

## AMBus SDIF Card

### Installing the AMBus Card

To install the AMBus card, first make sure the power is turned off. You may wish to keep the unit plugged into a switched-off, grounded AC receptacle so as to minimize the chance of static discharge, and avoid standing on carpeting while carrying out this procedure. Keep the new AMBus card in its packaging until you are ready to install. Now turn the unit around so you're facing the back panel. Remove the plate covering an available AMBus slot. Ground yourself by touching a connector on the AD-8000 rear panel and unpack the card. Insert the card until you feel it mate with the connector at the back of the card bay. Fasten the card in place with the screws. You will need to remember the identification of the card slot (A-D) into which you have installed the card.

### SDIF, Sony Digital Multitracks and the AD-8000

The Apogee AMBus SDIF card provides eight channels of SDIF Input and Output via 25-pin D-connectors. The Output connector is to the left of the card and the Input to the right. Both connectors are DB-25 Female connectors so as to provide compatibility with the Tascam SDIF/TDIF converter. *Note: Be careful to connect the connectors correctly!*

Special wiring harnesses are available, one for output from the AD-8000 and one for input to the AD-8000. These harnesses consist of a DB-50 connector on one end, to go into the SDIF connector on a Sony digital multi-track (a male DB50 to connect to the Sony output or a female DB50 to connect to the Sony machine's input), and three male DB-25 connectors on the other, to connect to up to three AD-8000s equipped with SDIF cards. This means that each harness allows access to up to 24 Sony tracks. If you wish to use the AD-8000 in conjunction with other SDIF systems, please contact Technical Support for information on the pinout of the DB-25 connectors.

The SDIF AMBus card supports both the 4/24 and 6/20 Apogee Bit-Splitting modes. As a result, the following track configurations are possible:

Sony 3348HR: All tracks 24-bit (no bit-splitting)

Sony 3348: 24 tracks of 24-bit recording (4/24 mode) or 36 tracks of 20-bit audio (6/20 mode)

Sony 3324: 12 tracks of 24-bit or 18 tracks of 20-bit recording.

The 4/24 mode (four channels of 24 bits on eight 16-bit tracks) records the first 16 bits of a channel on the first track, and the remaining bits on a subsequent track along with a tone to indicate that you shouldn't be listening to it on its own! You can listen to the first track in each pair, but remember that the signal will only be 16-bit. This mode is compatible with Rane's PaqRat system.

An advantage of the 4/24 modes is that you can record or overdub on an individual 24-bit channel, by recording on two adjacent odd/even tracks at the same time, without damaging any other tracks. This is not possible with the 6/20 mode, which is more intended for multi-channel live recordings where subsequent individual channel overdubs are not required.

In any of the bit-splitting modes, the source resolution will be displayed as "24" in the source resolution display (above the SOURCE SELECT button).

The bit-splitting modes are selected by DIP switches on the top of the SDIF card, as shown below. **Note that you will need to remove the card to change the switch settings. We recommend that you turn the AD-8000 off to do so.**

### SDIF DIP Switch

Switch	Function when 'ON'
1	ABS 4/24 mode (PaqRat compatible)
2	ABS 6/20 mode
3	not defined
4	not defined

*If both switches 1 and 2 are both ON or both OFF, then ABS is turned off.*

*The default setting is all switches OFF ("Open").*

## Word Clock configuration with the AMBus SDIF Card

SDIF requires Word Clock for correct operation. There are two primary ways in which you can connect Word Clock in conjunction with Sony digital multitracks, the SDIF card and the AD-8000.

### Using the AD-8000 as the master

*This is the preferred configuration as it uses the AD-8000 high-stability clock as the master clock for the whole system. The disadvantage is that varispeed operation is not available.*

Distribute Word Clock to the system as follows:

- 1 Define one AD-8000 as the master and set it to CRYSTAL at the desired sample rate. Set all other AD-8000 units and the Sony machine to lock to Word Clock In.
- 2 Connect a high-quality digital BNC cable (such as Apogee Wyde Eye AD) of the shortest reasonable length to the WC OUT socket on the master AD-8000 and connect the other end to a 75Ω T-connector attached to the WC IN of the next AD-8000.
- 3 Take another cable and connect it between the other leg of the T-connector and a T-connector on the WC IN of the next AD-8000.
- 4 Continue this daisy-chaining operation until all AD-8000 units are connected.
- 5 Run a Word Clock cable from the spare leg of the T-connector on the last AD-8000 to the WC input on the Sony digital recorder and terminate as required.
- 6 Insure that all machines except the master AD-8000 are set to lock to WC IN.

### Using the Sony machine as the master

*Use this configuration only if you require varispeed operation on the Sony multitrack, as it relies on the Sony clock instead of the AD-8000 high-stability master clock. However, the incoming word clock signal is relocked by the first AD-8000 in the chain for maximum stability and jitter-free operation.*

Distribute Word Clock to the system as follows:

- 1 Set all AD-8000 units to lock to Word Clock In. Set the Sony machine to its internal clock.
- 2 Connect a high-quality digital BNC cable (such as Apogee Wyde Eye AD) of the shortest reasonable length to the WC OUT socket on the Sony machine and connect the other end to the WC IN of the first AD-8000.
- 3 Connect a cable to the WC OUT socket on the master AD-8000 and connect the other end to a 75Ω T-connector attached to the WC IN of the next AD-8000.
- 4 Take another cable and connect it between the other leg of the T-connector and a T-connector on the WC IN of the next AD-8000.
- 5 Continue this daisy-chaining operation until all AD-8000 units are connected.
- 6 Connect a 75Ω terminator to the open leg of the T-connector on the last AD-8000.
- 7 Insure that all machines except the Sony recorder are set to lock to WC IN.

## Emphasis and De-Emphasis

The DAC-2 and DAC-8 D/A converter cards for the AD-8000 will apply de-emphasis automatically when required. On the DAC-2, set SW3 to ON to disable automatic de-emphasis. On the DAC-8, SW2 set to ON will disable automatic de-emphasis sensing.

The AD-8000 and the SDIF card do not implement pre-emphasis on recording. If you attempt to overdub on a track which was previously recorded with emphasis, the Sony recorder will indicate an error.

## More on ABS Bit-Splitting Formats

There are two ABS formats. The first mode allows *up to four simultaneous 24-bit channels* to be recorded across eight 16-bit tracks. This mode is compatible with Rane's PaqRat system, and thus permits replay of tracks previously recorded with an Apogee AD-1000 Platinum Edition system.

In this mode, each 24-bit channel is recorded on two adjacent 16-bit tracks. The 16 most-significant bits of the first 24-bit channel are recorded on the first track of the pair, while the remaining eight bits are recorded on the second track. The remaining eight bits of the second track are used to record a tone to indicate that this track was not designed to be monitored on its own (as a result, even numbered tracks always have signal present on record). The odd-numbered tracks, however, may be monitored if desired (bearing in mind that they will only deliver 16-bits of resolution). **VERY IMPORTANT: When using this mode, ensure that UV22 is turned off on the AD-8000 channels you are using.**

A benefit of the 4/24 bit-splitting mode is that each of the four high-resolution channels can be re-recorded or overdubbed upon, simply by placing two adjacent odd/even tracks of the machine in record.

