

# SCSI INTERFACE INSTRUCTIONS

## THE EMAX SCSI INTERFACE

SCSI (pronounced skuzzy) stands for *Small Computer System Interface*. SCSI is an industry standard hardware and software specification that allows high-speed data transfers between different pieces of equipment SCSI devices can include hard disks, optical disks and other types of digital equipment.

The Emax SCSI software supports 20 megabyte external fixed or removable media hard disks A device with greater than 20 megabyte capacity may be used but Emax will still only access 20 megabytes Up to eight external drives can be added (seven if the Emax is already an HD). 35 banks of sounds can be stored on one 20 megabyte hard disk, any of which can be loaded in under 4 seconds.

## ABOUT SCSI

### Why use SCSI?

- SCSI is fast. SCSI is a parallel interface, which transmits eight bits of information at a time at high speed over the SCSI cable. MIDI in comparison is a serial interface, which can only send one bit of information at a time over its line.
- Compatibility. Since SCSI is an industry standard, equipment from many different manufacturers can be linked to work together.
- Expandability: Up to eight SCSI devices can be linked together.

### Priority Numbers

Each device on the SCSI bus has its own **Priority Number or ID number** so that it can distinguish its data from data meant for another device. If the Emax wants to save data to a device with ID No 2 for instance all the other devices on the SCSI bus will ignore that data. If two devices have the same ID number confusion will surely reign Each device must have its own unique ID number.

The SCSI ID number of the Emax's internal HD is fixed at 0 and cannot be changed. The SCSI ID numbers of most other hard disk drives can be changed. If you have an Emax HD, make sure that none of the external drives have a SCSI ID number of 0.

Most SCSI devices have hardware defined ID numbers, which means that there is a little switch on the device to change the ID number. Consult the operation manual of your hard disk for information on changing the drives ID number.

### Terminating Resistors

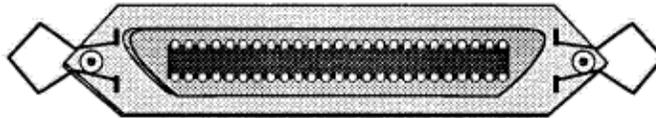
Terminating resistors or terminators are special resistor packs that are installed on the first and last device in the SCSI chain. Terminators are used to reduce line echoes or standing waves on the SCSI bus. Termination resistors can be thought of as noise reducers.

Most manufacturers ship their external SCSI devices with terminators installed In theory the termination resistors on devices in the middle of the SCSI chain should be removed. In practice however we have found that the SCSI bus will have fewer errors if the termination resistors are left in place. If problems do occur, removing the excess terminators may help. Problems are much more likely with long SCSI cables. You should not have any problems if the total length of the SCSI cable does not exceed 12 feet.

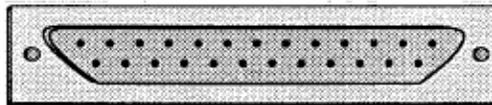
## Types of SCSI Cables

There are two basic types of SCSI cables in use, which can be identified by their connectors. The two connector types, which are quite different, are: DB25 and 50-pin Centronics. The Emax uses a DB25 type connector. These are the type found most often on the back of personal computers. When buying SCSI extension cables it is important to choose ones with the right type of connectors, since your hard disk may have a Centronics type SCSI connector. When ordering, make sure to get a cable that has all the pins connected. Many cables only have some of the pins wired.

*The types of SCSI cables in use today have either Centronics or the DB25 type connectors.*



50-pin Centronics Connector



25-pin DB Connector

## Positioning the Drive

A hard disk drive generates some audible noise, which may cause problems in a quiet studio environment. If the audio noise is objectionable, you may want to move the drive to another room or closet. The maximum SCSI cable length is 12 feet. Exceeding this length may cause problems such as data corruption.

