The Next Generation in Sound Synthesis
——the AI Synthesis System

Super Guide

M1

MUSIC WORKSTATION

AI Synthesis System

CONTENTS

THE M1----A BRILLIANT NEW CONCEPT IN SOUND GENERATION

Message from KORG

The AI Synthesis System: In Search of the Perfect Sound .

A wealth of synthesizers are available on the musical instrument market and many have offered new sound creation possibilities. With the development of the technology, the palette of sounds available and the wide range of sonic control afforded today's electronic musicians grows by leaps and bounds.

However, the true value of these instruments as expressive musical tools is in the actual quality of the sounds and not in the complexity or superiority of the technology.

------ The Sound is the Thing ------

Korg has marshalled all its technological might to provide excellent sound quality and return to the original intention of all musical instrument makers: that is, above anything else, an instrument should sound good. Advanced technology itself does not create sounds, but it aids human beings in the creation of real or imagined sounds. This is the basic concept Korg brings to the invention and construction of all of its instruments. And nowhere is the application of this concept more comprehensive than in the AI Synthesis system of the Korg M1 Music Workstation.

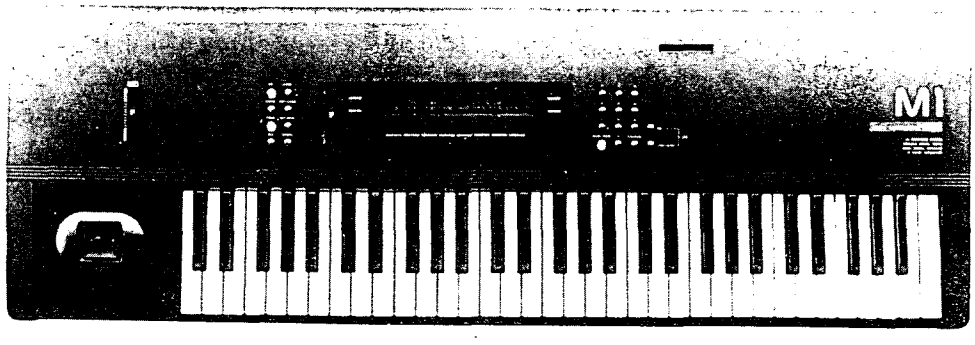
This system employs digital sound technology in all operations throughout the instrument, from generation of the raw sound material to controlling the effects that process the sound before it is output. Such a system ensures not only optimum sound quality but easy and logical operation. A wide range of high-quality 16-bit PCM ROM-based sounds, which include extracted waveform data composed of the attack transients of various sounds, make possible a whole new world of sound synthesis. The approach is revolutionary and the resulting sound is by far more expressive and powerful than any other instrument in its class.

This is the result of the AI Synthesis system -- the obsession that Korg engineers brought to their search for the perfect sound -- and is precisely the concept which produced the M1 Music Workstation.

TRANSFORMING IMAGINATION INTO MUSIC

With the M1 Music Workstation, Korg takes a bold step in a new direction of synthesizer design. The basic concept of the M1 emerged from the determination to use the most advanced technology and yet remain unhampered by existing concepts of what a synthesizer should be. The M1 is not only a tool for sound creation; it is also one for music creation. From recording to song composition and arranging, an 8-track sequencer makes it incredibly easy to bring the music you have in your head to life, with the use of various convenient and powerful editing functions. A digital multi-effects section, also of 16-bit quality, lets you further tailor the sounds to suit your needs. Right to the final stereo mixdown, the M1 provides everything you need in one easy-to-use, yet comprehensive package for creating MIDI recordings of studio quality. With the M1, your imagination becomes music.

Welcome to the new age of digital synthesis. Welcome to the M1 Music Workstation.



part 1

THE M1 BRINGS A NEW CONCEPT IN SYNTHESIS: THE MUSIC WORK STATION

A Work Station for the Modern Musician

Musicians of today are finding it more and more necessary to assume a wide variety of roles as the lines between the composer, the synthesizer programmer and the player become blurred. This may be due in part to technological advancements made in electronic instruments, but it also reflects a more traditional, craftsman-like attitude in which the artist is responsible for his creation from start to finish.

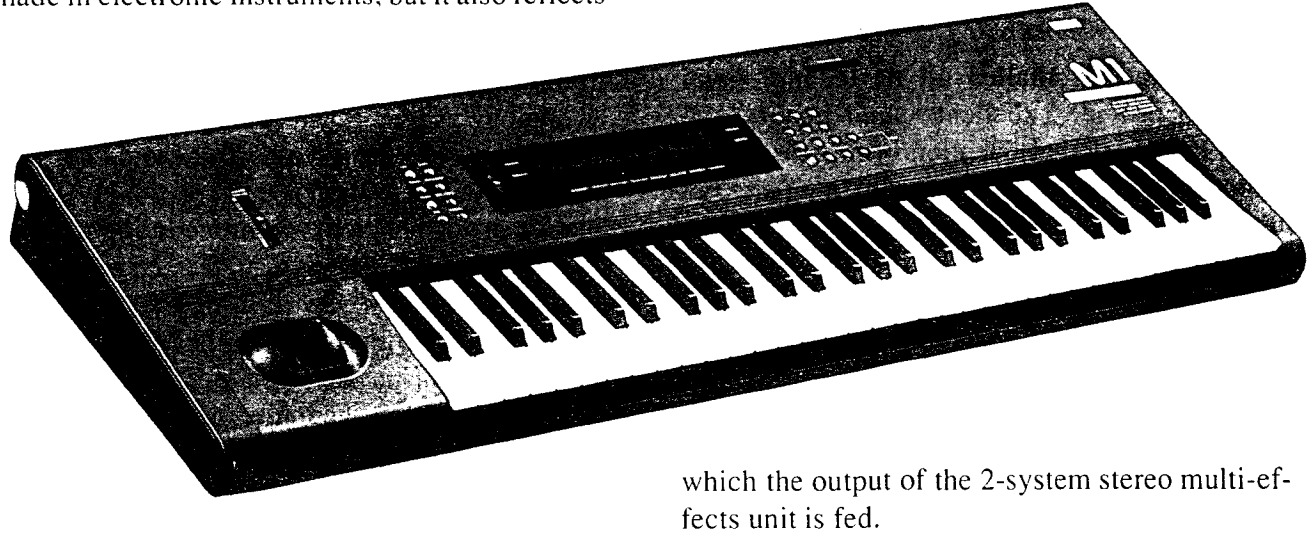
Modern synthesizers deserving of the name must keep up with the demands of today's musicians and provide the versatile all-in-one player with an equally versatile all-in-one instrument.

To fulfill this need was the basic guideline under which the M1 was made.

In order for a musician to turn his inspiration into a piece of music in the shortest possible time, the ideal situation is for all work to be done from one instrument. The first thing to do then is to install all essential music making functions in one instrument.

Chart 1 shows the sound generation/sound processing layout of such a synthesizer. This also happens to be a chart of the functions which are built into the M1.

As you can see, every necessary function for the creation of music is concentrated in just one M1: a maximum of 8 separate "synthesizer units" with a total of 16 available simultaneous voices (for use as a conventional synthesizer, or as a sampler keyboard or a rhythm machine), an independent 2-system stereo multi-effects unit, an 8-track sequencer and 4-channel mixing, through which the output of the 2-system stereo multi-effects unit is fed.



Now you can see why the M1 is called a "Music Workstation" -- all operations from start to finish, from sound creation to music composition can be handled right here in this one instrument.

Some might suspect the quality of each of the components of such a synthesizer: an instrument that does everything can't be capable of doing everything well. With the M1, the exception proves to be the rule. Each of its sections are no-compromise components that could easily stand alone on their own merits.

For example, in the sound generation section of the M1, an entirely new system has been

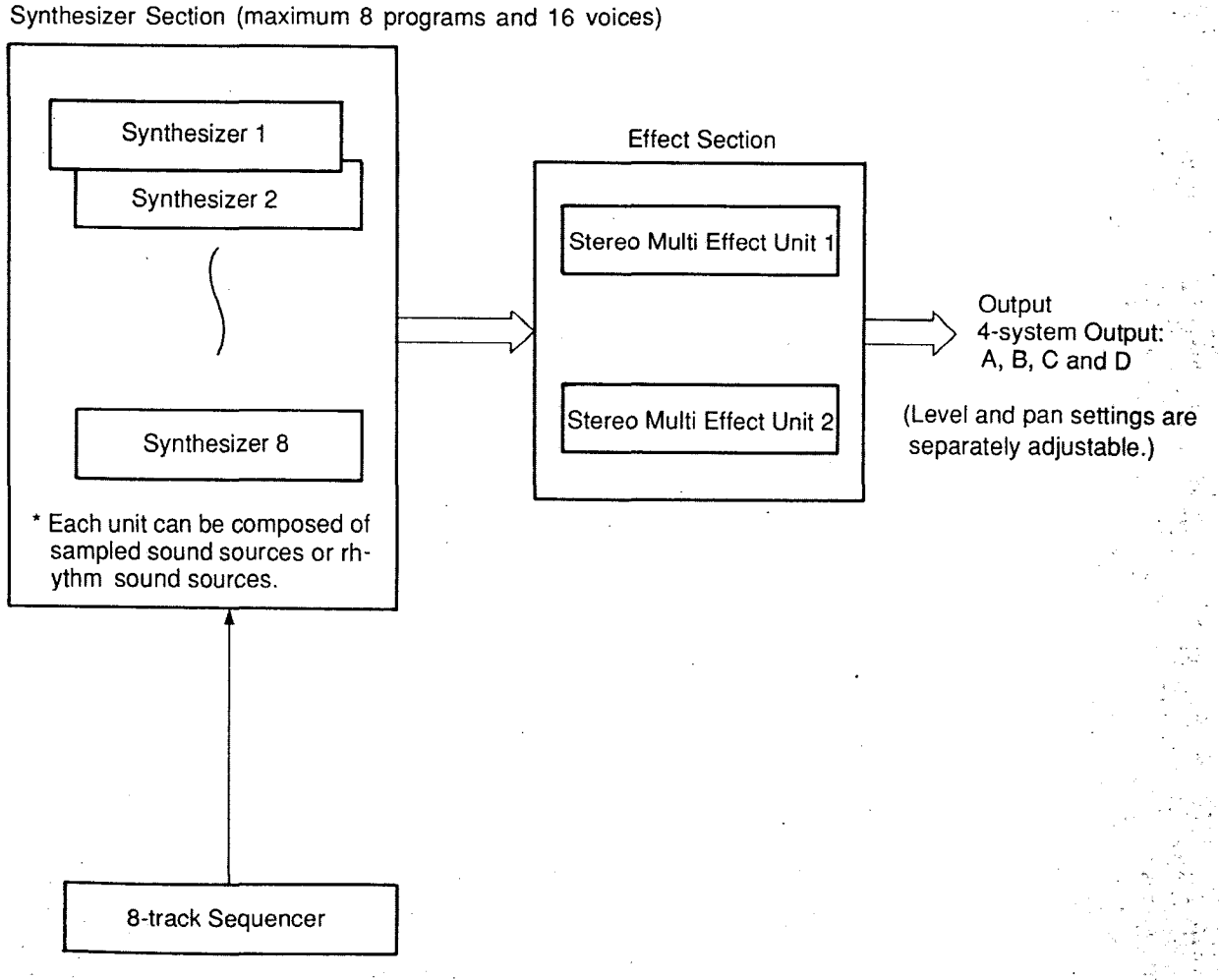
employed -- the AI Synthesis system -- which, in utilizing the very best today's technology has to offer, comes up with a clarity and beauty of sound that is simply unsurpassed.

The 2-megaword large capacity ROM also catapults the memory capabilities of the M1 beyond that of the conventional sampler.

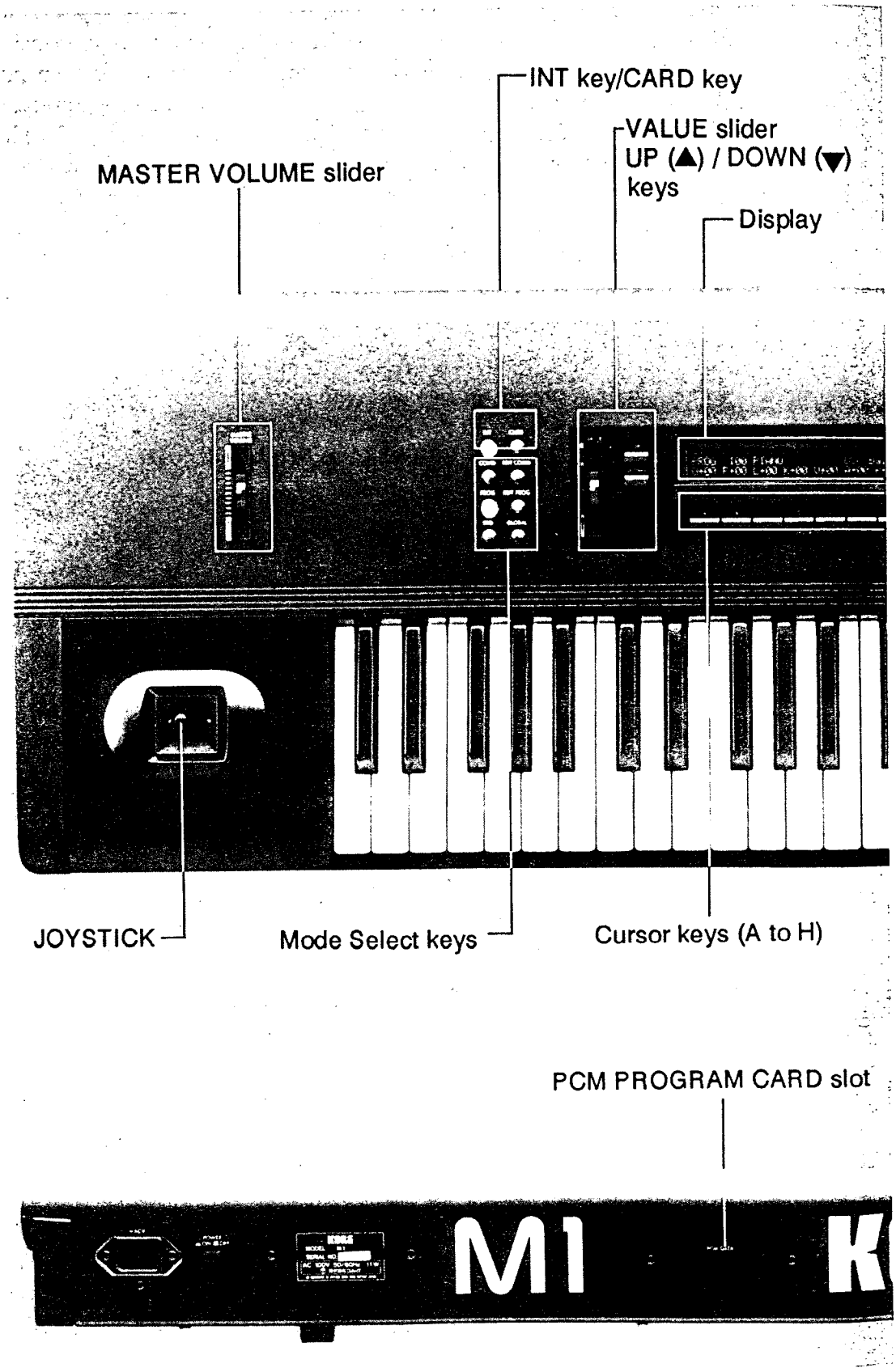
Moreover, the utmost care was taken in designing this advanced instrument to ensure that the superior quality and resolution of the digital signal is perfectly preserved from sound source to final output.

Many types of low-cost keyboards, sequencers and rhythm machines are currently available. Yet none of them can match the comprehensiveness, the flexibility, the ease-of-operation, or the sheer quality of the M1. The M1 Music Workstation was created in direct response to satisfy the present demand for not only an excellent synthesizer but also a complete music making system.