The third mode allows up to *six simultaneous channels of 20-bit audio* to be recorded on a set of eight 16-bit tracks. The first 16 bits of the first three channels are recorded on tracks 1, 2 and 3. The five least-significant bits of these three channels are recorded on track 4. The first 16 bit of the second three channels are recorded on tracks 5, 6 and 7 with the LSBs on track 8. This mode is designed for simultaneous and multi-channel surround recording, and as a result it is only possible to *re-record* (overdub) three 20-bit channels at a time. We do not recommend that you try listening to tracks 4 and 8 in each set. **IMPORTANT: We advise employing UV22 in this mode, to capture more of the 24-bit detail of the AD-8000. Be sure to set the UV22 output word length to 20 bits rather than the default 16 bits. Set SW2 on the rear of the AD-8000 (NOT on the card) to ON.**

### **Bit-splitting with multiple cards**

You can use two SDIF cards in 4/24 mode to fully utilize all eight channels of the AD-8000. In 4/24 mode, when a card is in an “odd” slot (A or C), channels 1–4 will be encoded/decoded by that card. When a card is in an “even” slot (B or D) then channels 5–8 will be encoded/decoded by that card.

## AMBus ADAT8 Card

### Installing the AMBus Card

To install the AMBus card, first make sure the power is turned off. You may wish to keep the unit plugged into a switched-off, grounded AC receptacle so as to minimize the chance of static discharge, and avoid standing on carpeting while carrying out this procedure. Keep the new AMBus card in its packaging until you are ready to install. Now turn the unit around so you're facing the back panel. Remove the plate covering an available AMBus slot. Ground yourself by touching a connector on the AD-8000 rear panel and unpack the card. Insert the card until you feel it mate with the connector at the back of the card bay. Fasten the card in place with the screws. You will need to remember the identification of the card slot (A-D) into which you have installed the card. If you intend to use the 4/24 bit splitting mode (see below), you should install the first card in slot A or C, and the second card (if any) in slot B or D.

### ADAT and the AD-8000

The ADAT lightpipe audio format and the ADAT8 AMBus card both support 24 bit I/O, even though the basic ADAT and the ADAT XT only support 16 bits, and the M20 only supports 20 bits. In the event that a 24-bit ADAT machine becomes available, your ADAT8 card will provide full 24-bit compatibility. In the meantime, to allow recording of higher resolutions (20- and 24-bit) on standard 16-bit ADAT machines, the ADAT8 card includes several additional "bit-splitting" formats which split high resolution signals among multiple 16-bit tracks, at the cost of having fewer total tracks available for recording. The ADAT8 card supports the following digital audio formats:

1. 8 tracks of 16 bits on ADAT/XT, 20 bits on M20 (and 24 bits on a future 24-bit ADAT machine)
2. 4 channels of 24 bits each (Rane's PaqRat format) on an 8-track 16-bit recorder
3. 4 channels of 24 bits each (ABS 4/24 format, which is identical to PaqRat, but with auto-ID)
4. 6 channels of 20 bits each (ABS 6/20 format with auto-ID) on an 8-track 16-bit recorder

The auto-ID facility (available shortly) enables the AD-8000 to recognize an incoming ABS signal automatically, without having to set any switches. Full PaqRat capability is provided, however, enabling you to create or replay recordings that are completely compatible with Rane's PaqRat equipment or with the PaqRat-compatible mode of the enhanced Apogee AD-1000. 4/24 recordings made with the AD-8000 will always include the ABS auto-ID, but this does not affect replay via a PaqRat system.

The two 4/24 modes (four channels of 24 bits on eight 16-bit tracks) record the first 16 bits of a channel on the first track, and the remaining bits on a subsequent track along with a tone to indicate that you shouldn't be listening to it on its own! You can listen to the first track in each pair, but remember that the signal will only be 16-bit.

An advantage of the 4/24 modes is that you can record or overdub on an individual 24-bit channel, by recording on two adjacent odd/even tracks at the same time, without damaging any other tracks. This is not possible with the 6/20 mode, which is more intended for surround-sound mixing and multi-channel live recordings where subsequent individual channel overdubs are not required.

An additional feature of the 4/24 modes is the ability to record eight simultaneous 24-bit channels by using two ADAT machines (and thus two ADAT8 cards). In 4/24 mode (either PaqRat or ABS), a card in slot A will output 24-bit audio from channels 1-4, and likewise on input will reconstruct the 24-bit audio onto channels 1-4. Similarly, slot B will use 24-bit data on channels 5-8, slot C will use 24-bit data on channels 1-4, and slot D will use 24-bit data on channels 5-8. Alternating slots use different channels in order to facilitate an 8-channel/24-bit recording and playback mode using two ADAT8 cards and two 16-bit, 8 track MDMs. For example, if two ADAT8 cards are plugged into slots A and B, then channels 1-4 will be directed to and from the slot A card, and channels 5-8 will be directed to and from the slot B card.

In 6/20 mode (ABS), cards in any slot will operate on audio on channels 1-6 only.

In any of the bit-splitting modes, the source resolution will be displayed as "24" in the source resolution display (above the SOURCE SELECT button).

The bit-splitting modes are selected by DIP switches on the back of the ADAT8 card, as shown below. **Note that on the card switches, UP is OFF and DOWN is ON. This is the opposite of the switches on the rear of the AD-8000 itself.**

### ADAT8 DIP Switch

Switch Function when 'ON'

- |   |                                   |
|---|-----------------------------------|
| 1 | ABS 4/24 mode (PaqRat compatible) |
| 2 | ABS 6/20 mode                     |
| 3 | not defined                       |
| 4 | not defined                       |

*If both switches 1 and 2 are both ON or both OFF, then ABS is turned off.*

On replay, the presence of an ABS signal is detected automatically (feature available shortly) and the card is set up accordingly, irrespective of the DIP switch settings. To receive a PaqRat signal (4/24 mode with no ABS ID), set SW1 ON.

### Channel routing LED matrix

#### Bit Splitting Modes

Bit-splitting is indicated on the channel routing matrix. If 4-channel/24-bit (4/24) bit-splitting (PaqRat or ABS) is enabled on one or two installed AMBus cards, then channels 1/2 and 3/4 light in the A or C row and channels 5/6 and 7/8 in the B and D row, depending on the position of the card(s).

If 6-channel/20-bit (6/20) bit-splitting is enabled on an installed AMBus card, then the channel LEDs 1-6 for that row are turned on, indicating that channels 1-6 are selected for input.

#### Destination Monitor Mode

If the unit is in "tape monitor" (destination) mode, and you are monitoring a selected AMBus card, only one of the DEST LEDs is illuminated – the one for the selected AMBus card.

#### Source Monitor Mode

When an AMBus card is in source monitor mode, and it is selected as the digital source, its outputs will be muted (DEST LEDs will be OFF for that card) to prevent the possibility of digital feedback or looping.