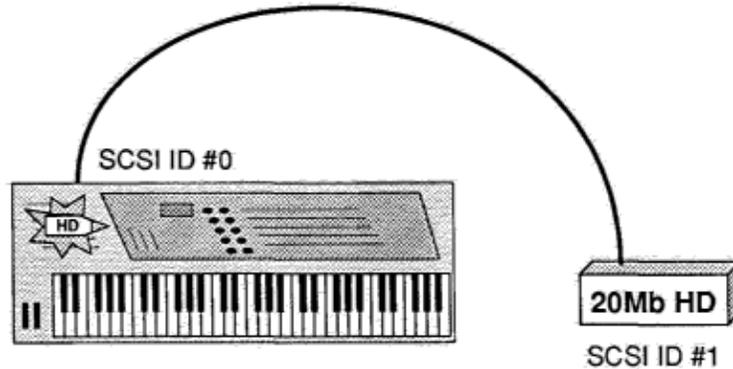
## Problems with the SCSI Bus

If you are experiencing data errors using more than one external SCSI device, first attempt to isolate the problem to a particular device or combination of devices. Using shorter SCSI cables may help. If you are unable to solve the problem, you should contact your E-mu authorized dealer or service center.

## GETTING THE HARD DISK UP AND RUNNING

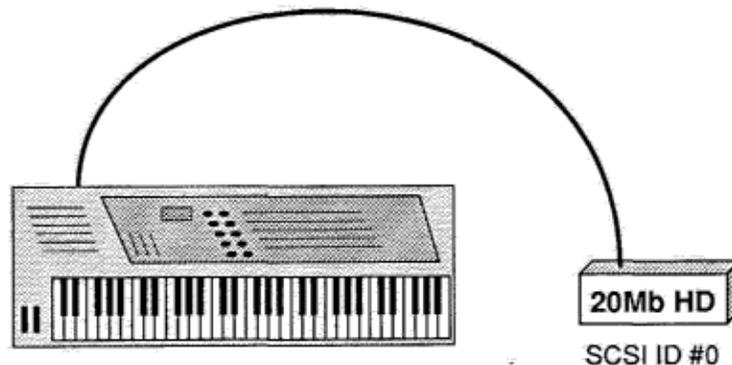
### WHICH ID NUMBER?

**Emax HD Owners:** If you have an Emax HD you probably already know that the internal hard disk contains the system software for the Emax. The SCSI ID number of the Emax's internal HD is fixed at 0 and cannot be changed. Therefore you want the external drives to have ID numbers other than 0.



**Regular Emax Owners:** One of the advantages of having a hard disk for the Emax is that the system software can now reside on the hard disk. (The system software is the computer program that runs Emax.) Having the system software on the hard disk eliminates the annoying wait as you move from module to module. The Emax will always look to ID 0 when it wants to access the system software.

Therefore if you do not have an internal HD, you should designate your external hard disk as drive number 0. If you are using an external drive, which has removable media, **DO NOT** designate the removable media drive as drive 0. Choose another ID number or the system may sometimes crash. If you have a non-removable HD and a removal media drive, then the drive with non-removable media should be designated as drive 0. Alternately, the system software could be loaded from floppy disk. This would allow the hard disk to be turned off after loading a bank in order to cut down on ambient noise.



## Starting Up the System

If the drive is very cold, allow it to warm up to room temperature before applying power.

1. Turn on the external drive.
2. Wait about five seconds then apply power to the Emax Boot the Emax with the Emax SCSI software disk supplied. The Emax should power up normally. If it does not, check all the connections and try again.

**Note:** If there is no hard disk connected to the Emax, it must be booted from a non-HD software disk.

## TO SELECT THE HD NUMBER

1. Press and hold the Transpose button.
2. While holding the Transpose button, press the number on the numeric keypad corresponding to the ID number of the drive you wish to access.