Chart 1



M1 – Front and Rear Panel Controls

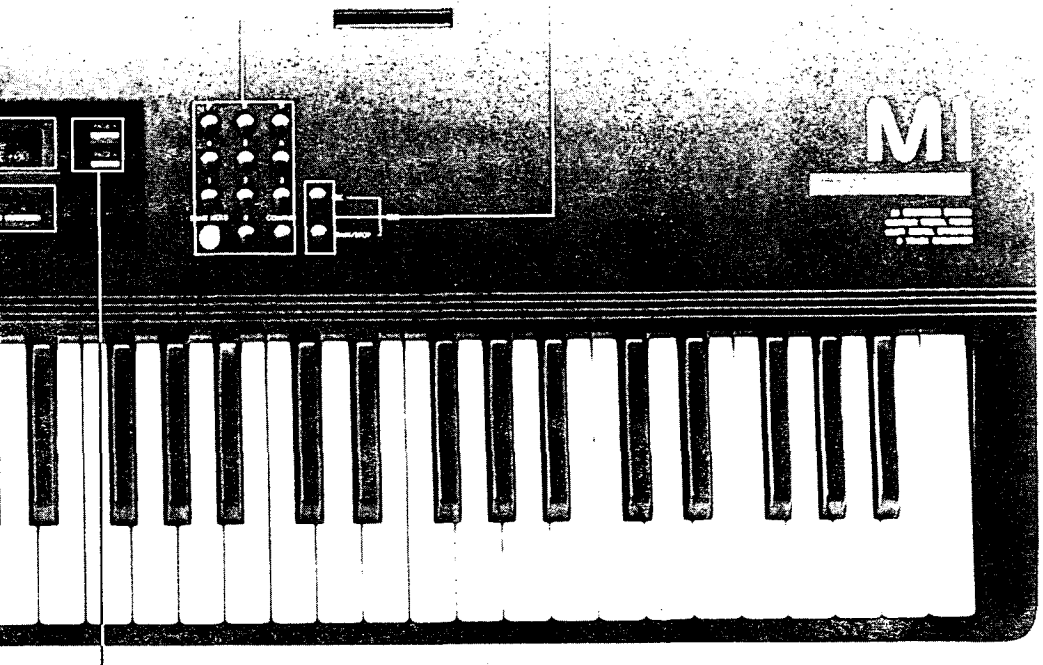


PCM PROGRAM CARD slot

Numeric Keypad (0 to 9), BANK HOLD key, COMPARE key

PROG/SEQ DATA slot

REC key, START/STOP key



PAGE + / - keys

CONTRAST

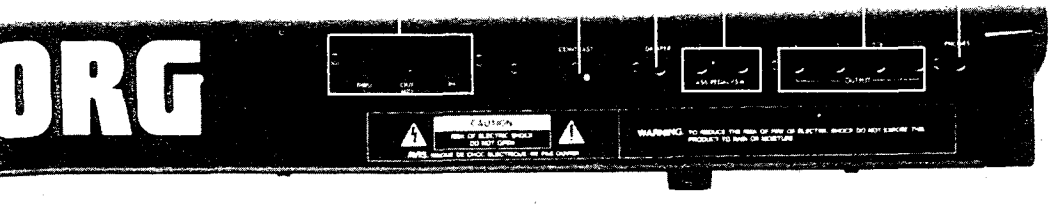
DAMPER jack

ASS. PEDAL/SW jacks (1, 2)

OUTPUT jacks (1/L 2/R, 3, 4)

MIDI jack

PHONES jack



part 2

The Advanced Features of the M1 as Seen Through the Discriminating Eyes of Music Professionals.

JACK DEJOHNETTE

Attracting attention first as a drummer in the latter half of the 1960's with his work in the Bill Evans Trio and with Miles Davis, Jack DeJohnette has, since the late seventies, been concentrating on his own band, Special Edition. He has also released his own album as a pianist.

"The M1...an excellent synthesizer!"

I like KORG's instruments and have been using several of them. The SG-1D NEW in particular is excellent. There isn't any electric piano better than that; that's the best. Besides the SG-1D, I'm using the DSS-1, DSM-1, DDD-1 and DDD-5, and the 707.

The M1's got a great sound. The keyboard has a very nice action to it and it has a lot of expressive power -- it responds so well to touch that I can play it as if I was playing the acoustic piano. I like both synthesizer sounds and acoustic sounds, and the M1 is excellent at creating both. The simulation of acoustic instruments especially is so real that I can hardly believe I'm playing a synthesizer.

"You have to study about an instrument to imitate it."

It's really up to the keyboard player to develop the techniques necessary to play the acoustic-like sounds on the synthesizer as they would be played on the actual acoustic instrument. It's not only the sound of the voice -- you have to learn the special ways of phrasing and articulation of the guitar player, the sax player and all the others. You can't play them with your normal piano techniques. If you use a sax sound and play it like you play the piano, it's not going to sound like a sax. You must learn to think, to phrase, to articulate like the player of the instrument you're imitating, and study the technique necessary to get the original nuance of that instrument from the synthesizer.

As for the other functions, I think the built-in effects are fantastic. The quality of the effects section itself is very high. And it's very convenient for players that they're built-in. Very effective, too. I also like the Scale Type function which lets you change the tuning. For example, you can set the pitch of C to be a little bit higher...you can create your own tuning, since any of the 12 steps can be adjusted any way you like.

"One other thing I like about the instrument is that it's quite light -- that's important for touring."

Since you can do everything with just one M1, it seems ideal for solo concerts. I can combine my drums with the sequencer...and do just about anything with this one instrument. If I had to describe it in one word, I'd say the M1 is great!

MICHELE PACIULLI

This multi-faceted keyboard player, well-versed and experienced in all styles of music from rock to jazz, is in constant demand as a session player in his native Italy. He has also seen activity all over the world as one of KORG's top demonstrators. As part of KORG's voice programming staff, he has helped create some of the fabulous sounds of the M1.

"It's expressive and the sound is incredibly real."

The M1 keyboard has a very acoustic feel to it. I can play it as if I was playing a piano or guitar. It sounds very real and clear -- much like the effect of a camera being completely in focus. The application of the 16-bit sampling makes all the difference, since before the M1, only the most expensive professional instruments had that. The M1 is capable of that level of sound quality.

"...as easy to operate as the Poly Six."

Sound programming is very easy, too. Whatever ideas I have in my head, I can realize them quickly, because it has a traditional editing system just like the Poly Six. The parameters are very easy to understand, and because the switches are all lined up under the parameters, I can edit as I want very easily, even on stage. The Pedal Assign function lets me control parameters as I play, too.

"There is nothing halfway about it..."

The multi digital effects of the M1 give you a wide range of reverb sounds -- from small room to large cathedral to even a cavern-type effect. I like the fact that I can combine effects, such as the exciter and the overdrive, and others. But all that is meaningless if the sounds of the effects are poor. If, for example, you use a cheap reverb unit, the reverberation effect is the same, whether you choose a small room or a large room, whether you play a high sound or a low sound. The M1, however, has no such problems. The same reverb effect on a hi hat sound changes appropriately when a bass drum sound is played; the effect can be made to best suit each instrument. There is nothing halfway about the effect functions. They, and the rest of the instrument, are absolutely fantastic.

part 3

THE NEW AI SYNTHESIS SYSTEM

The Purpose of Sound Synthesis

The M1 can serve as the ideal control center for total musical creation. No matter how advanced or complete the functions, however, the value of such a work station is very little if the sounds themselves are not up to par.

What does a "good" sound consist of?

The last few years have seen tremendous development in various digital technologies and have resulted in a vast number of benefits for musicians. Developments have ranged from digital sampling, for reproducing acoustic sounds with unprecedented accuracy, to new methods of synthesis, that generate sounds with greater clarity and brilliance than was possible with traditional VCO/VCF/VCA analog synthesis.

When analog synthesizers were approaching their height of popularity, many musicians took the new sound technology to unexplored territories and created a wealth of sounds never dreamed of before. Many felt that the synthesizer had the capability of producing an unlimited amount of sounds not possible with acoustic instruments.

Yet, it wasn't long before most of the sounds musicians were producing on the synthesizer sounded much the same. A number of factors might have been responsible, but certainly the lack of a simple, logical sound creation system was a main cause.

Even if the programming possibilities were endless, the basic theory of synthesis -- which demanded a knowledge of acoustics -- was quite limiting in practice. It meant disappointment for musicians who wanted to create sounds as quickly as they imagined them in their minds.

The equation of good sound with accurate sound, triggered by the appearance of the sampler, was also another strong reason for the uniformity of sounds.

But this role of the sampler, as a mere recorder of sounds, will cause this instrument to also fall by the wayside if it is used only in this way. Various technologies should be used together for creation of the best possible sounds in the easiest possible way.

From this basic idea, Korg presents the AI Synthesis system as a new method of sound creation.

The Structure of the AI Synthesis System.

AI is an abbreviation for Advanced Integrated. It is a system of comprehensive sound shaping capabilities and it combines some of the most advanced sound color creation methods and technologies available. To get a firm grasp of the total system and see how sounds are processed in the M1, refer to the AI Synthesis chart (fig.1).

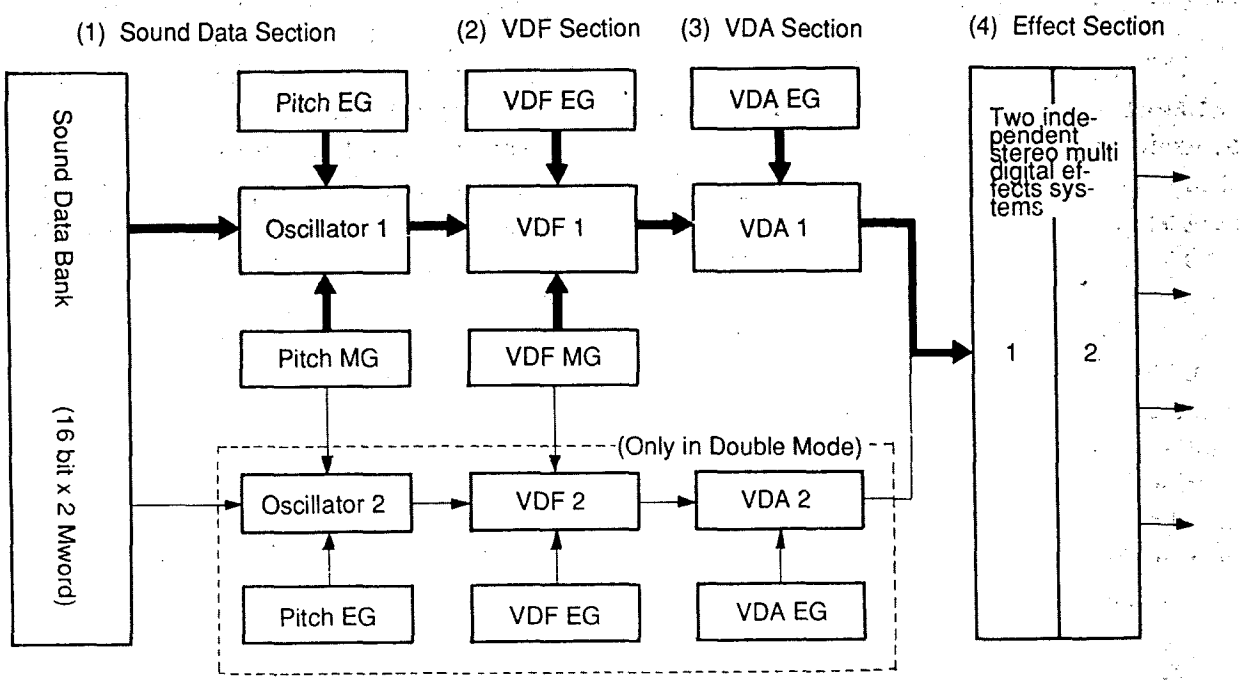
As shown in the chart, the AI Synthesis system is divided into 4 sections.

One of these 4 sections is the sound data section, which is the M1's version of the oscillator section of conventional synthesizers. Oscillators 1 and 2, rather than generating sounds, are actually assigned sound sources of 16-bit waveform data that is stored in the large capacity 2-Mword ROM.

In the newly developed VDF (Variable Digital Filter) section the timbre of the sounds are controlled, while the volume of the sounds are controlled by the VDA (Variable Digital Amplifier) section. In these sections, the setup of the M1 is very similar to that of conventional analog synthesizers.

Moreover, there are two complete OSC/VDF/VDA systems. The systems are logical and straightforward since they are based on the three main elements of sound, pitch, timbre and volume.

On top of all that, a complete 2-system independent effect section processes the sound after it



4 sound data groups are installed in the sound data bank, and data can be assigned in any fashion to Oscillators 1 and 2.

In the effect section, either serial or parallel operation is possible.

passes through the section mentioned above. Here, various effects such as reverb, delay, chorus and distortion, to mention just a few, can be applied to the sounds in nearly any fashion. And all effect settings made for a sound program created with the OSC/VDF/VDA can be stored as part of the program.

Many synthesizers that are referred to as digital have repeated analog-to-digital and digital-to-analog conversions in their internal operation, and each conversion results in a degeneration of the quality of the final sound. The M1, however, features complete digital processing of the signal -- from start to finish -- for optimum sound quality.

Let's take a look at each section in more detail.

Sound Data Section

The Sound Data Section, the first stage of AI Synthesis, allows you to select the basic sound source waveforms for sound creation. In this section, Korg has included the most advanced features of its original digital technology -- technology developed in products such as the DSS-1 and the DSM- 1.

A large capacity ROM of 16 bit x 2 Mword, which exceeds that of most sampling machines, is installed in the sound data bank and forms the core of this section. A total of 144 sounds are stored here.

Moreover, all waveform data are of the highest possible resolution and sound quality. From the view point of memory usage, sound quality should take precedence over the number of waveforms available.

These waveforms can be classified into 4 types.

part 3

Realistic and Natural Sounds From Multisound Data

This waveform data, common to conventional sampling machines, utilizes digital recordings of acoustic instruments such as piano, brass and strings and is distributed over the range of the keyboard.

These waveforms, however, are different from those on most sampling machines because they have been sampled with superior 16-bit resolution. As a result, all subtle nuances that characterize the original sound -- from the harmonically unrelated overtones present in the attack sound of a string being plucked or breath flowing over a mouthpiece to the release tones peculiar to each instrument -- are reproduced with stunning accuracy and realism.

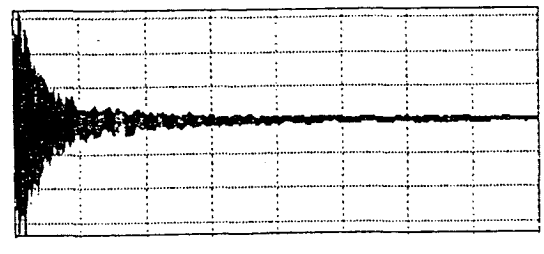
Problems inherent in other samplers, such as abrupt timbre changes and unnatural sound quality in all but a specific range, are conspicuously absent from the M1. All sounds have been carefully recorded and edited to provide clear and natural response over the entire range of the keyboard. Having optimum raw materials like these make it especially easy to create and alter sounds when working with the VDF and VDA sections.

And yet, because the sounds are so realistic and natural, they can even be used at this stage, without any editing or processing. For strict reproduction of the original acoustic characteristics, these sounds are complete as they are.

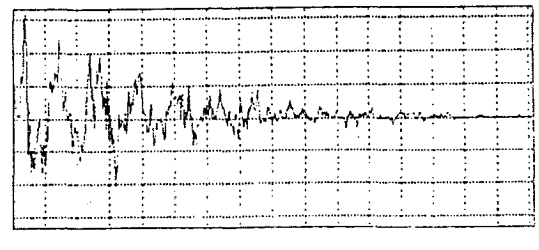
A total of 62 Multisounds are available on the M1. On a conventional sampler, the only way to

Types of wave shapes that are installed in M1

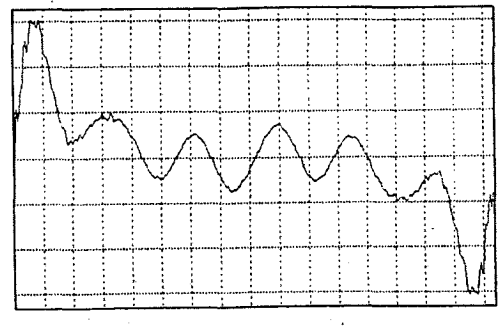
Piano (PCM wave shape)



Vibe Hit (Separated wave shape)



Voice (D.W.G.S. wave shape)

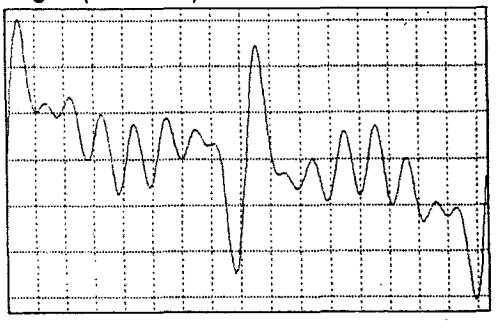


have so many sounds to choose from is by loading them from disks. Since all of the sounds are installed in the large capacity ROM, they can be recalled for use instantly, without the trouble and time spent in handling disks.

