ADAT Digital Optical Interface Kit Installation Instructions for E4 Ultra, E4X, EIV, & E4K

6861

The ADAT digital optical I/O card adds 16 digital output channels and 8 digital input channels to the Emulator Four models listed above. Since Emulators can only sample in stereo, only two of the 8 input channels can be used at once. The interface adds 8 digital output channels (sub 4-7) in addition to 8 digital channels which duplicate the 8 analog outputs (main, sub 1-3).

The modification is fairly easy to install, however if you are unsure of your abilities, please contact E-mu for referral to an authorized service center.

This kit **cannot be installed in the e64** due to hardware constraints.

IMPORTANT NOTE #1:
The ADAT board CANNOT be installed on a unit which already has the 8 channel analog output expander installed.

IMPORTANT NOTE #2:
You MUST have EOS version 4.0 software to use the ADAT board. If you have an older Emulator you can order the 6853 software upgrade kit from your E-mu dealer.

Tools Needed:

Phillips head screwdriver #2

Kit Contents:

(1) These installation instructions
(1) ADAT interface board
(1) 50-pin ribbon cable, 2x25x4 connector
(2) 8-pin ribbon cable, 2x4 pin connector
(2) 3-pin cable, 1x3 pin connector
(1) Optical interface cable
(1) 2-pin jumper block

These instructions are not provided as a guarantee against improper installation. When in doubt, contact: E-mu Customer Service at (831) 438-1921. Contact E-mu UK at +44 (0) 131-653-6556.

WARRANTY MAY BE VOIDED IF DAMAGE IS CAUSED BY IMPROPER INSTALLATION, IMPROPER OR INADEQUATE MAINTENANCE, ACCIDENT, ABUSE, MISUSE, ALTERATION, UNAUTHORIZED REPAIRS, TAMPERING, OR FAILURE TO FOLLOW PROCEDURES OUTLINED IN THESE INSTRUCTIONS.

——————————> WARNING <——————————

UNPLUG THE AC CORD BEFORE DOING ANY WORK!

Groundwork

Before you begin, find a clean, well lit place in which to work. This procedure requires that you periodically "Ground" yourself, by touching a grounded object such as a water pipe or a grounded piece of equipment. Grounding yourself prevents the static charge in your body from damaging the sensitive memory chips. When you are asked to "Ground" yourself, simply reach over and touch the grounded metal. Do not walk across the room or a rug, as this will defeat the purpose of grounding.

OPENING RACK UNITS

Tools Needed:

- #2 Phillips screwdriver

Remove the Top Cover

To gain access to the interior of the unit, the top panel must first be removed. The top panel is attached to the main chassis by means of (7) screws. There are three screws along the back of the unit and two on each side. When all the screws are removed, slide the metal top backwards and up off the unit, exposing the main circuit board. Set the top cover aside in a safe place and put the screws into a cup so they will not get lost. The power supply is covered by a metal box. Do not remove this metal cover!

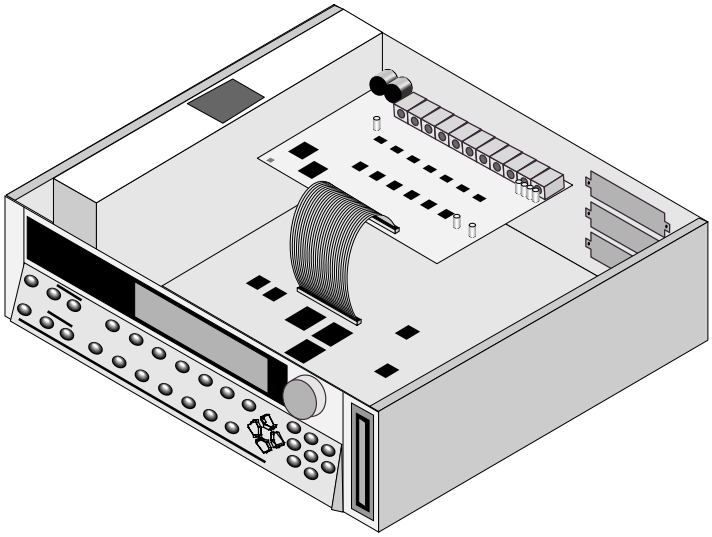

FIG. 1

Remove the Metal Cover Plate

Before you install the ADAT Interface board, you need to make a place for it. On the back of the unit there are three metal cover plates covering the three option card slots. Choose a slot and remove the two screws from the plate. Put these screws in a cup and save them for later reassembly. Remove the cover plate and store it with other “useful” things which don't seem to have any particular use.