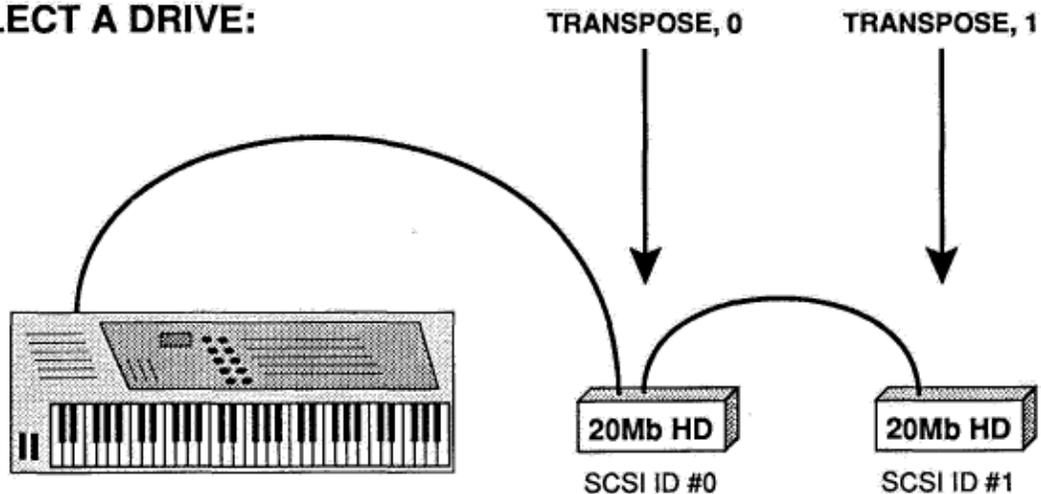
The display shows:

Transpose  
SCSI Ids: 2

For example pressing Transpose and then 2, selects HD drive number 2. Drive number 2 stays selected until you change it or until Emax is turned off.

Selecting the correct drive is very Important especially if you have more than one hard disk If the wrong drive is selected, you could accidentally format the wrong drive and erase all your valuable work If you try to load or save from a SCSI ID location on which no HD exists (or isn't turned on) the Emax will display an 'HD Catalog Error'.

## TO SELECT A DRIVE:



**Remember:** The Emax HD internal drive is always drive 0 (the default drive).

## FORMATTING

Just as a floppy disk must be formatted in order to receive Emax data, so must the hard disk Formatting, which erases any existing hard disk data, occurs for one of two reasons:

- The hard disk has never been used previously and must be prepared for operation. However, **NEVER** format a hard disk before first checking whether or not there are existing banks on the hard disk that should be saved to floppy.
- The hard disk has developed one or more Disk Read Errors making one or more banks unavailable. The error scan has been performed but has either failed to restore the banks or has resulted in slow response time from the hard disk or other problems.

Formatting will re initialize the hard disk and erase any existing banks Hard disk crashes are not frequent occurrences, which may lull you into a false sense of security. However, Murphy's Law dictates that a crash will occur when you have sampled fantastic unique new sounds that aren't backed up so **ALWAYS** maintain floppy disk backups of any banks stored on the hard disk.

## FORMATTING THE HARD DISK

First select the hard disk you wish to format (Hold transpose down then press the HD number).

**Warning:** To avoid confusion; we recommend that you disconnect all external hard disk drives except the one that you are formatting.

1. To format the hard disk, Select **MASTER, Special, 7** and the display says:

Format Hard Disk  
Erases Memory! OK?

If it's not okay to erase memory, press **NO** and copy the Bank contents to disk. Otherwise, press **YES**. The display now says:

Get Software  
From: Hard Disk

2. Move the data slider and change the display to:

Get Software  
From: floppy

3. Press **ENTER** to select the source drive You **MUST** select floppy, since there is no way to change drives from within this submodule The display asks you to insert the source disk in the drive.

Press **ENTER** again The Emax now loads the software into its memory. Then the display says:

Format DESTROYS  
ALL BANKS! READY?

Press **YES** to format the hard disk and **NO** or **ENTER** to return to the **MASTER** module. Formatting takes about 5 minutes and leaves you with bank 01 Untitled and banks 02 - 35 as empty banks.

After the drive has been formatted, you can start loading it up with sound banks.

## SAVING A BANK TO THE HARD DISK

1. Activate Preset Management 2; the display says:

Save Bank to: XX  
XX Name of Bank

... where "XX" is the bank number and "Name of Bank" is the bank name.

