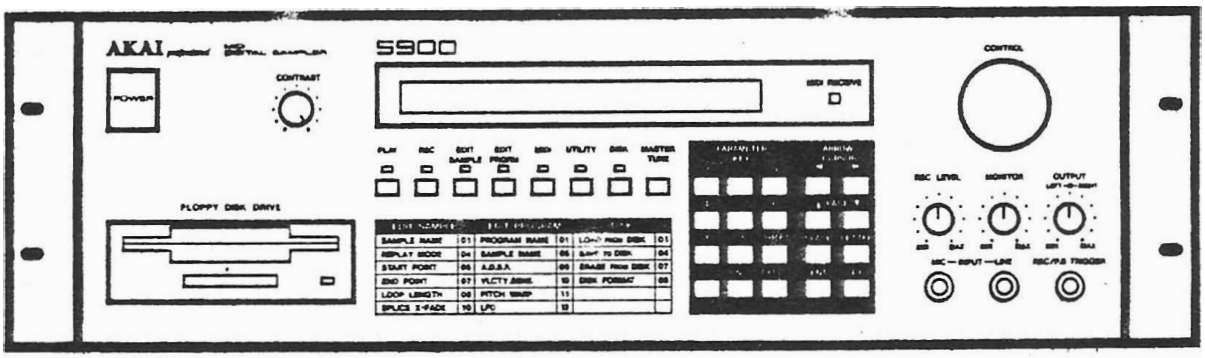
AKAI professional

S900

MIDI DIGITAL SAMPLER



WARNING

To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

Operator's Manual

CHAPTER 1: INTRODUCTION

WELCOME!

Welcome to the Akai S900 Sampler. This versatile sampler provides the flexibility associated with more expensive machines, yet is quite easy to use once you become familiar with its operation.

It took many months of intensive development to produce the S900, and it will take you some time and practice to master this advanced instrument. But the reward for your efforts will be the opportunity to make creative, exciting music using the latest in sampling technology.

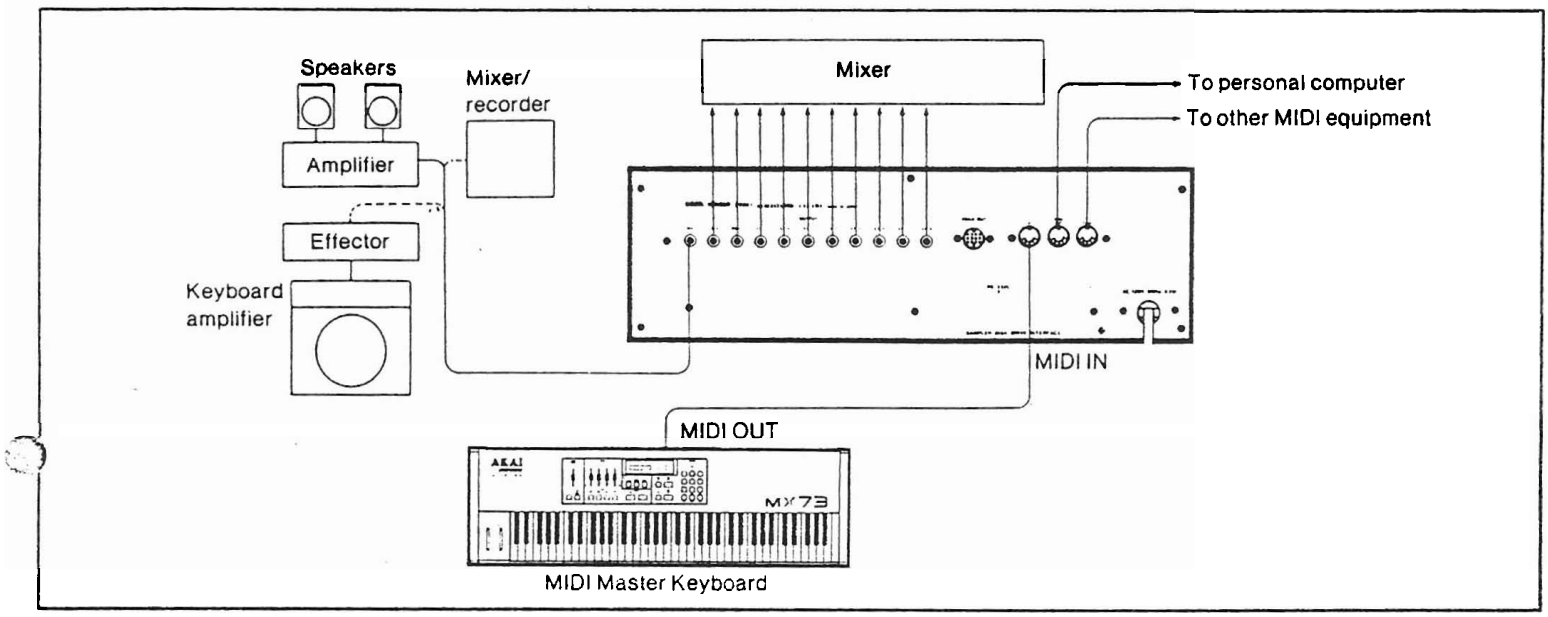
The S900 has several features of interest:

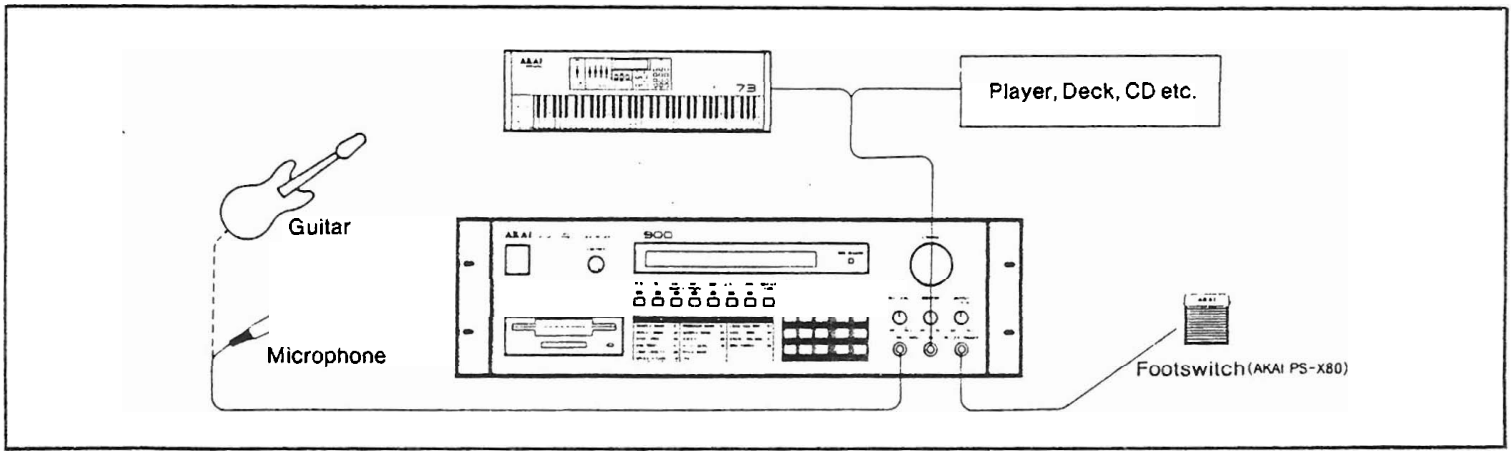
- 12 bit sampling resolution for less noise and better high frequency response than older, eight bit samplers.
- Variable sampling bandwidth to save on memory.
- Built-in disk drive for added convenience.
- A "user-friendly" liquid crystal display (LCD) that displays helpful messages and instructions.
- Versatile MIDI implementation (omni, poly, and mono modes available)
- Individual audio outputs for eight signals, left and right mix outputs, and mono mix output.

Of course, this list just skims the surface (for example, with an optional hardware card the S900 becomes a full-featured sampling drum machine). You will find out much more about the S900's capabilities over the course of this manual, but since you are no doubt very eager to get started, let's set up the S900 and play back some sounds.

SET IT UP

1. Connect a cord from the master MIDI controller MIDI Out to the S900 MIDI In jack. Akai recommends the MX73 master MIDI keyboard, but other MIDI-compatible controllers can be used (MIDI keyboards, guitar-to-MIDI converters, MIDI drum controllers etc.).
2. Connect an audio patch cord from the S900 Mix Out jack to a suitable amplification system, initially turned to zero level. (We will describe how to use the other outputs later in the manual.)





PLAYING BACK SOUNDS

We know you can't wait any longer to hear the S900, so grab one of the factory disks and let's go. Follow these instructions exactly as given.

1. Insert a factory sound disk as shown in Fig. 1. Push gently until the disk locks in place. A push tab will pop out from below the disk slot after the disk is inserted. When you want to change disks, push on the tab and the disk will pop out.
2. Turn on the S900 power. The red light in the lower right-hand side of the disk drive will light. This indicates that disk activity is taking place (in this case, sound data is being transferred from the disk into the S900's memory).

Caution: NEVER, EVER remove a disk while the red disk activity light is on!! This is true of all disk drives, not just the S900's. Removing a disk when the disk light is on may damage the disk or drive.

3. It can take up to 40 seconds to load a disk, depending on how much data is on the disk. While you're waiting, adjust the CONTRAST control for the most readable LCD display.
4. Turn the large gray CONTROL counter-clockwise. The sound programs contained in memory will scroll past the LCD window. Each program has an associated number; press the key corresponding to that number to select a particular program.
5. Turn up your audio amplifier, turn up the S900 Output control for a confortable listening level, and play your master controller. The MIDI RECEIVE light (towards the right side of the LCD) should light up as you play, and you should hear some pretty life-like sounds coming out of your amplifier. If not, check your connections. If the MIDI RECEIVE light does not light up, the S900 is not receiving MIDI data. Make sure your controller is generating MIDI data. For more information, turn to the MIDI section of this manual.
6. To audition other disks, first press the tab below the disk drive insertion slot. The previously inserted disk should pop out. Now insert the next disk you want to hear as described in step 1.
7. Note that there are eight function buttons below the LCD. The second one from the right says "DISK." Press this button (Fig. 1).
8. Note the matrix of buttons shaded in gray and located under the right side of the LCD. Press the ENT button (bottom row, second from the right) (Fig. 1).
9. The new sounds will be loaded into S900 memory and the disk activity light will come on. After the sounds are loaded, the disk activity light will go off. Play your master controller.

Now you know how to play back sounds, but there is much, much more to learn about the S900. When you're ready, proceed to the next section.