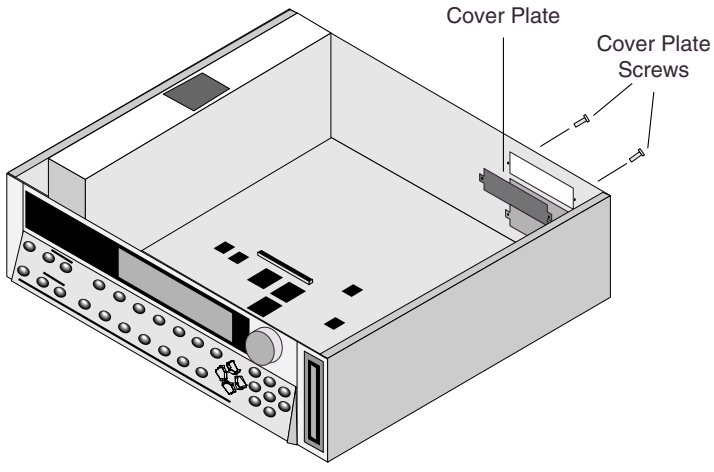

FIG. 2

Install the ADAT Interface Board

The ADAT Interface Board is easy to install. Ground yourself again, by touching a grounded object, then remove the board from its protective bag.

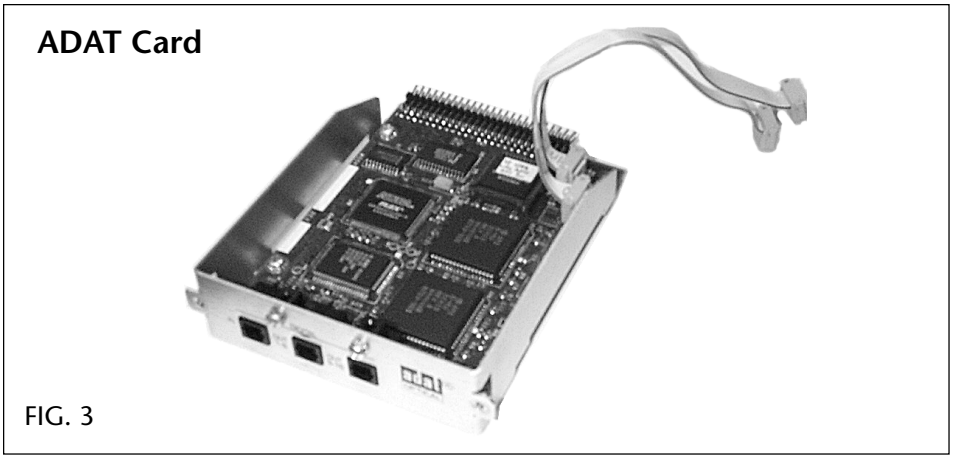

FIG. 3

• If you already have another expansion card installed, you do not need to use the ribbon cable provided with this kit. The ribbon cable connecting the other expansion board(s) will be used for all the boards.

Install the ADAT board from the inside of the unit (see the diagram below). While holding the card with one hand, secure with one screw from outside the unit. Use the same screws that were holding the cover plate.

