ALESIS
MMT-8 (MT)
Service Manual

P/N: 8-31-0018-A

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Preface

This document is intended to assist the service technician in the operation, maintenance and repair of the Alesis device. Together with the User Reference Manual, this document provides a complete description of the functionality and serviceability of the Device. Any comments or suggestions you may have pertaining to the document are welcome and encouraged.

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The arrowhead symbol on a lightning flash inside a triangle is intended to alert the user to the presence of un-insulated "dangerous voltage" within the enclosed product which may be of sufficient magnitude to constitute a risk of electric shock to persons.

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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CAUTION: The product under service may employ the use of a replaceable fuse. Danger of fire or electrocution if fuse is incorrectly replaced. Replace with only the same type or equivalent type recommended by the equipment manufacturer.

Regarding the Internal Battery

CAUTION: The product under service may employ the use of a internal battery. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instruction.

Safety Instructions

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 Componants - Somtimes 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 MMT-8 MultiTrack Recorders power lies mainly in the sophistication of it's software. The most powerful troubleshooting tools available to the technician are the a good working knowledge of the MMT-8's operation and the software history in section X.X. Most problems with the MMT-8 arise from either user error, or older software. The hardware is very simple and should normally prove to be problem to troubleshoot. Please note here that there are sveral revisions of main PCB and 2 revisions of keypad boards. While latest versions of the main PC Board include most of the hardware updates, older board revisions will require some additions to bring them up to the current factory specifications. These updates are discussed fully in section X.XX.

2.00 Power Supply

2.10 Battery Backup

Battery backup is actually more complicated than it might first appear, as it depends on a good system reset (see section X.X for details) in order to function properly. The actual backup circuit consists of a battery (3V - 3.6V Lithium), a 10K resistor (R76) for checking standby current (see below), a "steering" diode (D5), a filter capacitor (C13), and a transistor/resistor/diode combination (Q11, R79, D6) that acts as a steering diode. This combination may be missing on older board revisions, and must be installed (see section X.X) to prevent data corruption due to a significant difference between V^{CC}, and the amplitude of the data buss.

SRAM standby current should always be checked. While the unit is off, check the voltage across R76. If the voltage is higher than 80mV (specification, although a 1 to 20mV range is more normal) then a problem exists. Usually it indicates a bad (or simply wrong) SRAM, or a short, somewhere along the MEM PWR line. Note, that for a short time, Sony 58256-PM (high power) SRAMs were being installed at the factory, causing batteries to drain in about 1 year. They should be replaced with low power versions (58256-LP) when found, in order to eliminate excess battery drain. We are currently using Hitachi 62256ALPs as replacements.

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same type or equivalent type recommended by the equipment manufacturer.

Battery Manufacturer: Tadiran
Type: TL-5101
Rating 3.6V

3.00 The 8031 Micro Controller

The 8031 MPU is the heart of the MMT-8's control section. It handles everything from keypad input and MIDI I/O, to sequencing. Note that the 8031 data buss serves a dual purpose. This buss multiplexes between low order addresses (1st 8 bits), and data. Latch U11 is used to hold the low order address half, during 8031 read and write cycles. The EPROM (U12) is used to hold 8031 program information. The SRAMs (U9, U10) hold system variables, as well as user sequence data. Z1 provides the 12MHz 8031 clock. MIDI I/O is handled through the 8031's built in RXD (Read Serial Data), and TXD (Transmit Serial Data) ports. Tape I/O is handled through the built in 8031 I/O ports. LCD output is handled through memory mapped I/O (see section X.X). Keypad decoding uses both forms of I/O (see section X.X).

3.10 Reset

The 8031 reset circuit is perhaps the single most important circuit in the MMT-8. When this circuit is functioning incorrectly, problems ranging from loss of battery backup, to a complete lock-up of the machine, can occur. A thorough knowledge of the operation of this circuit will greatly facilitate troubleshooting this unit.

This circuit uses the differential between raw +10V, and regulated +5V, to generate the required signals for system RESET. This is necessary due to fact that the system MUST be in a reset state while powering down, otherwise, random noise on the 8031 data, and address, busses could corrupt SRAM data, and destroy any hope that the battery backup will work. R11, R12, and the 5.1V zener diode (D1), work together as a voltage divider to the base of Q1, and is designed so that transistor Q1 will turn on when the raw +10V supply is roughly 7V. This is to ensure that RESET does not occur until after the +5V regulator is fully functioning (i.e. +5V rail is solid). If RESET occurs too early, noise on the +5V rail can cause data corruption. Before the Q1 turn on threshold, Q2 remains turned on (the base of the transistor being pulled up by R13). This in turn holds the voltage across C8 at .3 volts. This is below the threshold (set by R17 and R18) necessary to turn on the comparator U14A, leaving the reset line high (pulled up by R14). Once the raw supply has reached a sufficient level to turn on Q1 (roughly 7V), Q1 will pull the base of Q2 low, turning it off. This allows C8 to begin charging through R15. Once C8 has charged to roughly 3.3V, the comparator will switch states pulling the input of the inverter (U14A) high (thus switching the invertors output low). This in turn pulls the threshold voltage of the comparator down to 1.6V, ensuring that noise does not cause any false resets. This completes the reset cycle during power up.

During power down, the opposite occurs, ensuring that the 8031 is held in a reset state during power down as well. This is necessary in order to prevent random data from being written into the SRAM during shutdown. Be aware that this can cause unusual unit lockups to occur if the circumstances are just right. For example, if an MMT-8 was shut off while in record mode, it's possible the 8031 was put into reset in the middle of writing a two byte pointer into memory. If only one of those bytes is written before reset, then it may point to an incorrect location in memory (battery backup holds the incorrect data). When the unit is powered back up, the incorrect pointer may send the software into "never never land" where the only way to recover is to reinitialize the unit.

3.20 Memory Mapped I/O

In order to easily control the vast number of hardware functions that the 8031 needs to access, a system of memory mapped I/O is used. The basic idea is to make hardware functions appear to the 8031 as unused memory locations. That way all that the software has to do is write to an unused memory location in order to send that information to a specific device such as the LCD, or keypad LEDs.

You Are Here

74HC138 (U13) performs the majority of the work in this circuit. Two things are required before U13 becomes active. 1> A15 must be low (i.e. the 8031 is accessing the lower 32K of address space). 2> The 8031 WRite line must be active (the 8031 is performing a memory write). A15 is used to directly control which function (memory or I/O) is active.

Once U13 is enabled, addresses A8-A10 are decoded by it, and the latch corresponding to the value of the decoded address is strobed. At this point, data on the 8031 data buss is "written" into the latch.

4.00 Tape I/O

Tape output is very simple, while tape input is somewhat more complicated. This is due to fact tape backup and tape sync have different requirements. It's important to remember that not all tape decks are created equal. Probably the largest factor involved is the decks input and output capacitances. These can greatly affect the signals sent to and from the deck, and may cause some decks to be incompatible with the tape I/O needs of the MMT-8. However, these cases should be rare, as the components chosen for the MMT-8 are based on the industry "standards" that most manufacturers adhere to.

The tape output hardware is simply the 8031 output port P3.2 (pin 12), a pullup resistor (R40), and a voltage divider (R39 and R39) for achieving a line level output. The output during tape save or type sync out applications, will appear as a .5V pulse train, but only if the tape out is NOT connected to a deck (the decks A.C. coupling will distort the output).

While we have heard many complaints regarding tape back up, we have actually found very few actual tape failures. Most of the complaints arise from user error, so below is a list of successful backup and tape sync strategies.

1. When attempting to save to a stereo cassette deck, use only the 1 channel (using both channels may result in odd phase cancellations during playback).
2. Avoid using any noise reduction systems (i.e. Dolby, or DBX) as these can distort the timing of the pulse train that contains the data.
3. Avoid using adapters for two reasons. 1> Some adapters contain built in attenuators that can result in extremely reduced levels, both to and from the tape. 2> Oxidation and "wear and tear" can cause adapters to become intermittent.
4. Always make several copies of each "save". It's especially smart to make copies on at least 2 different tapes as well. This reduces the chances that tape dropouts will cause loss of data.
5. Always use normal bias tapes, as high bias tapes actually end up recording noise, which could make it past the wave shaping circuitry and cause false triggers.
6. Always verify tapes after saving them. This helps reduce the chances of bad saves. Note however that the MMT-8 does not compare the tape to the contents of memory. It simply verifies that the information on the tape is valid MMT-8 data.
7. Experimentation with record and playback levels usually lead to better results.

Trouble shooting tape problems should begin with listening to the data tape audibly. This can help the technician determine if the problem occurs during tape save or load. If unusual dropouts are heard then the problem is either just a bad tape, bad cable, or the tape save circuit. Normal sounding tapes usually indicate a tape load problem. Only practice will help you determine what is "normal".

5.00 MIDI I/O

The MIDI hardware is a standard implementation. MIDI out begins at the 8031's TXD port (pin 11) and travels via R6 to the darlington pair Q1/Q2. Note that the 8031's internal pullup is not very strong, and older units (revision A) may require the addition of an external pullup resistor for the MIDI out to function correctly (see section 7.7).

MIDI in consists mostly of the opto isolator (U4), protection diode D6, pullup R7, and threshold resistor R5. Note that the threshold resistor may need to be changed in order to eliminate false MIDI triggers (see section 7.6).

6.00 Keypad Decoding

Keypad I/O is handled through a simple polling process Each row of the keypad matrix is pulled low one at a time (via U14 which is memory mapped). If any button along the row is pressed, the corresponding column input (U22) will appear high. If no buttons are pressed, all column inputs will appear as a low. D9-D15 and R42-R47 provide protection for the outputs of U14. Use diagram 3 to localize individual button failures.