2. Use the data slider or the increment/decrement buttons to select the source bank (either hard disk or floppy), and then press **ENTER** to save the bank to disk, or **NO** to return to the module identifier. When the save is complete, Emax will return to the module identifier.

To save a bank to the floppy drive, select bank 00.

**Warning:** When using a removable media external drive, there must be a disk in the drive while saving or a crash could occur.

## LOADING A BANK FROM THE HARD DISK

Press the **LOAD BANK** button; the display says: Load Bank, and shows the name and number of the current bank. Use the data slider to scroll through the available hard disk banks. Stop when you find the bank you want and press **ENTER**.

An alternate method of loading a hard disk bank is to press **LOAD BANK**, then simply type in the number of the bank using the numeric keypad.

Load Bank  
XX name of Bank

The display will show the current preset number and name (the cursor will flash underneath the first digit).

To load a bank from the floppy drive, select bank 00.

## BACKING UP THE HARD DISK DRIVE

Backing up your work should by now be a regular practice. Hopefully you won't have to learn the hard way about the importance of backing up. There are several methods of backing up an Emax hard disk. If you only have one hard drive you must back up to floppy disks. To back up to floppy disks, you may use either the **COPY BANK** function or the **BACKUP** and **RESTORE** functions. Use whichever method seems best for the way you work. Keep in mind that backup is far less painful when your backup disks are kept orderly.

If you have more than one hard disk, you can use the Copy HD function **MASTER, Special, 0**. This function allows you to copy the entire contents of one hard disk drive to another. For instance, you may wish to backup your internal HD to a removable media HD.

The following instructions are for using **COPY BANK**, **BACKUP/RESTORE** and **COPY HD**:

### Module: MASTER 6

### Function: COPY BANK

**This function allows you to copy bank(s) one at a time, to the same hard disk or to a floppy.**

To copy a single bank to another hard disk, **LOAD** the bank, then **SAVE** it to the desired HD. To copy all banks from one HD to another, use the **COPY HD** function (**MASTER, Special, 0**).

**Note:** Copying data to a bank or floppy will erase any data on the floppy disk or bank being copied to. Use the Back Up HD function to back up your library. See **MASTER 8**.

1. Activate **MASTER 6**. The display says:

Copy Bank  
Erases memory! OK?

2. Copying will erase whatever is in Emax's memory. If that's not okay, press **NO**, save what's in memory to another disk (**PRESET MANAGEMENT 2**), then try copying again. Otherwise, press **YES** and the display will say:

Copy from Bank XX  
XX Name of Bank

... where "XX" is the Bank number and "Name of Bank" is the name of the bank.

**Note:** The "Name of Bank" is simply the current preset at the time that the bank was saved.

3. If you are copying from floppy, make sure you put one in the drive. You might as well write protect it, just in case, Use the data slider or increment/decrement keys to select the source bank (either from hard disk or floppy) and press **ENTER**. Emax will load the selected bank into its memory. Then the display will say...

Copy XX to XX  
XX Name of Bank

... where "XX" is the Bank number and "Name of Bank" is the name of the bank.

4. Use the data slider or increment/decrement keys to select the destination bank (either hard disk or floppy) and press **ENTER**. If the destination is a floppy disk, make sure that you insert one in the drive and that the disk has been formatted first. The data will then be copied to the destination bank.

After several seconds, the display asks:

Copy to Another  
Bank? Y/N

If you want another copy, insert another previously formatted disk (if applicable) and press **YES**. Otherwise, press **NO** to return to the Module Identifier.

## Module: MASTER 8

## Function: BACK UP

This module allows you to backup a portion or the entire contents of the hard disk onto floppy diskettes. This function makes backup so easy that you will have no excuse for not backing up all your hard disk banks! Remember, if you would hate to lose it, **BACK IT UP**.

1. **Activate MASTER 8**. The display says:

Backup Bank  
Erases Memory! OK?