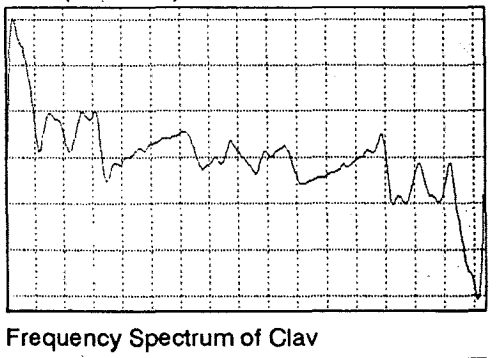
Digital Synthesizer Waveforms

This is Korg's original D.W.G.S. method. The frequency components of an actual instrument's sound are analyzed by computer in 16-bit resolution and then reproduced as a table of harmonics, much the same as is done in additive synthesis. Twenty-three different short cycle waveforms, including saw wave and square wave, are available. With them a wide range of characteristically synthesizer-like sounds, from muted tones to sounds of great clarity, thickness and warmth are available.

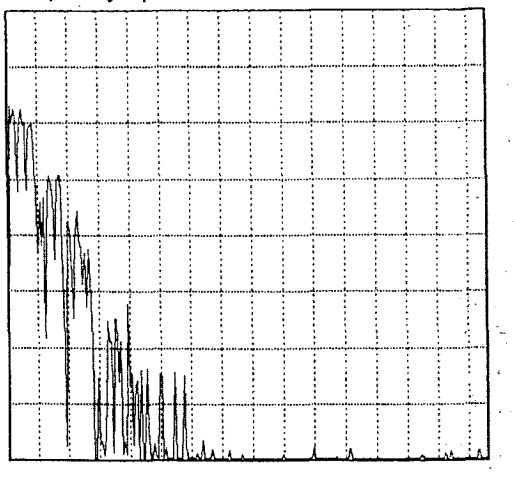
Organ (D.W.G.S.)



Clav (D.W.G.S.)



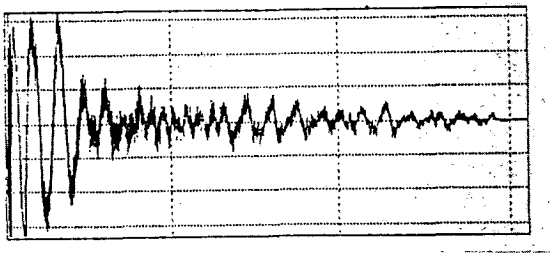
Frequency Spectrum of Clav



Drum Sound Data

These sounds have been created by taking 16-bit sampled data of 44 percussive instruments' sounds, including those of a full drum set, various kinds of percussion, finger snaps, handclaps and metallic sounds -- all in addition to the Multisound data. And each waveform can be assigned to any key of the keyboard.

Waveform of Bass Drum (PCM wave shape)



Extracted Waveforms

Sound data of the waveform extraction type form one of the basic tools in the AI Synthesis system.

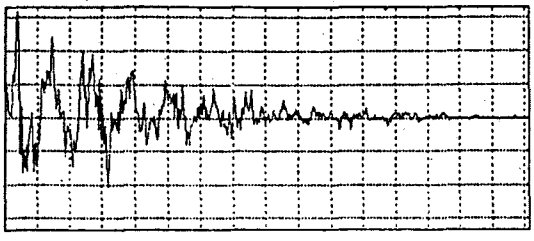
All sounds in nature, including, of course, instrumental sounds, can be classified into one of two groups: pitched (cyclical) and unpitched (non-cyclical.)

Using the sound of a piano as an example, the sound that occurs at the instant the hammer hits the string has many unpitched elements. Once the string begins to vibrate regularly, the basic frequency elements of the played key's pitch become stronger.

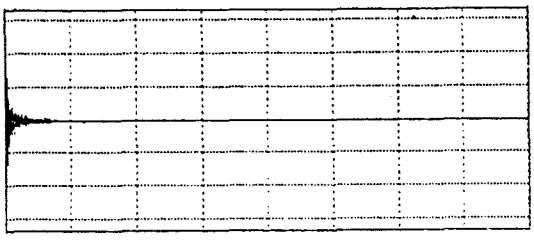
Waveform extraction is done by the following process: The waveforms present in acoustic instruments such as piano or the human voice are

part 3

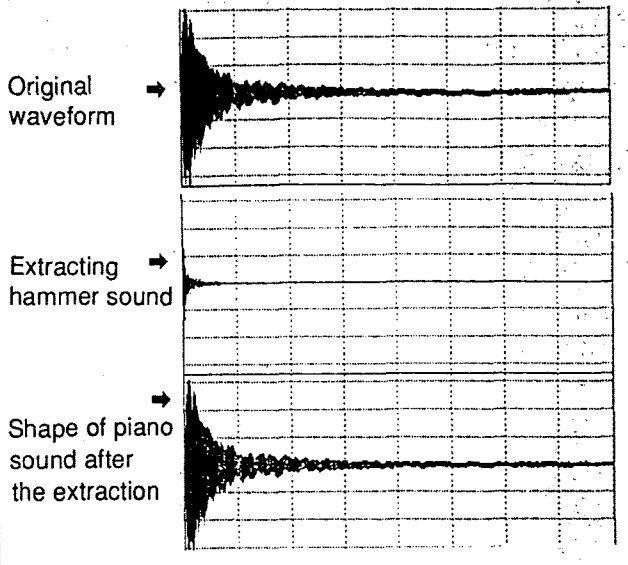
Vibe Hit (extracted waveform)



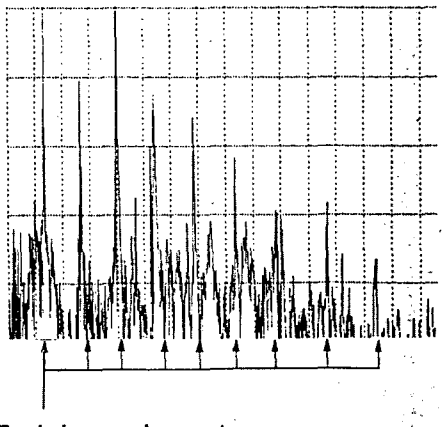
Hammer sound of piano (extracted waveform)



Separation of Extracted Waveform



Spectrum of piano sound



Each harmonic overtone appears as a peak in the graph. Frequencies indicated between peaks are hammer sounds or the vibrations of other strings.

analyzed and converted into digital information. The unpitched elements, found mainly in the attack portion of the sound, are separated and extracted from the pitched elements that occur later. These unpitched sounds are then used as Multisound data.

Waveform data is not merely separated, but is carefully edited so that each sound can be easily re-edited and run through normal synthesizer processing, enabling stronger percussive attacks on quick attack sounds and more natural loops on continuous sounds. (See page 13 for a list of the 144 types of waveforms.)

These waveforms can be assigned in any fashion to Oscillators 1 and 2. An unlimited amount of unique, unheard-of sound combinations can be created in this way: for example, the unpitched elements of the human voice (the sound of breath) can be grafted onto the continuous sound of a muted trumpet.

And, of course these waveforms can be further controlled by the M1's filtering and envelope functions.

MULTISOUND LIST

00	Piano	25	SynMallet	50	FingerSnap	75	VoiceWv NT 1
01	E.Piano 1	26	Flute	51	Pop	76	VoiceWv NT 2
02	E.Piano 2	27	Pan Flute	52	Drop	77	DWGS E.P.1
03	Clav	28	Bottles	53	Drop NT	78	DWGS E.P.2
04	Harpsicord	29	Voices	54	Breath	79	DWGS E.P.3
05	Organ 1	30	Choir	55	Breath NT	80	DWGS Piano
06	Organ 2	31	Strings	56	Pluck	81	DWGS Clav
07	MagicOrgan	32	Brass 1	57	Pluck NT	82	DWGS Vibe 1
08	Guitar 1	33	Brass 2	58	Vibe Hit	83	DWGS Bass 1
09	Guitar 2	34	Tenor Sax	59	VibeHit NT	84	DWGS Bass 2
10	E. Guitar	35	Mute TP	60	Hammer	85	DWGS Bell 1
11	Sitar 1	36	Trumpet	61	Metal Hit	86	DWGS Orgn 1
12	Sitar 2	37	TubaFlugel	62	MetalHit NT	87	DWGS Orgn 2
13	A. Bass	38	DoubleReed	63	Pick	88	DWGS Voice
14	Pick Bass	39	Koto Trem	64	Distortion	89	SquareWave
15	E. Bass	40	BambooTrem	65	Dist NT	90	Digital 1
16	Fretless	41	Rhythm	66	Bass Thumb	91	Saw Wave
17	SynthBass 1	42	Lore	67	BasThum NT1	92	Digital 2
18	SynthBass 2	43	Lore NT	68	BasThum NT2	93	25% Pulse
19	Vibes	44	Flexatone	69	Wire	94	10% Pulse
20	Bell	45	WindBells	70	Pan Wave	95	Digital 3
21	Tubular	46	Pole	71	Ping Wave	96	Digital 4
22	Bell Ring	47	Pole NT	72	Fv Wave	97	Digital 5
23	Karimba	48	Block	73	Mv Wave	98	DWGS TRI
24	KarimbaNT	49	Block NT	74	Voice Wave	99	DWGS Sine

- The "NT" designation on certain Multisounds indicates that the pitch of the sound is the same regardless of the key played.

DRUM SOUND LIST

01	Kick 1	12	Open HH 1	23	E. Tom	34	Metal Hit
02	Kick 2	13	Closed HH 2	24	Ride	35	Pluck
03	Kick 3	14	Open HH 2	25	Rap	36	Flexa Tone
04	Snare 1	15	Crash	26	Whip	37	Wind Bell
05	Snare 2	16	Conga 1	27	Shaker	38	Tubular 1
06	Snare 3	17	Conga 2	28	Pole	39	Tubular 2
07	Snare 4	18	Timbales 1	29	Block	40	Tubular 3
08	Side Stick	19	Timbales 2	30	FingerSnap	41	Tubular 4
09	Tom 1	20	Cowbell	31	Drop	42	Bell Ring
10	Tom 2	21	Claps	32	Vibe Hit	43	Metronome 1
11	Closed HH 1	22	Tambourine	33	Hammer	44	Metronome 2

NATURAL FILTERING AND PROCESSING OF THE VDF AND VDA SECTIONS

Newly Developed VDF For Smooth Analog-like Filtering

Sound source waveforms assigned to each oscillator from sound data bank are sent to the VDF section, and it is here that the tonal quality or timbre of the sound can be controlled.

Korg's newly developed VDF (Variable Digital Filter) is utilized for the first time in the M1's filter section.

As a digital filter, the VDF processes the signals in complete digital form; however, compared with conventional digital filters, it possesses the warmth characteristic of analog filters. As a result, the superior clarity of digital filtering is combined with the richness of analog filtering for optimum sound quality.

Let's take a look at the main parameters that make up the VDF section.

VDF Cutoff

Controls the cutoff frequency of the VDF. (This determines the clarity of the sound of the waveform which is output from the oscillator.)

VDF EG Intensity

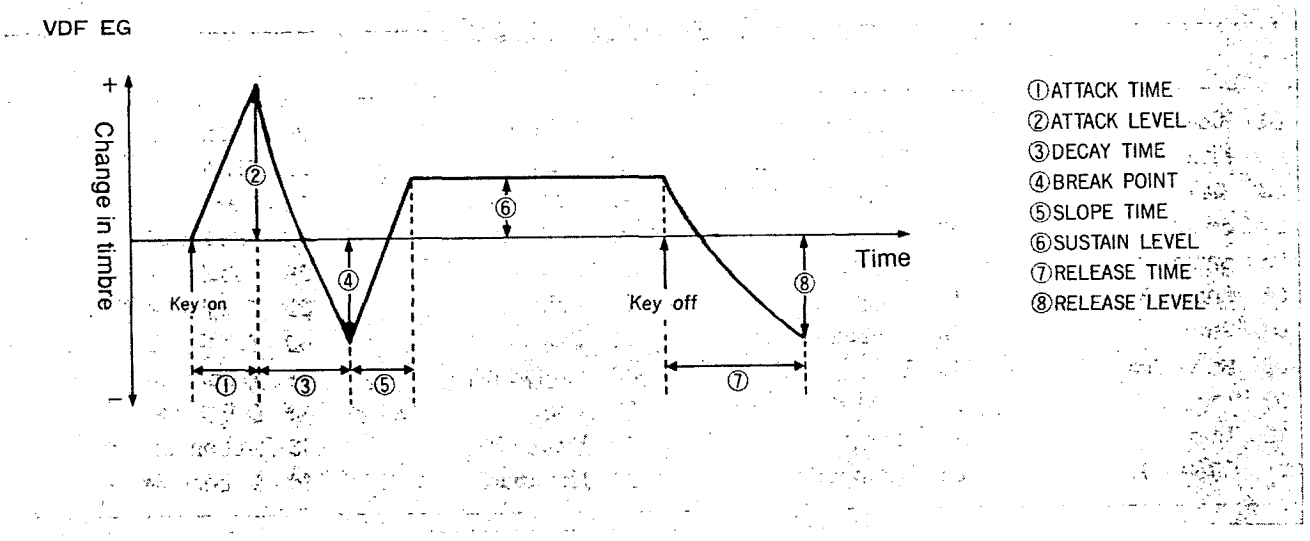
Controls the degree to which the VDF EG affects the cutoff frequency.

VDF EG

This is the envelope generator that controls how the cutoff frequency will change over time.

The EG features two new parameters, attack level, which is the cutoff frequency reached after the attack time has elapsed, and release level, which is the level reached after the release time has elapsed. These parameters are in addition to the normal A (attack time), D (decay time), B (break point), S (slope time), S (sustain level) and R (release time) parameters.

Attack level, break point, sustain level and release level can be set to either positive or negative values, allowing unprecedented flexibility and complexity in sound shaping.



VDF Velocity Sensitivity Parameters

EG Int (EG Intensity Velocity Sensitivity)	-99~+99	The degree to which the VDF EG's level is affected by key velocity.
EG Time (EG Time Velocity Sensitivity)	0~99	The degree to which the VDF EG's time is affected by key velocity.
Attack Time	-,0,+	These are the parameters that EG Time Velocity Sensitivity can be programmed to affect; negative and positive values can be individually (selected with 0 having no effect.)
Decay Time	-,0,+	
Slope Time	-,0,+	
Release Time	-,0,+	

VDF Velocity Sensitivity

In this set of parameters, EG Intensity Velocity Sensitivity lets you change the tone color or timbre of the sound depending on how hard you strike the keys. EG Time Velocity Sensitivity lets you change the speed of the VDF EG depending on how hard you strike the keys.

VDF Keyboard Track

These parameters let you control the VDF cutoff frequency and the overall time of the VDF EG depending on the section of the keyboard that is being played.

VDF Keyboard Tracking Parameters

Center Key	C-1 ~ G9	The central key for the VDF Keyboard Tracking (the key at which effect is +/-0)
Cutoff (cutoff frequency keyboard tracking)	- 99 ~ +99	Change of VDF cutoff frequency (the brightness of tone color) key position
EG Time (EG time keyboard tracking)	0 ~ 99	Change of VDF speed by key position
Attack Time	- , 0 , +	These are the parameters that EG Time Velocity Sensitivity can be programmed to affect; negative and positive values can be individually selected with 0 having no effect.)
Decay Time	- , 0 , +	
Slope Time	- , 0 , +	
Release Time	- , 0 , +	

This function combines the traditional filter tracking, in which the timbre can become more muted as higher keys are played, with a VDF EG tracking feature, in which it is possible to have the timbre change slow down when lower notes are played and speed up for higher notes.

The Center Key parameter sets the key at which no change is applied to the set cutoff frequency and EG time values. Positive and negative settings for each of the four EG time parameters are also available.

All parameters explained up to this point are included for both the VDF 1 and the VDF 2 and can be set independently, providing maximum flexibility in controlling the sounds of the oscillators.

Newly Developed VDA Continues the All-digital Processing

Now let's see how the sound can be further changed -- with volume controls in the VDA section.