7.00 Metronome Output

8.00 Updates and Corrections

9.00 Troubleshooting

10.00 Software History

DATE	VERSION	COMMENTS
11/1/87	1.02	First production release
12/1/87	1.03	1) Fixes tape sync output so that when a part or song loops, a clock output pulse isn't skipped. 2) Outputs MIDI controller 64 (sustain pedal) at value 0 (off) once for each MIDI channel whenever a part or song is stopped so as to stop synths from sustaining. 3) Changed MIDI test routine so that an extra byte is sent out before testing MIDI to accommodate 8051s that have indeterminate data in the UART on power up. THIS VERSION WAS NEVER RELEASED.
12/8/87	1.04	1) Fixes STEP EDIT bug that caused erroneous data to be displayed if an event other than the first or last event on a beat is moved to another beat. 2) Also in STEP EDIT, editing the sub-beats now do not allow decrementing below beat 001/00.
12/16/87	1.05	1) Fixes cassette output bug that would occasionally cause a part to output data much longer than it should, which would make the cassette interface data unusable.
12/30/87	1.06	1) Fixes cassette input bug that would cause data to be corrupted if only part 99 is loaded in from tape.
1/4/88	1.07	1) Fixes cassette input bug that would cause part 99 to be erased if a single part or song was loaded in, or a cassette was verified.
5/26/88	1.08	1) When in record on a part in loop, the display will no longer remain displaying "RECORDING" after looping. The display will still not change when punching in or out (to reduce delays). 2) Fixes bug that would cause an incorrect display if aborting "LOAD ONE PART" before tape data has begun when previously in song mode, and aborting "LOAD ONE SONG" before tape data has begun when previously in part mode. 3) Fixes bug that caused the display in part edit mode to show the incorrect beat number for beats 456 through 511. This bug was also present in insert note (COPY button) while in edit part mode. 4) Fixes bug that caused the display to lock up flashing between "CHANGE LENGTH" & "MEMORY FULL" if an attempt was made to change the length of a part when memory was full. 5) Fixes bug that would cause the end point of a track or part to be erased if part of a track or part (i.e., only notes, controllers, MIDI channel 1, etc.) was erased. This would not cause a problem while playing a part, but would result in the part following this one in a song not to play. 6) Fixes bug that would cause any notes with durations of 2/64 or any multiple thereof to be increased by 2/64. This would occur when changing length, quantizing, or copying any part or track. 7) Increased delay loops in display routines so that fewer LCD displays would be rejected in production.

3/8/89 1.09

1) If a song was stopped and continued within the first part of the song, the MIDI output of the sequence would not always be in sync with the click, MIDI clock, and display. This is now fixed.

2) If a track of a song was shifted by 2 or more 384th notes, and one or more of the parts of the song was 1 beat in length, the first occurrence of a 1 beat part would be played twice, causing that track to be delayed by 1 beat. This is now fixed.

3) Fixes bug in which if two events such as controller, program change, or aftertouch, occurred on the same beat, and any edit operation was performed (such as ERASE, QUANTIZE, LENGTH, etc.), then stepping backwards through this event in step edit mode would cause non-existing events to show up in the display, which could cause the machine to lock up.

4) Fixes bug which system exclusive data would be played back incorrectly if the track with the data was set to any MIDI channel other than UNCHANGED.

5) Fixes bug in which events could be inserted into an empty track in step edit mode repeatedly, until the events being inserted occurred before beat 1.

6) Fixes bug that would cause a song to continue from the wrong part if a step was selected in edit mode and then STOP/CONTINUE was pressed.

7) When changing the name of parts or songs, the characters will no longer loop from the last character (⌀) to the first character (space) and vice versa.

8) Added feature that allows locating directly to any specific beat of a part. This is accessed by holding either the fast forward or the rewind button, and entering a beat number with the keypad. If in stop, pressing STOP/CONTINUE will continue the part from the selected beat. If in play, the part will continue from the selected beat when fast forward or rewind is released. In SONG mode, this feature can be used to locate directly to any beat within the current step of the song.

9) Fixes bug that caused a track to stop playing if the track was shifted forward in time (+1 to +48 384th notes), and the song was stopped during the last beat of a step, and the track had already played the first beat of the next step. If continue was pressed from this point, the shifted track would no longer play. This is now fixed.

7/22/89 1.10

1) If in song mode with the first step of a song being a one beat part, and rewind is held until the display reads step 00 beat 000, and then stop/continue was pressed while holding rewind, The first step would be played twice, and offset tracks may be out of sync. Stop/continue is now ignored while holding the rewind button.

2) The start/stop footswitch jack is now scanned at power on to determine the polarity of the switch that is plugged in (normally open or normally closed). For this to function properly, the footswitch should be plugged in before turning the power on, and it should not be pressed when turning the power on. If no footswitch is plugged in at power on, the MMT-8 will assume a normally open footswitch.

3) If the start time of an unquantized note added to its duration results in the exact beat that the note would be quantized to, performing a quantize note start would result in a duration of 00/000 (e.g., note start of 001/47 duration 000/01 when quantized would become 001/48 with a duration of 000/00), which is invalid, and could result in a fatal crash if other notes existing on the same beat are edited. This is now fixed.

4) If a note event and a sysex event exist on the same beat, rewinding past the events in step edit mode would cause the display to skip the sysex event, and only show the note. If more than one note existed as well, the note preceding the sysex event would also be skipped. This is now fixed.

5) In step edit mode, erasing a sysex event could cause a track to have erroneous data, which could lead to a crash. This is now fixed.

6) In step edit mode, changing the start time of a sysex event forward would cause a lock up and often complete memory dump. This is now fixed.

10/31/90 1.11

1) If an empty part is selected, Edit mode should not be able to be entered. However, if an empty part is played, it is possible to enter Edit mode, stop playing, and then insert events which will corrupt data. Now, Edit mode cannot be selected when playing an empty part.

2) If an empty part is recorded for 683 beats (either by recording through the entire part, or rewinding with loop on to a beat before 683 and punching in) without having set the length first, the length of the part will not be set properly, causing eroneous data in the Edit mode as well as other problems. This is now fixed.

3) If a part's length is changed from the top, any notes whose duration was a multiple of 256 clocks (2beats/64sub-beats, 5/32, 8/00, etc.) will have its duration altered such that the duration becomes 256 clocks (2/64) greater than it was previously. This is now fixed.

11.00 MIDI Implementation

The following information is provided as a guide for programmers wishing to modify the data received via MIDI from the MMT-8 for the purpose of interchanging parts from separate block dumps, modification of part names, MIDI channel assignments, etc. Great care must be taken to insure that all modified addresses are valid, since one incorrect value (the length of a part, for example) could result in all data being lost in the MMT-8. These errors may not show up immediately, since the incorrect values may not be accessed by the MMT-8 until a particular part or song is selected. Therefore, it is recommended that any data manipulation programs be thoroughly tested after loading into the MMT-8 by selecting and recording on many parts before assuming that the data is valid.

A system exclusive MIDI data dump from the MMT-8 is initiated by holding the TAPE button down, pressing (and releasing) the PAGE DOWN button once, and then pressing the RECORD button. The data sent out MIDI is in the following format:

HEX	COMMENTS
F0H	SYSTEM EXCLUSIVE STATUS BYTE
00H	
00H	
0EH	ALESIS I.D. NUMBER
00H	MMT-8 I.D. NUMBER

Following the above 5 bytes will be a block of data representing the contents of the MMT-8's memory. In order to optimize the data transfer, 8 MIDI bytes are used to transmit each block of 7 MMT-8 data bytes. If the 7 data bytes are looked at as one 56-bit word, the format for transmission is eight 7-bit words beginning with the most significant bit of the first byte, as follows:

SEVEN MMT-8 BYTES:

0:	A7	A6	A5	A4	A3	A2	A1	A0
1:	B7	B6	B5	B4	B3	B2	B1	B0
2:	C7	C6	C5	C4	C3	C2	C1	C0
3:	D7	D6	D5	D4	D3	D2	D1	D0
4:	E7	E6	E5	E4	E3	E2	E1	E0
5:	F7	F6	F5	F4	F3	F2	F1	F0
6:	G7	G6	G5	G4	G3	G2	G1	G0

TRANSMITTED AS:

0:	0	A7	A6	A5	A4	A3	A2	A1
1:	0	A0	B7	B6	B5	B4	B3	B2
2:	0	B1	B0	C7	C6	C5	C4	C3
3:	0	C2	C1	C0	D7	D6	D5	D4
4:	0	D3	D2	D1	D0	E7	E6	E5
5:	0	E4	E3	E2	E1	E0	F7	F6
6:	0	F5	F4	F3	F2	F1	F0	G7
7:	0	G6	G5	G4	G3	G2	G1	G0

In order to use the data properly, it must be decoded properly into MMT-8 byte format. The following list gives the data locations within the "unpacked" (decoded) block of data, starting with the first byte of the block being 000. NOTE: All absolute addresses must have an offset of 400H added to them (e.g., an absolute pointer to a part that starts at 35AH should have the pointer value 75AH).