2. If you don't want to lose what you have in the Bank, save it to disk first (see **PRESET MANAGEMENT 2**). Otherwise, press **YES**.
3. The display now says:

Backup Banks:  
all banks

4. Moving the data slider changes the display to:

Backup Banks:  
Updated banks

5. Select "All banks" if you want to backup the entire hard disk. Select "Updated banks" if you wish to backup only the banks that have been changed since the last back up.

6. If you select "All banks", the display will prompt you to:

Get XX Formatted  
Disks. Ready? Y/N

7. Where "XX" is the number of floppy disks needed.
8. If you select "Updated banks", the display will prompt you to get the number of formatted disks ready that have changed since the last back-up. After pressing **ENTER**, you may scroll through the banks that have been changed with the data slider and update your backup disks as desired. Any bank may be skipped during backup. Press **MASTER** to exit the function.

**Hint:** It's a good idea to keep your backup copies in order and labeled so that backup and restore can be performed quickly and easily.

## Module: MASTER 9

## Function: RESTORE

This module allows you to easily restore a portion or the entire contents of the hard disk from your floppy backup diskettes.

1. Activate **MASTER 9**. The display says:

Restore Bank:  
Erases memory! OK?

If you don't want to lose what you have in the Bank, save it to disk first (see **PRESET MANAGEMENT 2**). Otherwise, press **YES**.

The display now instructs you to "Insert the Floppy".

Insert the floppy disk with the bank that you wish to restore and press **ENTER** to begin.

2. The display says: **Loading Bank...** and loads the floppy bank. After the disk has been loaded, the display shows the name of the bank just loaded and allows you to select the destination hard disk bank with the slider.

For example, in restoring the Arco Strings bank, the display says:

Arco Strings To  
01 Arco Strings

Bank loaded from floppy  
Destination bank selected with slider

Any bank may be skipped during restore. Press **MASTER** to exit the function.

**Module: MASTER, Special, 0**

**Function: COPY HD**

**This function allows you to easily copy the entire contents of one hard disk to another.**

1. Activate **MASTER, Special, 0**. The display says:

Copy HD  
Erases Memory! OK?

Press **YES** if you don't mind erasing the internal RAM and want to continue. Press **NO** to return to the module identifier. The display shows:

Copy DX  
Select a Drive

Where "X" is the hard disk drive number that you want to copy.

2. Use the data slider to select the drive number, then press **ENTER**. The display shows:

Copy DX to DY  
Select a Drive

Where "Y" is the hard disk drive number that you want to write over.

3. Use the data slider to select the destination drive number, then press **ENTER**. The display now shows:

Copy DX to DY  
Copying HD...

The copy procedure takes several minutes, then Emax returns to the module identifier.

## OTHER SOFTWARE CHANGES

### Module: MASTER 5

### Function: FORMAT DISK

Before a new floppy disk can record (store) any data, it first must be told how to record this data (called formatting the disk). Run the following formatting procedure on any new floppy disk, or on “recycled” disks previously used with other systems (such as home computers) since these will not be formatted correctly for the Emax.

Formatting not only formats the disk, but also writes Emax’s operating system (the software that tells the system how to operate).

**Note:** Formatting a disk that already contains data will “bulk erase” any data on the disk being formatted. Always check that disks are either blank, or contain nothing you want to save, before formatting. A disk need only be formatted once unless you want to use the “bulk erase” aspect of formatting.

Use only 3.5” double-sided, double-density (DSDD) disks. Avoid bargain disks.

1. With a formatted disk already in the drive, activate **MASTER 5**. The display says:

Format Floppy  
Erases Memory! OK?

If you don’t want to lose what you have in the Bank, save it to disk first (see **PRESET MANAGEMENT 2**). Otherwise, press **YES**.

2. The display says:

Get Software  
From: harddisk

Moving the data slider changes the display to:

Get Software  
From: floppy

3. If you choose floppy, the display says:

Please Insert  
Source Disk

Check that a formatted Emax disk with the latest software is in the drive. If not, insert one. To prevent any embarrassing errors write-protect the disk (**GENERAL INSTRUCTIONS 4**).