The wide range of waveforms are all processed digitally with the newly developed VDA (Variable Digital Amplifier). In this way, the original quality of the 16-bit sampling data is preserved throughout all sound volume control parameters.

Let's take a look at the main parameters that make up this VDA section.

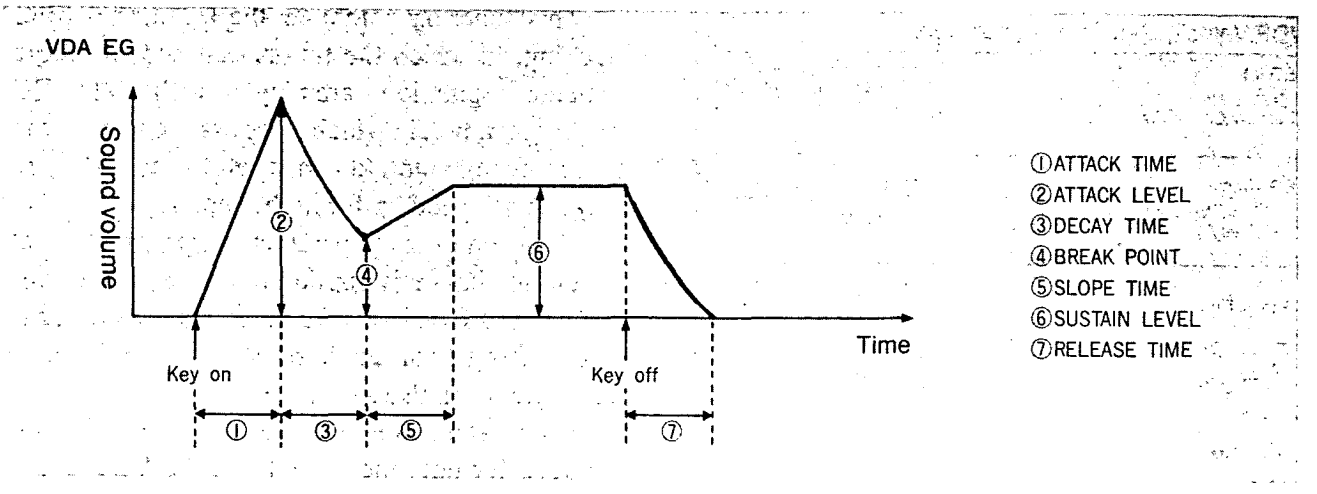
VDA EG

This envelope generator determines how the volume of the sound will vary over time.

7 different parameters, including attack level (the volume reached after the attack time has elapsed), allow you the flexibility of making both subtle and broad changes in the sound volume.

VDA Velocity Sensitivity

In this set of parameters, Amplitude Velocity Sensitivity lets you change the sound volume



VDA Velocity Sensitivity Parameters

Amplitude (Amplitude Velocity Sensitivity)	- 99 ~ +99	Change of the VDA's volume by key velocity
EG Time (EG Time Velocity Sensitivity)	0 ~99	Change of the VDA's EG time by key velocity
Attack Time	-, 0, +	These are the parameters that EG Time Velocity Sensitivity can be programmed to affect; negative and positive values can be individually selected with 0 having no effect.
Decay Time	-, 0, +	
Slope Time	-, 0, +	
Release Time	-, 0, +	

depending on how hard you strike the keys. EG Time Velocity Sensitivity lets you change the speed of the VDA EG depending on how hard you strike the keys.

VDA Keyboard Tracking

These parameters let you control the volume of the sound and the overall time of the VDA EG depending on the section of the keyboard that is being played.

This function combines the traditional volume tracking, in which the sound can become softer as higher keys are played, with a VDA EG tracking feature, in which it is possible to have the volume change slow down when lower notes are played and speed up for higher notes.

Similar to the corresponding VDF Keyboard Tracking function, VDA Keyboard Tracking Center Key sets the key at which no change is applied to the set sound volume and EG time values. Positive and negative settings for each of the four EG time parameters are also available.

All parameters can, of course, be set independently, providing maximum flexibility in controlling the sounds of the oscillators. This allows you not only to use two different sounds simultaneously, but also have the levels of the two sound sources weave in and out of each other as notes are played and held.

The actual creation and programming of sounds is taken care of in the Edit Program Mode. Here is a complete list of the available parameters in the Edit Program Mode.

VDA Keyboard Tracking Parameters

Center Key	C - 1 ~ G9	The central key for the VDA Keyboard Tracking (the key at which effect is +/-0)
Amplitude (Amplitude Keyboard Tracking)	- 99 ~ +99	Change of the volume of the VDA by key position
EG Time (EG Time Keyboard Tracking)	0 ~ 99	Change of the VDA's EG speed by key position
Attack Time	-, 0, +	These are the parameters that EG Time Keyboard Tracking can be programmed to affect; negative and positive values can be individually selected with 0 having no effect.
Decay Time	-, 0, +	
Slope Time	-, 0, +	
Release Time	-, 0, +	

Parameter list of EDIT PROGRAM MODE

OSC BASIC	Oscillator mode
OSC1	Waveform, level of oscillator 1
OSC2	Waveform, level, pitch of oscillator 2 (Double mode)
OSC1 PITCH EG	Pitch variation over time of oscillator 1
OSC2 PITCH EG	Pitch variation over time of oscillator 2 (Double mode)
VDF1	Cutoff frequency, EG intensity of VDF 1
VDF1 EG	Variation of the VDF 1's cutoff frequency over time
VDF1 VEL SENS	Degree to which VDF 1 responds to key velocity
VDF1 KBD TRK	Degree to which VDF 1 tracks the keyboard
VDF2	Cutoff frequency, EG intensity of VDF 2 (Double mode)
VDF2 EG	Variation of the VDF 2's cutoff frequency over time (Doublemode)
VDF2 VEL SENS	Degree to which VDF 2 responds to key velocity (Double mode)
VDF2 KBD TRK	Degree to which VDF 2 tracks the keyboard (Double mode)
VDA1 EG	Volume variation over time of VDA 1
VDA1 VEL SENS	Degree to which VDA 1 responds to key velocity
VDA1 KBD TRK	Degree to which VDA 1 tracks the keyboard
VDA2 EG	Volume variation of VDA 2 over time (Double mode)
VDA2 VEL SENS	Degree to which VDA 2 responds to key velocity (Double mode)
VDA2 KBD TRK	Degree to which VDA 2 tracks the keyboard (Double mode)
PITCH MG	Pitch modulation (tremolo effect)
VDF MG	VDF modulation (wah-wah effect)
AFTER TOUCH	Degree to which after touch affects tonal quality
JOY STICK	Degree to which joy stick affects tonal quality
EFFECT1	Selection of Effect 1
EFFECT1 PARAMETER	Parameters of Effect 1
EFFECT2	Selection of Effect 2
EFFECT2 PARAMETER	Parameters of Effect 2
EFFECT PLACEMENT	Assignment of Effects 1 and 2
EFFECT COPY	Copying of effect parameter values
WRITE/RENAME	Writing and renaming of Programs

part 3

COMPLETELY UNIQUE SOUNDS MADE POSSIBLE BY THE DOUBLE MODE

Full Use of Independent Two-system Synthesizer

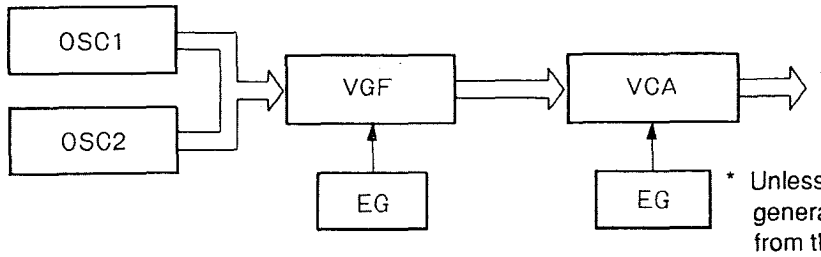
As we mentioned above, the section of the M1 that takes the role of basic sound generation and creation -- from oscillator to VDF to VDA to envelope generator -- is made up of two completely independent systems.

The advantages that such a two-system synthesizer provides are well worth looking at.

Two-oscillator synthesizers are actually quite common. However, in most conventional two-oscillator synthesizers only one filter/amplifier system was provided, allowing for but the very simplest kind of mixing of the sound sources.

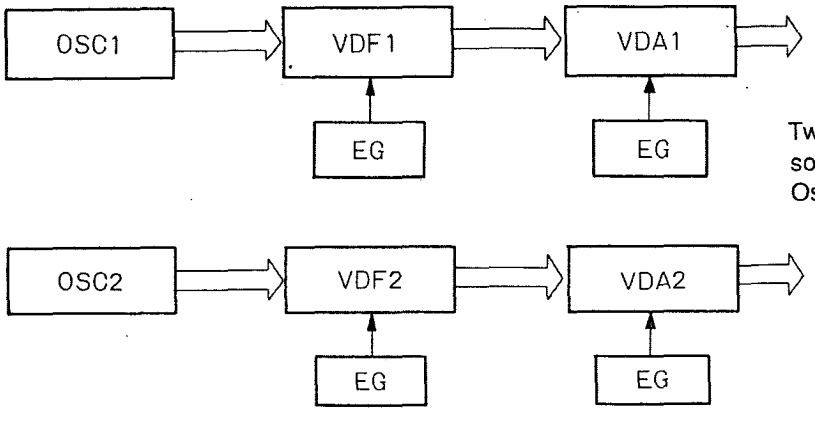
In the M1, though, the creation of one total sound can include the sound colors of two completely independent synthesizer units, allowing you to program complex dual synthesizer sounds from just one instrument.

With the Conventional Two Oscillator Synthesizer:



* Unless the instrument is capable of generating nearly complete sound sources from the individual oscillators, such as in the case of the DSS-1, it is very difficult to have two independent sounds from this system.

With the M1:



Two completely different independent sounds can be programmed for both Oscillator 1 and Oscillator 2.

Powerful 16-voice Synthesizer in Single Mode

Each function and parameter of the M1 has been specifically designed for maximum flexibility. The Oscillator Mode parameter is one excellent example of that fundamental design concept. Simply put, this oscillator section parameter lets you determine how the oscillator will be used.

For example, when you are programming sounds that recreate actual acoustic instruments, you can simply use the waveforms of the actual sounds (brass, strings, etc.) that are stored in the Multisound data bank, and polish up and customize the sounds by editing the appropriate parameters, such as transposition, envelope or touch sensitivity.

In the above example, you may not need to use the M1 as a two-synthesizer unit. If you set the Oscillator Mode to Single, your sound can be shaped by the Oscillator / VDF / VDA system, saving you time and making the whole sound creation process just that much more efficient.

The Single Oscillator Mode allows you to take full advantage of the M1's 16-voice polyphony for expressive play of instrument sounds such as piano and harp.

On the other hand, if you want to create complex sounds with two systems, set the Oscillator Mode to Double. The M1 then functions as two completely independent synthesizers.

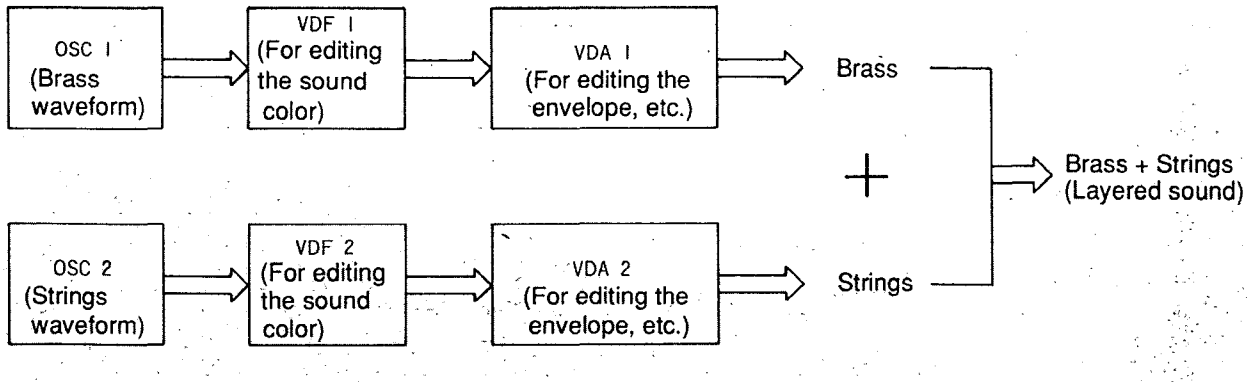
When in Double Oscillator Mode, the maximum simultaneous voices available is, of course, limited to 8, since two oscillators are used for one sound.

Let's take a look at some of the possibilities and uses of the M1's Double Mode.

Layered Sounds With Two Oscillators

Initially, let's see what can be done with the most basic use of this function: simultaneous play of two different sounds.

In order for a conventional synthesizer to sound both brass and strings programs from the play of one key, it is necessary to set up 2 programs, one brass and one strings, and create a layer of the sounds by using a special combination function that allows several programs to be grouped together. (Naturally, it is impossible for



synthesizers which do not have a combination function to accomplish this.)

In the M1, however, this is possible from the very beginning at the program creation stage by merely setting the Oscillator Mode to Double.

In our example, we'll assign the brass Multisound data to Oscillator 1 and the strings Multisound to Oscillator 2. Then edit the VDF 1 and VDA 1 parameters to precisely create the brass sound you want, and do the same for the strings sound by editing the VDF 2 and VDA 2 parameters.

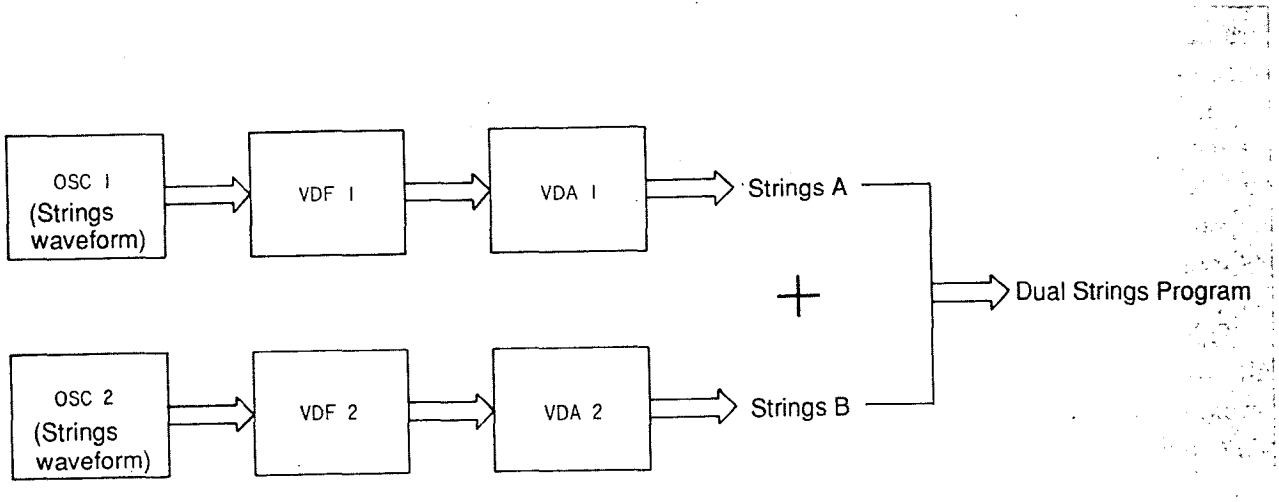
The sounds can be "pre-mixed" by using the Oscillator Level parameter for each oscillator; moreover, transposition and detuning settings can also be made independently for each oscillator.

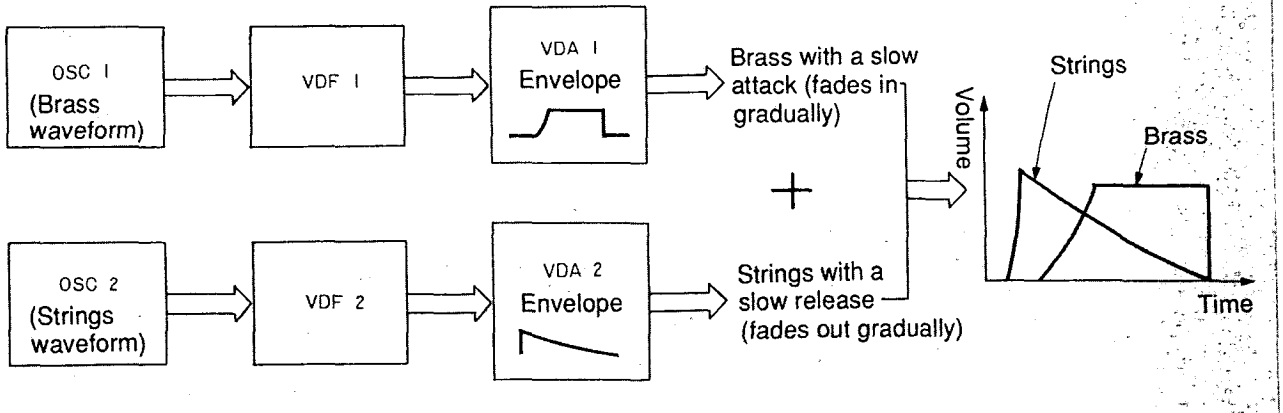
Finally, your layered sound can be named and then stored as one complete sound program.