000H	MSB of absolute pointer to part 00
001H	LSB of absolute pointer to part 00
002H	MSB of absolute pointer to part 01
003H	LSB of absolute pointer to part 01
004H	MSB of absolute pointer to part 02
005H	LSB of absolute pointer to part 02
"	" " " "
0C6H	MSB of absolute pointer to part 99
0C7H	LSB of absolute pointer to part 99
0C8H-0CEH	DON'T ALTER
0CFH	LSB of absolute pointer to 1st byte past SONG 99 data (start of free mem)
0D0H	MSB of absolute pointer to 1st byte past SONG 99 data (start of free mem)
0D1H-0D2H	DON'T ALTER
0D3H	LSB of FF00H minus data in 0CFH & 0D0H (length of free mem)
0D4H	MSB of FF00H minus data in 0CFH & 0D0H (length of free mem)
0D5H-101H	DON'T ALTER
102H	MSB of absolute pointer to song 00
103H	LSB of absolute pointer to song 00
104H	MSB of absolute pointer to song 01
105H	LSB of absolute pointer to song 01
106H	MSB of absolute pointer to song 02
107H	LSB of absolute pointer to song 02
"	" " " "
1C8H	MSB of absolute pointer to song 99
1C9H	LSB of absolute pointer to song 99
1CAH-1FFH	DON'T ALTER
200H-?	PART 00 DATA

The part and song data must be dealt with in a specific manner:

1) All part and song data must be in consecutive order, i.e., part 05 data cannot be before part 02 data. The order for the data should be part 00 through 99, followed by song 00 through 99.
2) If a part or song does not exist, its MSB pointer will = 0, which is an illegal pointer address. Since there will be no data for this part, it is skipped, i.e., if part 04 is empty, part 05's data follows after part 03's data.
3) There can be no gaps in the data. Part 01's data must follow directly after part 00's data, etc.
4) Locations 0CFH-0D0H (start of free memory) and 0D3H-0D4H (length of free memory) must be kept valid.

PART DATA FORMAT

The following is the format of each part, starting with the address pointed to byte the absolute pointer to the part (offset by 400H):

00H	LSB of number of bytes in part, including header.
01H	MSB of number of bytes in part, including header.
02H	LSB of offset from start of part to address of start of track 8 data
03H	MSB of offset from start of part to address of start of track 8 data
04H	LSB of offset from start of part to address of start of track 7 data
05H	MSB of offset from start of part to address of start of track 7 data
06H	LSB of offset from start of part to address of start of track 6 data
07H	MSB of offset from start of part to address of start of track 6 data
08H	LSB of offset from start of part to address of start of track 5 data
09H	MSB of offset from start of part to address of start of track 5 data
0AH	LSB of offset from start of part to address of start of track 4 data
0BH	MSB of offset from start of part to address of start of track 4 data
0CH	LSB of offset from start of part to address of start of track 3 data
0DH	MSB of offset from start of part to address of start of track 3 data
0EH	LSB of offset from start of part to address of start of track 2 data
0FH	MSB of offset from start of part to address of start of track 2 data
10H	LSB of offset from start of part to address of start of track 1 data
11H	MSB of offset from start of part to address of start of track 1 data
12H	LSB of number of beats in part in BCD format (0 beats =
13H	MSB of number of beats in part in BCD format empty part)
14H	MIDI channel for track 8 (0=unchanged, or 1-16)
15H	MIDI channel for track 7 (0=unchanged, or 1-16)
16H	MIDI channel for track 6 (0=unchanged, or 1-16)
17H	MIDI channel for track 5 (0=unchanged, or 1-16)
18H	MIDI channel for track 4 (0=unchanged, or 1-16)
19H	MIDI channel for track 3 (0=unchanged, or 1-16)
1AH	MIDI channel for track 2 (0=unchanged, or 1-16)
1BH	MIDI channel for track 1 (0=unchanged, or 1-16)
1CH-29H	14 digit ASCII name of part
2AH-?	Data for track 8
?-?	Data for track 7, etc...

Part data must follow these rules:

1) Track data must be in the order track 8 through track 1.
2) An empty track must exist as a track with no notes in it. The data for an empty track would be 7 bytes long, as follows: 80H, xLSB, xMSB, 00H, 80H, 00H, 00H, with x = the number of clocks in the part, i.e., number of beats * 96. The number of clocks must be divisible by 96.
3) Adding the number of bytes in a part to the absolute pointer of a part should point to 1 byte past the last byte of the part.

Each data event within a track consists of either 7 or 5 bytes, depending on whether or not other events exists on that same clock step. The 7 byte format is as follows:

Byte #	Format	Comment
1	1nnnnnnn	note or controller number
2	xxxxxxxx	absolute start time lsb
3	yyyyyyyy	absolute start time msb
4	zvvvvvvv	note/controller flag, velocity or controller amount
5	0000cccc	MIDI channel number
6	0aaaaaaa	note duration msb or pitch bend lsb
7	bbbbbbbb	note duration lsb or pitch bend msb

The 5 byte format is similar, but does not include a start time:

Byte #	Format	Comment
1	0nnnnnnn	note or controller number
2	zvvvvvvv	note/controller flag, velocity or controller amount
3	0000cccc	MIDI channel number
4	0aaaaaaa	note duration msb or pitch bend lsb
5	bbbbbbbb	note duration lsb or pitch bend msb

Note that the most significant bit of each packet determines the length of the packet: A 7 byte packet has its 1st byte msb set to 1, while a 5 byte packet has the 1st byte msb set to 0. Each packet contains one of the following seven events: Note event (with duration), controller 0-121 event, program change event, after touch event, pitch bend event, sysex event, or end of track event. The five byte packet versions of these events are shown below. If the event is a seven byte packet, the second and third bytes will contain the clock count at which the event should occur. Each clock count = 1/384th note (4 times MIDI clock resolution), with 0000 = first beat of sequence. 5 byte packets always occur on the clock specified by the nearest 7 byte packet preceeding it.

Note format:

0nnnnnnn	Note number 0-127
0vvvvvvv	Velocity 1-127
0000cccc	MIDI channel number 0 through 15
0aaaaaaa	Note duration msb (number of clocks until note off)
bbbbbbbb	Note duration lsb (number of clocks until note off)

Controller 0-121 format:

0nnnnnnn	Controller number 0-121
1vvvvvvv	Controller amount
0000cccc	MIDI channel number 0-15
00000000	not used
00000000	not used

Program change format:

01111010	Program change flag (122)
1vvvvvvv	Program number 0-127
0000cccc	MIDI channel number 0-15
00000000	not used

00000000	not used

After touch change format:

01111011	After touch flag (123)
1vvvvvvv	After touch amount 0-127
0000cccc	MIDI channel number 0-15
00000000	not used
00000000	not used

Pitch bend format:

01111100	Pitch bend flag (124)
10000000	not used
0000cccc	MIDI channel number 0-15
0aaaaaaa	Pitch bend lsb
0bbbbbbb	Pitch bend msb

Sysex format:

01111101	Sysex flag (125)
1vvvvvvv	sysex byte 0-127
bccccccc	b=1=EOX, b=0 then c=sysex byte
00000000	not used
deeeeeee	d=1=EOX, d=0 then e=sysex byte

A sysex message ends (and an EOX is sent) whenever bits b or d are high, or a new 7 byte packet occurs, or a packet other than sysex occurs. The sysex message can be as long as necessary by having consecutive 5 byte sysex packets.

End of track format:

80H, # clocks lsb, # clocks msb, 0, 80H, 0, 0
The number of clocks should equal the number of beats in the sequence multiplied by 96.

SONG DATA FORMAT

The following is the format of each song, starting with the address pointed to by the absolute pointer to the part (offset by 400H):

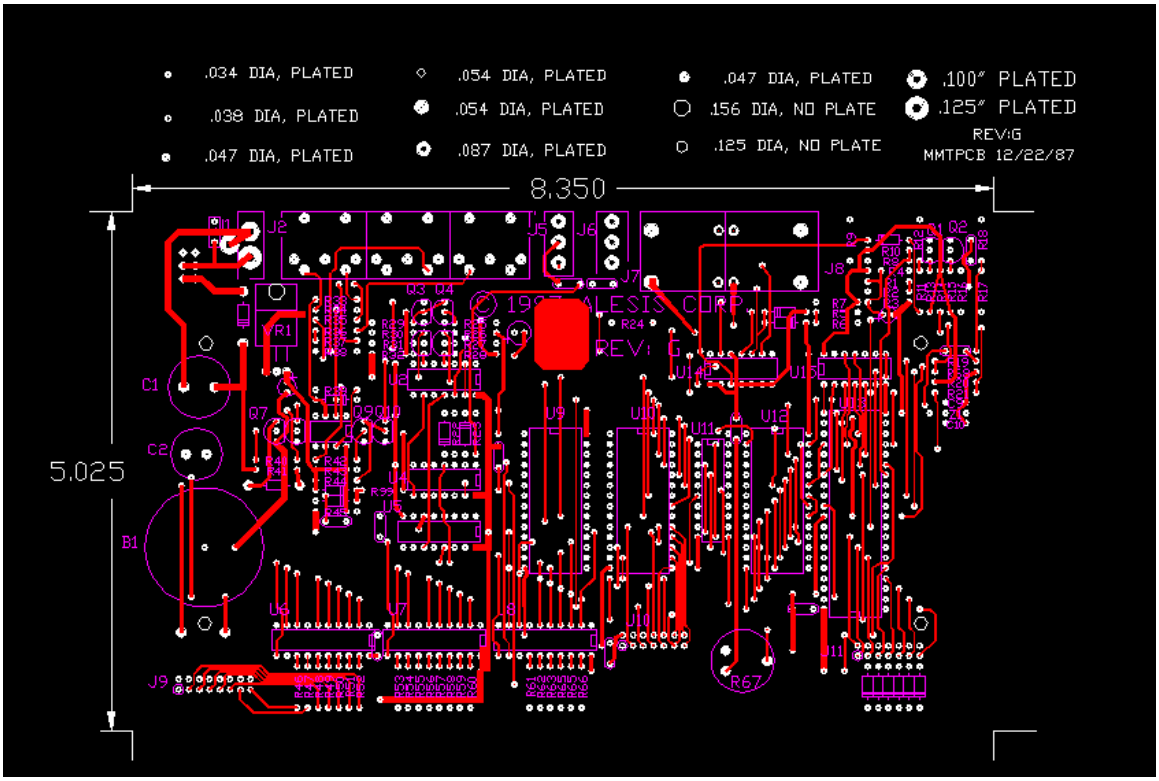
00H	LSB of number of bytes in song, including header.
01H	MSB of number of bytes in song, including header.
02H	Tempo of song, in BPM
03H-10H	14 digit ASCII name of song
11H	Step 1 part number (00-99)
12H	Step 1 play tracks (bit 0=track 1, bit 7=track 8; 0=off, 1=on)
13H	Step 2 part number
14H	Step 2 play tracks
15H	etc....
xxH	Part number 0FFH (end of song)

