Part Number	Description		Quantity
25207	IC 74HC 74 FF D DUAL U23	SO14	1 EA
25201	IC 74HC 4046A PLL - MOTOROLA NOTE: MOTOROLA ONLY NO SUBSTITUTES U31	SO16	1 EA
25202	IC 74HC 573 LATCH OCTAL NINV U17	SO20	1 EA
25211	IC 74HC 08 AND 2 INPUT QUAD U38	SO14	1 EA
25402	IC RAM 62256 32K STATIC U25	SOL28	1 EA
25801	IC MICRO 80C537 PROC CMOS U19	PLCC84	1 EA
25601	IC LIN TL074 OPAMP BIMOS U12,U33	SO14	2 EA
25602	IC LIN LM311 COMP U24	SO8	1 EA
25701	IC REG 79L05 -5V U14	SO8	1 EA
25802	IC SF XILINX XC3020 U21	PLCC68	1 EA
25803	IC SF BATTERY CTRL, BQ2201 U13	SO8	1 EA
24714	IC LIN LM1881M VID SYNC SEP U15	SO8	1 EA
24810	IC REG SI7661 VOLTAGE INVERTER U32	DIP8	1 EA
31413	CONN D PCB, 25 PIN FGM RT ANG W/SCR LOCK J10		1 EA
48404	CONN PWR, 2.5MM J15		1 EA
50230	SW PB PCB 2PDT RT ANGLE S3		1 EA
50902	SW DIP 8 POS RIGHT ANGLE S1		1 EA
22A002	SEMI DIODE 1N914 D26,D27		2 EA
23D003	OPTO ISOL HI-SPD ACTV H11L1 U2A,U9A,U2B	DIP6	3 EA
24D025	IC 74HC 14 SCHMITT TRIG INV U6,U34		2 EA
24J009	IC CD 4031 S/R 64 BIT U7,U8	DIP16	2 EA
24N021	IC INTFC 26LS32 RS-422 RECEIVER U11	DIP16	1 EA

Bills of Material

Part Number 70C052
ASSY PCB ALESIS AI-2 I/F
Revision Level: A8

Part Number	Description		Quantity	
55A053-C	PCB ETCHED, AI-2 MAIN AND KBD BEFORE BKWY		1	EA
20239	RES MF SM 330R 1/8W 5% R44,R54,R106,R118,R119,R120,R121,R122,R123,R124,R125	1206	11	EA
22206	SEMI RECT SM 1A 50V PIV D10,D11,D12,D13		4	EA
25507	IC INTFC 2691 UART U26	PLCC28	1	EA
25509	IC SF 82C54 COUNTER U22	PLCC28	1	EA
30120	SOCKET IC DIP, 14 PIN, SM U2,U6,U9,U34	ICS14	4	EA
30121	SOCKET IC DIP, 16 PIN, SM U7,U8,U10,U11	ICS16	4	EA
30124	SOCKET IC DIP, 32 PIN, SM U18	ICS32	1	EA
20202	RES MF SM 10K 1/8W 5% R30,R31,R32,R34,R35,R38,R39,R40,R41,R42,R43,R51, R53,R56,R58,R59,R61,R69,R71,R72,R73,R77,R104,R105, R110,R111,R112,R113,R114,R115,R116,R117,R116	1206	33	EA
20205	RES MF SM 1K 1/8W 5% R21,R22,R48,R50,R52,R55,R66,R67,R68,R85,R90	1206	11	EA
20210	RES MF SM 220R 1/8W 5% R2,R3,R5,R8,R10,R14,R15,R16,R19,R20,R23,R26,R27, R28,R33,R36,R47	1206	18	EA
20211	RES MF SM 100K 1/8W 5% R29,R94,R99	1206	3	EA
20212	RES MF SM 47K 1/8W 5% R57	1206	1	EA
20213	RES MF SM 470K 1/8W 5% R82	1206	1	EA
20222	RES MF SM 33K 1/8W 5% R96	1206	1	EA
20214	RES MF SM 680K 1/8W 5% R81	1206	1	EA
20216	RES MF SM 560R 1/8W 5% R62	1206	1	EA
20218	RES MF SM 1.2K 1/8W 5% R64,R65	1206	2	EA

