

# Chapter 10

## MIDI, SCSI, and Sample Dumps

### SCSI Guidelines

The following sections contain information on using SCSI with the K2500, as well as specific sections dealing with the Mac and the K2500.

#### Disk Size Restrictions

The K2500 accepts hard disks with up to 2 gigabytes of storage capacity. If you attach an unformatted disk that is larger than 2 gigabytes, the K2500 will still be able to format it, but only as a 2 gigabyte disk. If you attach a *formatted* disk larger than 2 gigabytes, the K2500 will not be able to work with it; you could reformat the disk, but this - of course - would erase the disk entirely.

#### Configuring a SCSI Chain

Here are some basic guidelines to follow when configuring a SCSI chain:

1. According to the SCSI Specification, the maximum SCSI cable length is 6 meters (19.69'). You should limit the total length of all SCSI cables connecting external SCSI devices with Kurzweil products to 17 feet (5.2 meters). To calculate the total SCSI cable length one must add up the lengths of all SCSI cables, plus 8" for every external SCSI device connected. No single cable length in the chain should exceed 8 feet.
2. The first and last device in the chain must be terminated.

The K2500 comes with SCSI termination enabled. You must disable this termination if the K2500 will be in the middle of a SCSI chain or if you are installing a hard drive into the K2500.

There are three ways to disable the K2500's termination, depending on the manufacture date of the unit. Newer K2500's have an external "SCSI Termination Enable/Disable" switch on the rear panel. Older K2500's require either the removal of SCSI termination resistors or a jumper setting; these modifications can only be performed by an authorized service center.

Poor termination is a common cause of SCSI problems. Having more than two terminators on the bus will overload the bus drivers, but this should not cause permanent damage to the hardware. Poor termination can corrupt the data on your disk, however, as can bad SCSI cables.

For the K2500R, if it is not located at one end of a SCSI chain all internal termination, including the terminator resistor network on the K2500 Engine Board plus terminator resistors in the internal SCSI drive must be removed. It is much simpler to just make sure that the K2500 is at one end of the SCSI chain.

For a K2500 keyboard model, it must be at the end of the SCSI chain if it has an internal disk drive.

A note about active termination - The K2500 uses active termination of the SCSI bus. Active termination has some benefits over traditional passive termination. Some people have positioned active termination as a panacea for SCSI problems, but this is more hype than reality. Active terminators are available to be used at the end of one's SCSI chain and

all APS SR2000 series external drives use internal active termination that can be switched on or off.

3. Each device in the chain (including internal hard drives) must have its own unique SCSI ID. The default K2500 ID is #6. Macintoshes use ID #7 & #0.
4. Use only true SCSI cables - high quality, twisted pair, shielded SCSI cable. Do not use RS432 or other non SCSI cables.

The majority of SCSI cables we've tested were poorly made and could damage data transferred to and from the disk. Nearly all the SCSI data problems Young Chang's engineering department has had have been due to bad cables that didn't twist pairs of wires properly. Correctly made SCSI cables have one ground wire for every signal wire and twist them together in signal/ground pairs. Cables made by APS Technologies (800-233-7550) are very good and are highly recommended. Young Chang manufactures 1 and 2 meter 25-25 SCSI cables, that we can also recommend. Good cables are essential to reliable data transfers to and from the disk drive.