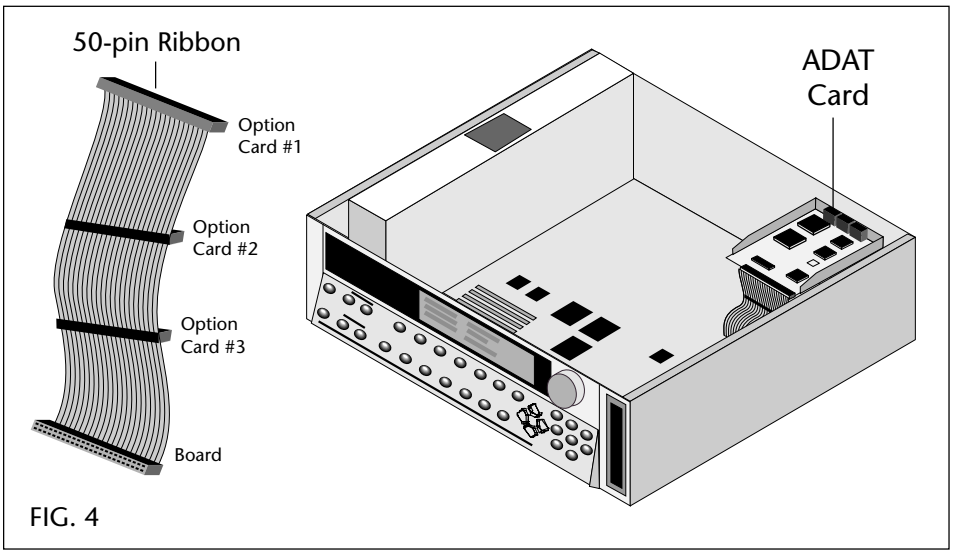

FIG. 4

Next install the second screw and then tighten both screws. The installed card should appear as in the diagram above.

Connect the Wide Ribbon Cable

Connect one end of the wide 50-pin ribbon cable to the card and the other to a connector on the main board labeled “Option Card Connector” (or “Dan Bus” on Ultra), which is directly below the end of the card. BOTH ends of the cable should always be connected. **The Red stripe on the cable MUST be aligned with Pin 1 on the ADAT card** *(cable as shown in figure 4 above).* Be sure not to disconnect any other cables in the unit.

E4 ULTRA - Connect the 8-pin Ribbon Cables

Locate the two 8-pin ribbon cables and plug them into headers CN1 and CN2 on the ADAT card so that the red stripe on the cable is toward the rear of the unit and the cables are pointed away from the sidewall of the ADAT card frame. See figure 5 below.

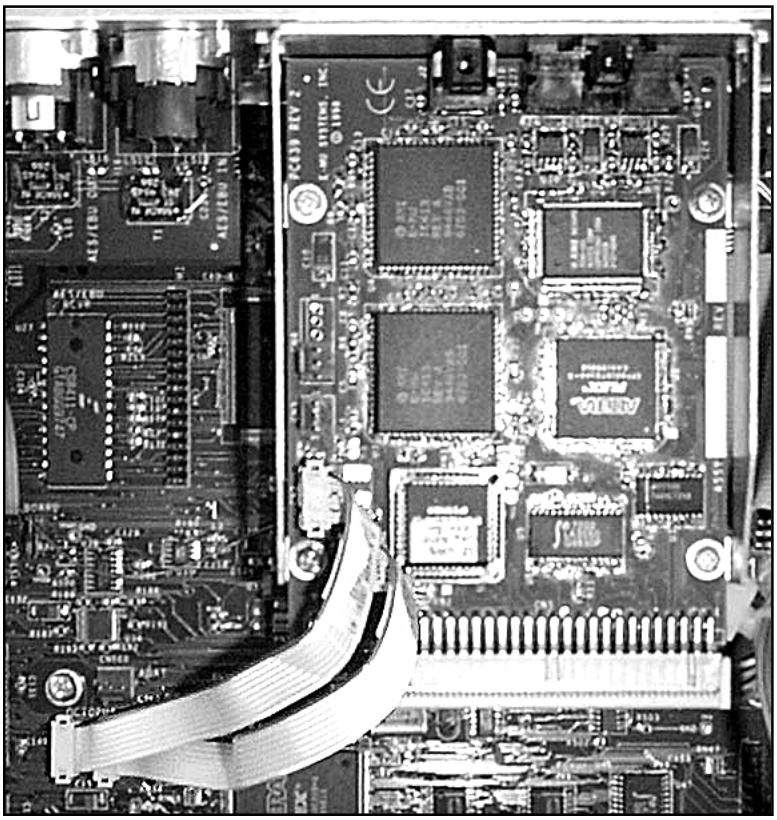

FIG. 5

The two cables connect to headers located in the center of the main board.

- ADAT **CN2** connects to **CN14** on the main board.
- ADAT **CN1** connects to **CN15** on the main board.

It's very important to **align the RED Stripe with Pin 1** as marked on the main board. Visually check to make sure all the pins are properly mated .