## Recording and Playback with the ADAT8 Card

### Recording

Having installed the card, select the mode you wish to use according to the DIP switch settings described above. We will describe the procedure for simple (non-ABS) recording, using the AD-8000 as the timing reference. The only differences when recording in an ABS mode are the settings of the card switches and the synchronization of multiple machines, if they are used, and these are covered in the following section. To synchronize the AD-8000 to a different timing source, see the AD-8000 manual. It is recommended to adjust DIP switch settings with the power off to ensure that settings changes are registered.

Use standard ADAT optical interconnects to link the card lightpipe ports to the ADAT machine. Connect the output on the card to the input on the ADAT machine, and vice-versa.

To record in normal (not bit-splitting) mode, all the DIP switches on the card should be set to either ON or OFF (it doesn't matter which: see the table above).

Power up the units. Set the ADAT machine to "DIG INPUT". If you wish to use the AD-8000 as the master clock reference for your recording, press the AD-8000 "SYNC SOURCE" button (far left of the panel, next to the Apogee logo) until the "crystal" LED is illuminated and press the "SAMPLE RATE" button on the AD-8000 until the desired sample rate LED is illuminated (44.1 or 48 kHz). Alternatively, you can synchronize the AD-8000 to other sources such as Word Clock, video (if the video sync module is installed) or a digital input. See your AD-8000 manual for details.

Press the "CLOCK SELECT" button on the ADAT machine until the display reads "DIG" at the correct sample rate (44.1 or 48 kHz). This sets the ADAT machine to receive its digital timing data from the AD-8000, via the optical interface. If the sample rate is set incorrectly (eg 44.1 instead of 48), undesirable results will be experienced. In particular, you may see mysteriously high readings on the Channel 1 meter of the ADAT machine.

You may now record-enable the channels on which you wish to record, and start recording!

### Playback

Ensure that the ADAT machine and the AD-8000 are connected as described above, and check that the ADAT machine is in replay mode (not input). Typically, press the "ALL INPUT" button until the word "ALL" is not

displayed in the input indicator. If you are in input mode during replay, the meters will not read and no signal of any kind will be output.

Press the AD-8000 "DIGITAL IN" button and select the channel pairs you wish to enable for digital input, or simply hold the "DIGITAL IN" button to illuminate all eight digital input indicators and set all the channels to digital input. In the Digital Routing section of the AD-8000 front panel (upper far right of the unit), press the "SOURCE" button until the correct AMBus card is selected. Refer to the earlier section on the routing matrix to check the LED display indications are correct. You are now ready to replay your recording.

### Synchronization

You can set up the clocking arrangement so that either the MDM or the AD8000 is the clock master. For the AD8000 as clock master, set the AD8000 to crystal at 44.1 or 48, and the ADAT to DIG. If you wish to make the ADAT the master clock, set the ADAT machine's clock to INT at the right sample rate by pressing "CLOCK SELECT". Now press the AD-8000's "SYNC SOURCE" button until the LED is illuminated for the AMBus card slot (A, B, C or D) into which the appropriate ADAT8 card is installed.

### Notes on ABS Operation and Multiple Cards

*While in bit splitting mode:*

If a digital input pair is assigned which does not exist, the corresponding DIG x/x LEDs on the assigned channel pair will flash. For example, if in 6/20 mode, and channel 7/8 is assigned as digital, the DIG7/8 LEDs will flash on channels 7 and 8. If in 4/24 mode, and a second AMBus card is not installed, LEDs DIG5/6 and DIG7/8 will flash if those channels are assigned as digital.

If in 4/24 mode, and two cards are installed and being used for bit-splitting, then both cards are checked for errors. If one of the two cards indicates an error condition, then the DIGITAL IN LED will flash, and outputs won't be muted (in case only one card is being used). If both cards indicate an error, the ERROR LED will come on, and digital outputs will be muted (as in normal digital input error handling).

If a single card set to 4/24 mode is installed and appears in slot A or C, ch 1-4 on the dot matrix for that row are lit up. If the card is in slot B or D, ch 5-8 are lit up. The selection LED for that slot is illuminated, and the 24 bit LED is on. With two bit-splitting-capable cards installed (eg two ADAT8's, or an ADAT8 and a TDIF8), the dot matrix illuminates 1-4 for slot A or C, and 5-8 for slot B or D. Two of the selection LEDs are on, corresponding to AMB A and AMB B, or AMB C and AMB D, and the 24 bit resolution LED is on. If one of the two cards has a slip or format error, then the "DIGITAL IN" LED flashes as before. If there is no second card or the second card is not capable of bit splitting, then operation is identical to the one card case (only 1-4 or 5-8 are illuminated).

### ABS Bit-Splitting Formats

There are three ABS formats. The first mode allows *up to four simultaneous 24-bit channels* to be recorded across eight 16-bit tracks. This mode is compatible with Rane's PaqRat system, and thus permits replay of tracks previously recorded with an Apogee AD-1000 Platinum Edition system.

In this mode, each 24-bit channel is recorded on two adjacent 16-bit MDM tracks. The 16 most-significant bits of the first 24-bit channel are recorded on the first track of the pair, while the remaining eight bits are recorded on the second track. The remaining eight bits of the second track are used to record a tone to indicate that this track was not designed to be monitored on its own (as a result, even numbered tracks always have signal present on record). The odd-numbered tracks, however, may be monitored if desired (bearing in mind that they will only deliver 16-bits of resolution). **VERY IMPORTANT: When using this mode, ensure that UV22 is turned off on the AD-8000 channels you are using.**

The second mode is identical to the first, except that the remaining eight bits of the second track contain, along with a tone, an ID bit-pattern which identifies the track as having been recorded with Apogee Bit-Splitting technology. Future revisions of the MDM AMBus cards will record this ID, and on replay the card will set itself up to decode the signal automatically.

A benefit of both 4/24 bit-splitting modes is that each of the four high-resolution channels can be re-recorded or overdubbed upon, simply by placing two adjacent tracks of the MDM in record.

The third mode allows *up to six simultaneous channels of 20-bit audio* to be recorded on eight 16-bit MDM tracks. The first 16 bits of the first three channels are recorded on tracks 1, 2 and 3. The five least-significant bits of these three channels are recorded on track 4, along with an ID for future automatic identification. The first 16 bit of the second three channels are recorded on tracks 5, 6 and 7 with the LSBs and ID on track 8. This mode is designed for simultaneous and multi-channel surround recording, and as a result it is only possible to

re-record three 20-bit channels at a time. We do not recommend that you try listening to tracks 4 and 8. **IMPORTANT: We advise employing UV22 in this mode, to capture more of the 24-bit detail of the AD-8000. Be sure to set the UV22 output word length to 20 bits rather than the default 16 bits. Set SW2 on the rear of the AD-8000 (NOT on the card) to ON.**

## AMBus TDIF8 Card

### Installing the AMBus Card

To install the AMBus card, first make sure the power is turned off. You may wish to keep the unit plugged into a switched-off, grounded AC receptacle so as to minimize the chance of static discharge, and avoid standing on carpeting while carrying out this procedure. Keep the new AMBus card in its packaging until you are ready to install. Now turn the unit around so you're facing the back panel. Remove the plate covering an available AMBus slot. Ground yourself by touching a connector on the AD-8000 rear panel and unpack the card. Insert the card until you feel it mate with the connector at the back of the card bay. Fasten the card in place with the screws. You will need to remember the identification of the card slot (A-D) into which you have installed the card. If you intend to use the 4/24 bit splitting mode (see below), you should install the first card in slot A or C, and the second card (if any) in slot B or D.