5. You should buy all SCSI cables from a single source to avoid impedance mismatch between cables.
6. Theoretically all eight SCSI IDs can be used. However, feedback from users has shown us that many people have problems with more than 5-6 devices in a chain. If you have 7 or 8 devices and are having problems, your best bet is to make sure you have followed all of the previous information, especially with respect to cables.
7. Connect all SCSI cables before turning on the power on any equipment connected by SCSI cables. Plugging or unplugging SCSI cables while devices are powered on can cause damage to your devices or instrument.
8. Authorized service centers should remove termination from the K2500 when installing an internal drive, set its ID correctly, and terminate the drive.
9. When using a Macintosh, power up the K2500 and other devices first.
10. The K2500 file format is a proprietary format; no other device will be able to read or write a Kurzweil file.
11. The floppy disk format of the K2500 is DOS. The SCSI disk format is a proprietary form that is close to DOS, but it is not DOS. Nonetheless, the K2500 can read and write to a DOS formatted disk provided it was formatted on the PC with no partitions.
12. It is possible to view, copy, move, name, delete files on a K2500 formatted floppy disk or removable media hard drive, with a PC or Macintosh running a DOS mounting utility program such as Access PC.
13. As long as the SCSI bus is properly terminated there is no way you can damage your hardware simply by operating it. There are a few hazards K2500 users should be aware of, however:

The only damage that usually occurs to SCSI hardware comes from static electricity "zapping" SCSI connector pins when the cables are disconnected. The silver colored shell of the SCSI connector on the end of the cable is connected to ground and is safe to touch, but the brass colored pins inside eventually lead to the SCSI interface chip and are vulnerable. You should discharge static from your body before touching SCSI connectors by touching the 1/4" jacks on the rear of the K2500 or another grounded metal object. Any devices connected to the SCSI bus should be turned off when plugging or unplugging SCSI cables.

If the K2500 is connected to a Macintosh or PC you should make sure that the computer cannot access a SCSI disk at the same time the K2500 does (see below for more information on this). Those who occasionally want to share a drive, but don't want to take any risks would be best served by disconnecting and connecting devices as needed. If you want to share drive(s) often and cannot constantly disconnect and reconnect devices, make sure the Mac or PC is really done with the disk before using the K2500. Furthermore, you should quit or exit from all running programs and disable screen savers, email, network file sharing, and any INITs or TSR's that run in the background. If the computer and K2500 access the disk at the same time there will be no damage to the hardware, but the bits on the disk, K2500, and computer memory can easily be corrupted. You may not know that damage has been done to these bits until weird things start to happen for no apparent reason.

## K2500 and Macintosh Computers

1. The Mac really does not like having another SCSI master on the bus (i.e., the K2500). It assumes that it owns the bus and its drives, therefore it will not tolerate the situation where the K2500 is trying to talk to its (the Mac's) disk. This suggests that you never want to select the ID of any drive mounted on the Mac's desktop. Even more fundamental is the problem that the Mac assumes that the bus is always free, so if it tries to do anything via SCSI when the K2500 is doing anything via SCSI, the Mac will freak. The only solution is, wait until your Mac is completely idle before accessing SCSI from the K2500.
2. The Mac and the K2500 cannot share a drive in any way, with or without partitions. If you are using a drive with removable media, you cannot easily switch back and forth between a Mac formatted volume and a K2500 formatted volume. To prevent problems, you will need to unmount the drive from the Mac desktop before switching to a K2500 format volume. The Mac will basically ignore the volume if it's not Mac format, but once you insert a Mac format volume, the Mac owns it. Don't forget about #1 above; inserting a cartridge will cause the Mac to access SCSI, so don't try to use the K2K at that moment.
3. The only good reason for connecting the Mac and the K2K on the same SCSI bus is to use Alchemy or equivalent. If you're using a patch editor or librarian, you can just hook up via MIDI. Connecting via SCSI will allow fast sample transfers through the SMDI protocol. In this type of configuration the easiest solution is to let the K2K have its own drive, and the Mac have it's own drive.

However, we have discovered that when using a K2500 with a Mac and a removable media drive in the middle of the chain, the following scenario will work:

Start with a Mac formatted cartridge in the drive. When you want to use the K2500, put the drive to sleep from the K2500. You can then change to a K2500 formatted cartridge and perform whatever disk operations you need. When you want to go back to the Mac, put the drive to sleep again, switch cartridges, and then wake up the disk by pressing **Load**. Of course the K2500 will tell you it can't read the cart, but the Mac will now access it fine.