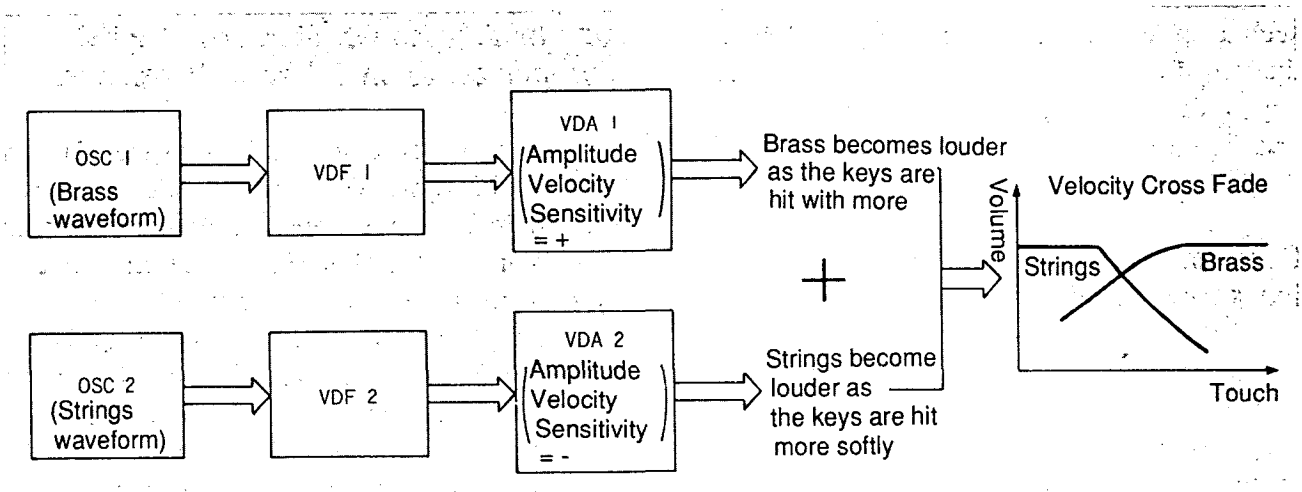
Infinite Possibilities of Sound Creation

Here's another hint to take you further in the creation of your own sounds.

Assign the same Multisound data to each oscillator, but set the oscillator and envelope parameters of each system to slightly different values, depending on your taste and your willingness to experiment. With a little judicious editing of volumes and detuning, very rich and warm







sounding string and brass sections can easily be created.

Besides the simple mixing of two voices, the two- synthesizer system can be used to create a composite sound in which the strings program gradually fades out just as the brass sound fades in. You can also program the brass sound to remain silent for a short, specified time after the key is played; set the attack level of the strings sound's VDA EG to 0 and the attack time to the length of time you want the sound to remain silent before fading in.

Another possibility is to set the VDA Amplitude Velocity Sensitivity of the brass sound to a positive value and the corresponding VDA parameter of the strings sound to a negative value. This creates a "velocity cross fade" in which the strings and brass sounds fade in and out of each other depending on key velocity. In other words, playing the keyboard very softly will cause only the strings to sound, and the harder the keyboard is played, the stronger the brass sound becomes.

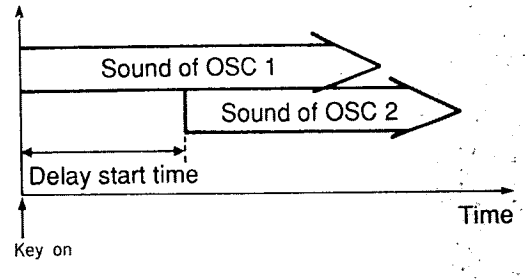
Use of Extracted Waveforms

As we mentioned earlier in the section on sound waveform data, instrumental and vocal waveforms made up of unpitched sound elements and waveforms of pitched elements are both available as sound sources for the M1's oscillators.

These extracted waveforms are extremely useful as basic material for creating new sound sources, since they can be effectively combined with other, pitched waveforms for unique sound programs.

To achieve this, the extracted unpitched waveform would be assigned to one oscillator and a Multisound data pitched waveform the other. The Delay Start parameter of Oscillator 2 is particularly important here. Without it, the assigned waveforms will sound at the same time, making the combined sound merely a mix or layer of the two waveforms. What we want to do is program the unpitched waveform to sound directly after the key is pressed, and the pitched waveform of the other oscillator to follow immediately after the first waveform sounds. The Delay Start parameter was included on the M1 to cover just

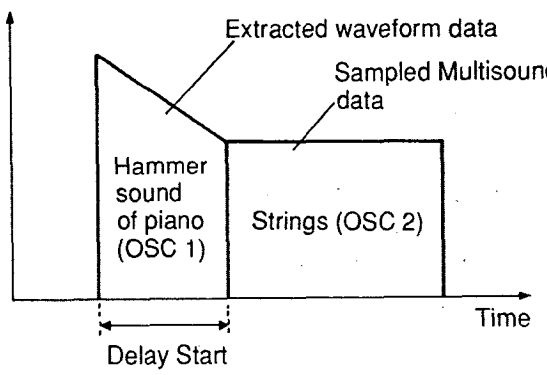
Delayed Start of OSC 2



such a application; it determines how much later the waveform of Oscillator 2 will sound after a key played. The diagrams below (Fig. 13, 14, 15) and the descriptions that follow clearly illustrate the use of this parameter.

Connecting an Instrument Sound to an Extracted Waveform

An infinite variety of unique formerly impossible sounds can be made through various combinations, such as grafting the hammer sound of an acoustic piano to a violin, or connecting the sound of pieces of metal being struck to an electric piano, or putting the breath sound of the human voice on a marimba -- the creative possibilities are absolutely endless!



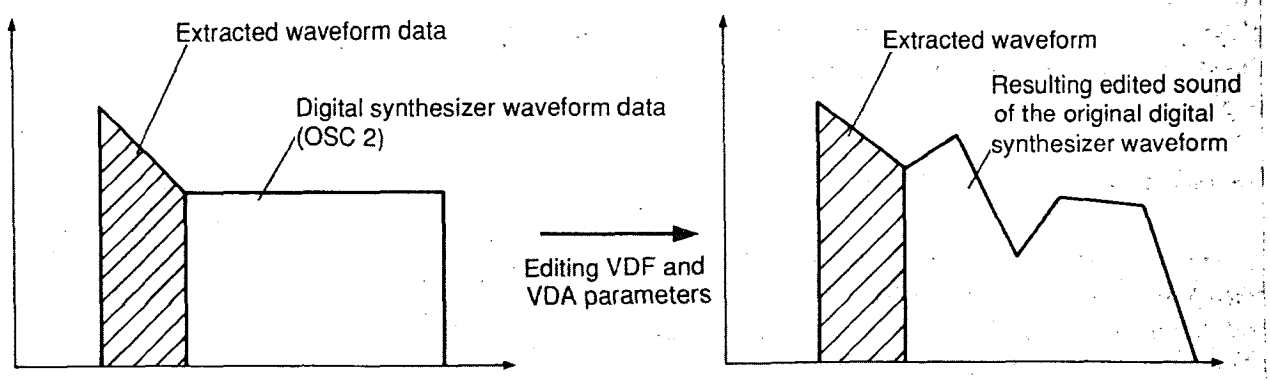
Connecting the Waveform of a Digital Synthesizer to an Extracted Waveform.

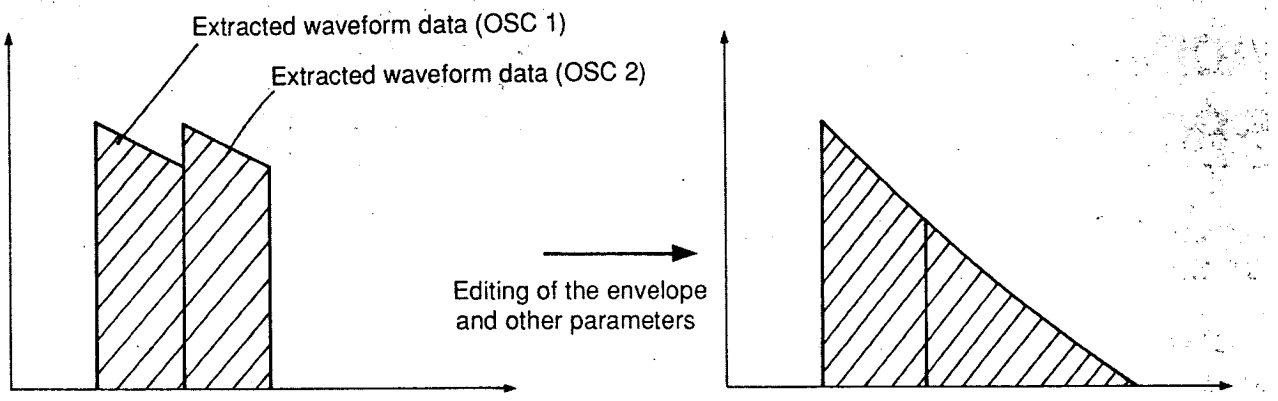
The two-oscillator functions of the M1 can also yield some very interesting acoustic-electronic hybrid sounds. Digital synthesizer sounds among the D.W.G.S. waveform data can be combined with various extracted waveforms. For example, a D.W.G.S. waveform could be attached to the end of a piano's hammer hit, or the thumb pop of an electric bass could be applied to the basic tone of a fat synthesizer bass.

And all sounds can be further enhanced by editing the D.W.G.S. portion with the VDF and VDA sections.

Connecting Extracted Waveforms

Sharp percussive sounds of unusual nature can be obtained by a similar method; however, in this case, only extracted waveforms are used. A metal hit could be combined with the attack sound of vibes. Or the human breath can be connected to hammer sound of a piano. A wide range of fascinating percussive sounds can be made in this fashion.



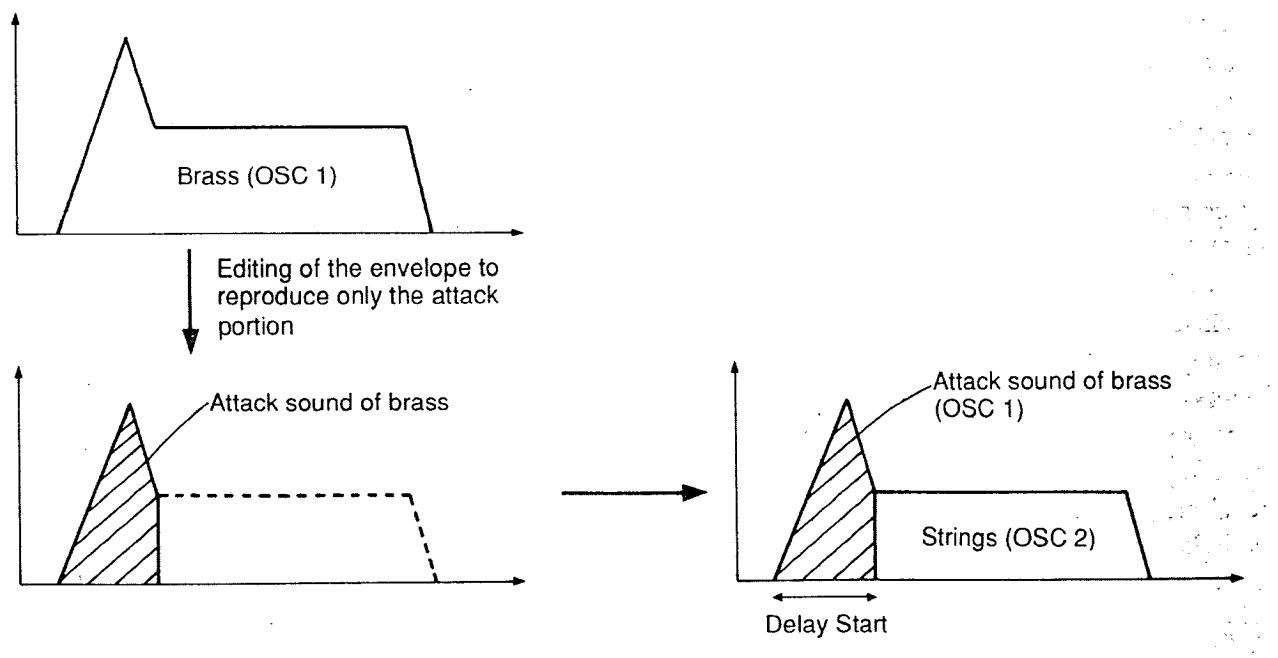


Connecting One Instrument to Another

It is very easy to reproduce only the attack portion of instrument sounds that have not been made into extracted waveform data; the VDA EG is the key.

Here's one possibility: Set the VDA EG so that only the attack part of a brass sound assigned to Oscillator 1 is reproduced. Then assign strings to Oscillator 2. Finally, by setting the Delay Start parameter to an appropriate value, a sound combining the attack of brass with the sustain of strings can be created.

The above are just a few ideas of what you can do with the advanced sound sources and editing features of the M1. Still, the bulk of the instrument's capabilities lie hidden beneath the surface, and it's up to you to bring them out!



part 3

STEREO MULTI-EFFECTS FOR ADDING THE FINAL PROFESSIONAL TOUCH

Effects: The Last Element in Total Sound Creation

Up until now we've seen the versatility of the M1 from its sound data section to the VDF and VDA functions. They form, however, only a part of the full potential and power of this advanced instrument. The AI system has some other surprises in store.

AI Synthesis means total sound creation. It means complete control over all aspects of the synthesized sound from waveform generation to final output. That fundamental concept of total control would be incomplete without one more essential sound processing function: Effects.

Everyone realizes from elementary physics that sound is heard because of vibrations in the air. Though it conducts the sound to our ears, the air that surrounds us is not nearly as important in determining the characteristics of the sound we hear as are the walls, ceiling and other parts of the listening environment that reflect or absorb the sound. In other words, the sound that reaches our ears is a combination of the direct sound, various reflected sounds and a lingering wash of reverberated sounds. The nature of this combination differs depending on the listening environment.

Strictly speaking, it is impossible to hear only the direct sound of an instrument, except inside an anechoic room (a room in which all sound reflections are absorbed). As a result, sound processing effects, particularly those that simulate the acoustic characteristics of the listening environment, must be considered a necessary element of the sound making process. Effects that alter or enhance the tone color of sounds, such as chorusing and phase shifting, are also essential.

This is why Korg has included a two-system stereo digital multi-effect unit capable of independent operation.

The clarity of sound is perfectly preserved since the effect section, like all others in the M1, features complete digital processing.

In terms of the effects and parameters available and its clear, natural sound, this section by itself would qualify as one of today's best high-quality multi-effects units.

Let's take a look first at the basic effects programs that make up this digital multi-effects section.

33 Different Effect Types

Each unit is equipped with not only reverb, delay, flanger and phase shift effects, but also distortion, an exciter, and a rotary speaker effect -- effects that up until now were not available on a synthesizer or even on most stand- alone multi-effect units.

Reverb Group

The effects of this group simulate the acoustic characteristics of various listening environments by recreating sound reflections.

The following six effect types make up this group.

- *HALL*

The natural, spacious ambience of a hall.

- *ENSEMBLE HALL*

A hall reverb especially suited for string and brass ensemble sounds.

- *CONCERT HALL*

A hall reverb that emphasizes the early reflections characteristic of a large hall.

- *ROOM*

The tight, well-defined reverberation patterns of a relatively small room.