### TDIF and the AD-8000

The Tascam TDIF audio format and the TDIF8 AMBus card both support 24 bit I/O, even though current Tascam-compatible (DTRS) machines record only 16 bits. In the event that a 24-bit TDIF machine becomes available, or if you connect your TDIF8 card to a digital audio card or console that supports it, your card will provide full 24-bit compatibility. In the meantime, to allow recording of higher resolutions (20- and 24-bit) on standard 16-bit TDIF machines, the TDIF8 card includes several additional "bit-splitting" formats which split high resolution signals among multiple 16-bit tracks, at the cost of having fewer total tracks available for recording. The TDIF8 card supports the following digital audio formats:

1. 8 tracks of 16 bits on DTRS modular digital multitracks (and 24 bits on a future 24-bit DTRS machine)
2. 4 channels of 24 bits each (Rane's PaqRat format) on an 8-track 16-bit recorder
3. 4 channels of 24 bits each (ABS 4/24 format, which is identical to PaqRat, but with auto-ID)
4. 6 channels of 20 bits each (ABS 6/20 format with auto-ID) on an 8-track 16-bit recorder

The auto-ID facility (available shortly) enables the AD-8000 to recognize an incoming ABS signal automatically, without having to set any switches. Full PaqRat capability is provided, however, enabling you to create or replay recordings that are completely compatible with Rane's PaqRat equipment or with the PaqRat-compatible mode of the enhanced Apogee AD-1000. 4/24 recordings made with the AD-8000 will always include the ABS auto-ID, but this does not affect replay via a PaqRat system.

The two 4/24 modes (four channels of 24 bits on eight 16-bit tracks) record the first 16 bits of a channel on the first track, and the remaining bits on a subsequent track along with a tone to indicate that you shouldn't be listening to it on its own! You can listen to the first track in each pair, but remember that the signal will only be 16-bit.

An advantage of the 4/24 modes is that you can record or overdub on an individual 24-bit channel, by recording on two adjacent odd/even tracks at the same time, without damaging any other tracks. This is not possible with the 6/20 mode, which is more intended for surround-sound mixing and multi-channel live recordings where subsequent individual channel overdubs are not required.

An additional feature of the 4/24 modes is the ability to record eight simultaneous 24-bit channels by using two DTRS machines (and thus two TDIF8 cards). In 4/24 mode (either PaqRat or ABS), a card in slot A will output 24-bit audio from channels 1-4, and likewise on input will reconstruct the 24-bit audio onto channels 1-4. Similarly, slot B will use 24-bit data on channels 5-8, slot C will use 24-bit data on channels 1-4, and slot D will use 24-bit data on channels 5-8. Alternating slots use different channels in order to facilitate an 8-channel/24-bit recording and playback mode using two TDIF8 cards and two 16-bit, 8 track MDMs. For example, if two TDIF8 cards are plugged into slots A and B, then channels 1-4 will be directed to and from the slot A card, and channels 5-8 will be directed to and from the slot B card. (You can, in fact, record on two different types of MDM machine at once with one TDIF8 card and one ADAT8 card, one in A or C and the other in B or D: however this may be confusing.)

In 6/20 mode (ABS), cards in any slot will operate on audio on channels 1-6 only.

In any of the bit-splitting modes, the source resolution will be displayed as "24" in the source resolution display (above the SOURCE SELECT button).

The bit-splitting modes are selected by DIP switches on the back of the TDIF8 card, as shown below. **Note that on the card switches, UP is OFF and DOWN is ON. This is the opposite of the switches on the rear of the AD-8000 itself.**



### TDIF8 DIP Switch

Switch Function when 'ON'

- 1 ABS 4/24 mode (PaqRat compatible)
- 2 ABS 6/20 mode. *Switches 1 and 2 BOTH ON sets the input word length to 24-bit (see below).*
- 3 not assigned

4 LRCK Master. Normally, this switch is set to OFF, for use with digital multitrack machines, in which the AD-8000 is effectively the slave and receives timing information (technically referred to as "LRCK") from the connected device, which acts as the master. Some TDIF devices, such as the IF-88 or Apogee's FC-8 format converter, can *only* act as a slave and do not generate LRCK timing information. In this case, set SW4 to ON. This makes the AD-8000 generate timing reference information and the system should operate correctly. Note that you may still need to connect a Word Clock (also known as "Word Sync") cable: ensure that it runs from the WC Out connector on the device you are using as the sync source, to the WC In connector on the device that is set to receive external clock.

To receive a PaqRat signal (4/24 mode with no ABS ID), set SW1 ON and SW2 OFF. For 6/20 mode, set SW1 OFF and SW2 ON.

### Card Input Word Length

The AMBus TDIF8 card has a 24-bit data path in both directions. Some DTRS machines, although they only operate at 16-bits, can output random values in the remaining bits. To avoid any resulting problems, the TDIF8 card normally disregards the last eight bits on input. If you are receiving data from a TDIF device that outputs more than 16 valid bits, set DIP switches 1 and 2 BOTH ON. This enables full 24-bit input without bit-splitting.

### Channel routing LED matrix

#### Bit Splitting Modes

Bit-splitting is indicated on the channel routing matrix. If 4-channel/24-bit (4/24) bit-splitting (PaqRat or ABS) is enabled on one or two installed AMBus cards, then channels 1/2 and 3/4 light in the A or C row and channels 5/6 and 7/8 in the B and D row, depending on the position of the card(s).

If 6-channel/20-bit (6/20) bit-splitting is enabled on an installed AMBus card, then the channel LEDs 1-6 for that row are turned on, indicating that channels 1-6 are selected for input.

#### Source and Destination Monitor Modes

When an AMBus card is in source monitor mode, and it is selected as the digital source, its outputs will be muted (DEST LEDs will be OFF for that card) to prevent the possibility of digital feedback or looping.

If the unit is in "tape monitor" (destination) mode, and you are monitoring a selected AMBus card, only one of the DEST LEDs is illuminated – the one for the selected AMBus card. Remember that ABS is a two-way, real-time process: you can monitor a 24-bit ABS signal in destination mode while you are recording it (see below).

### Recording and Playback with the TDIF8 Card

#### Recording

Having installed the card, select the mode you wish to use according to the DIP switch settings described above. We will describe the procedure for simple (non-ABS) recording, using the AD-8000 as the timing reference. The only differences when recording in an ABS mode are the settings of the card switches and the synchronization of multiple machines, if they are used, and these are covered in the following section. To synchronize the AD-8000 to a different timing source, see the AD-8000 manual. It is recommended to adjust DIP switch settings with the power off to ensure that settings changes are registered.