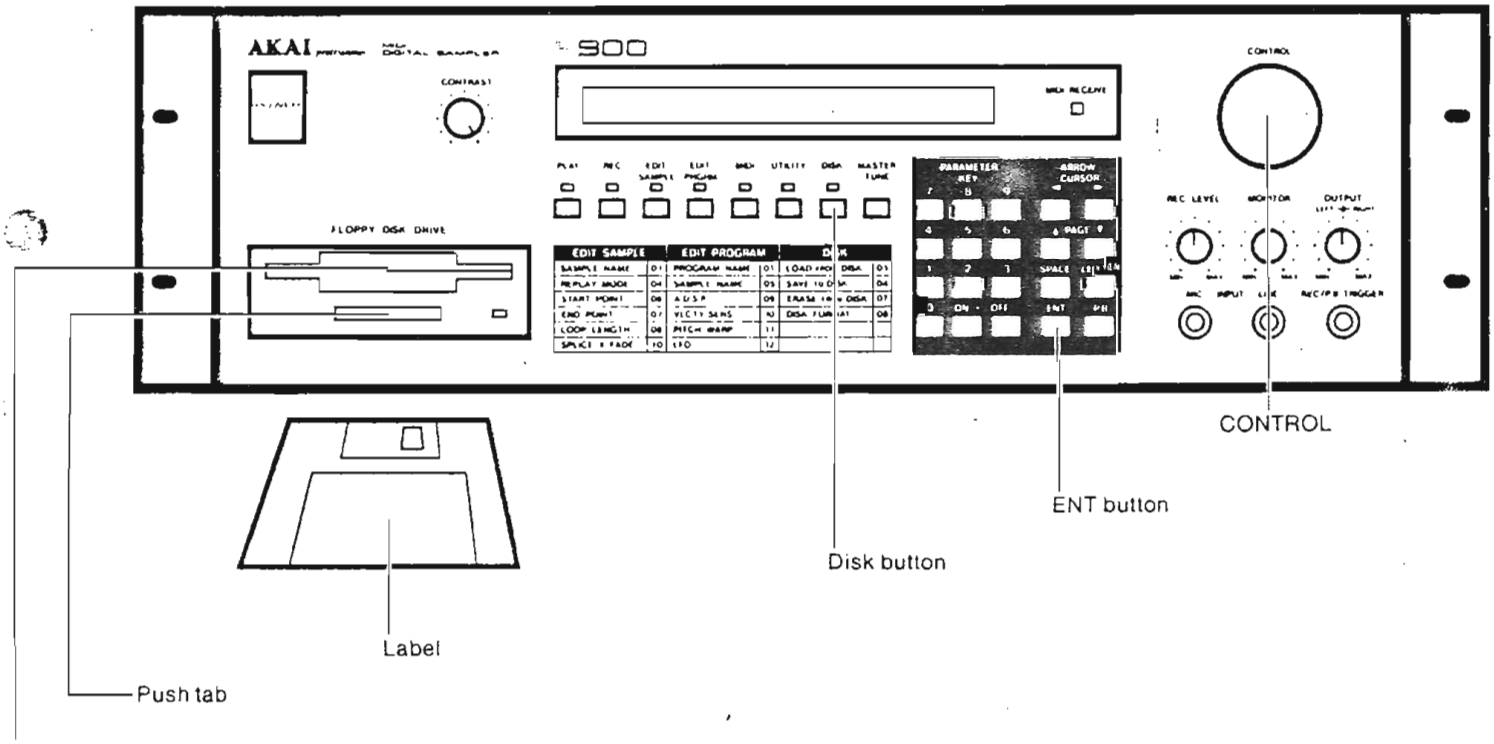


Fig. 1

HOW TO COMMUNICATE WITH THE S900

This section is very important. Read it carefully, as it lays the foundation for the rest of the manual.

FUNCTIONS, PAGES, and BUTTONS

The S900 has eight functions selected by eight front panel master buttons: PLAY, REC, EDIT SAMPLE, EDIT PROGRAM, MIDI, UTILITY, DISK, and MASTER TUNE.

Each function (except MASTER TUNE) includes several pages. Each page covers a specific aspect of the function's operation. For example, typical DISK function pages are load sound from disk, save sound to disk, erase disk, etc.

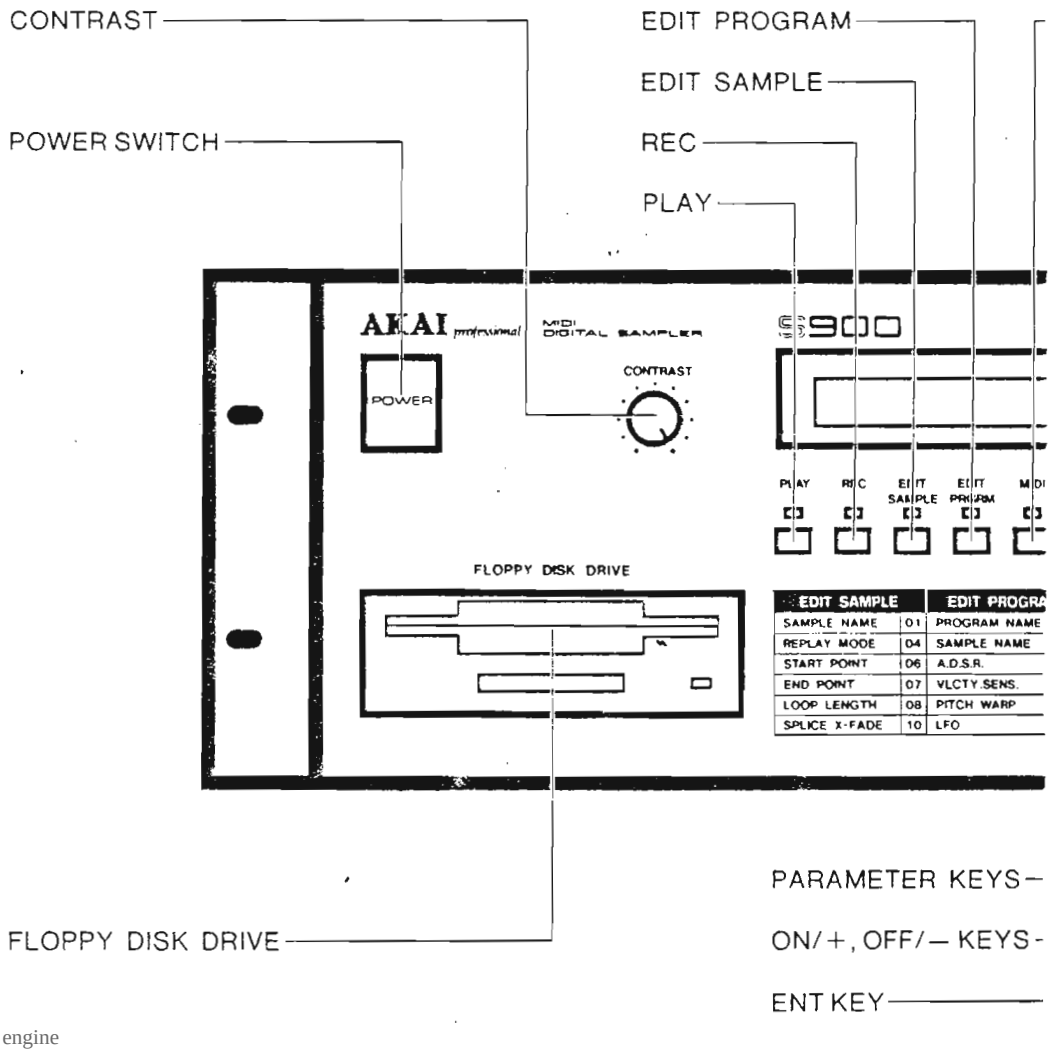
Each page also displays several of the S900's parameters. These are changed with the page programming buttons (contained within the gray rectangle below the right side of the LCD) and the upper-right hand CONTROL.

GETTING AROUND THE S900: A PRACTICAL EXAMPLE

Let's learn how the Function/Page/Button system works. We will do all our practicing with a blank, formatted disk so that if you make any errors nothing of importance will be lost.

1. Turn on power if it is not already.
2. Insert a blank, double-sided 3.5" disk as shown previously in Fig. 1. Push gently until the disk locks in place.
3. Press the DISK function button. The LCD will show Page 01, the Load Disk page. There are several other pages associated with the DISK function, and three ways to access them:

- Enter the page number directly with the numeric (0—9) PARAMETER KEYS. This must be a two-digit number; if you are calling up a single-digit page number, press the 0 button first (e.g. to call up Page 7, press the 0 key then the 7 key).
- You may advance to the next page by pressing PAGE (down arrow), or return to the previous page by pressing PAGE (up arrow).
- If the arrow points at the page number (see next section for more about the arrow), CONTROL will select the different pages within a function.



The front panel shows some of the most used page numbers for the EDIT SAMPLE, EDIT PRESET, and DISK functions.

4. Scan through the other pages by using one or more of the methods described above. Don't expect the LCD messages to make much sense; they will be explained later. We just want to get a feel for how the machine works.
5. Select Page 08. The LCD asks if you want to FORMAT, and explains that means to "Prepare a new disk" for use with the S900. It also reminds you to press ENT if you want to have this happen. Since you have a blank disk in the drive which you will eventually want to use with the S900, press ENT.
6. The Disk Activity light goes on. Remember, NEVER remove a disk when this light is on! The cursor will overwrite the existing display with dots. When the LCD is filled with dots and the Disk Activity light goes off, the disk is ready for use with the S900. Pop out the disk, and you have a formatted disk ready for later experiments.
7. Now let's learn how to select parameters within a page. Press the EDIT PRESET function button and select Page 06. Again, we don't need to concern ourselves with the specific LCD message other than to know that an asterisk (*) indicates a parameter that may be altered.

   Two "gadgets" help you locate the desired parameter:

- An Arrow gadget point to the name of the currently selected parameter (this will be the page number when the page is first selected).
- A flashing cursor indicates the value of the parameter pointed to by the Arrow. If you enter a piece of data (number, yes, no, letter, etc.), it will be entered in the space indicated by the flashing cursor.

  Use the elongated ARROW/CURSOR KEY to move the arrow and cursor. Press the left side of the switch to move the arrow/cursor left, and the right side to move the arrow/cursor to the right. Try this now.

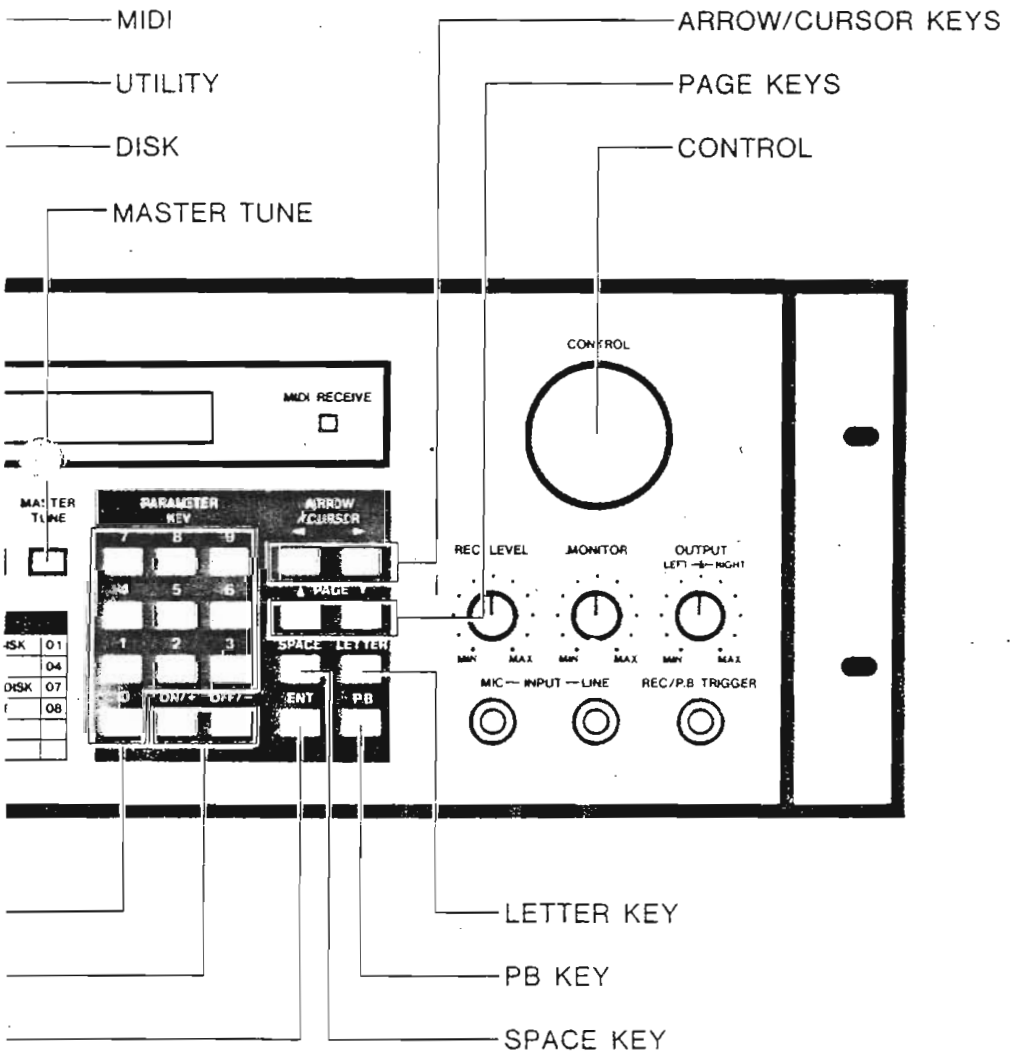


Fig. 2

CHANGING PARAMETERS

Now practice changing parameters. Parameters can usually be changed in two ways:

- Scroll by turning the CONTROL through the available options.
- Use the PARAMETER KEYS if you know the value you want to enter. If the value is a number, use the 0—9 keys (remember that numbers must have leading zeroes — e.g. if a three-digit number is required, enter zeroes if necessary. Thus, 9 would be entered as 009. If a two-digit number is required, then 9 would be entered as 09). Some parameters expect a yes/no answer, or a positive/negative indication; for these, use the ON/+ and OFF/— buttons.