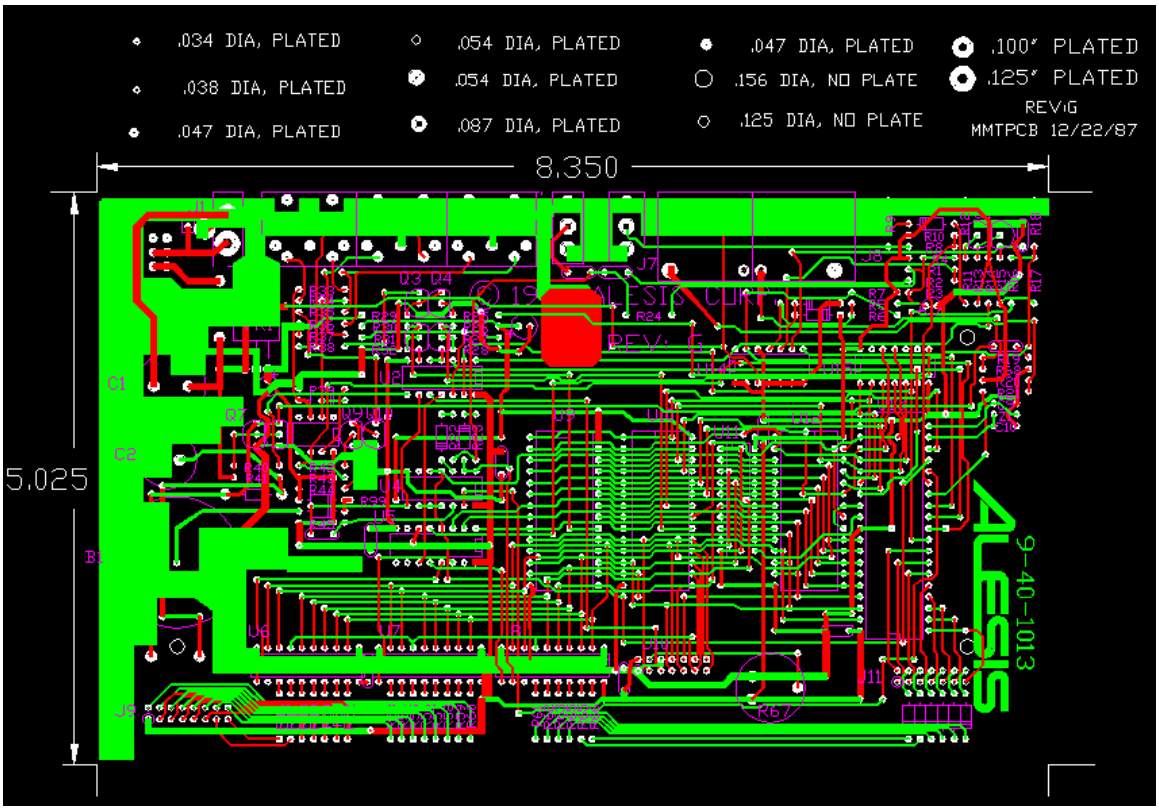
Song data must follow these rules:

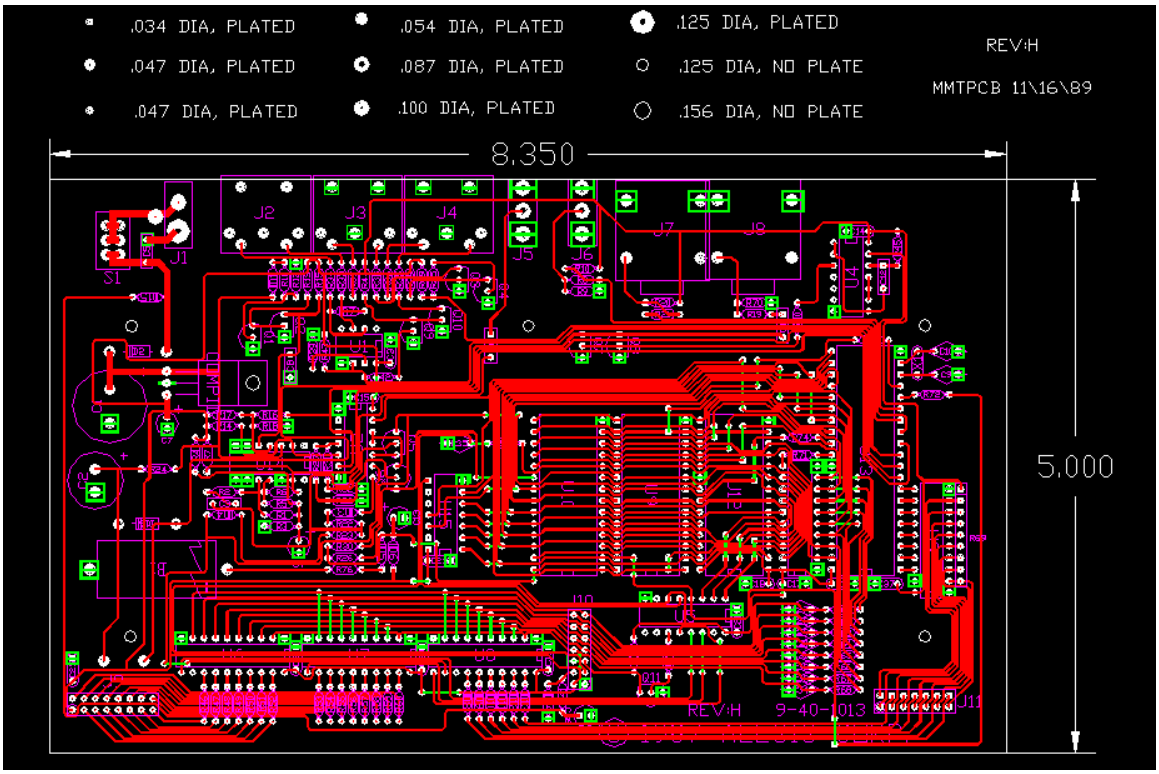
1) Part numbers 100-254 are not allowed.
2) There cannot be more than 255 steps in a song.
3) Adding the number of bytes in a song to the absolute pointer of a song should point to 1 byte past the last byte of the song.

ALESIS
MMT-8 (MT)

SCHEMATIC
AND
PCB
FILES


.034 DIA, PLATED
.038 DIA, PLATED
.047 DIA, PLATED
.054 DIA, PLATED
.054 DIA, PLATED
.087 DIA, PLATED
.047 DIA, PLATED
.156 DIA, NO PLATE
.125 DIA, NO PLATE
.100" PLATED
.125" PLATED
REV:G
MMTPCB 12/22/87
8.350
5.025
REV: G


.034 DIA, PLATED
.038 DIA, PLATED
.047 DIA, PLATED
.054 DIA, PLATED
.054 DIA, PLATED
.087 DIA, PLATED
.047 DIA, PLATED
.156 DIA, NO PLATE
.125 DIA, NO PLATE
.100" PLATED
.125" PLATED
REV:G
MMTPCB 12/22/87
8.350
5.025
ALESIS
9-40-1013


.034 DIA, PLATED
.047 DIA, PLATED
.047 DIA, PLATED
.054 DIA, PLATED
.087 DIA, PLATED
.100 DIA, PLATED
.125 DIA, PLATED
.125 DIA, NO PLATE
.156 DIA, NO PLATE
REV:H
MMTPCB 11\16\89
8.350
5.000
J1
J2
J3
J4
J5
J6
J7
J8
S1
REV:H
9-40-1013

ALESIS
MMT-8 (MT)

ECN
HISTORY

ALESIS

ENGINEERING CHANGE NOTICE

ECN #: 907807 **DATE:** 03/15/99

PROD UCT: REFER TO ASSY P/N:

9-96-1089 ASSY PCB MAIN MT
MA AMPLIFIER MICRO-AMP
ME MIRCO ENHANCER ME
MT SEQUENCER MMT-8

CHANGE TO BE MADE

WAS P/N_____ REV_____	: IS P/N_____ REV_____
1-12-0475 CAP 4.7uF ELEC 63V 20% 2x5x11mm	: 1-12-0471 CAP 4.7uF ELEC 63V 20% 2x5x11mm

REASON FOR CHANGE: To match Alesis Part Master Scheme.