Use a standard TDIF interconnect (Tascam part # PW-88D or PW-88L) to link the card to the TDIF device.

Now, determine which of the units is to provide the clock timing reference.

To make the AD-8000 the timing reference, connect the Word Clock Out BNC connector on the TDIF8 card to the Word Sync In on the DTRS machine, using a high-quality Word Clock interconnection cable such as Apogee's Wyde Eye. (Note: It is preferable to use the Word Clock Out connector on the TDIF8 card for this purpose than the Word Clock Out BNC on the rear of the AD-8000 panel.) Set the DTRS machine to utilize external Word Sync. Choose Crystal as the AD-8000 sync source, setting the sample rate on the AD-8000 as desired.

To make the DTRS machine the timing reference using Word Clock: Choose the required sample rate (Fs) on the DTRS machine (on replay, this will be set automatically). Set the DTRS machine to use Internal sync. Connect the DTRS machine's Word Sync Out BNC connector to the Word Clock In BNC on the rear of the AD-8000, and set the AD-8000 Sync Source to Word Clock (WC).

It is also possible to synchronize the AD-8000 to the DTRS machine by using LRCK instead of Word Clock, although Word Clock is preferable (and LRCK is 90 degrees out of phase with Word Clock). To use LRCK, do not connect the Word Clock Cable and instead set the AD-8000 Sync Source to the TDIF8 AMBus card slot letter. Also see the discussion above relating to the setting of DIP switch SW4.

Alternatively, you can synchronize the AD-8000 to other sources such as video (if the video sync module is installed) or a digital input. See your AD-8000 manual for details.

To record in normal (not bit-splitting) mode, ensure that DIP switches 1 and 2 on the card are set to OFF.

Power up the units. Set the TDIF machine to "DIG INPUT".

You may now record-enable the channels on which you wish to record, and start recording!

### Playback

Ensure that the TDIF machine and the AD-8000 are connected as described above, and check that the TDIF machine is in replay mode (not input). If you are in input mode during replay, the meters will not read and no signal of any kind will be output. Choose your synchronization source as described above.

Press the AD-8000 "DIGITAL IN" button and select the channel pairs you wish to enable for digital input, or simply hold the "DIGITAL IN" button to illuminate all eight digital input indicators and set all the channels to digital input.

In the Digital Routing section of the AD-8000 front panel (upper far right of the unit), press the "SOURCE" button until the correct AMBus card is selected. Refer to the earlier section on the routing matrix to check the LED display indications are correct.

You are now ready to replay the recording from your TDIF machine.

### Notes on ABS Operation and Multiple Cards

*While in bit splitting mode:*

If a digital input pair is assigned which does not exist, the corresponding DIG x/x LEDs on the assigned channel pair will flash. For example, if in 6/20 mode, and channel 7/8 is assigned as digital, the DIG7/8 LEDs will flash on channels 7 and 8. If in 4/24 mode, and a second AMBus card is not installed, LEDs DIG5/6 and DIG7/8 will flash if those channels are assigned as digital.

If you are in 4/24 mode, and two cards are installed and being used for bit-splitting, then both cards are checked for errors. If one of the two cards indicates an error condition, then the DIGITAL IN LED will flash, and outputs won't be muted (in case only one card is being used). If both cards indicate an error, the ERROR LED will come on, and digital outputs will be muted (as in normal digital input error handling).

If a single card set to 4/24 mode is installed in slot A or C, ch 1-4 on the dot matrix for that row are lit up. If the card is in slot B or D, ch 5-8 are lit up. The selection LED for that slot is illuminated, and the 24 bit LED is on. With two bit-splitting-capable cards installed (eg two TDIF8's, or an ADAT8 and a TDIF8), the dot matrix illuminates 1-4 for slot A or C, and 5-8 for slot B or D. Two of the selection LEDs are on, corresponding to AMB A and AMB B, or AMB C and AMB D, and the 24 bit resolution LED is on. If one of the two cards has a slip or format error, then the "DIGITAL IN" LED flashes as before. If there is no second card or the second card is not capable of bit splitting, then operation is identical to the one card case (only 1-4 or 5-8 are illuminated).

### ABS Bit-Splitting Formats

There are three ABS formats. The first mode allows four 24-bit channels to be recorded across eight 16-bit tracks. This mode is compatible with Rane's PaqRat system, and thus permits replay of tracks previously recorded with an Apogee AD-1000 Platinum Edition system. In this mode, each 24-bit channel is recorded on two adjacent 16-bit MDM tracks. The 16 most-significant bits of the first 24-bit channel are recorded on the first track of the pair, while the remaining eight bits are recorded on the second track. The remaining eight bits of the second track are used to record a tone to indicate that this track was not designed to be monitored on its own (as a result, even numbered tracks always have signal present on record). The odd-numbered tracks, however, may be monitored if desired (bearing in mind that they will only deliver 16-bits of resolution). **VERY IMPORTANT: When using this mode, ensure that UV22 is turned off on the AD-8000 channels you are using.**

The second mode is identical to the first, except that the remaining eight bits of the second track contain, along with a tone, an ID bit-pattern which identifies the track as having been recorded with Apogee Bit-Splitting technology. Future revisions of the MDM AMBus cards will record this ID, and on replay the card will set itself up to decode the signal automatically.

A benefit of both 4/24 bit-splitting modes is that each of the four high-resolution channels can be re-recorded or overdubbed upon, simply by placing two adjacent tracks of the MDM in record.

The third mode allows six channels of 20-bit audio to be recorded on eight 16-bit MDM tracks. The first 16 bits of the first three channels are recorded on tracks 1, 2 and 3. The five least-significant bits of these three channels are recorded on track 4, along with an ID for future automatic identification. The first 16 bit of the second three channels are recorded on tracks 5, 6 and 7 with the LSBs and ID on track 8. This mode is designed for simultaneous and multi-channel surround recording, and as a result it is only possible to re-record three 20-bit channels at a time. We do not recommend that you try listening to tracks 4 and 8.

**IMPORTANT: We advise employing UV22 in this mode, to capture more of the 24-bit detail of the AD-8000. Be sure to set the UV22 output word length to 20 bits rather than the default 16 bits. Set SW2 on the rear of the AD-8000 (NOT on the card) to ON.**

## AMBus AES I/O Card

### Installing the AMBus Card

To install the AMBus card, first make sure the power is turned off. You may wish to keep the unit plugged into a grounded AC receptacle so as to minimize the chance of static discharge, and avoid standing on carpeting while carrying out this procedure. Keep the new AMBus card in its packaging until you are ready to install. Now turn the unit around so you're facing the back panel. Remove the plate covering an available AMBus slot. Ground yourself by touching a connector on the AD-8000 rear panel and unpack the card. Insert the card until you feel it mate with the connector at the back of the card bay. Fasten the card in place with the screws. You will need to remember the identification of the card slot (A-D) into which you have installed the card. If you intend to use the 4/24 bit splitting mode (see below), you should install the first card in slot A or C, and the second card (if any) in slot B or D.