Important: If the LCD asks you to press ENT after altering a parameter, do so.

ENTERING TEXT AND NAMES: MEET THE S900 WORD PROCESSOR

Occasionally you will need to enter a name rather than a number, so let's meet the S900's "word processor".

Assuming that a blank disk is still in the drive, and that the EDIT PRESET function is still active, select Page 01. Move the arrow so that it points at "Select, Copy." This parameter requires a name instead of a number; here's how to enter a name.

1. When the arrow point to a parameter that requires a name, press the LETTER button (Fig. 2). The cursor will be replaced by a line under the letter to be entered.
2. Turn the control to choose a letter (A—Z). You may also choose 0—9, space, and #. To quickly choose a space without having to turn the CONTROL, press the SPACE button. To quickly choose a number, press the 0—9 buttons (Fig. 2).
3. After selecting the desired character, move the cursor to the next letter with the arrow/cursor button and repeat step 2. If you make a mistake at any time, back the cusor up to the incorrect character and repeat step 2.

Important: After entering the entire name, press ENT.

We have now learned how to scan pages, select parameters, and edit parameters. Before continuing, we need to cover some basic definitions.

DEFINITIONS

1. A **velocity keyboard** is a type of keyboard that measures the time it takes for a key to go from the up to down position. It assumes that if this time period is short, you have hit the key hard and want a loud sound; if this time period is longer, you have hit the key softly and want a soft sound. Therefore, even though velocity is measuring the **speed** at which a key goes from key up to key down, we will consider it as an indication of how **hard** or soft you hit the key.
2. A **Sample** is a single sound that you record into the S900. To cover more than one key on a keyboard, the sample may be transposed over up to a six-octave range.
3. A **Keygroup** is a pair of samples. Playing a velocity keyboard harder increases the level of one of the samples and decreases the level of the other (or, switches over from one of the samples to the other at a certain velocity threshold). Thus, with a bass sound you can have a normally plucked string at lower levels and a slap bass effect at higher levels. The sample meant to be heard at higher velocity levels is called the **Loud** sample and the sample meant to be heard at lower velocity levels is called the **Soft** sample.
4. Trying to transpose a sample over too wide a range leads to an unnatural sound. The S900 can assign up to 32 samples over the keyboard. Using multiple samples means that individual samples need not be transposed very far. A **Program** (also called preset) is a set of keygroups, and can consist of up to 32 different keygroups (or individual samples) assigned across the keyboard. For example, with a five-octave keyboard you could take five samples and assign one to each octave, or ten samples and assign one to every half-octave.

Samples may be edited in a number of ways, as can programs. These will be described fully later. Once samples and programs are set as desired, the S900 memory can be saved to disk.

THE IMPORTANCE OF SAVING S900 MEMORY DATA TO DISK

PLEASE NOTE: The S900 has no permanent memory. If you load a disk into the S900 and alter it, the altered parameters MUST BE SAVED TO DISK or your work will be lost if you turn off the power. This is described fully in the section of the DISK function.

ERROR MESSAGES

If all eight function lights flash, there is a usually not-too-serious problem. The LCD will give you some idea of what is wrong. To return to normal operation, press one of the function buttons.

HOW TO USE THIS MANUAL

We have now covered how to communicate with the S900. To learn about how the S900 works, we suggest the following:

1. Load in various sound disks and select the EDIT PRESET function. Go through the EDIT PRESET section of this manual and vary parameters on the various pages, carefully noting the effects on the sound caused by these parameter variations. Feel free to experiment as much as you like — parameter editing only affects what is in the S900 memory, and sound disk data remains intact UNLESS you save the S900 memory to disk. Therefore, as long as you don't save to disk, you won't lose any data on the disk.
2. After getting a feel for the EDIT PRESET (program) functions, load in various sound disks and select the EDIT SAMPLE function. Go through the EDIT SAMPLE section of this manual and vary parameters on the various pages, carefully noting the effects on individual samples caused by these parameter variations. As mentioned above, as long as you don't save to disk, you won't lose any data on the disk.
3. Start making your own samples. Insert a blank, formatted disk into the S900, select the REC function, and go through the REC section of this manual. We suggest speaking some sentences for your first few samples, as this makes it very easy to observe the effects of looping and other sampling parameter edits.
4. Practice making up disks using samples and programs from various other disks. Read through the DISK section of the manual to find out how this is done.
5. Experiment, experiment, experiment. The more you play with the S900, the more you will become familiar with its operation and the better you'll be able to exploit its many features.

CHAPTER 2: REFERENCE SECTION

PART 1: INTRODUCTION, SHORT FORM

The following is a summary of the information presented in the introduction and is intended to serve as a reference. For further information, re-read Chapter 1.

FUNCTIONS, PAGES, and BUTTONS

The S900 has 8 functions selected by 8 front panel master buttons: PLAY, REC, EDIT SAMPLE, EDIT PROGRAM, MIDI, UTILITY, DISK, and MASTER TUNE.
Each function (except MASTER TUNE) includes several pages. Each page covers a specific aspect of the function's operation. For example, typical DISK function pages are load sound from disk, save sound to disk, erase disk, etc.
Each page also displays several of the S900's parameters. These are changed with the page programming buttons (contained within the gray rectangle) and the upper-right hand CONTROL.

SELECTING A PAGE

There are three ways to select a page:

1. Enter the page number directly with the numeric (0—9) PARAMETER KEYS. This must be a two-digit number; if you are calling up a single-digit page number, press the 0 button first (e.g. to call up Page 7, press the 0 key then the 7 key).
2. You may advance to the next page by pressing PAGE (down arrow), or return to the previous page by pressing PAGE (up arrow).
3. If the arrow points at the page number (see next section for more about the arrow), CONTROL will select the different pages within a function.

ARROWS, CURSORS, and GADGETS

Upon selecting a page, the LCD will indicate parameters related to that page. Two "gadgets" help you locate the desired parameter:

1. An Arrow gadget point to the name of the currently selected parameter.
2. A flashing cursor indicates the value of the parameter pointed to by the Arrow. If you enter a piece of data (number, yes, no, letter, etc.), it will be entered in the space indicated by the flashing cursor.

Use the elongated arrow/cursor switch to move the arrow and cursor. Press the left side of the switch to move the arrow/cursor left, and the right side to move the arrow/cursor to the right.

CHANGING PARAMETERS

Parameters can usually be changed in two ways:

1. Scroll through the available options by turning the CONTROL.
2. If you know the value you want to enter, use the PARAMETER KEYS. If the value is a number, use the 0—9 keys (remember that numbers must have leading zeroes—e.g. if a three-digit number is required, enter zeroes if necessary. Thus, 9 would be entered as 009. If a two-digit number is required, then 9 would be entered as 09).Some parameters expect a yes/no answer, or a positive/negative indication; for these, use the ON/+ and OFF/— buttons.

Important: If the LCD asks you to press ENT after altering a parameter, do so.

ENTERING TEXT AND NAMES

To enter a name:

1. When the cursor specifies a parameter that requires a name, press the LETTER button. The cursor will be replaced by a line under the letter to be entered.
2. Turn the control to choose a letter (A—Z). You may also choose 0—9, space, and #. To quickly choose a space without having to turn the CONTROL, press the SPACE button.
3. After selecting the desired character, move the cursor to the next letter and repeat step 2. If you make a mistake at any time, back the cursor up to the incorrect character and repeat step 2.
4. After entering the entire name, press ENT.

ERROR MESSAGES

If all eight function lights flash, there is an error. Press one of the function buttons to return to normal operation.

DEFINITIONS

1. A **velocity keyboard** is a type of keyboard that measures the time it takes for a key to go from the up to down position and therefore indicates dynamics.
2. A **Sample** is a single sound that you record into the S900. To cover more than one key on a keyboard, the sample may be transposed over up to a six-octave range.
3. A **Keygroup** is a pair of samples. The sample meant to be heard at higher velocity levels is called the **Loud** sample and the sample meant to be heard at lower velocity levels is called the **Soft** sample.
4. Trying to transpose a sample over too wide a range leads to an unnatural sound. The S900 can assign up to 32 samples over the keyboard. Using multiple samples means that individual samples need not be transposed very far. A **Program** (also called preset) is a set of keygroups, and can consist of up to 32 different keygroups (or individual samples) assigned across the keyboard.

THE IMPORTANCE OF SAVING MEMORY DATA TO DISK

PLEASE NOTE: The S900 has no permanent memory. If you load a disk into the S900 and alter it, the altered parameters MUST BE SAVED TO DISK or your work will be lost if you turn off power. This is described fully in the section on the DISK function.

PART 2: THE PLAY BUTTON FUNCTION

PLAY FUNCTION

To play back programs stored in the S900 memory (usually these are loaded from disk first; see DISK function Page 01):

1. Press the PLAY function button.
2. Turn CONTROL counter-clockwise. The programs contained in memory will scroll past the LCD window.
3. Each program has an associated number. Press the key corresponding to that number to select a particular program.

PART 3: THE TUNE BUTTON FUNCTIONS

TUNE FUNCTIONS

To adjust the S900 tuning to that of other instruments:

1. Press the MASTER TUNE function button.
2. Enter the desired detuning as + or — followed by a two digit number between 00 and 16. Negative numbers offset tuning lower, positive numbers offset tuning higher. Numbers greater than 16 are not recognized.
3. To exit MASTER TUNE mode, hit any other function button.

PART 4: THE MIDI BUTTON FUNCTIONS

MIDI FUNCTIONS

A MIDI controller sends out MIDI data that describes your performance—which notes are being played, dynamics, modulation, etc. The S900 receives this data (if all is set properly) and produces sounds according to the data it receives.

PAGE 01 MIDI CHANNEL AND MODE SELECT

MIDI transmitters send data out over a particular channel from 1 to 16 (this is usually selectable). A MIDI receiver (such as the S900) has two main modes of operation:

- **OMNI ON** (the S900 receives any MIDI data that appears on any channel). This mode is useful for having the S900 receive master controller data without having to think about channel selection.
- **OMNI OFF** (the S900 receives any MIDI data that appears on one channel). In most situations, turn OMNI off and set the S900 to the same channel number as the transmitter (see below).

MIDI CHANNEL SELECT

1. Point arrow at "Basic MIDI channel."
2. Enter a two-digit channel number with the 0—9 keys. Enter leading zeroes (i.e. 01, not 1).

OMNI ON/OFF (MODE) SELECT

1. Point arrow at "Omni on/off."
2. Press + key for OMNI ON and — for OMNI OFF.
3. If the channels have been properly selected, playing the master controller will cause the MIDI RECEIVE light to glow.

PAGE 02 MIDI TEST SIGNAL TRANSMIT (CHANNEL, NOTE, VELOCITY, TRIGGER)

This page lets you trigger a note in the S900 via the Play parameter button (not the PLAY function button). Pushing the Play parameter button also sends MIDI note and velocity data out the MIDI Out connector. This feature is useful for triggering a note without having to use an external controller (e.g. MIDI keyboard).

CHANNEL SELECT

Point arrow at "Channel" and enter the two-digit channel number (i.e. 01, 02 . . . 16) over which the MIDI test signal will appear.
NOTE: This must be the same number as the S900 basic MIDI channel (selected on Page 1) if you want to trigger the S900.

NOTE SELECT

Point arrow at "Key" and use the 0—9 keys or CONTROL to enter the desired MIDI note number (middle C=60).

VELOCITY SELECT

Point arrow at "Velocity" and use the 0—9 keys or CONTROL to enter the desired velocity (loudness).

TRIGGER NOTE

Press the Play parameter button (not the PLAY function button) at any time to send the MIDI data through MIDI Out and also trigger the specified note within the S900.

PAGE 03 INCOMING MIDI SIGNAL ANALYZER

Page 03 is your "window on MIDI" and shows:

- The channel over which the Master Controller is sending notes.
- The last note played by the Master controller, both in musical terminology and MIDI note number.
- The velocity (dynamics) of the last note played (displayed for as long as the note is held down).

There are no user-settable parameters on this page. It is used solely as a monitor. If the S900 is not responding properly to the master controller, use this function to verify the channel number and also, that the master controller is sending out valid note and velocity data.