SPECIAL INSTRUCTIONS: **Number of pages:**

Effective Immediately. Please update BOM and WO#

PROJECT ENGINEER: _____

MANUF. COORDINATOR: David R. Wilkerson

○ Notice Only
● Implement Order
○ Waiver

ENGINEERING CHANGE ORDER

CM Release

ALESIS STUDIO ELECTRONICS
3630 Holdrege Avenue, Los Angeles, CA. 90016
Voice-(310) 558-4530 ECO Fax-(310) 558-4907

E.C.O.#	S/N EFF.	EFF. DATE	PAGES
336101		12-27-93	1 OF 1

PART EFFECTED

USED ON : Lit Packaging
PRODUCT CODE : 03, 04, GT, M3, MT, QV
ALESIS PART# : 7-51-0007 ECO DATE : 12-27-93
PART NOMENCLATURE : SHEET DATA DISK INFO
NEW REV - PREV.REV -
PREPARED BY : Brooks B. PREPARED FOR : Tom Vargas
NEW ALESIS PART# : N/A
NEW PART NOMENCLATURE : N/A

CHANGE OUTLINE

DESCRIPTION OF CHANGE :
Delete Data Disk Info Sheet from the Above products.

REASON FOR CHANGE :
Not needed since the Data Disk is no longer in production.

NOTES / SPECIAL INSTRUCTIONS :
BOM Ø

VENDOR FURNISHED

VENDOR FURNISHED ? ○ YES ● NO

WAIVER INFORMATION

REASON FOR WAIVER :

□ PERMANENT
□ TEMPORARY
START DATE
END DATE
WAIVERED BY:
S/N START
S/N STOP

APPROVALS

SIGNATURE OF...	SIGNATURE	DATE	DL
ENGINEERING MANAGER	N/A	X	
PROJECT ENGINEER	"	X	
MFG. ENG. MANAGER	Mike Blatzinger	1/4/94	YES
PRODUCTION MANAGER		1/4/94	YES
Q.E. MANAGER		1-5-94	YES
PROD.CTRL. MANAGER		1/4/94	YES
BETA			
REGULATORY ENG.			
REPAIR MANAGER		1/5/94	YES
PURCHASING MANAGER		1/5/94	YES
INV. CTRL. MANAGER		1/5/94	YES
SALES & MARKETING		1/4/94	
FAST FORWARD			
C.O.O.			

VENDOR FAX

VENDOR FAXED :	SST	KING JOHN.	
BY :	Ø	Ø	

DRAWING

INCORPORATE CHANGE ? ○ YES ● NO

DISPOSITION

	USE	RWK	OBS	QTY STOCK	QTY ON ORDER
PURCHASE ORDER - CURRENT		N/A			Ø
INVENTORY STOCK			X	Ø	
KITS - PENDING		X			
KITS - WIP		X			
FINISHED GOODS	X				

CONFIG.MGMT.-REV.D-10/28/93-FS3:G:/USER/ADRIAN/CDR/ECO-D.CDR

ALESIS
STUDIO ELECTRONICS

E.C. STAGE.

☐ Notice Only	☒ Implement Production Date: June Prod.	☐ DWG Inc'd ☐ DWG Un-Inc'd	☐ Waivered (See Below)

ENGINEERING CHANGE ORDER

ECO #: 312404

SHEET 1 OF 1

PART AFFECTED

7-53-0002 — PART NUMBER AFFECTED -

USED ON - (SUB-ASSEMBLY) —

SEE BELOW (PRODUCT CODE)

Sticker QC SQUARE — PART TITLE -

PART SPECIFICATIONS -

Brooks Brunner — PREPARED BY -

PREPARED FOR -

ECR or ECN #

5-6-93 — ECO DATE -

CURRENT REV.

NEW REV.

CHANGE WAIVERED

REASON FOR WAIVER -

☐ PERMANENT
☐ TEMPORARY

WAIVERED BY -

DATE WAIVER STARTS -

DATE WAIVER ENDS -

CHANGE OUTLINE

DESCRIPTION OF CHANGE -

Change from QC Sticker (7-53-0002) to QC Sticker w/MFR Date (11-02-0004).

REASON FOR THE CHANGE -

To use up existing stock of 11-02-0004.

NOTES or SPECIAL INSTRUCTIONS -

- This change affects the following Products:
  D3, XR, QV, DD, MT, GT, D4, M3, QS.
- Stock of 7-53-0002 Has already been Depleted.
- * Purchasing Note: After Depleting stock of 11-02-0004 We will use 7-53-0018 for All Products.

BOM Ø

APPROVALS / COMPLIANCE

	SIGNATURE	DATE	COMPLIANCE
ENGINEERING MANAGER			☐ SCHEMATICS ☐ P.C.B. ARTWORK ☐ COMP ID's ☐ MECHANICAL DWGS ☐ SPECIFICATIONS ☐ SOFTWARE ☐ SILKSCREENS
PROJECT ENGINEER			
MANUFACTURING ENGINEER			
PRODUCTION MANAGER			☐ FINAL ASSEMBLIES ☐ SCHEDULING ☐ SHIPPING DATE ☒ WORK IN PROGRESS (KITS) ☐ PRODUCTION STOCK ☒ KIT LIST ☐ PRE-QC GOODS ☐ POST-QC GOODS ☐ TEST PROCEDURES ☐ FIELD UNITS ☐ PACKAGING ☒ BILL OF MATERIALS
Q.E. MANAGER		5/16	
PRODUCTION CONTROL	Randy Jaye	5/26/93	
BETA			
REGULATORY ENGINEERING			
REPAIR		5/26/93	
PURCHASING		5/25/93	☒ PO's CURRENT ☒ PO's PENDING
SALES & MARKETING			☐ LITERATURE ☐ GRAPHICS ARTWORK
C.F.O.			
C.O.O.			

DISPOSITION

	USE	RWK	OBS	ADD
PO's - PENDING	☐	☒	☐	☐
PO's - CURRENT	☐	☒	☐	☐
KITS - PENDING	☐	☒	☐	☐
KITS - WIP	☐	☒	☐	☐
PROD STOCK	☒	☐	☐	☐
FINAL ASSY's	☒	☐	☐	☐
PRE-QC GOODS	☒	☐	☐	☐
POST-QC GOODS	☒	☐	☐	☐
SHIPPED GOODS	☒	☐	☐	☐

CHANGE REVIEW MEETING?

☐ Yes ☒ No

DATE

TIME ☐ AM ☐ PM

WHERE ?

☐ BUILDING #1
☐ BUILDING #2
☐ BUILDING #3
☐ BUILDING #4

ALESIS ENGINEERING CHANGE ORDER

ALESIS CORP 3630 HOLDREGE LA CA 90016

ECO# 102802 | SH 1 OF 1

EFFECTIVE DATE: 2/8/91

ISSUED BY: BRADY BARLENQUAST	DATE: 1/28/91	ECR#:
PRODUCT: D1/D2/D3/DD/QV/MT/M3	SUBASSY: MAIN PCB	CURRENT REV: —
ITEM: 8 PIN DIP 0.3 SOCKET	P/N: 4-04-0008	NEW REV: —

DESCRIPTION OF CHANGE:

REMOVE FROM BOM ON ABOVE PRODUCTS

SERIAL NUMBERS
START:
END:

REASON FOR CHANGE:

NOT NECESSARY (USED w/ 6N138)

COMPLIANCE ITEMS	CHANGE DATE	ITEM DISPOSITION	USE	RWRK	SCRAP	ADD	N/A
BOM		PO's -PENDING		X			
SCHEMATICS		PO'S -CURRENT	X				
COMP ID		KITS -PENDING	X				
FAB DRAWINGS		KITS -WIP	X				
ARTWORK		PROD STOCK	X				
QC/TEST PROC		FINAL ASSYS	X				
LITERATURE		PRE-QC GOODS	X				
		POST-QC GOODS	X				
		SHIPPED GOODS	X				

EC'S INCORPORATED

EC#:	N/A		
DESC:			

CHANGE REVIEW BOARD: YES ☐ NO ☒ DATE: / / TIME: :

AUTHORIZATION:

DEPT:	PROD ENG	ENG	ENG DIR	PROD	PURCH	PDS	SALES	AD/PROMO	RPR
APPROVAL:	RVB ↔	CAD	[signature]	[signature]	MF	[signature]			GB
DATE:	1/30/91	1/30/91	1-30-91	1-30-91	2-5-91	2/5/91			1-30-91

DEPT:	WHSE	CEO	CFO	FST FRWD					
APPROVAL:			[signature]						
DATE:			2/6/91						

NOTES/INSTRUCTIONS/DRAWINGS (ATTACH SEPARATE SHEET IF NEEDED):

OPTO ISOLATOR SOCKET.

ALESIS ENGINEERING WAIVER

ALESIS CORP 3630 HOLDREGE LA CA 90016

EW# 28001 | SH 1 OF 1

EFFECTIVE DATE: 09 / /91

ISSUED BY: B. BARGENQUAST | DATE: 10 /7 /91 | ECR#:

PRODUCT: (D3) / MT | SUBASSY: | REV#:

ITEM: 4-24 X 5/16 PPB PLASTITE | P/N: 5-00-1002

DESCRIPTION OF WAIVER:

SUBSTITUTE 3-24 X 3/8 HI LO FOR 4-24 X 5/16 PPB PLAST.