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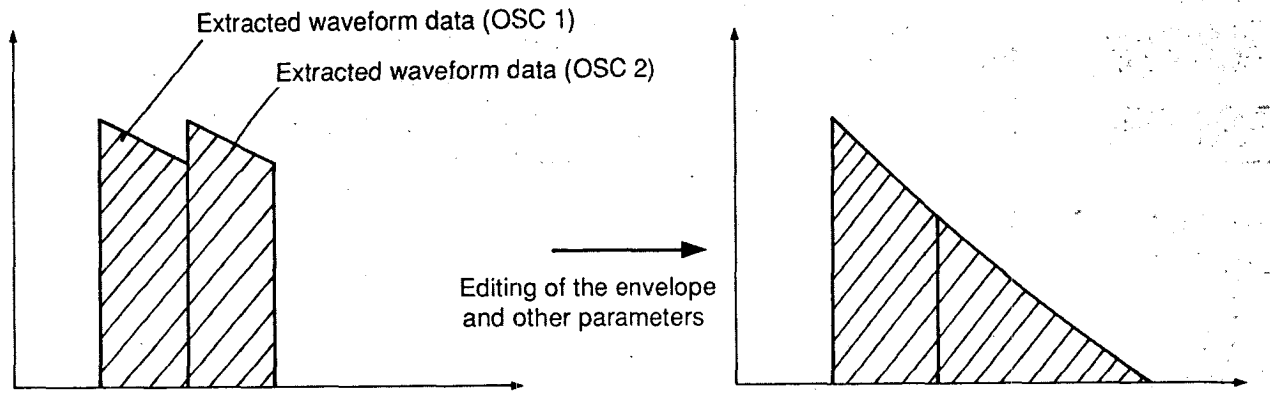

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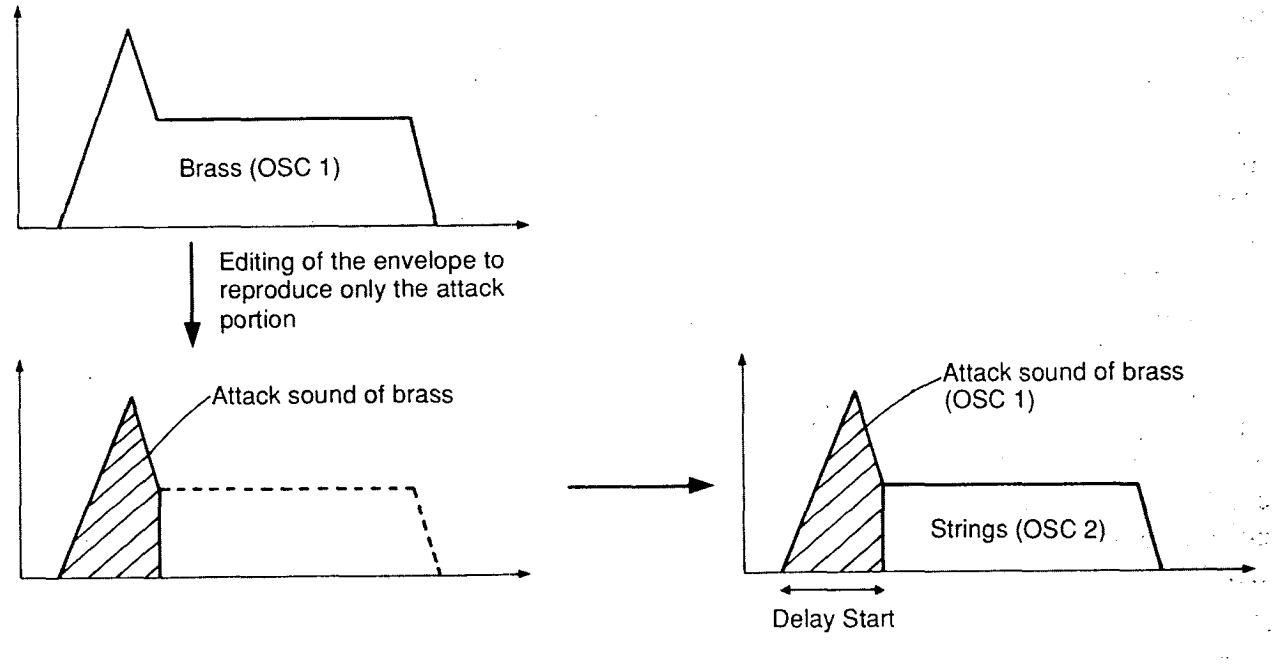

- *LARGE ROOM*

Emphasis here is on the relative density of the sound and the effect created is much like that of a disco. A gating effect can be achieved when the reverb time is set to about 0.5 sec.

- *LIVE STAGE*

This program creates the reverberation characteristics of a relatively large room.

Early Reflection Group

This effect group allows you to adjust the early reflections, which are crucial in determining the realism of the reverb sound as it would be heard in an actual room, separate from the reverberant "wash." A wide range of effects can be obtained, such as adding to the density of the sound or achieving a "live" room sound with more discrete echoes and reflections.

The following three effect types make up this group.

- *EARLY REFLECTION I*

This program is effective for reinforcing or emphasizing the low frequency range, as well as putting a general-purpose gating effect on percussive sounds.

- *EARLY REFLECTION II*

The change in level for the early reflection sound time differs from that in Early Reflection I.

- *EARLY REFLECTION III*

Unlike Early Reflection types I and II, this effect uses a reverse envelope on the early reflections. A reverse effect (similar to a tape recorder being played backwards) can be applied to sounds which have strong attack characteristics, such as cymbals.

Delay Group

Delay patterns here make use of a stereo configuration; the delay time can be set independently for the left and right channels. The damping of high frequencies for more accurate reproduction of the natural decay of high frequencies in an actual room can be achieved by using the high damp parameter.

- *STEREO DELAY*

A stereo delay effect having two delay systems, each of which has a feedback circuit that sends part of the sound back to the delay again.

- *CROSS DELAY*

A stereo delay in which the feedback signal of each delay crosses over and is routed to the other delay.

Chorus Group

This is a stereo effect that combines two chorus circuits and imparts a natural, warm and "fat" sound to an instrument sound. It is particularly effective with piano, strings and brass.

- *STEREO CHORUS I*

A stereo effect that combines two chorus circuits. A swirling, constantly changing sound that moves between the stereo outputs is created through phase inversion of the two circuits.

- *STEREO CHORUS II*

In this effect the two chorus circuits are kept in phase.

Flanger Group

This effect is achieved by the addition of feedback to the chorus effect. Since its pronounced swirling adds color and motion, it is most effective with sounds that have many harmonics, such as cymbals.

- *STEREO FLANGER*

A stereo effect that combines two flanger circuits. The swirling and swishing effect that moves expansively between the stereo outputs is enhanced by phase inversion of the two flanger circuits.

- *CROSS FLANGER*

A flanger effect in which the feedback signal of each flanger circuit crosses over and is routed to the other flanger.

Phase Shifter Group

This effect uses phase inversion of the signal to create a pronounced swirling and swishing sound.

- *PHASER I*

A stereo effect that combines two phaser circuits. The swirling and swishing effect that moves expansively between the stereo outputs is enhanced by phase inversion of the two phaser circuits.

- *PHASER II*

In this effect the two phaser circuits are kept in phase.

Tremolo Group

This effect periodically varies (or modulates) the volume.

- *STEREO TREMOLO I*

This is a stereo effect that combines two tremolo circuits. The stereo effect is enhanced by phase inversion of the two tremolo circuits and automatic panning between the left and right outputs.

- *STEREO TREMOLO II*

In this effect the two tremolo circuits are kept in phase.

Equalizer Group

There is one effect type in this group.

- *STEREO 2 BAND EQUALIZER*

This effect decreases (cuts) and increases (boosts) the frequencies in both the low and high ranges.

Overdrive Group

This group includes distortion effects not previously available in multi-effects units. One type is overdrive and the other is distortion.

- *OVERDRIVE*

Overdrive was originally a soft distortion effect gained by "overdriving" a tube amplifier. This effect on the M1 simulates the overdrive used generally for guitars, and is particularly effective when playing guitar-like lines and solos.

- *DISTORTION*

Compared with Overdrive, this effect has a "dirtier" sound with more of a hard edge, and is excellent for simulating a fuzz distortion sound.

Exciter Group

- *EXCITER*

This is an effect which increases the clarity of the sound, gives it greater definition and presence, and helps in bringing the sound to the forefront.

Ensemble Group

This effect makes one instrument sound like many of the same instrument played together.

- *SYMPHONIC ENSEMBLE*

This effect is most effective on sounds that are often used in ensembles, such as strings, and works by applying greater modulation in a chorus-type program.

Rotary Effect Group

This effect is designed to duplicate the rotational (Leslie) speaker effect popular for jazz and rock organ sounds.

- *ROTARY SPEAKER*

A very effective rotary speaker effect, especially effective on organ sounds. The speed changes characteristic of the Leslie speaker can be

A flanger effect in which the feedback signal of each flanger circuit crosses over and is routed to the other flanger.

Phase Shifter Group

This effect uses phase inversion of the signal to create a pronounced swirling and swishing sound.

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- *ROTARY SPEAKER*

A very effective rotary speaker effect, especially effective on organ sounds. The speed changes characteristic of the Leslie speaker can be

- *LARGE ROOM*

Emphasis here is on the relative density of the sound and the effect created is much like that of a disco. A gating effect can be achieved when the reverb time is set to about 0.5 sec.

- *LIVE STAGE*

This program creates the reverberation characteristics of a relatively large room.

Early Reflection Group

This effect group allows you to adjust the early reflections, which are crucial in determining the realism of the reverb sound as it would be heard in an actual room, separate from the reverberant "wash." A wide range of effects can be obtained, such as adding to the density of the sound or achieving a "live" room sound with more discrete echoes and reflections.

The following three effect types make up this group.

- *EARLY REFLECTION I*

This program is effective for reinforcing or emphasizing the low frequency range, as well as putting a general-purpose gating effect on percussive sounds.

- *EARLY REFLECTION II*

The change in level for the early reflection sound time differs from that in Early Reflection I.

- *EARLY REFLECTION III*

Unlike Early Reflection types I and II, this effect uses a reverse envelope on the early reflections. A reverse effect (similar to a tape recorder being played backwards) can be applied to sounds which have strong attack characteristics, such as cymbals.

Delay Group

Delay patterns here make use of a stereo configuration; the delay time can be set independently for the left and right channels. The damping of high frequencies for more accurate reproduction of the natural decay of high frequencies in an actual room can be achieved by using the high damp parameter.

- *STEREO DELAY*

A stereo delay effect having two delay systems, each of which has a feedback circuit that sends part of the sound back to the delay again.

- *CROSS DELAY*

A stereo delay in which the feedback signal of each delay crosses over and is routed to the other delay.

Chorus Group

This is a stereo effect that combines two chorus circuits and imparts a natural, warm and "fat" sound to an instrument sound. It is particularly effective with piano, strings and brass.

- *STEREO CHORUS I*

A stereo effect that combines two chorus circuits. A swirling, constantly changing sound that moves between the stereo outputs is created through phase inversion of the two circuits.

- *STEREO CHORUS II*

In this effect the two chorus circuits are kept in phase.

Flanger Group

This effect is achieved by the addition of feedback to the chorus effect. Since its pronounced swirling adds color and motion, it is most effective with sounds that have many harmonics, such as cymbals.

- *STEREO FLANGER*

A stereo effect that combines two flanger circuits. The swirling and swishing effect that moves expansively between the stereo outputs is enhanced by phase inversion of the two flanger circuits.

- *CROSS FLANGER*

made in real time with the use of a volume pedal.

Combination Effects Group

These effect programs are combination effects in which different effects are assigned to the two channels. Each combination effect can even be used in the two-system (Effects 1 and 2) configuration common to the other channels, for a total of four possible simultaneous effects. The following eight combination effects are available:

DELAY/HALL
DELAY/ROOM
DELAY/EARLY REFLECTION
DELAY/DELAY
DELAY/CHORUS
DELAY/PHASER
DELAY/TREMOLO

As we mentioned above, there are more than 33 kinds of effects built into the M1. A wide variety of sound processing possibilities are available by editing the parameters of each effect type.

Infinite Effects Combination Through Dual System

The beauty of the M1's multi-effects section is that two effects can be set independently. The path that the sound takes through the effects, serial or parallel, can also be selected.

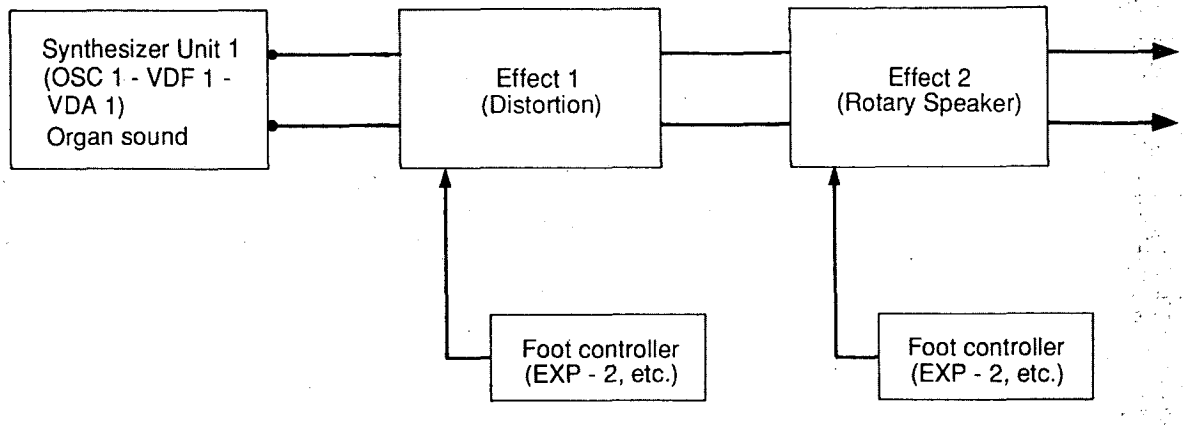
Let's take a look at some examples of two-system effects.

Example 1

This setting reproduces the hard rock organ sound by connecting the effects in serial fashion. The depth of the distortion and the speed of the rotary effect can be controlled by using the foot controller (EXP-2).

An effect suitable for guitar sounds can be obtained by setting Effect 2 to one of the Reverb Group effects.

<EX-1>



Example 2

This also is an example of effects being connected in serial. The parameters are set so that only reverb affects the sound of Timbre 2; the exciter effect is assigned to the sound of Timbre 1 to make that sound stand out.

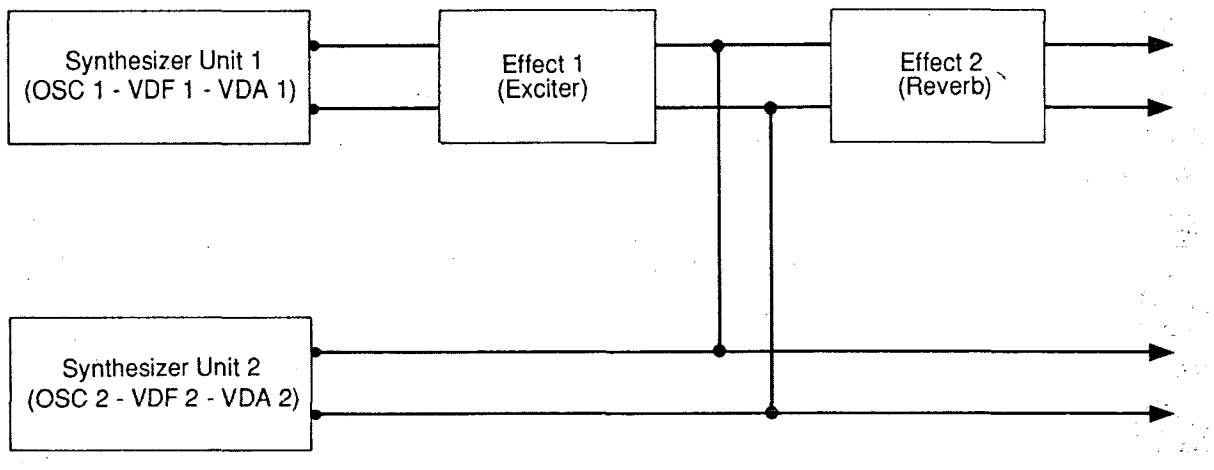
Example 3

Here is an example of a parallel setup. All drum sounds except the snare are panned and routed through the stereo reverb effect. A delay is applied to the solo guitar and an early reflection effect is used for the snare by selection of the combination type Delay/Early Reflection.