PAGE 04 PITCH WHEEL RESPONSE

This page lets you trim the S900's response to the MIDI Master Controller's pitch wheel.

1. Point arrow at "Pitch wheel range (± semitones)."
2. Select the range of the pitch bend travel, from ±1 semitone to ±12 semitones, by entering a two-digit number (01, 02 . . . 12) or turning the CONTROL.

PAGE 05 RS-232 PORT PARAMETERS

The S900 may be controlled from the RS-232 port included on many home computers as well as via MIDI (for more information, refer to the Appendix "RS-232 Applications"). In RS-232 mode, the S900 Baud Rate (speed of communications) must match that of the computer.

MIDI/RS-232 SELECT

Point arrow at "Control by MIDI (1) RS232 (2)." Enter 1 for MIDI or 2 for RS-232.

RS-232 BAUD RATE SELECT

Point arrow at "RS232 Baud rate." The Baud rate is a five-digit number; enter the first four digits of the number. Example:

For 19200 Baud rate, enter 1-9-2-0.
For 300 Baud rate, enter 0-0-3-0.
For 9600 Baud rate, enter 0-9-6-0.

You can also use the CONTROL but this is not recommended as it takes more time to make adjustments.
The LCD will show a measurement of the actual Baud rate. If it is more than ±2% different from the intended Baud rate, there is a problem.

PART 5: THE DISK BUTTON FUNCTIONS

DISK FUNCTIONS

The disk drive:

- Loads disk samples and programs into the S900, and
- Saves samples and programs stored in the S900 to disk. The S900 loses all data in its memory when power is turned off, so save your work to disk **before** turning off power. Also save your work to disk periodically to guard against power failures or unforeseen problems.

One additional function, format, converts standard disks into disks suitable for use with the S900. Any new disk, or disk used previously with a diffeent piece of equipment (e.g. personal computer, other instrument) must be formatted before it can be used with the S900.

Disks have a write-protect feature that helps prevent accidental erasure. There will be a small, movable tab in one corner of the disk. When slid towards the outside of the disk, a hole will appear and you will not be able to record data on, or format, the disk. Moving the tab towards the inside of the disk blocks the hole and defeats the write-protect feature.

PAGE 01 LOAD SOUND DATA FROM DISK TO MEMORY

```
→Ø1 Clear memory and load        Memory_76%
    entire disk (ENT)            Disk_78%
```

Selecting Page 01 displays "Clear memory and load entire disk (ENT)." To do this, press the ENT button. Any data in the S900's memory will be replaced with data from the disk.

After loading, the LCD will indicate what percentage of the S900 memory has been filled, and what percentage of the disk was filled.

PAGE 02 LOAD PROGRAM, OR PROGRAM AND SAMPLES, FROM DISK

```
→Ø2 LOAD PROGRAM (ENT)  *PR only-M-76%
    *name WELCOME       *PR & Samples-
```

This page offers two main choices:

- **Load program only**. Use this when you have samples in memory that you want to arrange into a program, and already have a program on disk that would be suitable for the samples currently in S900 memory.
- **Load program and samples**. Use this to make up a disk with many different sounds by loading programs and samples from other disks. (Example: Load bass program and samples from one disk and drum program and samples from another disk to make up a "rhythm section" disk.)

1. Point arrow at "name." Turn CONTROL to scan the catalog of available programs, or enter the name of the program you want to load.
2. Point arrow at "PR only" to load only the program data. Point arrow at "PR & Sample" to load the programed samples that make up the program.
3. After making your choice, press ENT. The disk activity light will turn on to indicate that loading is taking place.

PAGE 03 LOAD SAMPLE FROM DISK

```
→Ø3 LOAD SAMPLE (ENT)            Mem-76%
    *name WELCOME
```

Use this feature to fill the S900 memory with many different sounds by loading samples from various disks.

1. Point arrow at "name." Turn CONTROL to scan the catalog of available samples, or enter the name of the sample you want to load. If the LCD says "none," there are no samples on the disk.

If you switch disks during this process, press the DISK function button immediately after the change to load the new disk sample catalog.

2. After selecting a sample, press ENT. The disk activity light will go on to indicate that loading is taking place.

PAGE 04 ERASE DISK, THEN SAVE S900 MEMORY TO DISK

```
→Ø4 Clear disk and save          Mem-76%
    entire memory (ENT)          Disk-78%
```

Selecting Page 04 displays "Clear disk and save entire memory (ENT)." To do this, press the ENT button. Caution! This will erase whatever had previously been on the disk, unless it was write-protected. If the disk is write-protected, the LCD will notify you and advise you what to do.

After saving, the LCD will indicate what percentage of the disk has been filled, and what percentage of the S900 memory was filled.

PAGE 05 SAVE PROGRAM, OR PROGRAM & SAMPLES, FROM S900 TO DISK

```
→Ø5 SAVE PROGRAM (ENT)  *PR only_      Disk
    *name WELCOME       *PR & smpls_   78%
```

This page offers two main choices:

- **Save program only**. Use this when you come up with a particularly useful program in the S900. Once saved to disk, you can subsequently use this program with different sets of samples.
- **Save program and samples**. Use this to transfer a complete program, including the samples contained in the program from S900 memory to disk. To transfer a program and its samples from one disk to another disk, load the program and samples from one disk in memory (Page 02), then save to another disk from S900 memory.

1. Point arrow at "name." Turn CONTROL to scan the catalog of available programs, or enter the name of the program you want to save.

If you switch disks during this process, press the DISK function button immediately after the change to load the new disk sample catalog.

2. Point arrow at "PR only" to save only the program data. Point arrow at "PR & samples" if you want to save the program and the samples that make up the program.
3. After making your choice, press ENT. The disk activity light will turn on to indicate that saving is taking place.

PAGE 06 SAVE SAMPLE TO DISK

```
-·Ø6 SAVE SAMPLE (ENT)          Disk
     *name WELCOME              78%
```

This page saves a sample in memory to disk. You may transfer a sample from one disk to another by loading the sample in memory from one disk (Page 03), then saving the sample from S900 memory to a different disk.

1. Point arrow at "name." Turn CONTROL to scan the catalog of available samples, or enter the name of the sample you want to save. If the LCD says "none," there are no samples on the disk.

If you switch disks during this process, press ENT immediately after the change to load the new disk sample catalog.

2. After selecting a sample, press ENT. The disk activity light will go on to indicate that saving is taking place.

PAGE 07 ERASE SAMPLE OR PROGRAM FROM DISK

```
→Ø7 ERASE FROM *Sample          Disk
   DISK (ENT)  *program          %
```

1. To erase a sample, point arrow at "Sample." Turn CONTROL to select the sample to be erased. Press ENT.
2. To erase a program, point arrow at "Program." Turn CONTROL to select the program to be erased. Press ENT.
3. After making your selection, press ENT. The disk activity light will indicate that erasure is taking place. The Disk space indicator will update the percentage of the disk allocated to data.

Note: If the disk space indicator shows no change, the sample or program to be erased was not found. Make sure the disk drive's disk catalog matches that shown in the LCD. If you switch disks, press the DISK function button to load the new catalog, then reselect Page 07.

PAGE 08 FORMAT DISK

```
·Ø8 DISK FORMAT                 Disk
   Prepare new disk (ENT)       11%
```

This page formats new or differently formatted disks to S900 specifications. Caution: Formatting will bulk-erase the entire disk of previously stored data, so double-check the disk's identity before formatting.

1. Selecting Page 08 displays "DISK FORMAT. Prepare new disk (ENT)." After making sure a blank disk (or one you want to bulk-erase) is in the drive, press ENT.
2. The Disk Activity light in the lower right side of the drive will turn on. Remember not to remove the disk when this light is on!
3. When formatting begins, the cursor will overwrite the existing display with dots. When the LCD is filled with dots and the Disk Activity light goes off, the disk is formatted and ready for use with the S900.

PART 6: THE EDIT PROGRAM BUTTON FUNCTIONS

EDIT PROGRAM FUNCTIONS

The EDIT PRESET (Program) function provides extensive ways to alter the program. Editing options include velocity sensitivity, amplitude envelopes, filtering, positional crossfade, etc.

PAGE 01 PROGRAM SELECT/COPY/ RENAME/DELETE

```
→Ø1          *Select, Copy          TONE PRGRM
 PROGRAM     *Rename, Delete (—)    TONE PRGRM
```

This page offers four choices:

SELECT (the program you want to edit)
Point arrow at "Select, Copy." Use CONTROL to scan the available programs for editing. When the LCD shows the desired program, press ENT.

COPY (one program to another and keep both in memory)
Point arrow at "Select, Copy" and select the program to be copied (see above). Press the + key then ENT. Note: Prior to pressing +, you can select where the + will appear in the program name by pressing LETTER then placing the cursor (with the ARROW/CURSOR button) where desired.

RENAME (an existing program)
Point arrow at "Select, Copy" and select program to be re-named (see above, SELECT). Then point arrow at "Rename, delete (—)." Name the program (as described in Chapter 2, Part 1).

DELETE (an existing program)
Point arrow at "Select, Copy" and select program to be deleted. Then point arrow at "Rename, delete (—)." Check that the cursor is on the first character of the name (if not, then point arrow at "Select, Copy" and start over). Press —, then ENT. This erases the sample from S900 memory.

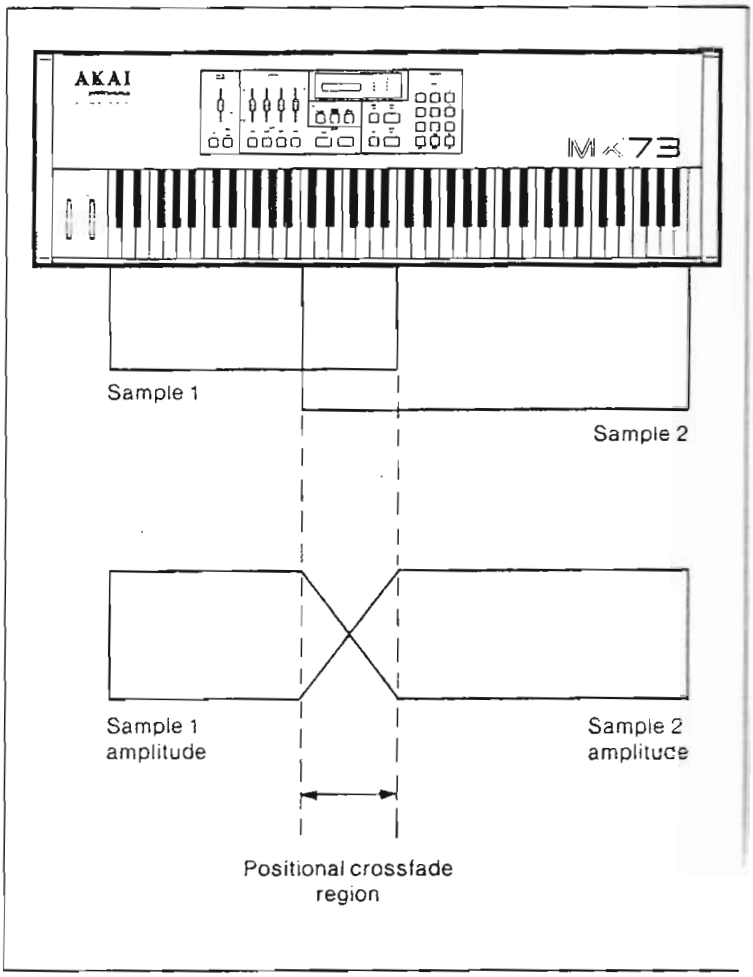
PAGE 02 KEY/LOUDNESS INTERACTION, POSITIONAL CROSSFADE

```
→Ø2          *Key—loudness +ØØ
             *Positional crossfade   OFF
```

KEY/LOUDNESS INTERACTION
This sets how much the pitch of the note being played affects the loudness.

1. Point arrow at "Key-loudness."
2. Rotate CONTROL between −50 and +50 for the desired degree of interaction. With +00 Key/Loudness, the loudness remains constant no matter where you play on the keyboard. Increasing the Key/Loudness up to +50 decreases the loudness as you play further down on the keyboard and increases the loudness as you play further up on the keyboard. Decreasing the Key/Loudness to −50 increases the loudness as you play further down on the keyboard and decreases the loudness as you play further up on the keyboard.