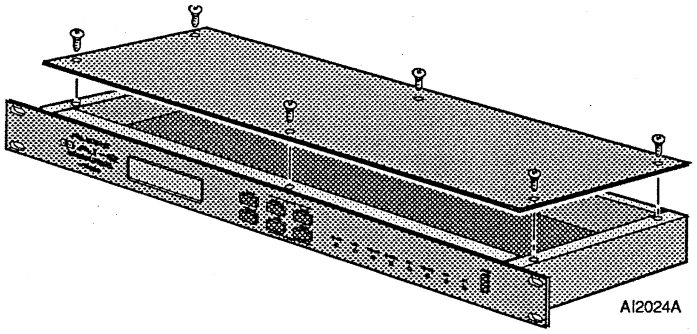

Figure 2. Remove the Top Cover

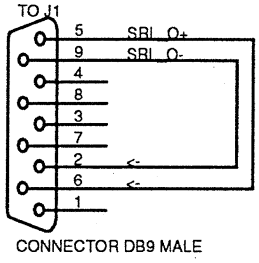

Figure 3. Sync Out Loopback Connector Schematic

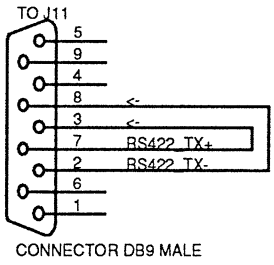

Figure 4. Editor Loopback Connector Schematic

11. Battery Test

A. Turn off the AI-2, hold the STORE switch, turn the power on, and let go of the STORE switch. The display should indicate that the memory was cleared and will scroll through the default user settings; the unit is ready to accept commands.

B. Press the SETUP switch, the display should show:
Setup Adat:
All Input: Off

C. Press the DISPLAY switch two times, the display should show:
Setup: CONTROL
Mode: AUTO
Then press the UP switch to:
Setup: CONTROL
Mode: LYNX

D. Turn off the AI-2, wait one minute, then turn it on. During the usual display startup messages, verify that CONTROL is still LYNX.

E. Turn off the AI-2, hold the STORE switch, turn the power on, and let go of the STORE switch. After the display indicates that the memory was cleared, turn the unit off.

G. Use a DMM to measure the battery BT1 voltage. It should be between 2.5V and 3.7V.

If test fails, replace the battery. Replace cover, end of test.

9. Time Code Reader Test

A. Turn off the AI-2 and, if necessary, disconnect the jumper installed in Section 4, Step A, going from the DH1 pin 8 to ground. Turn the power on. Verify that the display shows "CLEARING MEM", then scrolls through the current (default), user settings and the unit is ready to accept commands.

B. Connect a squarewave generator to an oscilloscope channel and to AI-2 connector RDR IN, (signal to tip, ground to sleeve). Set the generator output to be a 200mVpp, 1KHz squarewave. Also display this signal and use it as the trigger source on the oscilloscope.

C. Attach a scope lead to AI-2 E4 (SMPL).

D. Sweep the generator frequency from 100Hz to 125KHz; verify that SMPL signal tracks the generator output. The SMPL signals rising edge should be at approximately the three-quarters point of a "bit". (A "bit" can either be one whole cycle, or one-half cycle of the squarewave generator output. See Figure 6.)

   If test fails, check U12D, U24 and U34. See the schematic sheet 4, zone D3 & D4.

E. Set the generator to 1KHz. Turn the generator output level to 8Vpp. Verify that the SMPL signal rising edge still occurs at the three-quarters point of a bit as defined above.

F. Connect the time code source, time code output to the AI-2 J14 RDR IN connector. Set the output time code to play speed.