SERIAL NUMBERS START: END:

REASON FOR WAIVER:

SHORTAGE OF 4-24 X 5/16 PPB PLAST. SCREWS

DRAWING (INCLUDE SEPARATE SHEET IF NEEDED):

NEW:

MT Bom	IS	WAS
3-24 X 3/8 PP HILO	22	4
4-24 X 5/16 PP BLK PLAST	Ø	18

D3 Bom	IS	WAS
4-24 X 5/16 PP BLK PLAST	Ø	6
3-24 X 3/8 PP HILO	6	Ø

OLD:

X ESC INV 8/9

DEPT:		ENG	PROD						RPR
APPROVAL:	[illegible]	[illegible]	[illegible]						[illegible]
DATE:	11-14-91	11-14-91	11-14-91						11.14.91

ADDITIONAL NOTES:

ENGINEERING CHANGE NOTICE

ALESIS CORP., 3630 HOLDREGE AVE., LA, CA, 90016

ECN# 021903 SH. OF

ECN DATE: / /

ISSUED BY: BRADY BARGENQVAST DATE: 8/07/90

APPROVED: [signature] DATE: / /

PROJECTED ECO DATE: 10/01/90

PRODUCT: MT SUBASSY.:

ITEM: CASE TOP / FLIP-UP PANEL P/N: 9-11-1004/9-11-1005 EXISTING REV:

DESCRIPTION OF CHANGE:

CHANGE COLOR OF PLASTIC & PAINT FOR CASE TOP + FLIP-UP PANEL

GREY → BLACK

REASON FOR CHANGE:

DRAWING: (ATTACH SEPARATE DRAWING OR USE REVERSE IF NEEDED)

IS:	WAS:
TOP PANEL (P/N 9-11-1035) // BLK ABS / BLK PAINT	TOP PANEL (P/N 9-11-1004) // GREY ABS / GREY PAINT
FLIP-UP PANEL (P/N 9-11-1036) // BLK ABS / BLK PAINT	FLIP-UP PANEL (P/N 9-11-1005) // GREY ABS / GREY PAINT

CHANGE REVIEW BOARD REQUIRED: YES NO DATE: / / TIME: :

DIST.	ENG	PROD	PURCH	QC/QA	PDS	MKTG	SALES	SVC	WHSE	PE	PP
C/W	[signature]		ME							[signature]	GB
DATE:	8-14-90		8-14-90							8/7/90	8/14/90

COMPLIANCE ITEMS	DISPOSITION
~~[illegible]~~	
SCHEMATIC DIAGRAM	
BILL OF MATERIALS	
PCB ARTWORK	
ASSY. DRAWINGS	

ITEM DISPOSITION	USE	RWK	OBS	ADD
P.O.'S-PENDING		X		
P.O.'S-CURRENT		X		
KITS-PENDING		X		
KITS-WIP	X			
PROD. STOCK	X			
FINAL ASSY.'S	X			
PRE-QC GOODS	X			
POST-QC GOODS	X			
SHIPPED GOODS				

NOTES:

- SILKSCREEN COLORS REMAIN THE SAME.
- STARTING W/ NOVEMBER PRODUCTION

USE REVERSE FOR CONTINUATION

ALESIS CORP. FORM ECN-001-REV A

ENGINEERING CHANGE ORDER

ALESIS CORP., 3630 HOLDREGE AVE., LA, CA, 90016

ECO# 010102 | SH 1 OF 1

CUTOFF DATE: 4/01/90

ISSUED BY: BRADY BARGENQUAST DATE: 4/01/90 ECN# 007201 P

APPROVED: DATE: / / LOGGED: P

PRODUCT: MT SUBASSY.: MAIN PCB

ITEM: P/N: 9-40-1013 EXISTING REV: H

DESCRIPTION OF CHANGE: ADDITION OF THE FOLLOWING PARTS TO UNITS ~~USING 1257 SRAMS ONLY~~:

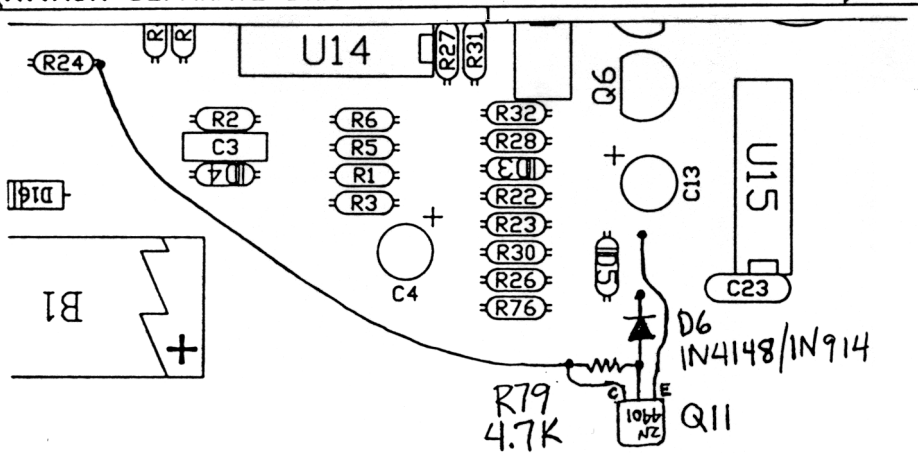
(1) - 4401 TRANSISTOR - Q11
(1) - 4.7KΩ RESISTOR R79
(1) - JUMPER (SEE BELOW)

ALL

REASON FOR CHANGE: CRASHING MEMORY DUE TO VOLTAGE DIFFERENCE BETWEEN DATA LINES & SRAM Vcc.

DRAWING: (ATTACH SEPARATE DRAWING OR USE REVERSE IF NEEDED)

IS:



CHANGE REVIEW BOARD REQUIRED: (YES) NO DATE: / / TIME: :

DIST.	ENG	PROD	PURCH	QC/QA	PDS	MKTG	SALES	SVC	WHSE	PP
C/W	CJ	JP	MF					PC		GB
DATE:	3-15-90	3-15-90	3-15-90					3-15-90		3-15-90

COMPLIANCE ITEMS	DISPOSITION
SCHEMATIC DIAGRAM	CHANGED 3/14/90
BILL OF MATERIALS	
PCB ARTWORK	
ASSY. DRAWINGS	

ITEM DISPOSITION	USE	RWK	OBS	ADD
P.O.'S-PENDING		X		
P.O.'S-CURRENT		X		
KITS-PENDING		X		
KITS-WIP	X			
PROD. STOCK	X			
FINAL ASSY.'S	X			
PRE-QC GOODS	X			
POST-QC GOODS	X			
SHIPPED GOODS	X			

NOTES:

- NOTE LOCATION OF CATHODE OF D6 (IGNORE SILKSCREEN FOR D6).

USE REVERSE FOR CONTINUATION

ALESIS CORP. FORM ECN-001-REV A

ENGINEERING CHANGE NOTICE

ALESIS CORP., 3630 HOLDREGE AVE., LA, CA, 90016

ECN# 007201 | SH. 1 OF 1

ECN DATE: 3 / 13 / 90

ISSUED BY: BRADY BARGENQUAST DATE: 03 / 13 / 90

APPROVED: DATE: / /

PROJECTED ECO DATE: 4 / 01 / 90

PRODUCT: MT SUBASSY.: MAIN PCB

ITEM: P/N: 9-40-1013 EXISTING REV: H

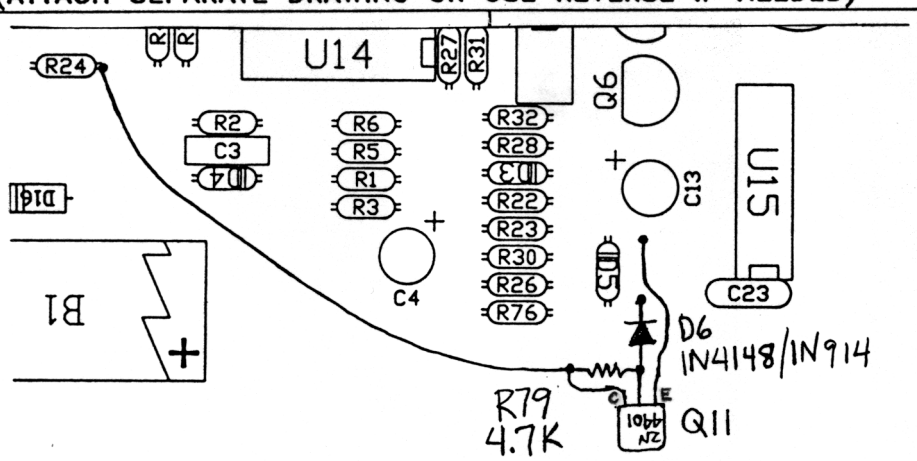
DESCRIPTION OF CHANGE: ADDITION OF THE FOLLOWING PARTS TO UNITS USING '257 SRAMS ONLY:

(1) - 4401 TRANSISTOR - Q11
(1) - 4.7K Ω RESISTOR R79
(1) - JUMPER (SEE BELOW)

REASON FOR CHANGE: CRASHING MEMORY DUE TO VOLTAGE DIFFERENCE BETWEEN DATA LINES + SRAM Vcc.

DRAWING: (ATTACH SEPARATE DRAWING OR USE REVERSE IF NEEDED)

IS:



CHANGE REVIEW BOARD REQUIRED: YES NO DATE: / / TIME: :

DIST.	ENG	PROD	PURCH	QC/QA	PDS	MKTG	SALES	SVC	WHSE	PP
C/W	C.P.	SP	MF					PC		GB
DATE:	3-15-90	3-15-90	3-15-90					3-15-90		3-15-90

COMPLIANCE ITEMS DISPOSITION

SCHEMATIC DIAGRAM
BILL OF MATERIALS CHANGED 3/14/90
PCB ARTWORK
ASSY. DRAWINGS

ITEM DISPOSITION	USE	RWK	OBS	ADD
P.O.'S-PENDING		X		
P.O.'S-CURRENT		X		
KITS-PENDING		X		
KITS-WIP	X			
PROD. STOCK	X			
FINAL ASSY.'S	X			
PRE-QC GOODS	X			
POST-QC GOODS	X			
SHIPPED GOODS	X			

NOTES:

- NOTE LOCATION OF CATHODE OF D6 (IGNORE SILKSCREEN FOR D6).
- MOD WILL WORK FOR BOTH '256 + '257, BUT ONLY NEEDED WHEN '257' ARE USED.