POSITIONAL CROSSFADE
Samples may be assigned so that the high range of one sample overlaps the low range of another sample. With positional crossfade on, the lower sample will fade out as the higher sample fades in over the range of the overlap. This is useful for creating a smooth, natural-sounding transition between adjacent samples.
Point arrow at "Positional crossfade." Press ON/+ for positional crossfade on, OFF/— for crossfade off.



PAGE 03 KEYGROUP SELECT/COPY/DELETE

```
*Ø3 KEYGROUP:   →Select (Ø to 10) [ ]1
                 *Copy (+), Delete (—) _
```

This page offers three choices:

SELECT (the keygroup to be edited)
Point arrow at "Select." Use CONTROL to scan and select the available keygroups for editing (or enter the keygroup number with the 0—9 keys). To edit all program keygroups simultaneously, press "all."

COPY (one keygroup to another and keep both in memory)
Point arrow at "Copy(+), Delete(—)." Press the + key then ENT. The copied keygroup will be numbered one digit higher than the previously highest-numbered keygroup.

DELETE (an existing keygroup)
Point arrow at "Copy(+), Delete(—)." Press the — key then ENT. The keygroup will be removed from memory.

IMPORTANT INFORMATION ABOUT PAGES 04 to 16
The LCD shows the keygroup number being edited below each page number. To change keygroups at any time, point the arrow at "KG—" and use CONTROL (or enter a two-digit number with the 0—9 keys) to select the new keygroup. This feature is also convenient for efficiently adjusting identical parameters for various keygroups with a minimum of button-pushing.

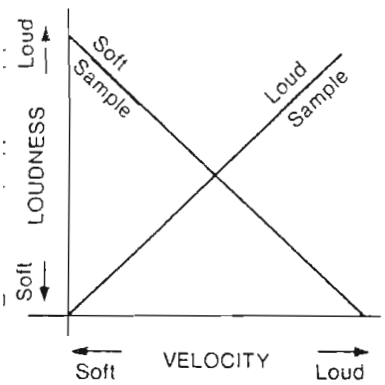
PAGE 04 VELOCITY CROSSFADE, VELOCITY SWITCH THRESHOLD

```
→Ø4   *Velocity Crossfade   ON
 *KG1 *Velocity switch threshold 128
```

VELOCITY CROSSFADE
This function crossfades between the two samples of the keygroup so that as you play harder, the Soft sample volume gets softer and the Hard sample volume gets louder. This provides a smooth transition between **Soft** and **Loud** samples as you play with greater or lesser dynamics.
Point arrow at "Velocity Crossfade." Press ON/+ for velocity crossfade on, OFF/— for velocity crossfade off.

VELOCITY SWITCH THRESHOLD
As you play a velocity keyboard, it produces numbers that correspond to your dynamics, with 0 representing a soft keystrike and 128 representing a hard keystrike. You may select any number between 0 and 128 with this function. If the velocity data is less than the selected number, the Soft sample will play. If the velocity data is greater than the selected number, the **Loud** sample will play.
Point arrow at "Velocity switch threshold." Use CONTROL to select the desired switch point, or enter a three-digit number with the 0—9 keys.

Note: A setting of 128 plays the Soft sample only since it is not possible to play a note louder than 128. A setting of 000 plays the **Loud** sample only since it is not possible to play a note softer than 000.



Playing harder fades in loud sample and fades out soft sample. With velocity switch, there is an abrupt transition from soft sample to hard sample at the specified velocity.

PAGE 05 SOFT SAMPLE RANGE ASSIGNMENT

```
→Ø5  Soft *sample    *Low Key    *High Key
 *KG1  SOFT          CØ  24      G8  127
```

Keyboard assignment determines the range (from lowest note to highest note) covered by a sample. Example: If you have a sample recorded at C3 (MIDI note 60) and want to transpose it plus and minus one octave, the low note would be C2 (MIDI note 48) and the high note would be C4 (MIDI note 72).
If there is no soft sample, which is the case if velocity threshold = 0 (thus precluding the use of a loud sample—see Page 04), the LCD will say "No soft sample, vlcty thrsh = 0."

1. Point arrow at "sample." Use CONTROL to select the sample to be assigned to a given range of the keyboard.
2. Point arrow at "Low key." Adjust CONTROL to select the desired note, or enter the three-digit MIDI note number with the 0—9 keys.
3. Point arrow at "High key." Adjust CONTROL to select the desired note, or enter the three-digit MIDI note number with the 0—9 keys.

PAGE 06 SOFT SAMPLE LOUDNESS, FILTER, TRANSPOSE, AND FINE PITCH

```
→Ø6 S *Loudness  *Filter  *Transpose  *fine
 *KGall  +ØØ      99      +ØØ         +ØØ
```

This page edits four soft sample parameters.

LOUDNESS (soft sample level adjust)
Each sample level can be adjusted by itself (Edit Sample PAGE 03) or as part of a keygroup, as in this case. Different sections of the keyboard can play at different levels if desired, or samples with unequal levels can be balanced out for uniform keyboard response.
Point arrow at "Loudness." Use CONTROL to increase loudness above the nominal +00 point (up to +50), or decrease loudness below the nominal +00 point (down to —50). Note: These figures represent arbitrary volume units, not deciBels.

FILTER (soft sample high frequency response)
Low pass filtering passes low frequency sounds and attenuates high frequency sounds. The frequency at which the filtering action occurs is adjustable. One application is to clean up noisy samples by removing high frequency hiss; also, filtering interacts with filter velocity sensitivity (see PAGE 10).
Point arrow at "Filter." Use CONTROL to set the initial filter frequency or enter a two-digit number with the 0—9 keys. The lower the number, the lower the cutoff frequency.

TRANSPOSE (soft sample transposition)
Point arrow at "Transpose." Use CONTROL or the +, —, and 0—9 keys to vary transposition amount in semitones from 50 semitones up (+50) to 50 semitones down (—50). +00 gives no transposition.
Note: Not all samples are capable of being transposed over the full range.

FINE PITCH (soft sample pitch)
Point arrow at "fine." Use CONTROL or the +, —, and 0—9 keys to fine-tune the sample pitch up to just over a flatted fifth (+99) or an equivalent amount in the downward direction (—99). +00 gives no pitch change.

PAGE 07 LOUD SAMPLE RANGE ASSIGNMENT

·Ø7 Loud	*sample	*Low Key	*High Key
*KGI	TONE	CØ 24	G8 127

Keyboard assignment determines the range (from lowest note to highest note) covered by a sample. Example: If you have a sample recorded at C3 (MIDI note 60) and wanted to transpose it plus and minus one octave, the low note would be C2 (MIDI note 48) and the high note would be C4 (MIDI note 72).
If there is no loud sample, which is the case if velocity threshold = 128 (thus precluding the use of a loud sample; see Page 04), the LCD will say "No loud sample, vlcty thrsh = 128."

1. Point arrow at "sample." Use CONTROL to select the sample to be assigned to a given range of the keyboard.
2. Point arrow at "Low key." Adjust CONTROL to select the desired note, or enter the three-digit MIDI note number with the 0—9 keys.
3. Point arrow at "High key." Adjust CONTROL to select the desired note, or enter the three-digit MIDI note number with the 0—9 keys.

PAGE 08 LOUD SAMPLE LOUDNESS, FILTER, TRANSPOSE, AND FINE PITCH

·Ø8 L	*Loudness	*Filter	*Transpose	*fine
*KGI	+ØØ	99	+ØØ	+ØØ

This page edits four hard sample parameters.

LOUDNESS (hard sample level adjust)
Each sample level can be adjusted by itself (Edit Sample Page 03) or as part of a keygroup, as in this case. Different sections of the keyboard can play at different levels if desired, or samples with unequal levels can be balanced out for uniform keyboard response.
Point arrow at "Loudness." Use CONTROL to vary loudness from +50 above the nominal +00 point (louder) to —50 below the nominal +00 point (softer). Note: These figures represent arbitrary volume units, not deciBels.

FILTER (hard sample high frequency response)
Low pass filtering passes low frequency sounds and attenuates high frequency sounds. The frequency at which the filtering action occurs is adjustable. One application is to clean up noisy samples by removing high frequency hiss; also, filtering interacts with filter velocity sensitivity (see PAGE 10).
Point arrow at "Filter." Use CONTROL to set the initial filter frequency or enter a two-digit number with the 0—9 keys. The lower the number, the lower the cutoff frequency.

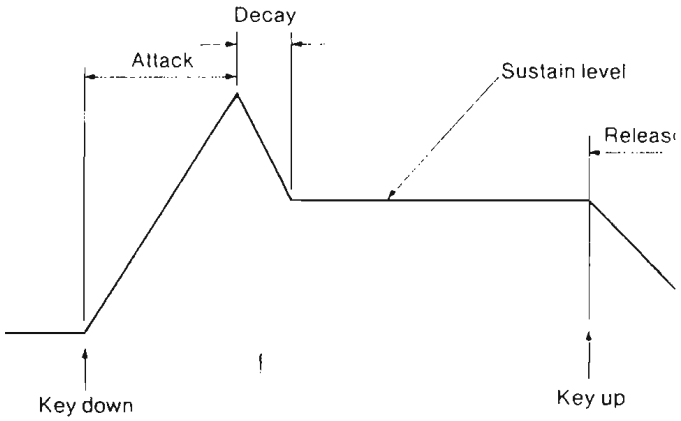
TRANSPOSE (hard sample transposition)
Point arrow at "Transpose." Use CONTROL or the +, —, and 0—9 keys to vary transposition amount in semitones from 50 semitones up (+50) or 50 semitones down (—50). +00 gives no transposition.
Note: Not all samples are capable of being transposed over the full range.

FINE PITCH (hard sample pitch)
Point arrow at "fine." Use CONTROL or the +, —, and number keys to fine-tune the sample pitch up to just over a flatted fifth (+99) or an equivalent amount in the downward direction (—99). +00 gives no pitch change.

PAGE 09 KEYGROUP ENVELOPE SETTINGS

·Ø9 ENV	*Attack	*Decay	*Sustain	*Releas
*KGI	Ø	8Ø	99	3Ø

Sounds are often looped to create continuous sustain. Tl saves memory but unfortunately sacrifices the natural dynami of a sound. The envelope function allows dynamics to be p back in to a sound, and can also be used to create special e fects—super percussive piano sounds, for example, or gui notes with the attack characteristics of a woodwind instead plucked instrument.
There are four adjustable parameters, as summarized below.



ATTACK
Attack is the envelope generator's first phase, and sets t amount of time required for the keygroup sound level to go fr full off to full on. Short attacks are characteristic of pluck instruments; longer attacks are characteristic of woodwind a some bowed instruments.
Point arrow at "Attack." Use CONTROL or enter a two-di number (00—99) with the 0—9 keys. Higher numbers gi longer attack times.

DECAY
Decay is the envelope generator's second phase, and sets t time the keygroup sound level takes to fall from the maximu sound level attained during the attack phase to an arbitrarily-s sustain level (see next heading).
Point arrow at "Decay." Use CONTROL or enter a two-di number (00—99) with the 0—9 keys. Higher numbers gi longer decay times.

SUSTAIN
Sustain, the envelope generator's third phase, sets the keygro sound level during the time the key is held down. A loop sound will remain at this level until the key is released.
Point arrow at "Sustain." Use CONTROL or enter a two-di number (00—99) with the 0—9 keys. Higher numbers gi higher sustain levels.

RELEASE
Release, the envelope generator's fourth phase, starts up releasing a key and sets how long it takes for the keygro sound level to fall from the sustain level back to zero. Completi of the release phase terminates the envelope generator cycle.
Point arrow at "Release." Use CONTROL or enter a two-di number (00—99) with the 0—9 keys. Higher numbers gi longer release times.

PAGE 10 KEYGROUP VELOCITY RESPONSE

```
→1Ø VLCTY   *Loudness 3Ø   *Attack 5Ø
  *KG1 SENS.  *Filter 5Ø    *Release +ØØ
```

Three different paramenters can be altered by the note-on velocity: loudness, filter frequency, and attack time. Release time can be altered by a note's release (note-off) velocity.

LOUDNESS

Point arrow at "Loudness." Use CONTROL or enter a two-digit number (00—99) with the 0—9 keys.