Press **ENTER**. There will be a short wait while Emax loads the formatting software. If you choose hard disk, Emax loads the formatting software from the hard disk.

4. The display now says:

Pls Insert Disk  
To Be Formatted

Remove the source disk and insert the disk to be formatted, then press **ENTER**. The display will say:

Formatting  
Floppy...

Formatting takes just enough time that you can get a drink of water or do a couple of sit-ups. After formatting is complete, the display asks:

Format Another  
Floppy? Y/N

To format another disk, remove the newly formatted disk from the drive, insert the next disk to be formatted in the drive, then press **YES**. Otherwise, press **NO**, whereupon the display returns to the Module Identifier.

## Module: MASTER 0

## Function: SPECIAL

This module holds some seldom-used, but extremely useful, functions.

1. Activate **MASTER 0**. The display says:

Special (0 - 8) / Slider

### 1 Copy Software

The Emax operating system deals with such tasks as disk transfers, memory management, and so on. Occasionally E-mu enhances the operating system. Each version of the operating system is numbered, as indicated when you move the data slider all the way to the top while in Special. As newer versions are introduced, use this function to copy the new software on to disks containing the old software. Everything else on the old disk - Samples, Presets, Sequences, and so on - remains unchanged.

1. Upon selecting Copy Software, the display says:

Copy Software  
Erases Memory! OK?

If it's not okay to erase memory, press **NO** and copy the bank contents to disk. Otherwise, press **YES**.

The display now says:

```
Copy Software
From: hard disk
```

2. Moving the data slider changes the display to:

```
Copy Software
From: floppy
```

Insert the source disk (the one with the new software) in the drive if you are copying from floppy.

3. Press **ENTER** to select the source drive. This clears the bank and loads the operating system software into Emax. The display will say: [Loading software](#).
4. If hard disk is selected, then the destination is automatically assumed to be the floppy disk. The display will read:

```
Copy Software
To Floppy - Ready ?
```

Insert the destination diskette and press **YES** to copy the software.

5. If diskette is selected, the display says:

```
Copy Software
To: hard disk
```

6. Moving the data slider changes the display to:

```
Copy Software
To: floppy
```

Insert the destination floppy disk (if applicable) and press **ENTER** to initiate the transfer. After copying the software to a floppy you have the option of copying the software onto another disk (insert the disk then press **YES**) or exit back to the Module Identifier (press **NO**).

## 8 ScanHD

The hard disk scan is used when the hard disk has developed one or more Disk Read Errors making one or more banks unavailable, or making the operating system unavailable resulting in failure to boot from the hard disk.

To run a HD error scan:

1. Everything should already be backed up on floppy disk. What!? You haven't backed it up? Well you had better do it now (if it's not too late).

Select Special 8 and the display says:

Scan Hard Disk  
Erases Memory! OK?

(The memory in question is the Emax's internal RAM, not the HD.)

2. Press **YES** to begin scan or **NO** to return to the **MASTER** module.

If you press **YES**, the display says:

Scanning HD...

3. The hard disk scans itself for defects. This takes a few minutes and if all is well after the scan, the display will read:

No Defects  
Were Found

4. Press **ENTER** to return to the module identifier  
If one or more hard disk defects were found, the display will read:

Defects Were Found  
In XX Bankname

where "XX Bankname" is the name and number of the damaged hard disk bank.

5. Press **ENTER** to get more information, and one of the following messages will be displayed.

Bank is Unusable!  
Keep Scanning? Y/N

This display indicates serious defects. The hard disk may need to be reformatted.

Bank is Corrupted!  
Keep Scanning? Y/N

This display indicates less serious defects. The bank has been made usable, but the data may be bad.

**Note:** If the bank is corrupted, there will probably be a glitch in one or more of the sounds. Other sounds in the bank may be entirely unaffected. Or, who knows? They might all be OK.

Bank is Corrected!  
Keep Scanning? Y/N

This display indicates minor defects. The errors have been corrected.

Press **YES** to continue scanning for defects, **NO** to return to the **MASTER** module.