USE REVERSE FOR CONTINUATION

ALESIS CORP. FORM ECN-001-REV A

ENGINEERING CHANGE ORDER

ALESIS CORP., 3630 HOLDREGE AVE., LA, CA, 90016

ECO# 006100 | SH 1 OF 1

CUTOFF DATE: 3/02/90

ISSUED BY: BRADY BARGENQUAST DATE: 03/02/90 | ECR# | P

APPROVED: DATE: / / | LOGGED: | P

PRODUCT: MT SUBASSY.: MAIN PCB

ITEM: RESISTOR CHANGES P/N: EXISTING REV: H NEW REV:

DESCRIPTION OF CHANGE: CHANGES TO BOM

1. DELETE R6 (4.7K)
2. ADD R69 (4.7K)

REASON FOR CHANGE:

1. DUPLICATE ON BOM
2. MISSING FROM BOM

DRAWING: ATTACH SEPARATE DRAWING OR USE REVERSE IF NEEDED

COMPLIANCE ITEMS	STATUS
BOM	CHANGED ON 03/02/90
SKE	UPDATED ON 3/02/90

ITEM DISPOSITION		USE	RWRK	SCRAP	ADD
P.O.'S-PENDING			X		
P.O.'S-CURRENT			X		
KITS-PENDING			X		
KITS-WIP		X			
PROD. STOCK		X			
FINAL ASSY.'S		X			
PRE-QC GOODS		X			
POST-QC GOODS		X			
SHIPPED GOODS		X			

ECN'S INCORPORATED:			
N/A			

CHANGE REVIEW BOARD REQUIRED: YES ~~NO~~ DATE: / / TIME: :

DIST.	ENG	PROD	PURCH	ME/PE	PDS	MKTG	SALES	SVC	WHSE	P/P
APPR.										DB
DATE:	3-2-90	3-2-90	3/2/90	3/2/90						3-2-90

NOTES:

USE VE R C

ALESIS CORP. FORM ECO-001-REV A

ENGINEERING CHANGE ORDER

ALESIS CORP., 3630 HOLDREGE AVE., LA, CA, 90016

ECO# 000804 | SH 1 OF 1

CUTOFF DATE: 1/8/90

ISSUED BY: John Glowdeman DATE: 1/8/90 | ECR# N/A | P① P

APPROVED: (JMG) DATE: 1/8/90 | LOGGED:

PRODUCT: ~~P-1/D2/DD/M3~~/MT/~~QV~~ SUBASSY.: Main PCB

ITEM: 47 kΩ resistor on MIDI (R39) P/N: 0-0X-0473 EXISTING REV: NEW REV:

DESCRIPTION OF CHANGE: Change 47k resistor on pin 7 of 6N138 to 10k Ω. R39 was 47k is 10k.

BOM

	VAL	WAS	IS
	47k	2	1
	10k	3	4

REASON FOR CHANGE: To give optimal timing on MIDI IN, reduce number of crashes.

DRAWING: ATTACH SEPARATE DRAWING OR USE REVERSE IF NEEDED

COMPLIANCE ITEMS	STATUS
BOM	

ITEM DISPOSITION		USE	RWRK	SCRAP	ADD
P.O.'S-PENDING			✓		
P.O.'S-CURRENT			✓		
KITS-PENDING			✓		
KITS-WIP			✓		
PROD. STOCK		✓			
FINAL ASSY.'S		✓			
PRE-QC GOODS		✓			
POST-QC GOODS		✓			
SHIPPED GOODS		✓			

ECN'S INCORPORATED: N/A

CHANGE REVIEW BOARD REQUIRED: YES (NO) DATE: / / TIME: :

DIST.	ENG	PROD	PURCH	~~QC/QA~~	PDS	MKTG	SALES	SVC	WHSE	ME/PE	Pre Prod
APPR.	AZ (09)	NS	MP		CG (09)					CAD (09)	GB (09)
DATE:	1-8-90	1-8-90	1-8-90		1-8-90					1-8-90	1-8-90

NOTES:

INCORPORATED INTO 3/90 SKE

USE REVERSE FOR CONTINUATION

ALESIS CORP. FORM ECO-001-REV A

89-

ENGINEERING CHANGE NOTICE

ALESIS CORP., 3630 HOLDREGE AVE., LA, CA, 90016

ECN# 934601 | SH. 1 OF 1

ECN DATE: 12 / 12 / 89

ISSUED BY: GLENN BUCKLEY DATE: 12 / 12 / 89

APPROVED: DATE: / /

PROJECTED ECO DATE: 03 / 01 / 89

PRODUCT: MMT-8 SUBASSY.: MAIN PCB

ITEM: MAIN PCB P/N: 9-40-1013 EXISTING REV: G

DESCRIPTION OF CHANGE:

NEW PCB ARTWORK FOR MMT-8'S IN MARCH
9-40-1013 WILL BECOME REV H

REASON FOR CHANGE: to Incorporate all ECN's + to Improve RF TRANSMISSIONS Without the USE OF TORROIDS/CHOKES

DRAWING: (ATTACH SEPARATE DRAWING OR USE REVERSE IF NEEDED)

IS:

1) Incorporate all current ECO's
2) SEE ATTACHED Bom

WAS:

CHANGE REVIEW BOARD REQUIRED: YES (NO) DATE: / / TIME: :

DIST.	ENG	PROD	PURCH	QC/QA	PDS	MKTG	SALES	SVC	WHSE	P/E
C/W	DS	SB	MF	X		X	X	TJ	X	GMG
DATE:	12-12-89	12-12-89	12-12-89					12/12/89		12-12-89

COMPLIANCE ITEMS			DISPOSITION
ORDER 9-40-1013 REV H	From ROC		
ORDER 9 PIN SIP IDK	P/N	0-06-1039	
ORDER 74HC541	P/N	2-14-0541	
ORDER 560Ω 1/8W resistors	P/N	0-00-0561	
ORDER 150pf CERAMIC CAPS	P/N	1-02-0151	
SCHEMATIC DIAGRAM	TO BE CHANGED BY	JAN 1, 1990	
BILL OF MATERIALS	TO BE CHANGED BY	DEC 20, 89	
PCB ARTWORK	TO BE CHANGED BY	DEC 20, 89	
ASSY. DRAWINGS	TO BE CHANGED BY	FEB 01, 1990	

ITEM DISPOSITION	USE	RWK	OBS	ADD
P.O.'S-PENDING		X		
P.O.'S-CURRENT	X			
KITS-PENDING		X		
KITS-WIP	X			
PROD. STOCK	X			
FINAL ASSY.'S	X			
PRE-QC GOODS	X			
POST-QC GOODS	X			
SHIPPED GOODS	X			

NOTES:

USE REVERSE FOR CONTINUATION

89-

ENGINEERING WAIVER

ALESIS CORP., 3630 HOLDREGE AVE., LA, CA, 90016

WVR# 931301 | SH 1 OF 1

CUTOFF DATE: 11/9/89

ISSUED BY: John Gloudeman DATE: 11/9/89 | RESCIND DATE: / /

APPROVED: [signature] DATE: 11/9/89 | REVIEW DATE: 12/16/89

PRODUCT: D1, D2, MT, QV | SUBASSY.:

ITEM: LCD Module | P/N: 9-44-0000, 9-44-1111 | EXISTING REV:

DESCRIPTION OF WAIVER:

LCD modules with Sanyo drivers allow a "phantom" line to show from top line to bottom line (and vice versa). Problem has always been in existence, but is more pronounced on latest LCD

REASON FOR WAIVER:

LCD shortage

CONDITIONS:

Pending review date

COMPLIANCE ITEMS: STATUS

DIST.	ENG	PROD	PURCH	QC/QA	PDS	MKTG	SALES	SVC	WHSE
C/W	[signature]	[signature]	[signature]	X		[signature]	[signature]	[signature]	X
DATE:	11-9-89	11-9-89	11-09-89				11-9-89	11/8/89	

NOTES:

USE REVERSE OF FORM FOR CONTINUATION

ALESIS CORP. FORM W-001-REV A

ENGINEERING WAIVER

ALESIS CORP., 3630 HOLDREGE AVE., LA, CA, 90016

WVR# 924201 | SH 1 OF 1

CUTOFF DATE: 8/28/89

ISSUED BY: John Gloudeman DATE: 08/30/89

APPROVED: DATE: / /

RESCIND DATE: 9[illegible]/01/89

REVIEW DATE: / /

PRODUCT: MMT-8 SUBASSY.:

ITEM: P/N: EXISTING REV:

DESCRIPTION OF WAIVER: MMT-8 1.08 software will be shipped for August production. Current version is 1.10.

REASON FOR WAIVER: It is too time-consuming to change the EPROM's. Exposure is limited (Approx. 100 units [illegible]). Impact on service should be minimal.

CONDITIONS: For August only. Version 1.10 is the only shippable version beginning Sept. 1.