With 00 loudness, the loudness remains constant regardless of keyboard velocity. Increasing this number (up to 99) increases the effect that velocity has on loudness, with more velocity giving a louder sound. Thus, the harder you play, the louder the keygroup sound.

FILTER

Point arrow at "Filter." Use CONTROL or enter a two-digit number (00—99) with the 0—9 keys.

With a setting of 00, the filter cutoff frequency remains constant regardless of keyboard velocity. Increasing this number (up to 99) increases the effect that velocity has on filter cutoff, with more velocity giving a higher filter cutoff frequency. Thus, the harder you play, the brighter the sound.

This effect is characteristic of many acoustic instruments.

ATTACK

Point arrow at "Attack." Use CONTROL or enter a two-digit number (00—99) with the 0—9 keys.

With a setting of 00, the attack remains constant regardless of keyboard velocity. Increasing the number (up to 99) increases the effect that velocity has on attack time, with more velocity giving shorter attack times. Thus, playing forcefully creates more percussive sounds than playing lightly.

RELEASE

Point arrow at "Release." Use CONTROL or use the +, —, and 0—9 keys to enter a two-digit from —50 to +50.

With a setting of 00, the release remains constant regardless of the release velocity. With higher numbers (up to +50), releasing the keys quickly gives a longer release time than releasing the keys slowly. With lower numbers (down to —50), releasing the keys quickly gives a shorter release time than releasing the keys slowly.

PAGE 11 WARP (automatic pitch bend)

```
→11 WARP  *Velocity Ø    Time99
  *KG1    *Attack offset +ØØ
```

Warp adds a pitch-shift to a note's attack so that the note starts slightly sharp or flat before gliding down or up respectively to the normal pitch.

1. Point arrow at "Velocity." Use CONTROL to set warp interaction with velocity as follows:

Ø: Velocity does not affect warp, which is constant.

1—128: Higher numbers give more warp with greater velocity. The amount of warp is hardly noticeable at 1 even with very hard playing; at 128, playing hard gives strong warps.

2. Point arrow at "Time." Use CONTROL to set the amount of time over which the warp occurs (0 = short, 128 = long).

3. Point arrow at "Attack offset." Use CONTROL, or the +, —, and 0—9 keys, to set total amount of pitch warp and direction.

Examples: +00 gives no pitch warp. —25 gives a slight warp from flat to normal pitch, —50 gives a strong warp from flat to normal pitch, and +50 gives a strong warp sharp to normal pitch.

Note: An upward pitch warp is characteristic of wind instruments (sax etc.); a downward pitch warp is characteristic of plucked instruments (bass, drums, etc.).

PAGE 12 LFO (low frequency oscillator for modulation)

```
→12  LFO   *Depth  *Rate  *Delay  *Desync
  *KG1       Ø      64      64      ON
```

The S900's LFO adds vibrato effects and has four parameters:

DEPTH (of modulation)

Point arrow at "Depth." Use CONTROL or the 0—9 keys to select a two-digit number (up to 99). Larger numbers make the vibrato effect more noticeable.

RATE (of modulation)

Point arrow at "Rate." Use CONTROL or the 0—9 keys to select a two-digit number (up to 99). Larger numbers increase the vibrato speed.

DELAY (the time over which modulaton fades in)

Point arrow at "Delay." Use CONTROL or the 0—9 keys to select a two-digit number (up to 99). Larger numbers increase the amount of time over which the modulation fades in.

DESYNC (LFOs)

Each S900 voice has its own LFO. These may be synchronized so that all notes vibrato together, or desynchronized so that vibrato occurs individually for individual notes. Desync LFO effects are useful when creating complex sounds, such as string sections.

Point arrow at "Desync." Press ON/+ to sync LFOs, OFF/— to desync.

PAGE 13 LFO DEPTH (via aftertouch or modulation wheel)

```
→13 LFO DEPTH  *Aftertouch  *Mod. wheel
  *KG1              0            50
```

LFO depth is often not set for a fixed amount (as described in Page 12) but selectively introduced under control of the player. One method is to use a modulation wheel, where turning the wheel adds modulation. Another is to use a keyboard with aftertouch, where pressing on keys once they are down introduces modulation.

Note: Any modulation added on this page is in addition to the modulation depth specified on PAGE 12.

AFTERTOUCH (LFO depth control)

Point arrow at "Aftertouch." Use the CONTROL or the 0—9 keys to enter a two-digit number. The higher the number, the greater the modulation depth when aftertouch is activated.

MOD WHEEL (LFO depth control)

Point arrow at "Mod. wheel." Use the CONTROL or the 0—9 keys to enter a two-digit number. The higher the number, the greater the modulation depth when the modulation wheel is turned to its maximum travel.

PAGE 14 KEY FILTER (filter keyboard tracking)

```
*14      *Key-filter   *Constant pitch
 *KGI        50              OFF
```

This sets how much the pitch of the note being played affects the filter cutoff.
Point arrow at "Key-filter." Use CONTROL or the 0—9 keys to enter a two-digit number. With 00 key-filter, the cutoff frequency remains constant no matter which keygroup keys you play. Increasing the key-filter amount (up to 99) lowers the cutoff frequency as you play lower notes of the keygroup.

PAGE 15 KEYGROUP MIDI ASSIGNMENT, STATUS, AND CHANNEL

```
→15    *MIDI channel This keygroup on
 *KGI off set (Ø—15) Ø MIDI ch.  ALL
```

The S900 is very flexible in its MIDI implementation. A keygroup can be assigned to any one of the 16 MIDI channels. This allows for MIDI mono mode operation, where each sound is driven by its own channel. This mode is very popular for use with MIDI sequencers and guitar synthesizers. A compete discussion of MIDI is beyond the scope of this manual; Akai suggests the book "MIDI For Musicians" (written by Craig Anderton and published by AMSCO, a division of Music Sales) for those who want to learn more about MIDI.

MIDI STATUS
The LCD's right side shows the keygroup's MIDI channel as initially set on MIDI Page 01 ("all" for Omni mode on, or a channel number from 1 to 16 if that was specified instead).

MIDI CHANNEL (offset)
Point arrow at "MIDI channel offset." Use CONTROL or enter a two-digit number with the 0—9 keys to offset the channel shown in the LCD by 0 to 15. Example: If the MIDI channel specified on MIDI Page 01 is 4, then adding an offset of 1 for a keygroup means that particular keygroup will respond to MIDI data coming in over channel 5 instead of channel 4. Adding an offset of 2 would set the keygroup to receive on MIDI channel 6. The LCD will update the channel number to reflect any offset you add. Offsetting a channel beyond the number 16 will de-assign that keygroup from responding to any MIDI information on any channel and the LCD will show "NONE."

PAGE 16 ASSIGNING KEYGROUP AUDIO OUTPUT

```
→16    *OUTPUT All (ØØ), Mono (Ø1—Ø8)
 *KGI VOICE(S) Left (Ø9), Right (1Ø)   Ø
```

The S900 offers several audio outputs. Each keygroup can be assigned to one of these outputs.
Point arrow at "Output Voice(s)." Use CONTROL or enter a two-digit number with the 0—9 keys as follows:

00 (All) The keygroup audio output will appear at the Mix Out jack.

01-08 (Mono) The keygroup output will appear at output jack 1-8, as designated. This is recommended for MIDI mono mode, as separate keygroups can respond to separate MIDI channels and produce separate audio outputs.

09 (Left) The keygroup output will appear at the Left Out jack.

10 (Right) The keygroup output will appear at the Right C jack.

PART 7: THE EDIT SAMPLE BUTTON FUNCTIONS

EDIT SAMPLE FUNCTIONS

Edit sample provides extensive ways to alter the sample. Editi options include level, tuning, nominal pitch, play forwards/bac wards, looping, and more.

PAGE 01 SELECT/COPY/RENAME/ DELET SAMPLE

```
→Ø1      *Select, Copy        TONE
 SAMPLE *Rename, delete (—)   TONE
```

This page offers four choices:

SELECT (the sample you want to edit)
Point arrow at "Select, Copy." Use CONTROL to examine t catalog. When the LCD shows the sample you want to edit, pre ENT.

COPY (one sample to another and keep both in memory)
Point arrow at "Select, Copy" and select the sample to be copi (see above). Press the + key then ENT. Note: Prior to pressi +, you can select where the + will appear in the sample nai by pressing LETTER then placing the cursor (with t ARROW/CURSOR button) where desired.

RENAME (an existing sample)
Point arrow at "Select, Copy" and select sample to be re-nam (see above, SELECT). Then point arrow at "Rename, delete (- Name as described in Chapter 2, Part 1.

DELETE (an existing sample)
Point arrow at "Select, Copy" and select sample to be delet (see above, SELECT). Then point arrow at "Rename, delete (— Check that the cursor is on the first character of the name (if n then point arrow at "Select, Copy" and start over). Press —, th ENT. This erases the sample from S900 memory.

PAGE 02 SELECT PROGRAM MONITOR

```
→Ø2 *Select program Monitor
```

Point arrow at "Select program monitor." Turn CONTROL dial select either a program or the direct input being sampled. If t latter, adjust the monitor control for the desired level.

PAGE 03 SAMPLE LOUDNESS, NOMINAL PITCH, AND FINE PITCH

```
→Ø3 *Loudness  *Nom pitch     *Fine pitch
      +ØØ       C3  6Ø          +ØØ
```

This page edits three parameters.

LOUDNESS (sample level adjust)
This option allows for mixing individual sample levels within program to allow for a uniform sound across the keyboard. Po

arrow at "Loudness." Use CONTROL to vary loudness from +50 above the nominal +00 point (louder) to −50 below the nominal +00 point (softer). Note: These figures represent arbitrary volume units, not decibels.

NOMINAL PITCH (of sample)

Point arrow at "Nom pitch." Use CONTROL to set the initial pitch of the sample in semitones. To transpose up, choose a higher number. To transpose down, choose a lower number.

Note: If you trigger the sound with the PLAY button, a higher number will produce a lower pitch. This is because as the sample gets higher in pitch, the PLAY button (which keeps putting out the same note) will transpose the note lower by a correspondingly greater amount.

FINE PITCH

Point arrow at "Fine Pitch." Use CONTROL or the +, −, and number keys to adjust the pitch plus or minus 1 semitone, in cent (hundredth of a semitone) increments.

PAGE 04 REPLAY MODE SELECT

```
→Ø4 *REPLAY MODE One shot (1),
    Looping (2), Alternating (3)
```

A sample may be played back in one of three ways. Point arrow at "Replay mode" and indicate your choice with a number key:

(1) One shot. Triggering the sample will cause it to play for the duration of the sample, then stop. This is the default setting.
(2) Looping. If you hold down a key, the sample will play all the way through. If the key is still held down, the sample will play again from beginning to end and keep repeating in this manner for as long as the key is down. Note: The entire sample need not be looped; a portion can be designated for looping, as set on Pages 06, 07, and 08.
(3) Alternating. If you hold down a key, the sample will play all the way through. If the key is still held down, the sample will play again from end to beginning, then from beginning to end, from end to beginning, and so on for as long as the key is down.

Note: The entire sample need not be looped; a portion can be designated for alternating looping, as set on PAGES 06, 07, and 08.

PAGE 05 TIME DIRECTION (NORMAL/REVERSE)

```
→Ø5 *TIME DIRECTION
    Normal (1), Reverse (2)
```

Point arrow at "Time Direction." Use a number key to enter either:

(1) The sample plays from beginning to end.
(2) The sample plays from end to beginning ("backward tape" effect).

IMPORTANT INFORMATION ABOUT PAGES 06, 07, and 08

Looping a sample, which creates a continuous, sustained tone from a short sample, is an art and a science. Much of this art involves finding the proper loop points and sample length, the parameters adjusted on PAGES 06, 07, and 08.

Fig. 3 graphically shows a flute note's amplitude envelope. Note how there is an attack phase as the player blows wind into the flute, where the flute level builds up to full. Then comes a sustained portion where the note stays basically the same until the decay, where the player runs out of breath and the level goes back to zero.

If we wanted to play long flute notes, we could sample the longest notes we think we might need. Unfortunately, this uses up lots of memory, which we might want to use for other sounds.

One solution is to loop (continuously repeat) a portion of the sound to create a sustained tone. This process involves setting a start point, stop point, and loop length.