G. Press the DISPLAY switch three times until the screen reads:
   Reader Input
   v 00:00:00:00 (or any time code value)

H. Verify that the display is showing time code incrementing smoothly.

7. VSG Interface Test

Note, you can only do this test if you have a VSG card, TimeLine Part Number 70C025. It also helps to have an oscilloscope with TV field trigger capability.

A. Press the DISPLAY switch; the display should show the following:
VSG INTF TEST, SETUP to start.

Connect a coax cable from the VID IN connector to an oscilloscope channel. Set the channel to .2V/div, and trigger on TV lines, or fields, if possible. Set the sweep time to 1mS/div.

B. Press the SETUP switch to start the VSG INTF TEST; the display should show the following: VSG INTF TEST, Video ON test.

Verify that the oscilloscope shows a .58Vpp TV sync signal. Wait until front panel LED D16 (ON-LINE) lights (approximately three seconds).

If signal amplitude is missing/wrong, check the VSG card. See the schematic sheet 3, zone A4.

C. Press the STORE switch; the display should show the following:
VSG INTF TEST, Video OFF test.

Verify that the oscilloscope shows no TV signal.

D. Press the STORE switch to end the test. Verify that the display indicates the test was passed, and LED D16 (ONLINE) goes off.

5. Time Code Out Test

A. Press the DISPLAY switch; the display should show the following:
TC OUT TEST, SETUP to start.
Signals tested: J3: GCO, J10 GTO+/-.

B. Press the SETUP switch. Verify that the display indicates:
TC OUT TEST, Test in progress.

C. Connect an oscilloscope to a phone plug inserted in J3, scope ground to ring or sleeve, tip to scope input. Verify that the oscilloscope shows a 2.06Khz +/-100Hz, slightly rounded squarewave at 1.0Vpp +/-0.1 Vpp.

If test fails, check U12. See the schematic sheet 3, zone C2.

D. Move the oscilloscope to J10 pins 6 and 7. Verify, on both pins, that the oscilloscope shows a 2.06KHz, .29Vpp to .32Vpp squarewave.

If test fails, replace U10. See the schematic sheet 1, zone C1.

G. Press the STORE switch to end the test.

4. Counter IC And Serial COM 1-6 Tests

These tests require taking the top cover off the AI-2 (see Figure 2), and placing a jumper from a debug header to ground, and cycling power to enter a special test software mode of operation.

(Serial Test Keyboard Commands Summary:)
SETUP = start test
MENU = next test
SET/HOLD = previous test

A. Turn off the AI-2, and take off the top cover. Place a jumper from DH1 pin 8 to a ground test point, E10. (Square dot indicates pin 1.) Turn on the AI-2. Verify that the following screens scroll through the display:

   TIMELINE AI-2, ACCEPTANCE TEST
   Power on test, in progress
   Diagnostic Mode, MENU to select
   COUNTER RD TST, SETUP to start.

B. Press the SETUP switch to start the COUNTER RD TST. Verify that the test passes.

   If test fails, check U22. (Surface mount part, may need to be returned to factory for service.) See the schematic sheet 2, zone B1, U22.

C. Attach a Midi cable from J5 (BRC MIDI OUT) to J6 (BRC MIDI IN). Attach the DB 9 Male loopback connector, wired per Figure 3, to J1 (SYNC OUT).

D. Press the DISPLAY switch; the display should show the following:
   SERIAL COM TST1, SETUP to start.
   Signals tested: J1: SRL_O+/-, SRL_IN+/-, MIDI_TX1, MIDI_IN_SYNCO.

E. Press the SETUP switch to start the SERIAL COM TST1. Verify that the test passes.

   If test fails, replace U6 or U2A. See the schematic sheet 2, zone C2 & D2, J1.

F. Press the DISPLAY switch; the display should show the following:
   SERIAL COM TST2, SETUP to start.
   Signals tested: J5: MIDI OUT BRC, MIDI_TX1-, J6: MIDI_IN_BRC.