### AES and the AD-8000

The AES8 I/O card provides eight channels of AES-compatible signals in and out, *in addition to* the eight channels of AES out and two channels of AES in on the main AD-8000 back-panel. The AES8 card provides a full eight channels in, which may be used for example to provide AES input capability in a Pro Tools system. For use with recorders such as the Sony PCM-800 (Sony's equivalent of the Tascam DA-88, which utilizes AES I/O instead of TDIF) or other multi-channel recorders with AES interfacing, the card includes several "bit-splitting" formats which split high resolution signals among multiple 16-bit tracks, at the cost of having fewer total tracks available for recording.

### ABS Bit-Splitting Formats

The AES8 card supports the following digital audio formats:

1. 8 tracks of up to 24 bits on an 8-track machine (use UV22 to reduce the word length from 24 to 16 or 20 bits as required)
2. 4 channels of 24 bits each (Rane's PaqRat format) bit-split on to an 8-track 16-bit recorder
3. 6 channels of 20 bits each (ABS 6/20 format with auto-ID) bit-split on to an 8-track 16-bit recorder

Note that there are two ABS formats. The first mode allows four 24-bit channels to be recorded across eight 16-bit tracks. This mode is compatible with Rane's PaqRat system, and thus permits replay of tracks previously recorded with an Apogee AD-1000 Platinum Edition system. In this mode, each 24-bit channel is recorded on two adjacent 16-bit tracks. The 16 most-significant bits of the first 24-bit channel are recorded on the first track of the pair, while the remaining eight bits are recorded on the second track. The remaining eight bits of the second track are used to record a tone to indicate that this track was not designed to be monitored on its own (as a result, even numbered tracks always have signal present on record). The odd-numbered tracks, however, may be monitored if desired (bearing in mind that they will only deliver 16-bits of resolution). **VERY IMPORTANT: When using this mode, ensure that UV22 is turned off on the AD-8000 channels you are using.**

A benefit of the 4/24 bit-splitting mode is that each of the four high-resolution channels can be re-recorded or overdubbed upon, simply by placing two adjacent tracks of the recorder in record. Full PaqRat capability is provided in this mode, enabling you to create or replay recordings that are completely compatible with Rane Corporation's PaqRat equipment or with the PaqRat-compatible mode of the enhanced Apogee AD-1000.

The second mode allows six channels of 20-bit audio to be recorded on eight 16-bit tracks. The first 16 bits of the first three channels are recorded on tracks 1, 2 and 3. The remaining least-significant bits of these three channels are recorded on track 4. The first 16 bits of the second three channels are recorded on tracks 5, 6 and 7 with the LSBs on track 8. This mode is designed for simultaneous and multi-channel surround recording, and as a result it is only possible to re-record three 20-bit channels at a time. We do not recommend that you try listening to tracks 4 and 8.

**IMPORTANT: We advise employing UV22 in this mode, to capture more of the 24-bit detail of the AD-8000. Be sure to set the UV22 output word length to 20 bits rather than the default 16 bits. Set SW2 on the rear of the AD-8000 (NOT on the card) to ON.**

The 4/24 mode (four channels of 24 bits on eight 16-bit tracks) records the first 16 bits of a channel on the first track, and the remaining bits on a subsequent track along with a tone to indicate that you shouldn't be listening to it on its own! You can listen to the first track in each pair, but remember that the signal will only be 16-bit.

An advantage of the 4/24 mode is that you can record or overdub on an individual 24-bit channel, by

recording on two adjacent odd/even tracks at the same time, without damaging any other tracks. This is not possible with the 6/20 mode, which is more intended for surround-sound mixing and multi-channel live recordings where subsequent individual channel overdubs are not required.

An additional feature of the 4/24 mode, to be provided via a future card firmware upgrade, will be the ability to record eight simultaneous 24-bit channels by using two 8-track machines or 16 tracks of a 16- or 24-track digital recorder (and thus two AES8 cards). You will be notified when this facility becomes available.

In 6/20 mode (ABS), cards in any slot will operate on audio on channels 1-6 only.

In either of the bit-splitting modes, the source resolution will be displayed as "24" in the source resolution display (above the SOURCE SELECT button).

The bit-splitting modes are selected by DIP switches on the back of the AES8 card, as shown below. **Note that on the card switches, UP is OFF and DOWN is ON. This is the opposite of the switches on the rear of the AD-8000 itself.**

### AES8 DIP Switches

Switches 1 & 2 control the operating mode: normal, 4/24 or 6/20, according to the following table. ON is DOWN:

SW	1	2	Bit-Splitting Function
	OFF	OFF	Normal (no bit-splitting)
	ON	OFF	4/24 mode
	OFF	ON	6/21 mode
	ON	ON	Normal (no bit-splitting)

Switches 3 & 4 determine the sync source for the card. You can set the card to lock to the AES signal on any of the four odd-even pairs of channels. Select the channel pair with the DIP switches according to the following table, and set the AD-8000 SYNC SOURCE setting to point at the AMBus card slot in which the card is installed (A-D):

SW	3	4	Sync Channel Pair
	OFF	OFF	7/8
	ON	OFF	5/6
	OFF	ON	3/4
	ON	ON	1/2

### Channel routing LED matrix

#### Bit Splitting Modes

Bit-splitting is indicated on the channel routing matrix. If 4-channel/24-bit (4/24) bit-splitting is enabled on one or two installed AMBus cards, then channels 1/2 and 3/4 light in the A or C row and channels 5/6 and 7/8 in the B and D row, depending on the position of the card(s).

If 6-channel/20-bit (6/20) bit-splitting is enabled on an installed AMBus card, then the channel LEDs 1-6 for that row are turned on, indicating that channels 1-6 are selected for input.

#### Source and Destination Monitor Modes

When an AMBus card is in source monitor mode, and it is selected as the digital source, its outputs will be muted (DEST LEDs will be OFF for that card) to prevent the possibility of digital feedback or looping.

If the unit is in "tape monitor" (destination) mode, and you are monitoring a selected AMBus card, only one of the DEST LEDs is illuminated – the one for the selected AMBus card. Remember that ABS is a two-way, real-time process: you can monitor a 24-bit ABS signal in destination mode while you are recording it (see below).

### Recording and Playback with the AES8 Card

#### Interconnection

The AES8 card provides the AES input and output signals on a single female 25-way D connector. This connector is wired to the same pinout as used by Yamaha for interfacing their AES digital devices. This pinout is as follows:

1	In Hot 1/2	5	Out Hot 1/2	14	In Cold 1/2	18	Out Cold 1/2
2	In Hot 3/4	6	Out Hot 3/4	15	In Cold 3/4	19	Out Cold 3/4
3	In Hot 5/6	7	Out Hot 5/6	16	In Cold 5/6	20	Out Cold 5/6
4	In Hot 7/8	8	Out Hot 7/8	17	In Cold 7/8	21	Out Cold 7/8

9, 11, 23: No Connection. 10, 12, 13, 22, 24, 25: Ground

### General Operation

Having installed the card, select the mode you wish to use according to the DIP switch settings described above. We will describe the procedure for simple (non-ABS) operation, using the AD-8000 as the timing reference. The only differences when operating in an ABS mode are the settings of the card switches and the synchronization of multiple machines, if they are used, and these are covered in the following section. To synchronize the AD-8000 to a different timing source, see the AD-8000 manual. It is recommended to adjust DIP switch settings with the power off to ensure that settings changes are registered. Use a cable with the pinout shown above to link the card to the AES device.