COMPLIANCE ITEMS: STATUS

DIST.	ENG	PROD	PURCH	QC/QA	PDS	MKTG	SALES	SVC	WHSE	
C/W	[illegible]									
DATE:	8/30/89									

NOTES:

USE REVERSE OF FORM FOR CONTINUATION

ALESIS CORP

89-

ENGINEERING WAIVER

ALESIS CORP., 3630 HOLDREGE AVE., LA, CA, 90016

WVR# 922201 | SH 1 OF 1

CUTOFF DATE: 10/AUG/89

ISSUED BY: C. DEVIN DATE: 10/AUG/89 | RESCIND DATE: 01/SEP/89

APPROVED: DATE: / / | REVIEW DATE: / /

PRODUCT: MMT-8 SUBASSY.: MAIN PCB

ITEM: EPROM P/N: EXISTING REV: 1.09

DESCRIPTION OF WAIVER: ECN FOR VER 1.10 DID NOT ARRIVE IN TIME - USE 1.09 FOR CURRENT "ON DOCK" UNITS

REASON FOR WAIVER: ECN FOR 1.10 DID NOT ARRIVE IN TIME

CONDITIONS: USE 1.09 FOR BUILT UNITS/WIP

USE 1.10 FOR NEW BUILD

COMPLIANCE ITEMS: STATUS

DIST.	ENG	PROD	PURCH	QC/QA	PDS	MKTG	SALES	SVC	WHSE	
C/W	(44)									
DATE:	8/10/89									

NOTES:

USE REVERSE OF FORM FOR CONTINUATION

ALESIS CORP. FORM V-001-REV A

ALESIS CHANGE ORDER

ALESIS CORP., 3630 HOLDREGE AVE., LA, CA, 90016

ISSUED BY: BRADY BARGENQUAST DATE: 23 /AUG/90 ALESIS ECN # 021901

PRODUCT: MT SUBASSY.:

ITEM: CASE TOP | FLIP-UP PANEL P/N: 9-11-1004 | 9-11-1005 REV #

DESCRIPTION OF CHANGE: CHANGE COLOR OF PLASTIC & PAINT OF CASE TOP & FLIP-UP PANEL

REASON FOR CHANGE:

DRAWING: (INCLUDE SEPARATE DRAWING IF NEEDED)

NEW	OLD
TOP PANEL BLACK ABS | BLACK PAINT FLIP-UP PANEL BLACK ABS | BLACK PAINT	TOP PANEL GREY ABS | GREY PAINT FLIP-UP PANEL BLACK ABS | BLACK PAINT

ACKNOWLEGED BY: B.L.B. DATE: 8/23/90

NOTES:

- SILKSCREEN COLORS REMAIN THE SAME
- STARTING W/ NOV. PROD.

ALESIS CORP. FORM ECN-001-REV A

ALESIS
MMT-8 (MT)

BOM

12.00 Service Parts List

GROUP	DESCRIPTION	PART #	QTY	POSITION	PCB	MANUFACTURER
CAB	14 PIN DIL 7 0.1 CTR	4-18-0714	2	KEYPAD-MAIN, LCD-MAIN		
CAB	16 PIN DIL 7 0.1 CTR	4-18-0716	1	KEYPAD-MAIN		
CAP	0.1 MF CERDISC	1-02-0104	13	C14-23,25,37,38	MAIN	
CAP	1000 MF ELEC	1-08-1000	1	C2	MAIN	
CAP	2200 MF ELEC	1-08-2200	1	C1	MAIN	
CAP	4.7 MF ELEC	1-12-0475	4	C4,7,13,36	MAIN	
CER	150 PF CERDISC	1-02-0151	9	C27-35	MAIN	
CER	20 PF CERDISC	1-02-0200	2	C9,10	MAIN	
CON	5 PIN DIN JACK	4-00-0001	3	J2-4	MAIN	
CON	3.5mm JACK (P2)	4-16-0001	2	J5,6	MAIN	
CON	3.5mm BAR JACK (P3)	4-16-0002	1	J1 (POWER, 2.5mm CTR)	MAIN	
FIL	0.1 MF FILM	1-20-0104	6	C3,5,6,8,11,12	MAIN	
HDR	14 PIN DIL 0.1 CTR	4-14-0014	3	J10,11,KEY PCB	MN/KY	
HDR	16 PIN DIL 0.1 CTR	4-14-0016	2	J9,KEY PCB	MN/KY	
HDW	6-32x1/4 PP BLK UNC	5-00-0003	2	HEATSINK		
HDW	4-24x5/16 PP BLK PLAST	5-00-1002	22	CASE(4), MAIN PCB(5), LCD(4), KEY PCB(9)		
HDW	1/2 STANDOFF 6-32	5-02-0003	1	HEATSINK	MAIN	
HDW	HEATSINK	9-03-1012	1		MAIN	
IC	7805 +5V TO220	2-11-7805	1	VR1 (NAT ONLY)	MAIN	NAT
IC	74HC138 DEMUX	2-14-0138	1	U5	MAIN	NAT/TI
IC	74HC541 OCTAL BUFFER	2-14-0541	1	U3	MAIN	NAT/TI
IC	74HC573 LATCH TRI-ST	2-14-0573	1	U11	MAIN	NAT/TI
IC	74HC574 TRI-STATE FF	2-14-0574	3	U6-8	MAIN	NAT/TI
IC	74HC00 2-IN N GATE	2-14-7400	1	U4	MAIN	NAT/TI
IC	74HC04 HEX INVERT	2-14-7404	1	U2	MAIN	NAT/TI
IC	74HC30 8-IN N GATE	2-14-7430	1	U15	MAIN	NAT/TI
IC	32Kx8 SRAM	2-17-0257	2	U9,10	MAIN	SONY
IC	27C256 V1.11	2-19-0256	1	U12	MAIN	TI
IC	80C31 MPU	2-20-8031	1	U13	MAIN	SIG
IC	LM339 QUAD COMP	2-22-0339	1	U14	MAIN	NAT
IC	6N138 OPTO-ISO	2-24-0138	1	U1	MAIN	HP
JAC	1/4 CLIFF (MONO)	4-02-0001	2	J7,8	MAIN	
LCD	LCD MODULE	9-44-1000	1			
LED	LED (RED) SMD RL-55	3-02-0002	15		KEY	
LIT	USER'S MANUAL	7-51-1056	1	LIT PACK		
ME	1N4148 SIGNAL DIODE	2-00-4148	13	D3-15 (1N4148 OK)	MAIN	
ME	1N4003 POWER DIODE	2-01-4003	2	D2,16	MAIN	
ME	1N5231B ZENER DIODE	2-02-5231	1	D1	MAIN	
ME	MPS 2369 FAST TRANS	2-03-2369	3	Q5,6,11	MAIN	
ME	2N4401 NPN TRANS	2-03-4401	9	Q1-4,7-11,ECO #10102	MAIN	
ME	12 MHz CER RES	7-01-0003	1	X1	MAIN	
ME	2" SPEAKER	7-02-0001	1	SP1		
ME	XFORMER P3	7-40-0903	1			
ME	LITHIUM BATTERY 3.5V	7-05-0003	1	B1	MAIN	
PCB	PCB, MT KEYPAD	9-40-1016	1			
PLS	CASE TOP (BLK)	9-11-1035	1			

PLS	FLIP-UP PANEL (BLK)	9-11-1036	1	W/CASE		
PLS	CASE BOTTOM	9-11-1006	1			
PLS	LCD BEZEL	9-11-1009	1	CASE TOP		
PLS	ALPHA SWITCH CAP	9-11-1011	1	S1		
PLS	FLIP-UP CHART TOP	9-13-1004	1	FLIP-UP TOP		
PLS	FLIP-UP CHART BOT	9-13-1005	1	FLIP-UP BOT		
PLS	REAR PANEL OVERLAY	9-13-1006	1	CASE BOTTOM		
RES	100 1/8W 5%	0-00-0101	2	R24,40	MAIN	
RES	1K 1/8W 5%	0-00-0102	1	R12	MAIN	
RES	10K 1/8W 5%	0-00-0103	5	R2,8,39,41,76	MAIN	
RES	100K 1/8W 5%	0-00-0104	2	R1,45	MAIN	
RES	1.2K 1/8W 5%	0-00-0122	1	R9	MAIN	
RES	1.5M 1/8W 5%	0-00-0155	1	R6	MAIN	
RES	2K 1/8W 5%	0-00-0202	1	R11	MAIN	
RES	220 1/8W 5%	0-00-0221	21	R46-60,33-38	MAIN	
RES	2.2K 1/8W 5%	0-00-0222	4	R26,27,30,31	MAIN	
RES	3.3M 1/8W 5%	0-00-0335	1	R15	MAIN	
RES	470 1/8W 5%	0-00-0471	10	R43,61-68,75	MAIN	
RES	4.7K 1/8W 5%	0-00-0472	21	R3,4,7,10,13,14,16-18,20-23,25,29,42,44,69,77-79	MAIN	
RES	47K 1/8W 5%	0-00-0473	1	R5	MAIN	
RES	51K 1/8W 5%	0-00-0513	2	R19,70	MAIN	
RES	510K 1/8W 5%	0-00-0514	2	R28,32	MAIN	
RES	560 1/8W 5%	0-00-0561	4	R71-74	MAIN	
RES	10K 9 PIN SIP	0-06-1039	1	R69	MAIN	
RUB	KEYPAD	9-21-1003	1	CASE TOP		
RUB	ROUND RUBBER FEET	9-23-1004	4	CASE BOTTOM		
RUB	RUBBER STRIP 8-3/4	9-23-1007	1	INSIDE CASE BOTTOM		
SWT	DPDT SWITCH	6-02-0001	1	SI (POWER)	MAI	

13.00 Service Manual History

7/21/94	V1.00b	Preliminary Release

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NOTES