Chapter 6
MIDI, SCSI, and Sample Dumps

SCSI Guidelines

The following sections contain information on using SCSI with the K2600, as well as specific sections dealing with the Mac and the K2600.

Disk Size Restrictions

The K2600 accepts hard disks with up to 2 gigabytes of storage capacity. If you attach an unformatted disk that is larger than 2 gigabytes, the K2600 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 K2600 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 feet). 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, add the lengths of all SCSI cables, plus eight inches for every external SCSI device connected. No single cable length in the chain should exceed eight feet.

2. The first and last devices in the chain must be terminated. There is a single exception to this rule, however. A K2600 with an internal hard drive and no external SCSI devices attached should have its termination disabled. If you later add an external device to the K2600's SCSI chain, you must enable the K2600's termination at that time.

   There's a switch on the rear panel of the K2600, which you can use to disable the K2600's termination. We recommend, however, that you leave this switch set to **Auto**, which enables the K2600 to switch termination on or off depending on your SCSI configuration.

   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.

   A note about active termination: The K2600 uses active termination of the SCSI bus. Active termination has some benefits over traditional passive termination. Some people view active termination as a cure for all SCSI problems, but this isn't true. Active terminators are appropriate at the end of a SCSI chain. 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 K2600 ID is 6. Macintoshes® use 7 and 0.

4. Use only true SCSI cables: high quality, twisted pair, shielded SCSI cable. Do not use RS432 or other nonSCSI 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 encountered 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 five or six devices in a chain. If you have seven or eight 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. When using a Macintosh, power up the K2600 and other devices first.

9. The K2600 file format is a proprietary format; no other device will be able to read or write a Kurzweil file.

10. The floppy disk format of the K2600 is DOS. The SCSI disk format is a proprietary form that is close to DOS, but it is not DOS. Nonetheless, the K2600 can read from and write to the first partition on a DOS-formatted disk.

11. You can view, copy, move, name, and delete files on a K2600-formatted floppy disk or removable media hard drive, with a PC or Macintosh running a DOS mounting utility program such as Access PC.

12. 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 you should be aware of, however:

    The only damage that usually occurs to SCSI hardware comes from static electricity discharging to 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-inch jacks on the rear of the K2600 or another grounded metal object. Any devices connected to the SCSI bus should be turned off when plugging or unplugging SCSI cables.

    If the K2600 is connected to a Macintosh or PC you should make sure that the computer cannot access a SCSI disk at the same time the K2600 does (see below for more information on this). If you occasionally want to share a drive, but don't want to take any risks, you should connect and disconnect devices as needed. If you want to share drives often and cannot constantly disconnect and reconnect devices, make sure the Mac or PC is really done with the disk before using the K2600. Furthermore, you should quit or exit from all running programs and disable screen savers, email, network file sharing, and any INITs or TSRs that run in the background. If the computer and K2600 access the disk at the same time there will be no damage to the hardware, but the bits on the disk, K2600, and

computer memory can easily be corrupted. You may not know that damage has been done to these bits until unexpected things start to happen for no apparent reason.

13. A good way to verify your SCSI hookup is to save and load some noncritical files.

K2600 and Macintosh Computers

There are several points to consider when using a Macintosh with the K2600:

1. The Mac is not well equipped for having another SCSI master on the bus (that is, the K2600). It assumes that it owns the bus and its drives—consequently it will not allow the K2600 to address any of its drives. Therefore, you should not attempt to read from or write to 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 K2600 is doing anything via SCSI, you'll have problems. The only solution is to wait until your Mac is completely idle before accessing SCSI from the K2600.

2. The Mac and the K2600 cannot share a drive in any way, with or without partitions. If you are using a removable-media drive (like a Syquest or Zip drive), you can't easily use it for both Mac-formatted disks and K2600-formatted disks. To prevent problems, you will need to unmount the drive from the Mac desktop before using a K2600-formatted disk in the drive. The Mac will basically ignore the disk if it's not in Mac format, but once you insert a Mac-formatted volume, the Mac owns it. Don't forget: inserting a disk in a removable drive 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 K2600 on the same SCSI bus is to use Alchemy or the equivalent. If you're using a patch editor or librarian, you can connect 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 K2600 have its own drive, and the Mac have its own drive.

   However, we have discovered that when using a K2600 with a Mac and a removable media drive in the middle of the chain, the following scenario will work:

   Start with a Mac-formatted disk in the drive. When you want to use the K2600, put the drive to sleep from the K2600. You can then change to a K2600-formatted disk and perform whatever disk operations you need. When you want to go back to the Mac, put the drive to sleep again, switch disks, and then wake up the drive by pressing **Load**. Of course the K2600 will tell you it can't read the disk, but the Mac will be able to.

Accessing a K2600 Internal Drive from the Mac

Access PC is one of the many programs for the Mac that allow it to format, read, and write to DOS floppy disks and removable SCSI cartridges. Reading and writing to an internal hard disk on the K2600 is fine, but don't try to format it using Access PC on a Mac.