E4 ULTRA - Connect the 3-pin Cables

Locate the two 3-pin cables and plug them into headers CN3 and CN4 on the ADAT card. The wires should come out toward the center of the board and NOT toward the sidewall.

These two cables connect to the main board close to the 8-pin ribbon cables.

- ADAT **CN3** connects to **CN500** on the main board.
- ADAT **CN4** connects to **CN10** on the main board.

The 3-pin connectors are keyed so they connect properly. They can be forced to connect backwards but don't do it.

The proper cable connections are shown in **figure 6** on the following page.

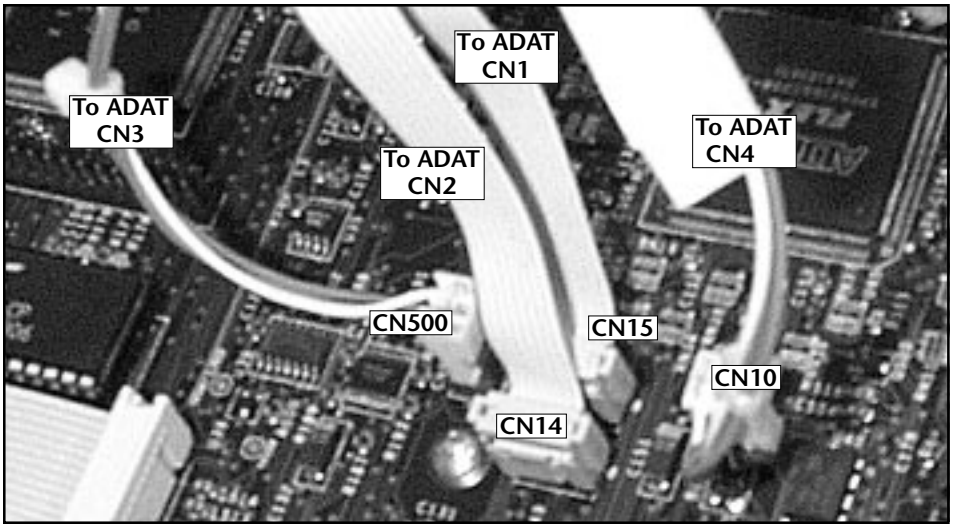

FIG. 6

Caution: *Check the connections shown in figure 6 carefully. Damage may result from improper connection.*

E4X Rack - Connect the 8-pin Ribbon Cables & Jumper

E4X Rack

Locate the two 8-pin ribbon cables and plug them into headers CN1 and CN2 on the ADAT card as shown in figure 5. The other end of these cables connect to headers located on the polyphony daughterboard in the center of the main board. CN6 and CN7 are located next to the SIMM sockets.

It's very important to **align the RED Stripe with Pin 1** as marked on the polyphony board. Make sure all the pins are properly mated.

- ADAT **CN2** connects to **CN6** on the polyphony board.
- ADAT **CN1** connects to **CN7** on the polyphony board.
- The 3-pin cables are NOT USED on the E4X.

Locate the 2-pin jumper block and install it onto the pins labelled "**W1**" on the polyphony daughter board. Pins **W1** are on the same side of the board and close to CN6 & CN7.

EIV - Connect the 8-pin Ribbon Cables

EIV Rack

Locate the two 8-pin ribbon cables and plug them into headers CN1 and CN2 on the ADAT card as shown in figure 5. The other end of these cables connect to headers located in the center and toward the back of the main board. The main board is mounted to the bottom panel of the unit.

It's very important to **align the RED Stripe with Pin 1** as marked on the main board. Visually check to make sure all the pins are properly mated.

- ADAT **CN2** connects to **CN13** on the main board.
- ADAT **CN1** connects to **CN31** on the main board.
- The 3-pin cables are NOT USED on the EIV Classic.

Reassemble the Unit

To reassemble, simply reverse the procedure used for disassembly.

1. Carefully insert the front edge of the top panel between the front panel and the top of the metal enclosure.
2. Next lay the top cover down flat on top of the enclosure. Make sure all the screw holes line up and reinstall the seven screws. The screws are all the same.

NOW…Go to page 9 -> Power ON!