In actual sound making, the desired effects are edited added at the final stage of sound creation, after completing the basic sounds in the oscillator, VDF and VDA sections. Finally, the sounds -- with the assigned effects -- can be written to memory as sound programs.

And that's the basic sound creation process of the M1, the AI Synthesis system. With its logical operation flow, its comprehensive features, and, above all, its fantastic sound, you can see (and hear) for yourself how this system can help you shape your own original sounds.

<EX-2>



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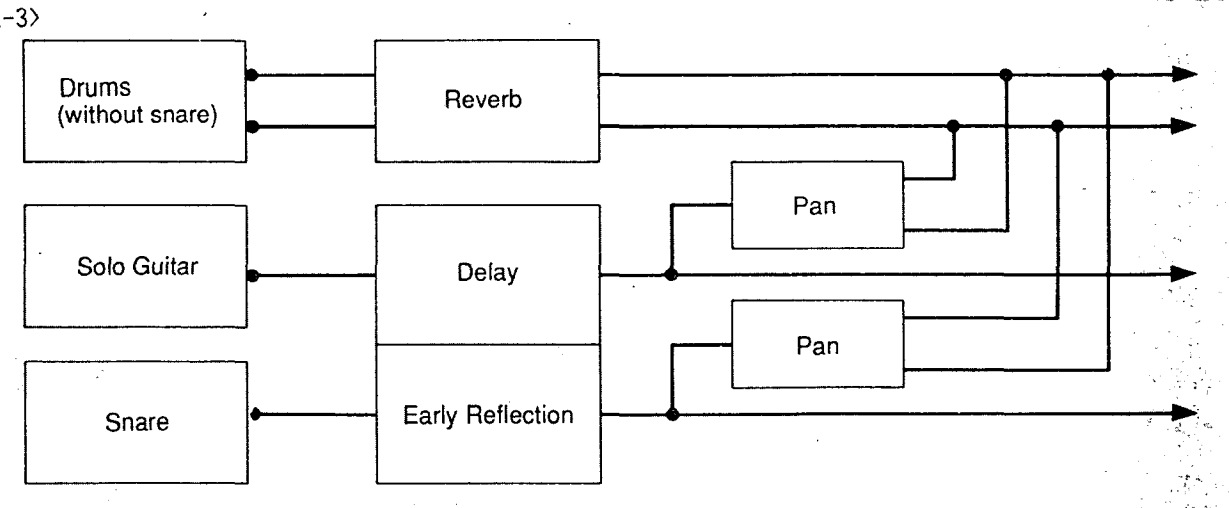


part 4

ALL THE EXPRESSIVE POWER YOU NEED

COMBINATION FUNCTION, PERFORMANCE AND EDITOR FUNCTIONS, PEDAL ASSIGN FUNCTION – ALL EXPAND PERFORMANCE POTENTIAL

In the previous section we've seen how the M1 can create sounds. Now, let's look at what it can do for the playing of those sounds.

The M1 is a musical instrument before it is a work station. As such, it must be capable of bringing out the expressiveness of the player. It must be capable of translating the human touch into a more natural, expressive sound.

Let's take a look at how the M1 does this.

Combination Function

As a keyboard player, you've undoubtedly come across the problem in which there were more instrumental parts to be played than there were synthesizers on which to play them.

With most conventional synthesizers, only one sound program can be played at any given time. And when you select one sound program, that program is assigned to all the keys of the keyboard. For a synthesizer to be truly versatile, it should allow you to play several separate sounds at the same time, and save you the effort (and expense) of working with huge multiple keyboard setups or complicated rack mount arrangements. And that's precisely what the Combination function of the M1 was designed to do.

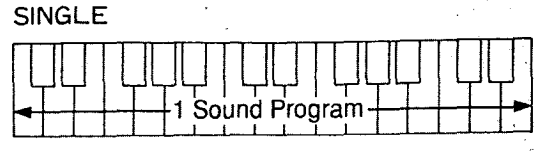
You can combine up to eight different sound programs in any fashion with this function. Many different combinations are possible, but for ease of operation, the following types have been prepared.

- *SINGLE*

This Combination allows play of one sound program.

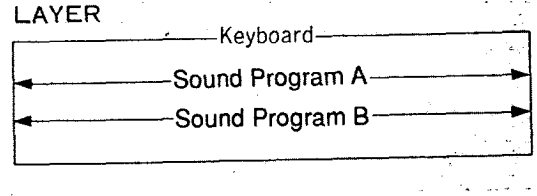
This setting should be used when you want to immediately select the sound program you have just finished editing.

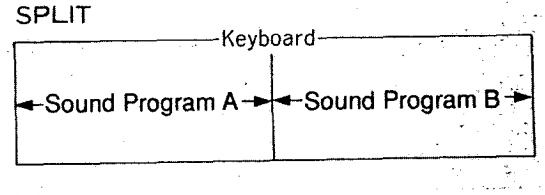
- *LAYER*



This Combination type allows you to mix or layer two sound programs. A layered sound of up to four programs can be created, since the M1 is capable of combining two programs into one sound at the initial sound creation stage.

- *SPLIT*





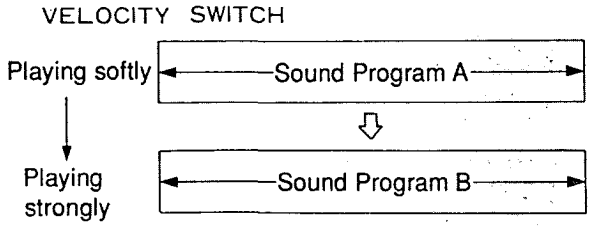
In this Combination, you can divide the keyboard into two sections, top and bottom, by selecting the desired split point (the key that separates the two sections), and assign a different sound program to each section.

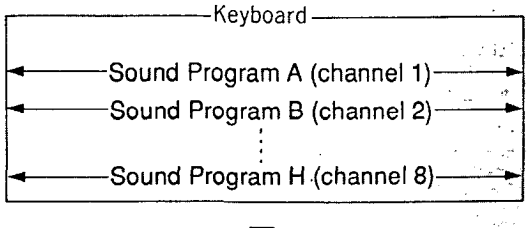
- *VELOCITY SWITCH*

This Combination makes it possible for you to switch between two different programs depending on how hard you play. The M1 can be made to sound one program when you play the keyboard softly, and a completely different program when you play it strongly.

- *MULTI*

Up to eight different sound programs can be used in the Multi Combination. Programs can be assigned to any MIDI channel, key range or velocity range.





MIDI channel of the data to be transmitted	Responding Sound Program
1ch	A
2ch	B
8ch	H

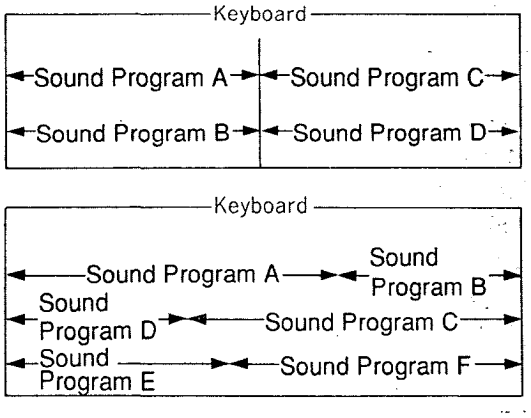
Here are some possible Multi Combinations:

For Use As Multiple Sound Sources

The M1 can be made to substitute for many synthesizers or modules by setting a different MIDI receiving channel for each of eight different programs.

Combination of Split and Layer

This example depends on the setting of the key window (the range on the keyboard over which the sound program can be played). As shown in the figure below, two different sounds are layered in the lower section of the keyboard, and two more are layered in the upper section. It is also possible to mix and layer sounds in more complex arrangements, as shown in the bottom diagram.



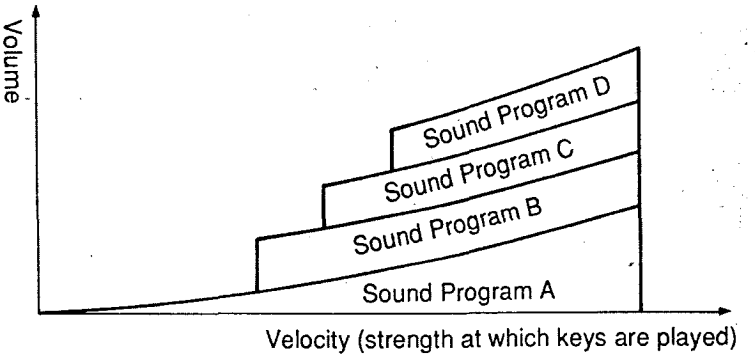
Velocity Layering

By setting the velocity window (the velocity range over which the sound program can be played), you can have additional sound programs gradually be mixed in with the basic sound program, depending on how strongly you play the keyboard. This function can also be used in tandem with Velocity Switch.

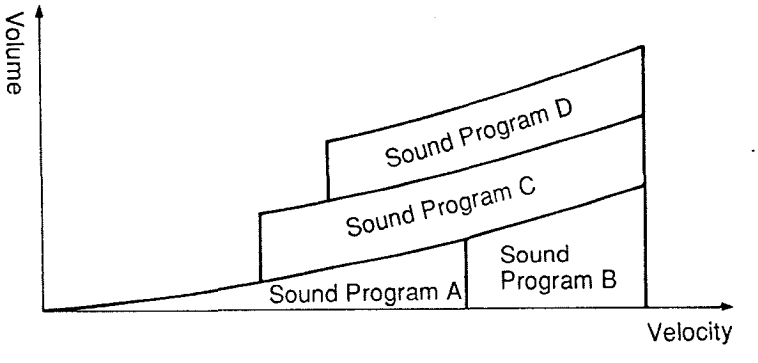
Moreover, Combinations can be made in which one sound program is played from the M1's keyboard and others are played by an external instrument, such as a sequencer or computer. The Multi Combination feature is flexible enough to

Velocity Layering

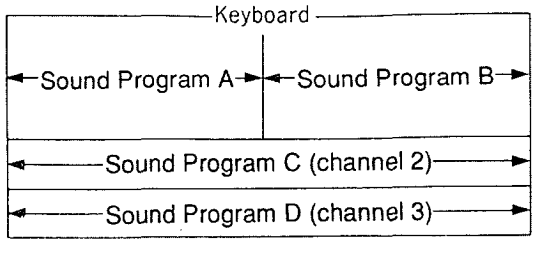
The stronger the keys are played, the more sound programs are added and mixed.



Combined With Velocity Switch



cover nearly any recording or performance situation.



* Sound programs A and B can be played from the keyboard as a Split. Programs C and D sound when they receive MIDI data over the selected channels.

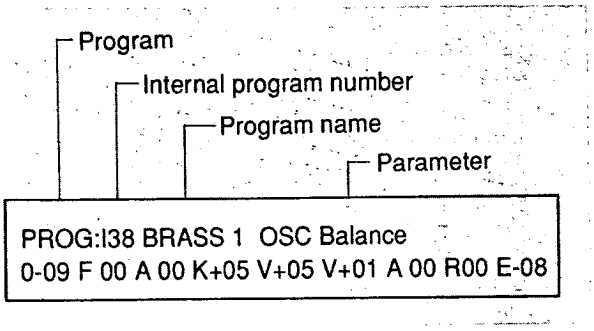
Performance Editor Function

The performance features of the M1 also make it possible to finely adjust various elements of the sound as you are playing. Whether on stage or in the studio, you can inject more personality, more emotion and more expressiveness into your playing.

This real-time performance editing function is part of the Korg DS-8 and 707 synthesizers; in the M1, however, it has been given greater depth and detail, allowing you finer control over your sounds than ever before.

To see just how wide ranging this function is, let's take a look at the relevant parameters displayed when playing sounds in the Program Mode.

The program number and name are indicated in the upper row and the eight parameters that can be adjusted in real time in the bottom row. The



display shows the current values of these parameters and each can be changed as desired.

Starting from the far left of the display, let's examine each of the eight parameters and what you can control with them.

- *Oscillator Balance*

For programs made in the Double Mode, control over the volume balance of Oscillators 1 and 2.

- *VDF Cutoff*

Control of the cutoff frequency of VDFs 1 and 2 (makes timbre brighter or more muted).

- *VDA Level*

Controls the overall sound level of Oscillators 1 and 2.

- *Keyboard Tracking*

Controls the sensitivity at which changes in sound color and volume are affected by the section of the keyboard played.

- *Velocity Sensitivity*

Controls the sensitivity at which changes in sound color and volume are affected by the section of the keyboard played.

- *Attack Time*

Controls the attack time of the VDF EG and VDA EG.

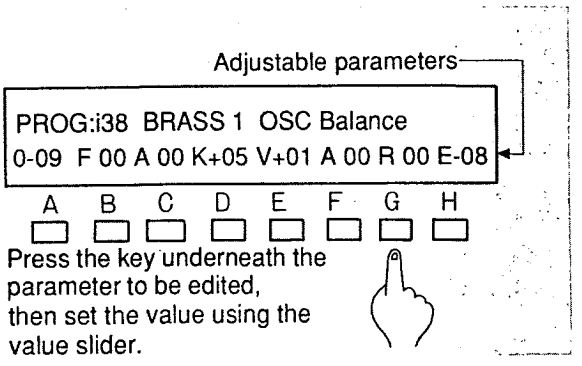
- *Release Time*

Controls the release time of the VDF EG and VDA EG.

- *Effect Balance*

Controls the balance of the direct sound and the sound of Effects 1 and 2.

Select the value you want to edit by pressing the key below it (from the A - G CURSOR POSITION keys at the bottom of the display), and change the value by using the value slider or UP/DOWN keys. Editing of these parameters can be done at any time, without having to enter the Edit Program Mode and separately select them.



Pedal Assign Function for Instant Sound Editing

A convenient pedal assign function is included so that you can operate various controls without taking your hands from the keyboard.

Control over the following functions is possible by connecting footswitches or volume pedals to the PEDAL 1 AND PEDAL 2 terminals on the rear panel.

Footswitch Controls

- *Program Up*

Selection of programs or Combinations by stepping up through them in sequence.

- *Program Down*

Selection of programs or Combinations by stepping down through them in sequence.

- *Effect 1 ON/OFF*

ON/OFF switch for Effect 1

- *Effect 2 ON/OFF*

ON/OFF switch for Effect 2

- *SEQ Start/Stop*

Start/Stop switch for sequencer

Volume Pedal Controls

- *Volume*

Volume adjustment

- *VDF Cutoff*

Adjust the cutoff frequency of the VDF

- *Effect 1 Balance*

Balance of the direct sound and effect sound for Effect 1

- *Effect 2 Balance*

Balance adjustment of the direct sound and effect sound for Effect 2

- *Data Entry*

Adjustment of parameter values (substitutes for Value slider on front panel)

The Pedal Assign function in the Global Mode is used to set any of the above to be controlled by the footswitch or the volume pedal connected to the PEDAL 1 and 2 terminals.

With this function, you can even set the timbre of the sound and the effect assigned to it to be controlled simultaneously AND independently. Simply assign one volume pedal to the VDF Cutoff and the other pedal to control the effect balance.

Scale Type Function for Tuning Changes

Another important element in the expressive power of a digital instrument is its ability to be tuned to alternate scales. The tuning of pianos and organs is, of course, fixed and relatively stable. However, many acoustic instruments, such as violins and other stringed instruments or members of the brass family, are difficult to play precisely in tune.

No matter how accurate the reproduction or simulation of the sound of actual acoustic instruments, a synthesizer that cannot imitate the flaws of intonation in those instruments falls noticeably short of the mark.

Alternate tunings are also important in the accurate interpretation of music of other eras. A piece composed in the Middle Ages was intended for a tuning system different than the one commonly employed now; to be faithful to the original piece, we should be able to change the tuning of the instrument to the one used at that time.

The Scale Type function was included on the M1 to cover these musical bases. It is one of the functions of the Global Mode, and in it four different tuning selections are available.

- *Equal Temperament*

A widely used tuning for keyboard instruments in which chords can be played in any key to the same effect.

- *Equal Temperament 2 (Random pitch)*

This equal temperament scale has random detuning applied to each note of the scale; in other words, every note that is played is detuned from the equal temperament scale by a randomly assigned amount. This is especially useful in reproducing the errors of intonation that occur in the playing of many acoustic instruments or reproducing instruments whose pitch is slightly unstable.

- *Pure Major*

Pure major is a tuning for which chords played in the selected key are most closely in tune. You can select the key from C to B.