If you use a Mac with Access PC to address your K2600's internal hard disk, never save or delete files from the K2600 when the internal disk is mounted by the Mac. This could result in corrupted files or directories—it could even corrupt the entire disk. Access PC has no way of knowing when the K2600 has modified the disk contents, and it could write over existing data, or crash while trying to read data that are no longer there. The safest approach is to connect a drive to either the K2600 or the Mac, but not to 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 K2600 (for example, 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 K2600 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 K2600 via the MIDI Sample Dump Standard can take a long time, on the order of a coffee break for a large sample. Most samplers, synthesizers, and software will "freeze up" during this process, preventing other features of the machine or program from being used. Your K2600, 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 K2600's front-panel flashes repeatedly during the transfer, so you will always know if the MIDI Sample Dump is proceeding. The MIDI-mode LED flashes only when the K2600 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 K2600, 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 K2600 from an external source such as a computer or sampler, first connect the MIDI Out port of the sampler (or computer) to the K2600's MIDI In port, and connect the K2600's MIDI Out to the MIDI In of the sampler. This is known as a MIDI loop.

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 K2600's SysEx ID parameter (on the RECEIVE page in MIDI mode). If the sampler has no facility for setting the Sample Dump channel number, try setting the K2600's SysEx ID parameter to **0** or **1**. Alternatively, if you set the SysEx ID to **127**, the K2600 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 K2600 will use for storing the sample. The K2600 sample number is mapped from the destination sample number as follows:

Sample Number	K2600 ID
0	uses lowest unassigned ID between 200 and 999.
1-199	adds 200 to the ID (for example, 5 becomes 205 in the K2600.)
200-999	ID is the same number.

If the sample number maps to a number already assigned to a RAM sample in the K2600, the RAM sample will be deleted before the K2600 loads the new sample. The K2600 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 K2600, which reserves IDs 1-199 for ROM samples, which cannot be loaded or dumped. To get around this, the K2600 adds 200 to any numbers between 1 and 199. Therefore, if you want to load a sample into the K2600 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* on page 6-6).

At this point, you're ready to try loading a sample. See *Accessing a New K2600 Sample* on page 6-6 to learn how to use samples once they've been dumped to the K2600.

Getting a Sample into a Sample Editor from the K2600

Connect the MIDI ports of the K2600 and the computer/sampler in a MIDI loop as described for the Sampler/Computer to K2600 procedure above.

Access the computer software's "Get Sample" page (it might be called something different). As with loading a sample into the K2600, the K2600 adds 200 to dump request sample numbers between 1 and 199. K2600 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 K2600 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* on page 6-6).

Loading a Sample into the K2600 from another K2600

Connect the MIDI ports of the two K2600s in a MIDI loop as described for the Sampler/Computer to K2600 procedure above.

On the source K2600, 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 K2600. The source K2600 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 K2600 as it is on the source K2600.

Dumping from the K2600 to a Sampler

This procedure is the same as dumping a sample from one K2600 to another. This will work only if the sampler supports the MIDI Sample Dump Standard.

Dumping a Sample from the K2600 to a MIDI Data Recorder

This can be accomplished by connecting the MIDI Out port of the K2600 to the MIDI In port of the MIDI Data Recorder. Go to the Sample Editor and select the K2600 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 K2600's MIDI mode LED will flash while the data transfer is in progress.

Loading a Sample into the K2600 from a MIDI Data Recorder

Connect the MIDI Out port of the Data Recorder to the MIDI In port of the K2600. Load the appropriate file containing the MIDI Sample Dump data into the Data Recorder, and send the file. The K2600's MIDI mode LED will flash during this procedure.

Accessing a New K2600 Sample

First, select the K2600 program you wish to play the new sample from, and press **Edit**. 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 K2600, it will have the same ID as it did on the other K2600. If the sample was loaded from any other source, its ID will be defined as described in *Loading Samples with the MIDI Standard Sample Dump* on page 6-4).

The name of the sample will be assigned by the K2600 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 K2600. 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 K2600

There are two reasons a K2600 will not accept a MIDI Sample Dump. First, a dump will not be accepted if the destination sample number maps to a K2600 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 K2600. There may be samples in the K2600 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 K2600 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 K2600 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 K2600 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 K2600

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 K2600 dump sample ID 203, which

would ordinarily dump a different sample from the one you intended, possibly causing the dump to fail. The K2600 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 K2600 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 K2600 to dump sample 205, ask for sample 204.

Some samples in the K2600 are copy-protected. These include all ROM samples and possibly some third-party samples. The K2600 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 K2600 from an external source (for example, a computer or a sampler). This button will also halt a sample dump from the K2600. The K2600 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 K2600. 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 K2600. Once the samples have been loaded to the K2600, 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 K2600'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.