## Accessing a K2500 Internal Drive from the Mac

Access PC is one of the many programs for the Mac which allow it to format, read, and write to DOS floppy disks and removable SCSI cartridges. However, we have discovered that it is possible to format internal K2500 hard drives, even though the documentation claims to only support removable media (not a fixed drive). Because the program claims not to be able to do this, we do not necessarily recommend it.

The main thing to remember is:

Never change the disk contents (i.e., save or delete files) from the K2500 when the disk is mounted by the Macintosh. If you do, this could easily lead to trashed files, directories, or even the entire disk. Access PC has no way of knowing when the K2500 has modified the disk structure, and it can just overwrite any state of the disk it thinks should be there. The safest thing is to connect a drive to either the K2500 or the Mac, but not both at the same time. Of course, you can't always predict when a Mac will access its drive, and it doesn't do SCSI bus arbitration, so using the Mac while using the SCSI bus from the K2500 (e.g., doing a disk mode operation) is also a bad idea, and can cause the Mac to hang.

## The MIDI Sample Dump Standard

Samples can be transferred between the K2500 and most other samplers and computer sampling programs using the MIDI Sample Dump Standard.

Due to the relatively slow transfer rate of MIDI data, transferring samples into the K2500 via the MIDI Sample Dump Standard can take a long time, on the order of a coffee break for a long sample. Most samplers, synthesizers, and computer software will “freeze up” during this process, preventing other features of the machine or program from being used. Your K2500, however, will allow you to continue playing the instrument or using any of its sound editing features during a MIDI Sample Dump! The transfer takes place in the background; the MIDI mode LED on the K2500’s front-panel will flash repeatedly during the transfer, so you will always know if the MIDI Sample Dump is still proceeding. The MIDI mode LED will flash only when the K2500 is transmitting or receiving a MIDI Sample Dump, or when it receives a MIDI System Exclusive message.

Note: if you’re using Sound Designer® to transfer samples, you’ll have to offset the sample number by 2 to transfer the right sample. For example, if you want to dump sample ID 208 from the K2500, then when you begin the sample fetching command from Sound Designer, instruct it to get sample 210.

### Loading Samples with the MIDI Standard Sample Dump

To load a sample into the K2500 from an external source such as a computer or sampler, first connect the MIDI Out port of the sampler (or computer) to the K2500’s MIDI In port, and connect the K2500’s MIDI Out to the MIDI In of the sampler. This is known as a closed-loop configuration.

Next, access the Sample Dump facility on the sampler. In addition to selecting which sample you wish to transfer over MIDI, you will need to set the correct sample dump channel number and destination sample number. The channel number should match the K2500’s SysX ID parameter (on the RECV page in MIDI mode). If the sampler has no facility for setting the Sample Dump channel number, try setting the K2500’s SysX ID parameter to 0 or 1. Alternatively, if you set the SysX ID to 127, the K2500 will accept a MIDI Sample Dump no matter what Sample Dump channel is used to send the sample dump.

If the sampler has a provision for setting the destination sample number, you can use it to specify the ID the K2500 will use for storing the sample. The K2500 sample number is mapped from the destination sample number as follows:

<b>Sample Number</b>	<b>K2500 ID</b>
0	uses lowest unassigned ID between 200 and 999.
1-199	adds 200 to the ID (i.e. 5 becomes 205 in the K2500.)
200-999	ID is the same number.

If the sample number maps to a number already assigned to a RAM sample in the K2500, the RAM sample will be deleted prior to the K2500’s accepting of the new sample load. The K2500 will always map sample number zero to an unassigned ID, and therefore no samples will be overwritten when zero is specified.

Some computer-based sample editing software limits the sample numbers to a low range such as 1-128. This conflicts with the K2500, which reserves IDs 1-199 for ROM samples, which cannot be loaded or dumped. To get around this, the K2500 adds 200 to any numbers between 1 and 199. Therefore, if you want to load a sample into the K2500 at number 219, but your program can’t transfer samples at numbers greater than 128, specify number 19 (There’s an exception to this; please see “Troubleshooting a MIDI Sample Dump” later in this section).