A sample is measured not in seconds, but in samples. Therefore, start, stop, and loop length are specified in samples.

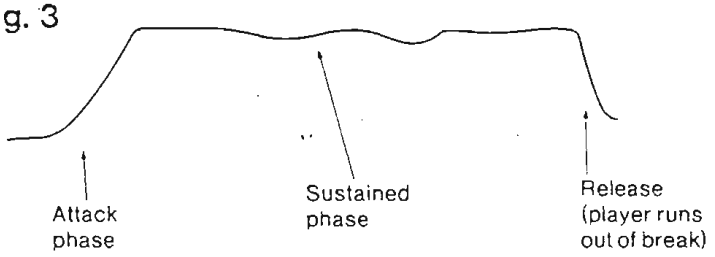
The Start point sets the beginning of the sample. This has two main uses:

- If you started sampling too early, or if sampling was triggered by noise, you will probably want to remove these unwanted sounds from the beginning of the sample.
- For special effects (e.g. cutting off the attack of a percussive note).

The End point sets the end of a sample. This has two main uses:

- Set the end of the loop point.
- Determine a point past which no more sample is needed. The remaining part of the sample can be discarded, thus freeing up more memory.

Fig. 3



The Loop Length determines the loop length in sample points (so called because a sample consists of a finite number of points along a waveform; these points define the waveform's amplitude over time). The loop's beginning point is the end of the sample minus the loop length.

Example: In the flute sound shown, the start point is at 500 points, the end point is at 4673 points, and the loop lenght is 1,223 points.

Holding down a key will repeat the looped portion, as shown in Fig. 4.

However, note that the flute volume does not stay constant over the duration of the sample. Therefore, there is a "glitch" (abrupt level change) where the beginning of the loop splices on to the end of the previous loop.

Choosing better loop points can produce a loop without such glitches. Refer to Fig. 5.

Fig. 4

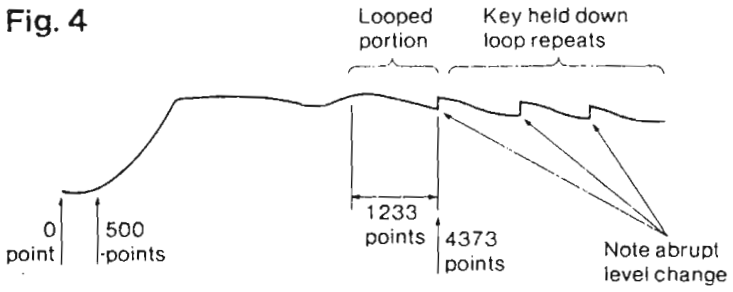
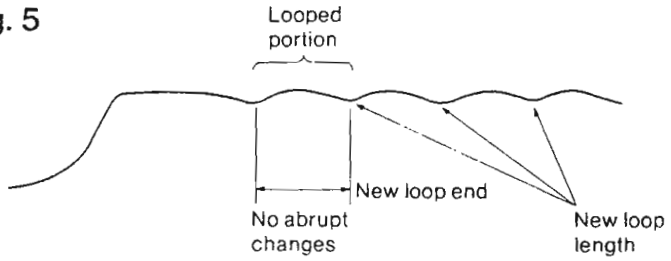


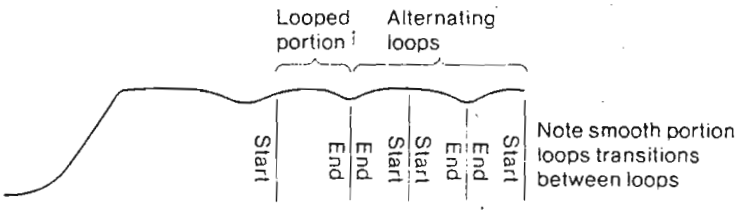
Fig. 5



A sustained tone, such as a flute, is easier to loop than a percussive tone, which does not have a steady level. To loop a percussive sound, try limiting or compressing the sound when sampling to even out volume variations, then use a short sample length located fairly late in the note's decay. Since the note now sustains continuously, and you want it to decay, use the S900's on-board envelope generator (see EDIT PROGRAM, Page 09) to add an artificial decay effect.

Another solution is to use alternate looping (Page 04). This creates the effect shown below, which also helps to minimize glitching.

Alternate looping applied to Fig. 4



PAGE 06 START POINT

```
→Ø6 START POINT   *Coase  *Fine
    (Ø—  24. 9ØØ)        Ø. ØØØ
```

Start point sets the sample's beginning. The lower left LCD line displays your range of choices—from the start of the sample to 100 points less than the total sample length.

1. To vary the start a thousand sample points at a time, point arrow at "Coarse." Use CONTROL or the 0—9 keys (enter a three-digit number, such as 021, 201, etc.) to specify the coarse start point.
2. To vary the start one sample point at a time, point arrow at "Fine." Use CONTROL or the 0—9 keys (enter a three-digit number, such as 009, 138, etc.) to specify the exact start point.

PAGE 07 END POINT

```
→Ø7 END POINT   *Coase  *Fine
  (ØØØ. 1ØØ—Ø25. ØØØ)      25. ØØØ
```

End point sets the sample's end. The lower left LCD line displa your range of choices—from 100 points greater than the st point (as set on Page 06) to the end of the sample.

1. To vary the end a thousand sample points at a time, poi arrow at "Coarse." Use CONTROL or the 0—9 keys (ente three-digit number, such as 007, 456, etc.) to specify t coarse end point
2. To vary the end one sample point at a time, point arrow "Fine." Use CONTROL or the 0—9 keys (enter a three-di number, such as 009, 138, etc.) to specify the exact e point.

PAGE 08 LOOP LENGTH

```
→Ø8 LOOP LENGTH *Coarse *Fine *Auto
    (5—  25. ØØØ)      2. ØØØ    (ENT)
```

Loop length sets which portion of the sample will repeat conti ously when the key is held down. The lower left LCD line c plays your range of choices—from 5 sample points up to the isting sample length (taking any start or stop points specified Pages 06 and 07 into account).

1. To vary the loop length in thousand of sample points, pc arrow at "Coarse." Use CONTROL or the 0—9 keys (ent three-digit number, such as 002, 608, etc.) to specify coarse loop length.
2. To vary the loop length one sample point at a time, point ar at "Fine." Use CONTROL or the 0—9 keys (enter a three-c number, such as 009, 138, etc.) to specify the exact l length.

AUTO (computer-generated loop length)

As noted previously, looping can produce glitches unless beginning and end points are carefully chosen to minim abrupt level changes. The S900's computer can compare loop beginning and end points, then automatically choos length that provides the least amount of glitching.

Point arrow at "AUTO" and press ENT. Each time you pr ENT, the S900 will select a new loop length with a slightly sh er length than the previous try. Listen to each change and the loop length that sounds best. Caution: Write down good l lengths so that if you try for a better auto-length and it turns to produce more glitching (computers aren't perfect at choo loop lengths, nor are they musicians!), you can go back to original setting. The Auto function is very powerful and can you make much better-sounding loops.

PAGE 09 RESAMPLE, DISCARD (memory saving features)

```
→Ø9 *Resample at half bandwidth (ENT)
  *Discard before start, after end (ENT)
```

RESAMPLE

Resample at half bandwidth cuts the amount of memory used by the sample in half, but also reduces high frequency response by half.

1. Point arrow at "Resample at half bandwidth." Press ENT.
2. Sample time will be cut in half. You can continue resampling (although quality will deteriorate with each resample) until the computer runs out of patience.

Caution: Resampling erases the original sample. It is good practice to make a copy of a sample, and resample the copy. If you do not like the results of resampling, you can always go back to the original sample.

DISCARD

Discard eliminates those portions of the sample before the start point and after the end point. Since you do not hear these parts of the sample, discarding the sample past these points will save memory.

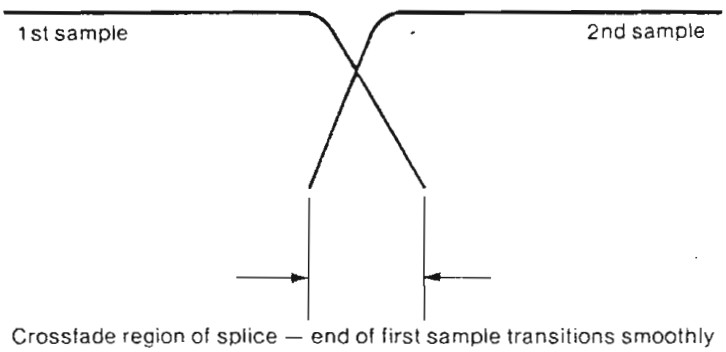
Point arrow at "Discard before start, after end." Press ENT.

Caution: If you intend to alter the start or end point at some time in the future, or think you might, do not use discard.

IMPORTANT INFORMATION ABOUT PAGES 10, 11, and 12

The S900 can also splice two samples (end of one to beginning of another) or mix samples together. For example, you could splice the sustain of a piano on to the pluck of a guitar, or mix bass and guitar samples together to create an octave divider effect.

Splicing involves the same challenge as looping (i.e. finding a glitchless splice point with no level variations). The S900 circumvents this problem by crossfading between the two samples over a specified number of samples.



Crossfade region of splice — end of first sample transitions smoothly into second sample

PAGE 10 SPLICE X-FADE (select samples to be spliced, name new sample)

```
→1Ø SPLICE *2nd sample name SAMPLE 2
    X-FADE *New sample name NEW SAMPLE
```

1. Select first sample to be spliced (or mixed) on PAGE 01.
2. Select PAGE 10.
3. Point arrow at "2nd sample name." Rotate CONTROL to scan the available samples for splicing.
4. Point arrow at "New sample name." Name (as described in Chapter 2, Part 1) the new sample that will hold the spliced or mixed samples. Press ENT after naming.

PAGE 11 SPLICE CROSS-FADE TIME

```
→11 *Splice crossfade time. (points)
      (Ø-8,496) 1ØØØ
```

1. The lower left side of the LCD shows the available number of sample points over which the crossfade will occur. Point arrow at "Splice crossfade time (points)."
2. Use CONTROL to dial in the desired crossfade time, or enter a five-digit number with the 0–9 keys.

PAGE 12 SPLICE ORDER

```
→12 *SPLICE ORDER: 1st then 2rd (1).
  2nd then 1st (2). Together (3). Mem 76%
```

1. To splice the beginning of the second sample to the end of the first sample, point arrow at "SPLICE ORDER:" and press 1.
2. To splice the beginning of the first sample to the end of the second sample, point arrow at "SPLICE ORDER:" and press 2.
3. To mix the two samples together, point arrow at "SPLICE ORDER:" and press 3.

Note that the LCD displays the remaining amount of memory. The S900 may not be able to splice for you if there is less memory left than that of the two samples combined.

PART 8: THE REC BUTTON (SAMPLING) FUNCTIONS

RECORDING (SAMPLING) FUNCTIONS

Sampling is the process of recording sounds into the S900 memory. Once in memory, these sounds can be edited or grouped together into programs.

If you are sampling with a microphone, plug into the front panel MIC INPUT jack. If you are sampling a line level signal, plug into the front panel LINE INPUT jack.

Unlike other functions, the REC function has no page numbers because pages are always accessed in the same order. After completing one page, move to the next page with the PAGE (down arrow) button.

STEP 1 NAME SAMPLE

The LCD says "Name of sample to be recorded." Name as described in Chapter 2, Part 1. Press ENT when done. We suggest you include the sample's original pitch (e.g. C#, E, etc.) as part of the name. Example: GUITAR D5.

STEP 2 SELECT PROGRAM FOR MONITORING

The LCD says "Name of program for monitoring." Use the control to select an existing program (to hear the sample in context with the program after recording) or monitor (for monitoring the sample by itself through the output). If the latter, adjust monitor level with the monitor control.

STEP 3 SPECIFY SAMPLE TYPE

You have three choices:

(1) Normal. When playing a velocity keyboard, the keys assigned to this sample will play only this sample regardless of velocity.

(2) Velocity crossfade - soft. When using velocity crossfade (EDIT PROGRAM Page 04) with a velocity-sensitive keyboard, the harder you play the keys assigned to this sample, the softer its level. When using velocity switch (EDIT PROGRAM Page 04), this sample will play when velocity data is below the specified velocity switch threshold.