G. Attach/leave the Midi cable from J5 (BRC MIDI OUT) to J6 (BRC MIDI IN).

H. Press the SETUP switch to start SERIAL COM TST2. Verify that the test passes.

   If test fails, replace U6 or U2B. See the schematic sheet 3, zone C4 & D4, J5, J6.

I. Press the DISPLAY switch; the display should show the following:
   SERIAL COM TST3, SETUP to start.
   Signals tested J5: MIDI OUT BRC, MIDI_TX1-, J6: MIDI_IN_BRC, J4: MIDI_THRU BRC, MIDI_THRU-, J9: MTC MERGE IN, MIDI_RX2.

3. Front Panel Keyboard, Configuration Switch, LCD Display Tests

These tests can be performed by pressing the indicated front panel keys; the top panel need not be removed.

(User's Commands Summary:)
SETUP then POWER = Diagnostics tests
SETUP = start test
DISPLAY = next test

A. Turn off the AI-2. Press the SETUP switch and the power switch, simultaneously, to turn on the AI-2. The display should scroll through the following messages:

TIMELINE AI-2, DIAGNOSTICS
Power on test, in progress
Diagnostics Mode, Menu to select
FP SWITCH TEST, SETUP to start

B. Verify that the Power On test (checks RAM, U25) passed.

If test fails, check that the software (U18) is installed correctly. Otherwise, one of the IC's in the processor section has probably failed. Return the unit for factory service.
See the schematic sheet 1, zones B2 thru D4.

C. Press the SETUP switch to start the FP SWITCH TEST. Follow the instructions on the display, and verify that the test passes.

If test fails, check that the Keyboard cable is plugged in correctly to J20. See the schematic sheet 4, zone B1.

D. Press the DISPLAY switch; the display should show the following:

CONFIG SW TEST, SETUP to start. Press the SETUP switch to start the CONFIG SWITCH TEST. The test tells the service personal, on the display, to set the AI-2 dip switch three different ways. Follow the instructions, and verify that the test passes.

If test fails, check switch S1. See the schematic sheet 1, zone B1.

E. Press the DISPLAY switch; the display should show the following:

FP LED TEST, SETUP to start. Press the SETUP switch (twice) to perform the FP LED TEST. Follow the instructions, and verify that the test passes. The LED's should show the following pattern: 00000000, 01010101, 11111111, 00000000. 1=on, 0=off.

If test fails, check diodes D16-D23. See the schematic sheet 4, zone B1.

1. Introduction

This service manual provides instructions to allow service personal to verify that an AI-2 is operating correctly, isolate a problem to a user replaceable part, or determine if factory service is required. The tests should be performed by an advanced electronics technician.

Warning

There are static sensitive IC's on the main circuit board. The unit should only be serviced on a static safe workstation. Standard ESD practices must be adhered to.

Some tests can be performed at the front panel alone, while most require removal of the top cover. Some communication/data tests require loop back cables; see the list of figures for cable schematics.

The table of contents lists the area's of the AI-2 currently tested. When troubleshooting, if the problem is understood, service personnel can proceed directly to the relevant section. To verify the overall integrity of the AI-2, all of the tests should be performed in the order given.

Required Parts:

Software:

One prom with the released AI-2 program (which includes test programs)

Hardware:

Video sync sources (at least one): black burst, comp sync, color bars (NTSC, PAL)

Oscilloscope with frequency counter, or Frequency counter

Digital Multimeter

Squarewave Generator, 100Hz-125Khz

Longitudinal Time Code Generator

One 70A071 10V AC power supply (As supplied with the AI-2).

One 70C025 VSG board (for VSG interface test only)

One DB 9 Male Connector wired per Figure 3

One DB 9 Male Connector wired per Figure 4

One DB 25 Male Connector wired per Figure 5

Two 5-pin DIN male cables, wired straight across