E4K or E-SYNTH KEYBOARD

Tools Needed:

- #2 Phillips screwdriver
- Pair of sharp scissors

Disassembly

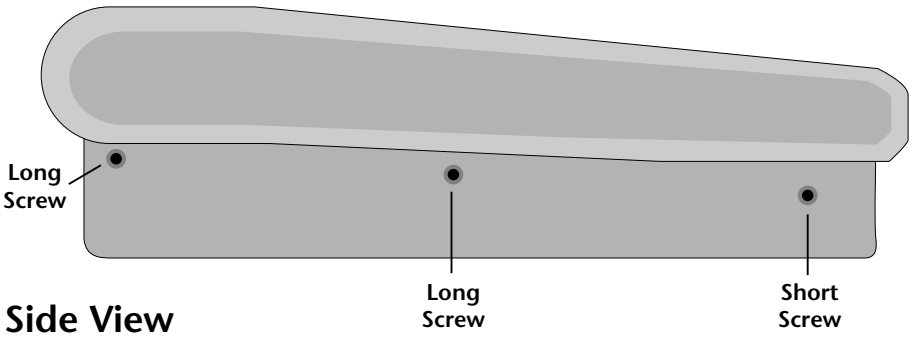

FIG. 7

1. **Remove the End Caps:** To gain access to the interior of the keyboard, the end caps must first be removed. The two end caps are attached by means of (3) phillips head screws each. Looking directly at the end of the unit, you can see the three screws. The front screw is slightly shorter.
2. When the screws are removed (and set aside in a safe place), pull the end cap straight out from the end.

Tip: *Use an end cap as a cup to hold the screws.*

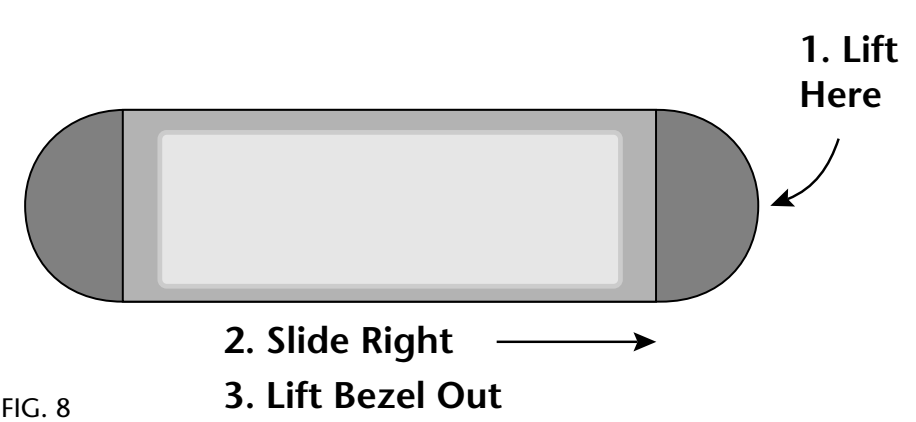

FIG. 8

3. **Remove the Display Bezel:** There are two more screws located underneath the display bezel. Lift the **right** edge of the plastic bezel slightly with your fingernail, then slide the entire bezel assembly to the right. The bezel assembly should easily pop out.
4. Remove the two screws on either side of the bezel and set them aside in a safe place.

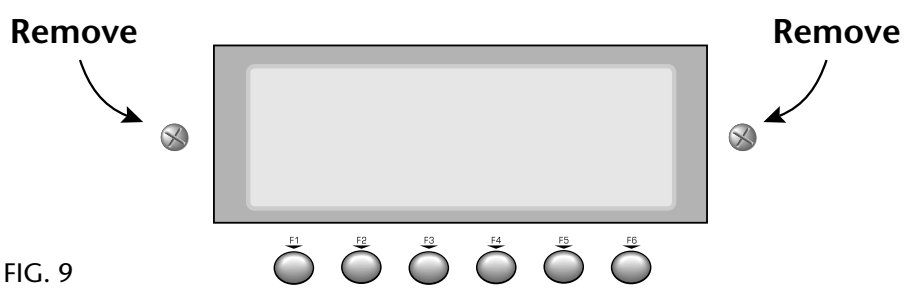

FIG. 9

5. There are three screws on each side of the control panel. Remove these six screws and set aside. Refer to figure 10 below.