At this point, you're ready to try loading a sample. See "Accessing a New K2500 Sample" later in this section to learn how to use samples once they've been dumped to the K2500.

#### **Getting a Sample into a Sample Editor from the K2500**

Connect the MIDI ports of the K2500 and the computer/sampler in a closed-loop configuration as described for the Sampler/Computer to K2500 procedure above.

Access the computer software's "Get Sample" page (it might be called something different). As with loading a sample into the K2500, the K2500 adds 200 to dump request sample numbers between 1 and 199. K2500 samples with IDs from 1 to 199 are ROM samples, and cannot be dumped. Therefore, if you want to get sample number 219 from the K2500 but your program can't transfer samples at numbers greater than 128, specify number 19 (There's an exception to this; please see "Troubleshooting a MIDI Sample Dump" later in this section).

#### **Loading a Sample into the K2500 from another K2500**

Connect the MIDI ports of the two K2500s in a closed-loop configuration as described for the Sampler/Computer to K2500 procedure above.

On the source K2500, go to the Sample Editor and select the sample you wish to transfer. To do this, start in Program mode and press EDIT, followed by the KEYMAP soft button. Now you should be on the KEYMAP page. Now move the cursor to the Sample parameter, use any data entry method to select the desired sample, then press EDIT.

To start the sample transfer, press the Dump soft button. A dialog will appear, suggesting the ID for the sample to be dumped to the destination K2500. The source K2500 will suggest the same ID as it uses for the sample, but you can change the destination ID with any data entry method. If you choose the default by pressing Yes, the sample will transfer to the same ID on the destination K2500 as it is on the source K2500.

#### **Dumping from the K2500 to a Sampler**

This procedure is the same as dumping a sample from one K2500 to another. This will work only if the sampler supports the MIDI Sample Dump Standard.

#### **Dumping a Sample from the K2500 to a MIDI Data Recorder**

This can be accomplished in an open-loop configuration, by connecting the MIDI Out port of the K2500 to the MIDI In port of the MIDI Data Recorder. Go to the Sample Editor and select the K2500 sample you wish to transfer. Set up the MIDI Data Recorder to begin recording, and press the Dump soft button on the Sample Editor page. This will bring up a dialog allowing you to change the sample number in the dump if you wish. In most cases, you will just use the default value. The K2500's MIDI mode LED will flash while the data transfer is in progress.

#### **Loading a Sample into the K2500 from a MIDI Data Recorder**

Connect the MIDI Out port of the Data Recorder to the MIDI In port of the K2500. Load the appropriate file containing the MIDI Sample Dump data into the Data Recorder, and send the file. The K2500's MIDI mode LED will flash during this procedure.

#### **Accessing a New K2500 Sample**

First, select the K2500 program you wish to play the new sample from, and press the EDIT button. Then select the layer you wish (using the CHAN/BANK buttons if necessary), press the

KEYMAP soft button, and select a keymap. Use the default keymap called “168 Silence” if you don’t want to alter any existing keymaps.

Now, enter the Keymap Editor by pressing EDIT once again. Use the Sample parameter to select the new sample. If the new sample was loaded from another K2500, it will have the same ID as it did on the other K2500. If the sample was loaded from any other source, its ID will be defined as described above (in the section called “Loading Samples with the MIDI Standard Sample Dump”).

The name of the sample will be assigned by the K2500 if the sample has been assigned to a previously unused ID. In most cases, the sample will have a name of “New Sample - C 4”.

The name will be “New Sample! - C 4” (note the exclamation point) if checksum errors were detected by the K2500. Checksum errors are usually not serious, since they may just mean the source sampler doesn’t adhere to the MIDI Sample Dump Standard checksum calculation. In other cases, a checksum error could indicate that the MIDI data flow was interrupted during the sample transfer.

