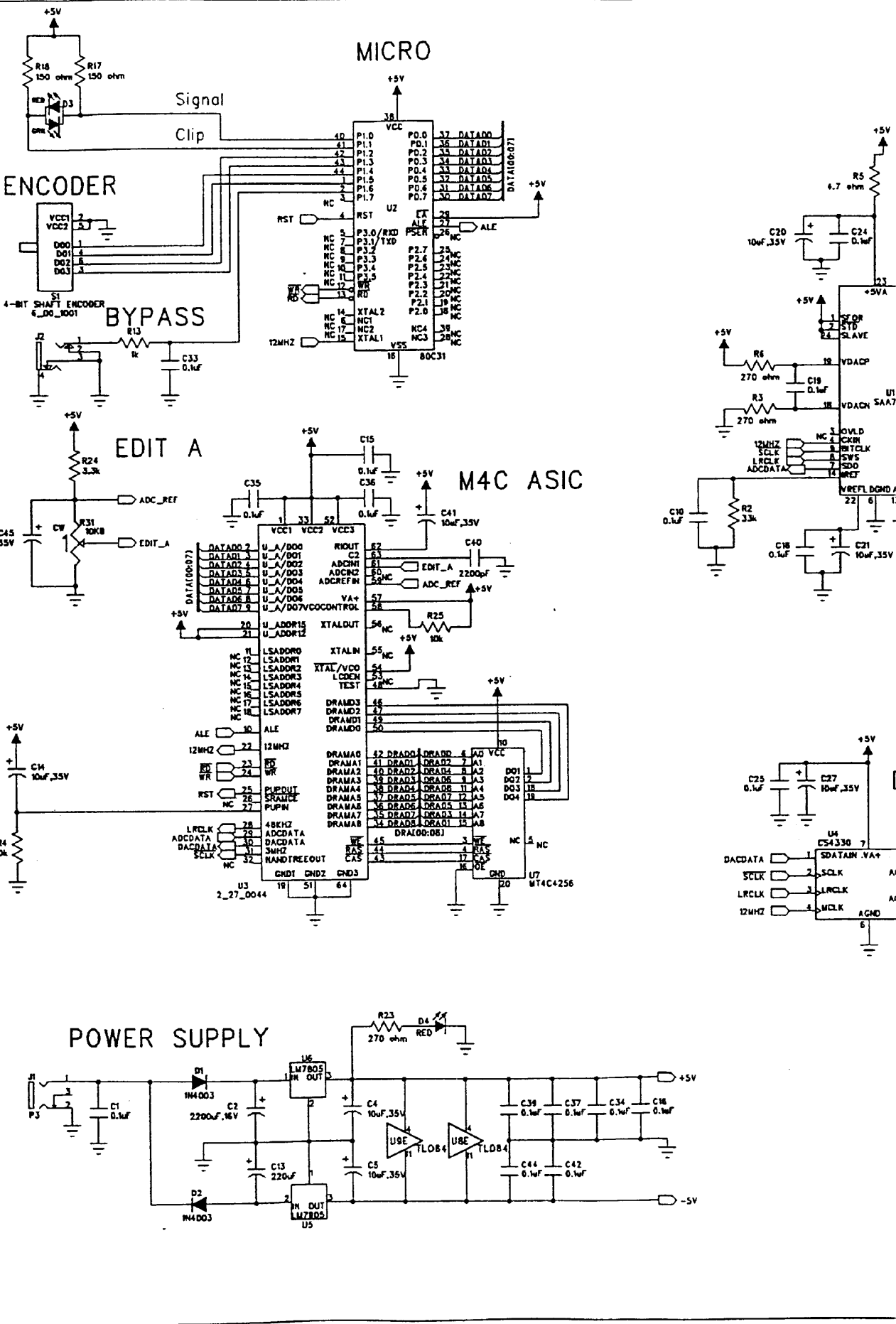
### POWER SUPPLY

D

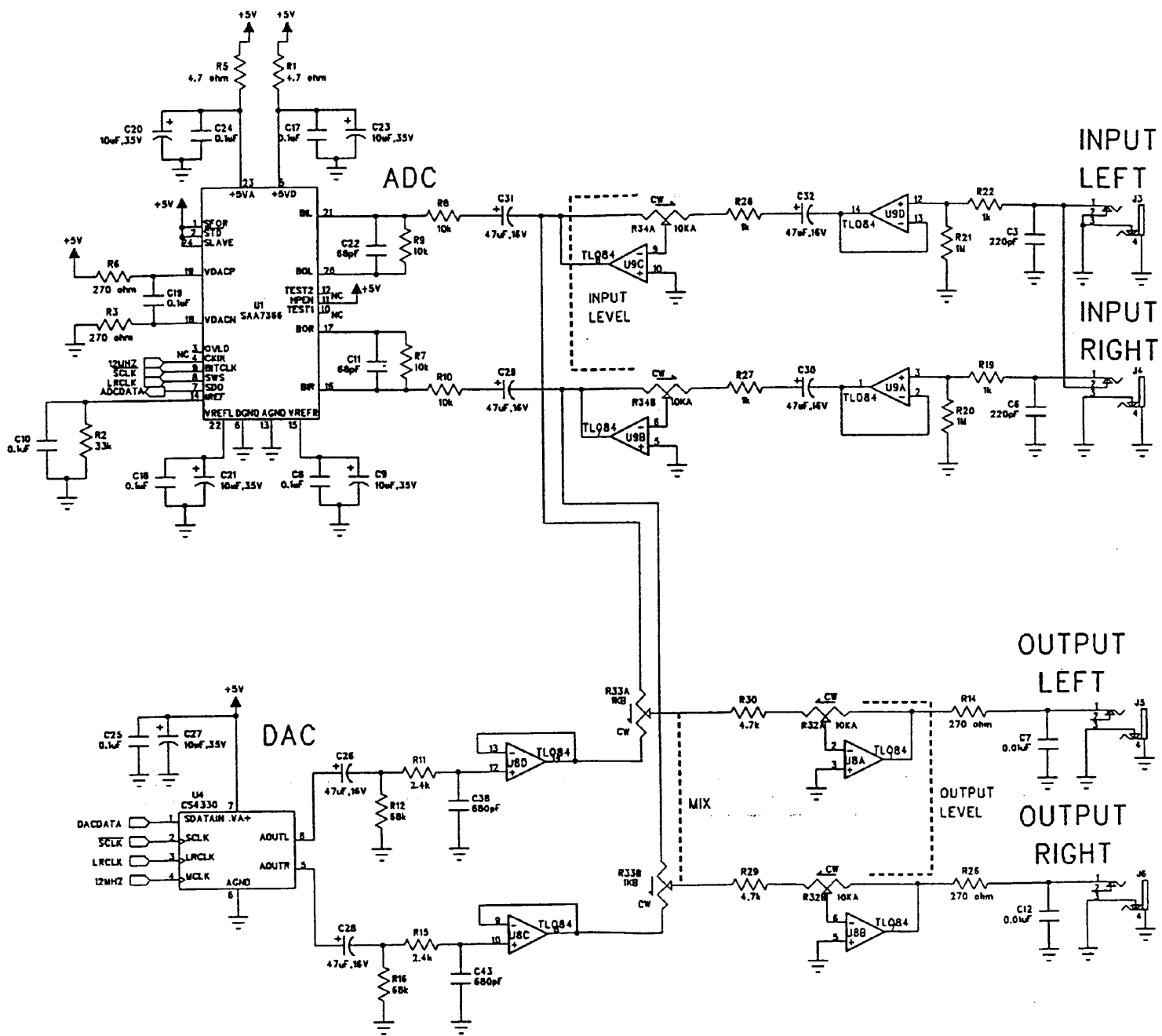
C

B

A



REVISION RECORD			
LTR	ECO NO:	APPROVED	DATE:



COMPANY: Alesis Corporation

TITLE: NanoVerb Main PCB

P/N: 9-40-1250 avm11XXI.mcb

DRAWN: John Hancock	DATED: 3/4/96
CHECKED:	DATED:
QUALITY CONTROL:	DATED:
RELEASED:	DATED:

CODE:	SIZE:	DRAWING NO:	REV:
	C		B