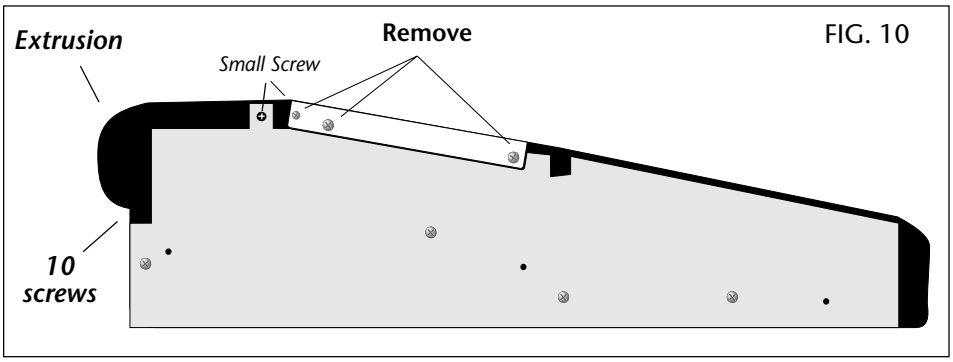

FIG. 10

6. **Lift the Control Panel:** Lift the metal top FROM THE FRONT and lift off the panel assembly with cables still attached. Place a soft towel on the keyboard and set the panel on the towel over on the keyboard area.
7. **Remove the curved rear extrusion piece:** Remove the (10) black screws located in a straight line across the back of the unit directly below the curved part of the unit. See figure 10. Set these aside in a safe place. Next remove the small screws attaching the extrusion on either side of the unit *(also shown in figure 10)*. Finally remove the extrusion itself and set aside.

Remove the Metal Cover Plate

Before you install the ADAT Interface board, you need to make a place for it. On the back of the unit there is a metal cover plate covering the option card slot. Remove the two screws from the plate. Put these screws in a cup and save them for later reassembly. Remove the cover plate and store it with other “useful” things which don't seem to have any particular use.

Shorten the 50-pin Ribbon Cable

The 50-pin ribbon cable is too long to fit inside keyboard Emulators. Use a sharp pair of scissors to cut the cable as shown below. Note that the RED Stripe is on the top in the picture. Cut it cleanly straight across. Discard the long piece of cut cable *(or save it in your special drawer)*.

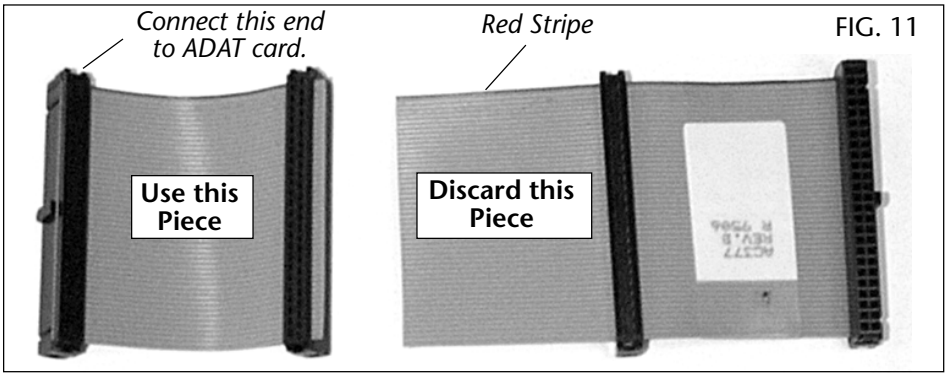

FIG. 11

Attach 50-pin Ribbon to the ADAT Card

Attach the short piece of the cut ribbon cable to connector CN5 of the ADAT board. Align the RED Stripe with pin 1 on the ADAT board. The cable should come DOWN from the edge of the ADAT board.

Attach 50-pin Ribbon to the Motherboard

Connect the other end of the 50-pin ribbon cable to the ribbon cable header on the main board of the keyboard. Refer to figure 12 below for the location of the 50-pin header.