You can now press EDIT to edit the parameters of the new sample such as Root Key, Volume Adjust, Pitch Adjust, and Loop Start point. You can also rename the sample. Be sure to save the parameters you change when you press EXIT. Once the sample is adjusted to your liking, you can assign it to any Keymap.

### **Troubleshooting a MIDI Sample Dump**

This section will help you identify what has gone wrong if your MIDI sample dumps fail to work.

#### **WHEN LOADING SAMPLES TO THE K2500**

There are two reasons a K2500 will not accept a MIDI Sample Dump. First, a dump will not be accepted if the destination sample number maps to a K2500 sample that is currently being edited—that is, if you’re in the Sample Editor, and the currently selected sample has the same ID as the sample you’re trying to dump. Second, a dump will not be accepted if the length of the sample to be dumped exceeds the available sample RAM in the K2500. There may be samples in the K2500 RAM that you can save to disk (if not already saved) and then delete from RAM to free up sample RAM space. You can delete the current sample by pressing the Delete soft button while in the Sample Editor.

Note that when you’re loading a sample to an ID that’s already in use, the K2500 will not accept a MIDI Sample Dump if the length of the sample to be loaded exceeds the amount of available sample RAM *plus* the length of the existing sample. If the K2500 accepts the sample load, the previously existing sample will be deleted.

Also note that certain computer-based editing programs will subtract one from the sample number when performing MIDI sample transfers to remote devices. So if you instruct these programs to send a sample to the K2500 as sample ID 204, the program will send the sample as 203. The only way to know if your program behaves in this manner is to try a MIDI Sample Dump and see what happens.

#### **WHEN DUMPING SAMPLES FROM THE K2500**

Certain computer-based sample editing programs subtract one from the sample number when performing MIDI Sample transfers to remote devices. For instance, if you tell these programs to get sample number 204, the programs will request that the K2500 dump sample ID 203, which would ordinarily dump a different sample from the one you intended, possibly causing the dump to fail. The K2500 automatically counteracts this offset by adding a number to sample requests. This was done because more sample editing programs create this offset than do not. If

you find that the K2500 is sending samples with higher IDs than the ones you requested, you can compensate by requesting the sample ID one lower than the one you want. For example, if you want the K2500 to dump sample 205, ask for sample 204.

Some samples in the K2500 are copy-protected. These include all ROM samples and possibly some third-party samples. The K2500 will not dump these samples.

#### **Aborting a MIDI Sample Dump**

The Abort soft button in the Sample Editor can be used to cancel any sample load into the K2500 from an external source (e.g. a computer or a sampler). This button will also halt a sample dump from the K2500. The K2500 will ask for confirmation before it aborts the sample dump.

## **SMDI Sample Transfers**

You can use Passport's Alchemy® and Opcode's Max® SMDI-capable Macintosh® software packages to transfer mono and stereo samples to and from the K2500. These applications use the SMDI data transfer format (SMDI stands for SCSI Musical Data Interchange—pronounced *smiddy*). SMDI is parallel, not serial, so sample transfers can be made much faster than with the MIDI sample dump standard.

Each of these applications has commands for getting and sending samples, which is how you'll make the transfer from your offline storage to the K2500. Once the samples have been loaded to the K2500, you can use the Keymap and Sample Editors as you would with any other sample. Check your manuals for Alchemy or Max for the specifics.

Keep in mind that when transferring samples via SMDI, the K2500's sound engine is disabled, so you can't play it during a SMDI transfer as you can during a MIDI sample transfer. The average SMDI sample transfer time is about 20K per second.

As of this writing, the latest versions of Alchemy and Max are the only software packages supporting SMDI sample transfers to and from the K2500. SMDI is a new technology, however, and many software developers are working on packages that will support K2500 SMDI sample transfers. Your Kurzweil/Young Chang dealer can let you know about new developments.