Normally the AD-8000 will be utilized as the sync source when the system is being used as an A/D conversion system, in which case set the SYNC SOURCE to CRYSTAL. Alternatively, you can synchronize the AD-8000 to other sources such as video (if the video sync module is installed) or a digital input. See your AD-8000 manual for details. You can synchronize the AD-8000 to any adjacent odd/even pair of AES input channels coming into the AES8 card by setting the DIP switches accordingly and setting the SYNC SOURCE on the AD-8000 to look at the card slot into which the AES8 card is installed. To operate in normal (not bit-splitting) mode, ensure that DIP switches 1 and 2 on the card are set to OFF. All on-board and card-based digital outputs on the AD-8000 are available at all times, enabling recording or transmission on more than one format simultaneously.

To return digital signals into the unit, ensure that the AES device and the AD-8000 are connected as described above, and choose your synchronization source as discussed. Press the AD-8000 "DIGITAL IN" button and select the channel pairs you wish to enable for digital input, or simply hold the "DIGITAL IN" button to illuminate all eight digital input indicators and set all the channels to digital input.

In the Digital Routing section of the AD-8000 front panel (upper far right of the unit), press the "SOURCE" button until the correct AMBus card is selected. Refer to the earlier section on the routing matrix to check the LED display indications are correct.

You are now ready to receive digital signals from your AES device.

### Operation as an 8-channel A/D-D/A system

If you have the 8-channel D/A converter installed in the system, you can effectively use the AD-8000 with the AES8 card as an 8-channel A/D with a separate 8-channel D/A. Press and hold the MONITOR button (next to the headphone socket) down until a letter (A through D) is displayed. The DEST LED will illuminate and you will be in Destination Monitor Mode. If necessary, use the headphone VOLUME switch to nudge the letter display up or down to display the letter corresponding to the AMBus slot into which the AES8 card is installed. In this mode, AES inputs fed to the card will be directed straight to the D/A. Meanwhile, the input channels of the AD-8000, whether set to analog or digital, will deliver signal to the AES outputs on the card (and the other digital interfaces for format conversion).

### Notes on ABS Operation and Multiple Cards

*While in bit splitting mode:*

If a digital input pair is assigned which does not exist, the corresponding DIG x/x LEDs on the assigned channel pair will flash. For example, if in 6/20 mode, and channel 7/8 is assigned as digital, the DIG7/8 LEDs will flash on channels 7 and 8. If in 4/24 mode, and a second AMBus card is not installed, LEDs DIG5/6 and DIG7/8 will flash if those channels are assigned as digital.

If a card set to 4/24 mode is installed in slot A or C, ch 1-4 on the dot matrix for that row are lit up. If the card is in slot B or D, ch 5-8 are lit up. The selection LED for that slot is illuminated, and the 24 bit LED is on. With two bit-splitting-capable cards installed (eg two AES's, or an ADAT8 and an AES), the dot matrix illuminates 1-4 for slot A or C, and 5-8 for slot B or D. Two of the selection LEDs are on, corresponding to AMB A and AMB B, or AMB C and AMB D, and the 24 bit resolution LED is on. If one of the two cards has a slip or format error, then the "DIGITAL IN" LED flashes as before. If there is no second card or the second card is not capable of bit splitting, then operation is identical to the one card case (only 1-4 or 5-8 are illuminated).

## AMBus FiberDX Card

### Installing the AMBus Card

To install the AMBus card, first make sure the power is turned off. You may wish to keep the unit plugged into a grounded AC receptacle so as to minimize the chance of static discharge, and avoid standing on carpeting while carrying out this procedure. Keep the new AMBus card in its packaging until you are ready to install. Now turn the unit around so you're facing the back panel. Remove the plate covering an available AMBus slot. Ground yourself by touching a connector on the AD-8000 rear panel and unpack the card. Insert the card until you feel it mate with the connector at the back of the card bay. Fasten the card in place with the screws. You will need to remember the identification of the card slot (A-D) into which you have installed the card. If you intend to use the 4/24 bit splitting mode (see below), you should install the first card in slot A or C, and the second card (if any) in slot B or D.

### FiberDX, ADAT and the AD-8000

The FiberDX card employs the same data format as the Alesis ADAT lightpipe audio format; however, instead of using a TosLink physical optical link, true glass-fiber interconnects are employed, with standard ST Optical connectors. This enables eight channels of digital audio data to be sent distances up to 5km (3 miles) without degradation, making the format ideal for transferring data between AD-8000 units in different studios in a facility, for example. 24 bit I/O is fully supported, even though the original ADAT and ADAT XT recorders only support 16 bits, and newer machines such as the M-20 only support 20 bits.

The FiberDX card and the ADAT8 card utilize the same firmware and as a result the FiberDX card offers the same bit-splitting technology as the ADAT8 card, although it may be of limited usefulness in most FiberDX applications. However, the technology is covered here for completeness.

### Apogee Bit-Splitting (ABS)

The FiberDX card includes two "bit-splitting" formats which split high resolution signals among multiple 16-bit data paths. The FiberDX card supports the following digital audio formats:

1. 8 channels of 24 bit data (16 or 20 bits with UV22, and bit-splitting OFF)
2. 4 channels of 24 bits each (ABS "4/24", Rane's PaqRat format) formatted as eight 16-bit data paths
3. 6 channels of 20 bits each (ABS "6/20" format) formatted as eight 16-bit data paths

Full PaqRat capability is provided in 4/24 mode, enabling you to create or replay recordings that are completely compatible with Rane's PaqRat equipment or with the PaqRat-compatible mode of the enhanced "Platinum Edition" Apogee AD-1000.

The 4/24 mode (four channels of 24 bits on eight 16-bit data paths) delivers the first 16 bits of a 24-bit signal on the first 16-bit path, and the remaining bits on a subsequent path along with a tone to indicate that you shouldn't be listening to it on its own! You can listen to the first path in each pair, but remember that the signal will only be 16-bit.

An advantage of the 4/24 mode is that you can record or overdub on an individual 24-bit channel, by recording on two adjacent odd/even tracks at the same time, without damaging any other tracks. This is not possible with the 6/20 mode, which is more intended for surround-sound mixing and multi-channel live recordings where subsequent individual channel overdubs are not required.