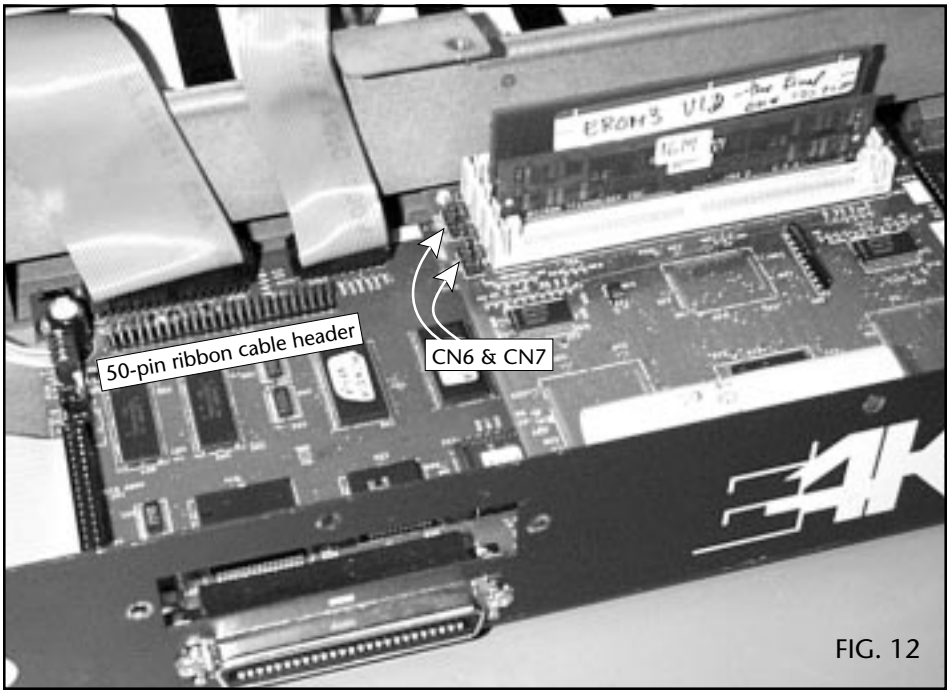

FIG. 12

Install the ADAT Board

Ground yourself again, by touching a grounded object, then remove the board from its protective bag.

Work the ADAT board into place. It's a tight fit, but it does fit. Use care. The front panel ribbon cables will be pressed against the metal divider. This is OK.

While holding the card with one hand, secure with one screw from outside the unit. Use the same screws that were holding the cover plate. Refer to figures 2, 3 & 4.

Connect the 8-pin Ribbon Cables

Locate the two 8-pin ribbon cables and plug them into headers CN1 and CN2 on the ADAT card as shown in figure 5. The other end of these cables connect to headers located on the polyphony daughterboard. CN6 and CN7 are located next to the SIMM sockets as shown in figure 12.

It's very important to **align the RED Stripe with Pin 1** as marked on the polyphony board. Make sure all the pins are properly mated.

- ADAT **CN2** connects to **CN6** on the polyphony board.
- ADAT **CN1** connects to **CN7** on the polyphony board.
- The 3-pin cables are NOT USED on keyboard Emulators.

Install the Jumper Block

Locate the 2-pin jumper block and install it onto the pins labelled "**W1**" on the polyphony daughter board. Pins **W1** are on the same side of the board and close to CN6 & CN7.

Reassembly

1. Replace the curved extrusion on the back of the chassis. Take your time and align the screw holes with the slot in the back of the extrusion. Install the screws in the ends first, then install the center screw, then the rest of the screws. The side screws can be installed last.
2. Lift the control panel and slide the rear edge back into the horizontal slot in the rear extrusion. Carefully align the control panel to the outer edges on each side of the unit.
3. Replace the two screws on either side of the display.
4. Replace the three screws on each end of the control panel. The small screw goes in the rear. You may have to adjust the control panel slightly so the screw holes align.
5. Replace the end caps. The lip on the top of the end cap rests on top of the control panel. Reinstall the three screws on each end cap. The short screw goes in front.
6. Carefully replace the display bezel. Set the bezel in the slots with the two pins on the right bottom of the bezel. Slide the bezel to the left, then press down on the right side.

Power On

At this point, the installation is almost finished. The Emulator should boot up normally when power is applied. It does? Congratulations! During the boot-up process, the Emulator should display "ADAT card installed".

Problems?