(3) Velocity crossfade - loud. When using velocity crossfade (EDIT PROGRAM Page 04) with a velocity-sensitive keyboard, the harder you play the keys assigned to this sample, the louder its level. When using velocity switch (EDIT PROGRAM Page 04), this sample will play when velocity data is above the specified velocity switch threshold.

By sampling a soft instrument sound as (2) and a loud instrument sound as (3), playing harder will produce the timbral changes associated with playing an instrument dynamically. The sound will crossfade smoothly from the soft sample to the loud sample with velocity crossfade, or switch with velocity switch.

STEP 4 SPECIFY AUDIO BANDWIDTH

The sample's frequency response can be set from 3000 H 16000 Hz. Enter a five-digit number with the 0—9 keys; you also turn the CONTROL but this is more time-consuming.

Higher bandwidth signals (i.e. towards 16000 Hz) have b high frequency response but also take up more memory t lower bandwidth signals. To conserve memory, use the minin bandwidth necessary for acceptable sound quality.

STEP 5 SPECIFY RECORDING TIME

The sample's overall time can be set from 250 ms (1000 ms second) to the maximum allowed by the amount of memory maining. This maximum time will vary depending on how m memory has been used and the audio bandwidth selecte step 4. Maximum sample length at 16000 Hz bandwidth wi clear memory is 11878 ms; at 3000 Hz bandwidth with a c memory, 63351 ms (that's over one minute!!).

Enter the five-digit number for recording time. Use the minin time possible to conserve memory and leave room for other s ples.

STEP 6 ASSIGN SAMPLE PITCH

The LCD says "Pitch of sound being recorded." Play the k board note that corresponds to the sample's pitch; we do recommend using the CONTROL, and numeric entry will work in this case.

STEP 7 SELECT TRIGGER

Use the 0—9 keys to enter a number as follows:

(1) Sampling begins when you press any keyboard key.

(2) Sampling begins when you press a footswitch plugged the rear panel footswitch jack.

(3) Sampling begins when a particular audio threshold is ceeded (as set in the next step).

If you press 1 or 2 then change your mind, exit the REC funct by pressing another function button, then try again.

STEP 8 SETTING LEVELS

In this step, the lower half of the LCD serves as a bar-graph meter to indicate sample signal level. The six dots to the right indicate the overload region. The line below the bar-graph is a peak-hold indicator that momentarily freezes the highest level attained.

If you pressed (1) in the previous step, the LCD will say "Press any key to start recording." Play the sample and adjust the REC LEVEL knob for the highest possible signal level short of overload. Press any key on the S900 or keyboard to begin recording.

If you pressed (2) in the previous step, the LCD will say "Hit footswitch to start recording." Play the sample and adjust the REC LEVEL knob for the highest possible signal level short of overload. Hit the footswitch to begin recording.

If you pressed (3) in the previous step, the LCD will say "knob sets trig level. Any key when ready." Play the sample and adjust the REC LEVEL knob for the highest possible signal level short of overload. A T indicates the trigger level and may be changed by turning the control. As soon as you press any key on the S900 or keyboard, and the signal to be sampled exceeds the set threshold, sampling will begin.

STEP 9 SAMPLING

Once sampling has been initiated, an arrow in the upper LCD line will move from left to right to indicate how much sampling time has elapsed. When the arrow reaches the right side of the LCD, the selected sampling time has elapsed. You will then be returned to step 7.

To replay the sample, advance to the next "page" (PAGE down arrow) and press ENT. The sample will play for its entire duration. You may also play the sample by pressing the PLAY parameter button. In this case the sample will play only as long as you hold down PLAY.

To re-record the sample, return to the previous page (PAGE up arrow) and repeat steps 7—9.

To re-record the sample and change some of the previously set parameters, press the REC function button and go through the steps again.

To keep the sample you just recorded and record a different sample, press the REC function button and start over.

To exit the REC function, press another function button (generally EDIT SAMPLE if you want to alter the sound you just sampled).

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Disk chart

GRAND PIANO #1

GRAND PIANO #1 uses as the original sound data sound played with a strong attack, and includes the following voice programs for user editing reference.

Program Name

1. PIANO-A: Original sound
2. PIANO-B: Soft piano sound acheived by filtering and applying velocity sensitivity.
3. HONKY TONK: Honky-tonk piano sound acheived by overlapping key groups and detuning.

ANO-A Sampling Data

Key Group KG	Soft Sample Name	Key Range Low (MIDI Note No.) ~ High (MIDI Note No.)
1	PIANO-C1	C0(24) ~ D1#(39)
2	PIANO-G1	E1(40) ~ A1(45)
3	PIANO-C2	A1#(46) ~ D2#(51)
4	PIANO-G2	E2(52) ~ A2(57)
5	PIANO-C3	A2#(58) ~ D3#(63)
6	PIANO-G3	E3(64) ~ A3(69)
7	PIANO-C4	A3#(70) ~ D4#(75)
8	PIANO-G4	E4(76) ~ A4(81)
9	PIANO-C5	A4#(82) ~ D5#(87)
10	PIANO-G5	E5(88) ~ C6(96)

CHOPPER BASS

CHOPPER BASS uses a velocity switch to provide two types of bass sound, soft and loud.

Program Name

1. CHOP BASS 1: Soft sound only.
2. CHOP BASS 2: Soft sound and loud sound.

CHOP BASS Sampling Data

Key Group KG	Sample Name		Key Range
	Soft	Loud	Soft/Loud Low (MIDI Note No.) ~ High (MIDI Note No.)
1	BASS E1	BASS E1	A0#(34) ~ G1(43)
2	BASS C2	BASS G2	G1#(44) ~ C2(48)
3	BASS D2#	BASS G2	C2#(49) ~ F2(53)
4	BASS G2#	BASS G2	F2#(54) ~ G2(55)
5	BASS G2#	BASS A2#	G2#(56) ~ A2#(58)
6	BASS C3#	BASS D3L	B2(59) ~ C3(60)
7	BASS C3#	BASS D3	C3#(61) ~ D3(62)
8	BASS C3#	BASS E3	D3#(63) ~ E3(64)
9	BASS C3#	BASS F3#	F3(65) ~ C6(96)

OPERATION GUIDE DISK

The OPERATION GUIDE DISK has been prepared to help user understand the various functions of the S900 faster and mor precisely.

Eight programs are stored on the Operation Guide Disk, eac one clearly explaining the features of the S900.

1. WELCOME

This is simply an introduction. The S900's vast memory make high quality sound and sampling for long periods of time poss ble. This program also serves as a POWER ON LOAD consta pitch demonstration.

2. SAW-PGM

On this program, saw tooth waves have been sampled an looped. This program is used mainly for explanations of sy thesizer functions.

3. SQU-PGM

On this program, square waves (short waves with PW=50% have been sampled and looped.

4. TRI-PGM

On this program, triangular waves have been sampled ar looped.

5. 1-2-3 PGM

On this program the numbers "One, Two Three" have bee sampled. This program is used mainly for edit sampling sca ning explanations.

6. ONE TO TEN

On this program "One" to "Ten" have been sampled separate these ten voices have been divided into ten key groups and t key split function has been used. This gives a demonstration the S900's abundant output and key assign functions.

7. VEL-SWITCH

On this program, two samples, "Soft" and "Loud" are divided a cording to the key velocity strength and played "Loud" wh there are 64 or more MIDI velocity data bits and "Soft" wh there are less than 64 data bits. This gives a demonstration the velocity switch function.

8. VEL-CROSS

On this program, "Soft" and "Loud" voices have been sampl in pairs and velocity cross feeding has been made possible.
The program is set so that:
When velocity data is large: "Loud" is played.
When velocity data is small: "Soft" is played.
When velocity data is medium: "Loud" + "Soft" is played.
This gives a demonstration of the velocity cross feed function.

Specifications

System	Digital sampling Sampling frequency: 7.5 kHz ~ 40 kHz (MIN ~ MAX) Sampling time: 63.3 sec. ~ 11.75 sec. (MAX ~ MIN) Voice: 8 Voice Range: 6 Octave
Storage	Built-in FLOPPY DISK DRIVE Memory capacity: 1M byte Memory Medium: 3.5 inch (2DD) BOTH SIDE, DOUBLE TRACK, DOUBLE DENSITY Internal memory: 750K byte
Multi sampling	32
Edit	Scanning (ONE SHOT, LOOPING, ALTERNATING) A.D.S.R (Velocity-Attack, Velocity-Release) Velocity cross fade Velocity switch Positional cross fade Attack pitch offset (— Velocity) LFO (delay, rate, depth) Filter (Key tracking, Velocity) Sample merge
Communication	RS-232C or EQUIVALENT
External jack	MIDI (IN, OUT, THRU) REC trigger ×1 Mic input/P.B trigger ×1 Line input/P.B trigger ×1 Line output ×8 Stereo output ×2 (L, R) Mix output ×1 Voice output ×1 (13 PIN/DIN)
Dimensions	482.6 (W) ×132.6 (H) ×410 (D) mm (EIA Rack mount/3U)
Weight	10.8 kg

Edit program sheet

PAGE

DATE : . .

BY :

01	PROGRAM NAME											
02	KEY LOUDNESS											
	POSITIONAL XFADE		ON	OFF								
03	KEY GROUPS											
04	VELOCITY XFADE		ON	OFF	ON	OFF			ON	OFF		
	VELOCITY SW											
SOFT 05	SOFT SAMPLE NAME											
	LOW KEY *											
	HIGH KEY *											
S 06	LOUDNESS											
	FILTER											
	TRANSPOSE	COARSE										
		FINE										
LOUD 07	LOUD SAMPLE NAME											
	LOW *											
	HIGH KEY *											
L 08	LOUDNESS											
	FILTER											
	TRANSPOSE	COARSE										
		FINE										
09	ENV.	ATTACK										
		DECAY										
		SUSTAIN										
		RELEASE										
10	VLCTY SENS.	LOUDNESS										
		ATTACK										
		FILTER										
		RELEASE										
11	PITCH WARP	VELOCITY										
		TIME										
		OFFSET										
12	L.F.O.	DEPTH										
		RATE										
		DELAY										
		DESYNC	ON	OFF	ON	OFF			ON	OFF		
13	LFO DEPTH	AFTER TOUCH										
		MOD.WHEEL										
14	KEY-FILTER											
	CONSTANT PITCH		ON	OFF	ON	OFF			ON	OFF		
15	MIDI CHANNEL	OFFSET										
		MIDI CH										
16	OUT PUT VOICES											

* Select either soft or lou

MIDI implementation chart

[MIDI DIGITAL SAMPLER]
Model S900 MIDI Implementation Chart Version :1.0

Function ...	Transmitted	Recognized	Remarks
Basic Default Channel Changed	× ×	1 1 - 16	without Disk Memorized(Disk)
Mode Default Messages Altered	× × **********	Mode 1 Mode 1 - 4 Omni on/off,P/M ×	without Disk Memorized(Disk)
Note Number : True voice	× **********	0 - 127 24 - 96	
Velocity Note ON Note OFF	× ×	○ 9n V=1-127 ○ 9n V=0 or 8n V=1-127	used Velocity release
After Key's Touch Ch's	× ×	× ○	
Pitch Bender	×	○	0-12:Half tone step (7 bit)
Control Change 1 64	× ×	○ ○	Modulation wheel Damper pedal
Prog Change : True #	× **********	1 - 32 1 - 32	by Preset number value
System Exclusive	○	○	ID:47
System : Song Pos : Song Sel Common : Tune	× × ×	× × ×	
System :Clock Real Time :Commands	× ×	× ×	
Aux :Local ON/OFF :All Notes OFF Mes- :Active Sense sages:Reset	× × × ×	× ○ (123) × ×	
Notes			

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO ○ : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO × : no

WARRANTY-VOIDING HACKERS among you may want to know about the following mod from Doug Kraul of Harmony Systems. By adding a single 660-ohm resistor, as shown in the diagram, you can measurably improve the S900's signal-to-noise ratio. The mod changes the sampling input circuit, so it will have no effect on any of your existing samples.

The theory is that the input filter in the S900 contributes the majority of noise to the samples. The filter's full dynamic range is not taken advantage of in the unit's current design. The input amplifier will begin clipping and distorting well before the filter does. The mod reduces the signal at the input stage, thus allowing the filter to be driven much hotter and hence with superior signal-to-noise. You need to increase the gain on the front panel somewhat to compensate.