An additional feature of the 4/24 mode is the ability to record eight simultaneous 24-bit channels by using two 8-channel 16-bit paths (and thus two FiberDX cards). In 4/24 mode, a card in slot A will output 24-bit audio from channels 1-4, and likewise on input will reconstruct the 24-bit audio onto channels 1-4. Similarly, slot B will use 24-bit data on channels 5-8, slot C will use 24-bit data on channels 1-4, and slot D will use 24-bit data on channels 5-8. Alternating slots use different channels in order to facilitate an 8-channel/24-bit recording and playback mode using two FiberDX cards and two 16-bit, 8-channel data paths. For example, if two FiberDX cards are plugged into slots A and B, then channels 1-4 will be directed to and from the slot A card, and channels 5-8 will be directed to and from the slot B card.

In 6/20 mode, cards in any slot will operate on audio on channels 1-6 only.

In any of the bit-splitting modes, the source resolution will be displayed as "24" in the source resolution display (above the SOURCE SELECT button).

The bit-splitting modes are selected by DIP switches on the back of the FiberDX card, as shown below.

**Note that on the card switches, UP is OFF and DOWN is ON. This is the opposite of the switches on the rear of the AD-8000 itself.**

### FiberDX DIP Switch

Switch	Function when 'ON'
1	ABS 4/24 mode (PaqRat compatible)
2	ABS 6/20 mode
3	not defined
4	not defined

*If both switches 1 and 2 are both ON or both OFF, then ABS is turned off.*

### Channel routing LED matrix

#### Bit Splitting Modes

Bit-splitting is indicated on the channel routing matrix. If 4-channel/24-bit (4/24) bit-splitting is enabled on one or two installed AMBus cards, then channels 1/2 and 3/4 light in the A or C row and channels 5/6 and 7/8 in the B and D row, depending on the position of the card(s).

If 6-channel/20-bit (6/20) bit-splitting is enabled on an installed AMBus card, then the channel LEDs 1-6 for that row are turned on, indicating that channels 1-6 are selected for input.

#### Destination Monitor Mode

If the unit is in "tape monitor" (destination) mode, and you are monitoring a selected AMBus card, only one of the DEST LEDs is illuminated – the one for the selected AMBus card.

#### Source Monitor Mode

When an AMBus card is in source monitor mode, and it is selected as the digital source, its outputs will be muted (DEST LEDs will be OFF for that card) to prevent the possibility of digital feedback or looping.

### Transferring Digital Signals with the FiberDX Card

A typical application for the FiberDX card is to transfer eight channels at a time of up to 24-bit digital data between rooms in a facility. For this application, you will typically have two or more AD-8000 units, each with a FiberDX card installed. The units should be linked together by ST Optical cables, the Out on one unit connected to In on the next and vice-versa.

It is possible to create a simple digital audio network by "daisy-chaining" the output of the FiberDX card on one AD-8000 to the input of the card on the next.

The FiberDX card can be used to transfer data from one AD-8000 to another irrespective of the format of the signal presented to the first AD-8000 in the chain. Each channel (analog) or channel pair (digital) on the AD-8000 can be set to receive its input from either an analog source or a digital source, and the output is provided at all digital outputs on the unit, including the FiberDX card. Simply set the source of each channel to analog or digital as required, and the SYNC SOURCE to CRYSTAL. The AD-8000 outputs data on all digital interfaces simultaneously, so you can transfer data via FiberDX while at the same time making a local recording, for example.

At the next AD-8000 down the line, to receive the data via FiberDX, set the appropriate AD-8000 channels to DIGITAL IN and set the SOURCE to the AMBus card slot in which the FiberDX card is installed. If you wish to send the same data out to another AD-8000 further down the line, hold the MONITOR button down until you enter Destination (Monitor) mode (DEST LED illuminates) and use the monitor volume control until the AMBus slot letter (A-D) in which the FiberDX card is installed is indicated in the adjacent LED display.

### Notes on ABS Operation and Multiple Cards

*While in bit splitting mode:*

If a digital input pair is assigned which does not exist, the corresponding DIG x/x LEDs on the assigned channel pair will flash. For example, if in 6/20 mode, and channel 7/8 is assigned as digital, the DIG7/8 LEDs will flash on channels 7 and 8. If in 4/24 mode, and a second AMBus card is not installed, LEDs DIG5/6 and DIG7/8 will flash if those channels are assigned as digital.

If in 4/24 mode, and two cards are installed and being used for bit-splitting, then both cards are checked for errors. If one of the two cards indicates an error condition, then the DIGITAL IN LED will flash, and outputs won't be muted (in case only one card is being used). If both cards indicate an error, the ERROR LED will come on, and digital outputs will be muted (as in normal digital input error handling).

If a single card set to 4/24 mode is installed and appears in slot A or C, ch 1-4 on the dot matrix for that row are lit up. If the card is in slot B or D, ch 5-8 are lit up. The selection LED for that slot is illuminated, and the 24 bit LED is on. With two bit-splitting-capable cards installed (any combination of FiberDX, ADAT8 or TDF8



cards), the dot matrix illuminates 1-4 for slot A or C, and 5-8 for slot B or D. Two of the selection LEDs are on, corresponding to AMB A and AMB B, or AMB C and AMB D, and the 24 bit resolution LED is on. If one of the two cards has a slip or format error, then the "DIGITAL IN" LED flashes as before. If there is no second card or the second card is not capable of bit splitting, then operation is identical to the one card case (only 1-4 or 5-8 are illuminated).

### More Detail on the ABS Bit-Splitting Formats

There are two ABS formats. The first mode allows *up to four simultaneous 24-bit channels* to be recorded across eight 16-bit tracks. This mode is compatible with Rane's PaqRat system, and thus permits replay of tracks previously recorded with an Apogee AD-1000 Platinum Edition system.

In this mode, each 24-bit channel is recorded on two adjacent 16-bit tracks. The 16 most-significant bits of the first 24-bit channel are recorded on the first track of the pair, while the remaining eight bits are recorded on the second track. The remaining eight bits of the second track are used to record a tone to indicate that this track was not designed to be monitored on its own (as a result, even numbered tracks always have signal present on record). The odd-numbered tracks, however, may be monitored if desired (bearing in mind that they will only deliver 16-bits of resolution). **VERY IMPORTANT: When using this mode, ensure that UV22 is turned off on the AD-8000 channels you are using.**

A benefit of the 4/24 bit-splitting mode is that each of the four high-resolution channels can be re-recorded or overdubbed upon, simply by placing two adjacent tracks of the recorder in record.

The second ABS mode allows *up to six simultaneous channels of 20-bit audio* to be recorded on eight 16-bit tracks. The first 16 bits of the first three channels are recorded on tracks 1, 2 and 3. The remaining least-significant bits of these three channels are recorded on track 4. The first 16 bits of the second three channels are recorded on tracks 5, 6 and 7 with the LSBs on track 8. This mode is designed for simultaneous and multi-channel surround recording, and as a result it is only possible to re-record three 20-bit channels at a time. We do not recommend that you try listening to tracks 4 and 8. **IMPORTANT: We advise employing UV22 in this mode, to capture more of the 24-bit detail of the AD-8000. Be sure to set the UV22 output word length to 20 bits rather than the default 16 bits. Set SW2 on the rear of the AD-8000 (NOT on the card) to ON.**