If the unit doesn't power up normally, disconnect power immediately and try the following:

- Are you running EOS version 4.0 (or higher) software? You should be.
- The message, "Bogus ADAT card installed" usually indicates that the 50-pin connector is correctly installed, but one or both of the 8-pin connectors is connected wrong.
- Did you install the jumpers on E4X or E4K?
- Open the unit, and verify all cable connections.
- Try returning the unit to it's original configuration.

If all else fails, call E-mu Customer Service at (831) 438-1921. Telephone support hours are 8:00-5:00 PST, Monday through Friday.

Operation

Inputs & Outputs

Digital In

When the ADAT Digital Optical card is installed, four additional sampling sources are available in the Create Sample screen. You can choose: ADAT in 1 & 2, ADAT in 3 & 4, ADAT in 5 & 6, or ADAT in 7 & 8.

When sampling from ADAT, set the Default Clock to match the sample rate of the ADAT input. The Emulator input automatically locks to the ADAT embedded data clock no matter what the Default Clock setting and will sample correctly. However, the sound you are monitoring will be distorted if the Default Clock doesn't match the incoming sample rate.

The display shows "No ADAT" when ADAT input is not detected.

Jack Detects Disabled - *The Jack detect feature is disabled when the ADAT card is installed.*
(This feature would automatically route a Sub output to the Main outs if a plug was not inserted into the Sub.)

Digital Out 1-8

The signals available on this output are identical to the 8 analog outputs. The analog and digital outputs can be used simultaneously.

Digital Out 9-16

When the ADAT Digital Optical card is installed, four new output destinations are available in the multimode screen and in the Voice Level, Amplifier screen. Route MIDI channels or Voices to Sub 4, Sub 5, Sub 6 and Sub 7 to access ADAT outputs 9-16 *(9-10, 11-12, 13-14, 15-16)*. Use the Pan controls to route to a single output.

Clock

Caution: *If Ultra is set to receive ADAT clock and no external clock source is present, the Emulator's internal clock drifts down to around 25 kHz. This will cause notes to sound at the wrong pitch.*

ADAT Optical can be used as a Word Clock source on the Ultra series. In a digital audio system, there must be only one Master Clock. For example, when recording into an ADAT you must switch the ADAT to receive external clock *OR* connect another lightpipe from the ADAT out to Ultra and set Ultra's Word Clock In (Master, Setup, In/Out) to ADAT.

The master clock in a digital system depends on your setup. All Emulator models have an extremely stable clock source and can be confidently used as a Master Clock.

An Ultra can be either a master or slave. Older Emulators MUST be the master in an ADAT setup as they cannot synchronize to an external Word Clock.

Dither

ADAT Output Dither

When to Dither?

Add Dither *- When sending ADAT data to a 16 bit device which doesn't dither at the input.*

Don't Add Dither *- When sending ADAT data to a 20-24 bit device.*

Dither is a technique used in digital systems to improve audio performance by adding noise to the least significant data bits. In general, dither is used whenever a digital number is converted to a smaller number (for instance when converting 20 bits to 16 bits).

As an example, suppose you were transferring ADAT optical data from the Ultra to an older ADAT recorder. The ADAT output is 20 bits wide while the older ADAT only receives data 16 bits wide. In this case you would turn Output Dither On because the receiving device has fewer bits. If you were sending data to a new ADAT which receives 20 bit data, you would turn Output Dither Off.

Sample Input Dither

Dither is also an option in the Create Sample screen. EOS machines sample at 16 bit linear, so dither should be turned On when digitally sampling from a source that has more than 16 bits, for example when sampling a 24 bit AES signal or when sampling from a 20 bit ADAT machine. Dither can be either On or Off when analog sampling (the audio performance is the same).

E-MU

WORLD HEADQUARTERS
E-MU SYSTEMS, INC.
P.O. BOX 660015
SCOTTS VALLEY, CA USA
95067-0015
TELEPHONE: 831-438-1921
FAX: 831-438-8612

EUROPE, AFRICA, MIDDLE EAST
E-MU SYSTEMS, LTD.
SUITE 6, ADAM FERGUSON HOUSE
ESKMILLS INDUSTRIAL PARK
MUSSELBURGH, EAST LOTHIAN
SCOTLAND, EH21 7PQ
TELEPHONE: +44 (0) 131-653-6556
FAX: +44 (0) 131-665-0473