- *Pure Minor*

This tuning is similar to pure major but is designed to be played in minor keys. Select the key from C to B.

- *User Programmable*

Original scales can be created by setting the pitch of each of the 12 tones from C to B in the range of +/- 50 cents (from the equal temperament scale). With this function, the playing of specific or unique scales besides the preset scales is possible.

part 5

RECORDING RHYTHMS

Creation of Rhythm Tracks With the M1

As we pointed out in the beginning of this guidebook, the M1 is fully equipped for all aspects of music production.

Up to this point, we've concentrated on the sound making and performance capabilities. Now, let's see what the instrument can do for you as you create music.

In songwriting generally, once the structure of a song has been decided upon, work on the concrete elements of the music and production can begin. In this early stage of composition, the rhythm arrangement is made.

Rhythm, which is one of the three main elements of music, is very important because it can affect the entire atmosphere of the song.

Let's now look at the rhythm functions of the M1.

Structure of the Rhythm Section

The M1's "rhythm section" is not separate from the rest of the instrument. For the first time in a synthesizer, the drum sounds are, with the sequencer and effects sections, an integral part of the machine.

The structure may appear extremely complex. Yet in operation, it is simpler than working with separate drum sampling and sequencing machines, and more flexible than using a rhythm machine.

Complete control over the sound of the rhythm is assured as well, since all VDF, VDA and Effects editing can be applied to the drum sounds as they are to any of the other programs of the M1.

Making Multisounds Especially for Rhythms

As we mentioned in Part 3, there are 44 different percussion sounds stored in the sound data bank. Here is that list again.

Since these percussion sounds are part of the sound unit data, it is necessary to collect them together as a Multisound and assign them to specific keys.

This operation is done in the Drum Kit function of the Global Mode. A Drum Kit in the context of the M1's operation refers to rhythm sound sources which are collected to and make up a Multisound. The internal memory of the M1 can memorize up to separate Drum Kits, which gives

Fig. 5 - 1: Drum Sound List

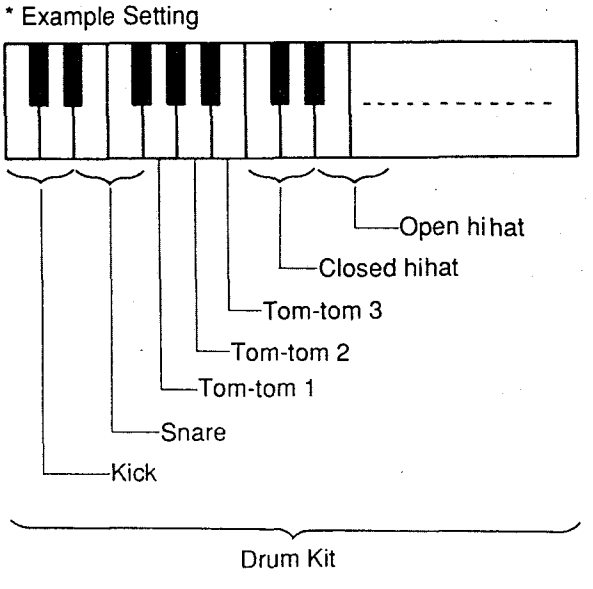
01 Kick 1	12 Open HH1	23 E. Tom	34 Metal Hit
02 Kick 2	13 Closed HH2	24 Ride	35 Pluck
03 Kick 3	14 Open HH2	25 Rap	36 FlexaTone
04 Snare 1	15 Crash	26 Whip	37 Wind Bell
05 Snare 2	16 Conga 1	27 Shaker	38 Tubular 1
06 Snare 3	17 Conga 2	28 Pole	39 Tubular 2
07 Snare 4	18 Timbales 1	29 Block	40 Tubular 3
08 Side Stick	19 Timbales 2	30 FingerSnap	41 Tubular 4
09 Tom 1	20 Cowbell	31 Drop	42 Bell Ring
10 Tom 2	21 Claps	32 Vibe Hit	43 Metronome 1
11 Closed HH1	22 Tambourine	33 Hammer	44 Metronome 2

four different percussion setups that can be switched between instantly.

And in this function, you can determine the key at which each drum sound will be played. Each Drum Kit can have up to 30 different drum sounds.

Fig. 5 - 2

Creating a Multisound by assigning 30 of the 44 drum sounds to the keyboard.



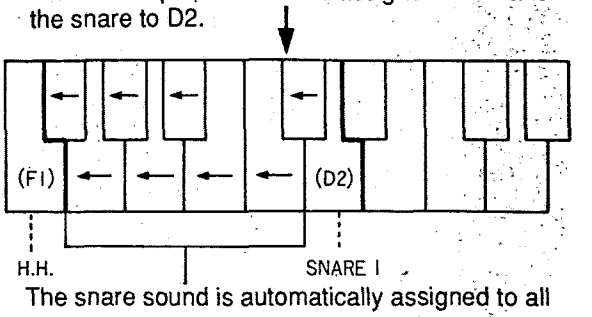
On most samplers, the play range of one sound is determined by the setting of two parameters, the top key (highest sound of the range) and the bottom key (lowest sound). On the M1, however, you need only set the top key parameter -- a very quick and efficient way to assign the 30 drum sounds to a Multisound Drum Kit.

In addition to the adjustable tuning range for each drum sound (+/- 1 octave), the decay time, output level and panning for each sound can also be set.

As is true of all the other sections of the M1, the rhythm section of this instrument more than measures up to nearly any stand-alone unit available.

Fig. 5 - 3

In this example, the hi hat is assigned to F1 and the snare to D2.



The snare sound is automatically assigned to all keys above the next lowest key assignment. (The pitch changes accordingly.)

Further Editing of Drum Sound Source With VDF and VDA

The Drum Kit by itself needs no further editing, because of the high-quality 16-bit sound.

However, for customizing the sounds for your own music production, all Drum Kit sounds can be processed through the VDF and VDA sections.

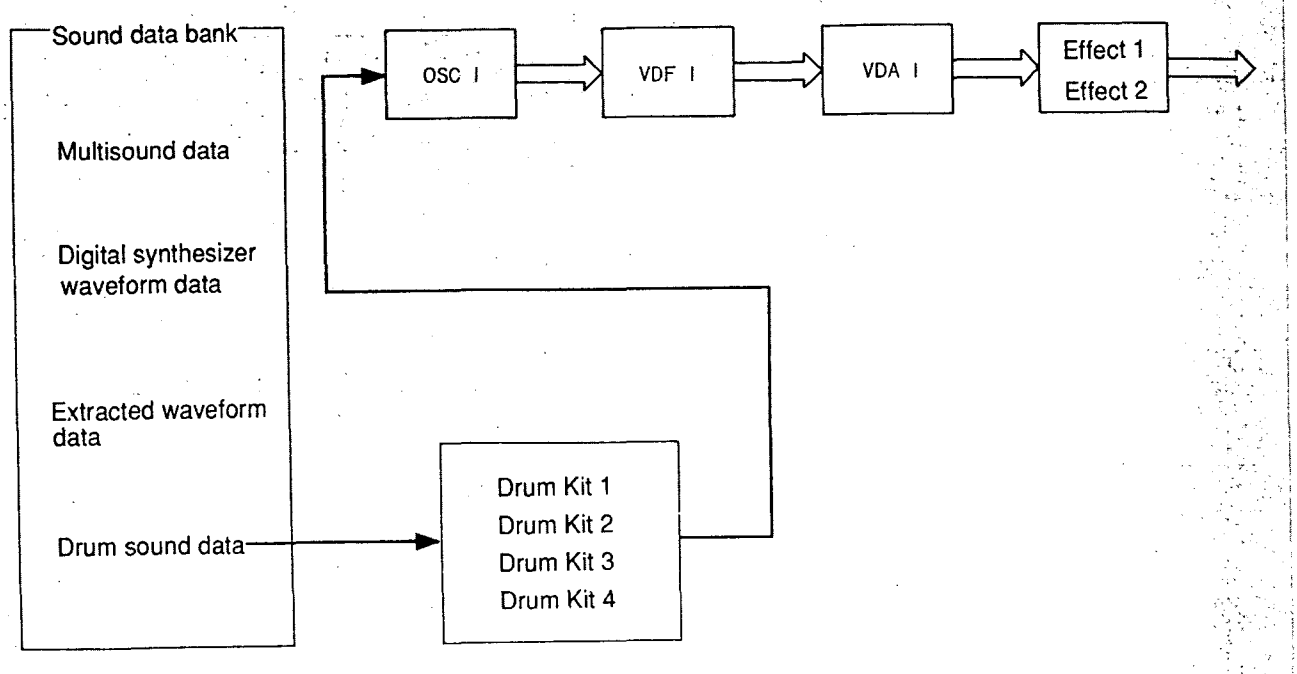
Fig. 5 - 4: Parameters of the Drum Kit Function in the Global Mode

Index	1~30	Drum sound to be edited
Inst.	000~119	Selection of drum sound
Key	C-1~G9	Key to which drum sound is assigned
Tune	-120~+120	Adjusting of pitch by +/- 1 octave
Level	-50~+50	Level adjustment of each sound
Decay	-50~+50	Decay time adjustment of each sound
Pan	A, A:B, B, C, C+D, D	Selection of output

In addition to the Single and Double Oscillator Modes described earlier, there is also a Drums Mode.

The Drum Kit made as described before cannot be used as it is for creating rhythms. Actually, it is necessary to write it in to memory as program data just as you would other sound colors.

When setting the oscillator mode to "DRUMS" Fig. 5 - 5



Select one out of the 4 Drum Kits you've made by setting the oscillator mode to "Drums," then you can assign the sounds to the oscillator.

After that, the sounds can be processed through the VDF and VDA sections as desired, and even have effects applied to them (such as gate reverb).

And all drum sounds edited in this fashion can be written to memory as program data.

Creating Rhythm Patterns

Now, let's use the percussion sounds stored in the M1 to make rhythms. To do this, we need to use the sequencer functions of the M1, a topic we haven't covered yet. In fact, operation of the sequencer functions will be covered in greater detail in the next section; here, we'll concentrate on the operations necessary to create rhythm patterns.

In general, the creation of rhythm parts on rhythm machines consists of the two operation steps outlined below:

(1) Pattern Program

Individual patterns of one to several measures in length are programmed.

(2) Song Program

Individual patterns (created in Step 1 above) are strung together in sequence to make up a song.

The sequencer section of the M1 allows for programming of rhythm tracks by this process.

Up to 100 patterns, each between 1 and 8 measures long, can be memorized. You can record the patterns you need for your song in two ways: 1) by playing the sounds in real time as you listen to a metronome click guide, or 2) by entering each beat individually by step time recording.

Real Time Recording

(1) Select the pattern number to be made.

(2) Select the beat and the number of measures of the pattern (length).

(3) Set the resolution (the smallest beat to which all notes will be adjusted), the ON/OFF set-

ting of the metronome, and the tempo at which to record.

(4) Press the REC key, then press the START/STOP key to start recording.

(5) Play the rhythm on the keys. (Just as on a rhythm machine, you can program the rhythm by playing the keys of each instrument.)

(6) Press the START/STOP key to complete recording

Step Recording

(1) Select the pattern number to be made

(2) Select the beat and the number of measures of the pattern (length).

(3) Press the REC key, then press the START/STOP key to start recording.

(4) Set the value of the note, its duration and its strength (volume). Use the keyboard to input the notes.

(5) Repeat Step 4 until the pattern is complete.

(6) Press the START/STOP key after you are finished recording.

Song Recording

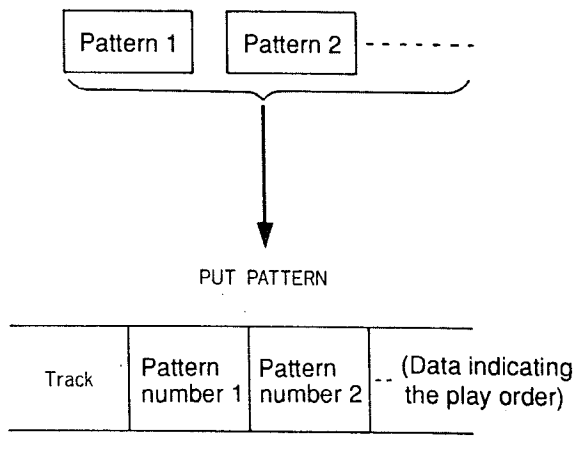
The rhythm track for one complete song can be created by setting a play order for the patterns recorded in the steps above.

One of the sequencer tracks must be reserved for this. The operation used is called Put Pattern.

Because only the pattern number itself (and not the note data of the pattern) is entered into the track's data, a great deal of memory is conserved for use on the other tracks. Once the order of the patterns has been entered to the track, the patterns will be played in the desired sequence.

Fig. 5 - 6

Put Pattern



part 6

THE FINAL STEP IN THE WORKSTATION PROCESS -- THE SEQUENCER

The sequencer section of the M1 lets you bring all the other functions of the instrument together and utilize them in the main purpose of the instrument: to create music.

This powerful, yet easy-to-use section functions effectively as a canvas for sketching out the musical ideas you have in your imagination and bringing them to completion as final, professional-sounding productions.

Complete Functions

The sequencer section is as comprehensive as any separately available sequencer, yet is remarkably easy to operate.

With its 8-track format, it is capable of handling complex multi-instrumental compositions and performs difficult arranging operations with ease.

Up to 250 measures of play data can be recorded to each track, while the total memory capacity is for 10 songs, or approximately 7,700 notes. When the memory capacity becomes full, optional RAM cards may be used to store sequenced data.

Let's see how songs are built with the sequencer of the M1.

The combination of the 8-track play data and parameter data makes up what, for the M1, is considered a "song". Parameters here refer to the song parameters, which allow control over the entire song and include such things as tempo and beat, and the track parameters, which allow control over the functions that need to be set for each track, such as program number, volume and panning.

To begin with, one program is assigned to a track, and its play data is input. Program changes can, of course, be made in the middle of songs as well.

Within the 16-voice polyphonic capability of the M1, there is no limit to the amount of simultaneous notes each track can play, nor need one be set because of the M1's dynamic voice allocation feature.

Song Recording Structure

SONG

Song Parameters (Tempo, beat, etc.)	Parameters (Program number, volume, MIDI channel, etc.) of Track 1	Play data of Track 1
	Parameters of Track 2	Play data of Track 2
	Parameters of Track 3	Play data of Track 3
	Parameters of Track 4	Play data of Track 4
	Parameters of Track 5	Play data of Track 5
	Parameters of Track 6	Play data of Track 6
	Parameters of Track 7	Play data of Track 7
	Parameters of Track 8	Play data of Track 8

EFFECT

Setting of the effects to be used for the song

Effects assigned to each sound program differ widely in type or level, and a program/effect combination that sounds good by itself may not be appropriate when played with other program/effect combinations. When using the sequencer section, therefore, each song is assigned an effect setting that is globally applied to all tracks, separately from the effect settings made on each program, so that the effects most suitable for the entire song may be chosen.

Three Recording Methods

Now let's take a look at the actual operation of inputting play data.

Recording to each track can be done in any of three ways: real time, punch in and step time.

Real Time Recording

Real time recording is the basic and natural recording method, since it records as you play the keyboard. It is just as simple as recording to an 8-track multitrack tape recorder.

First, clear all previously entered data by using the Song Initialize function. Then, after setting the time signature (in the same function), follow these steps:

(1) Set the mode to R/P (the normal recording/play condition) and select the song to be recorded.

(2) Select the track to be recorded.

(3) Select the sound program to be assigned to the track.

(4) Set the tempo and volume.

(5) Press the REC key, then press the START/STOP key to start recording.

(6) Recording starts after a lead-in of two measures.

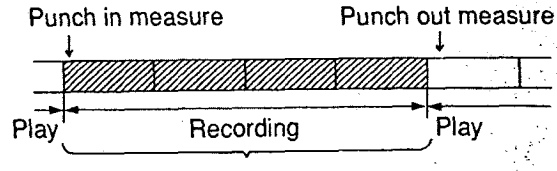
(7) When you're finished playing, stop the recording by pressing the START/STOP key. (The measure is reset automatically.)

(8) Repeat Steps 2 through 7 to record to other tracks.

All the advantages of tapeless multi-track recording can be enjoyed in the simple operation of selecting the track and sound program and starting the recording.

Recording with conventional sequencers is more complicated since MIDI channel and other parameters and functions must be set before recording can begin. This is yet another example of where the all-in-one nature of the M1 results in more efficient operation.

Punch In Recording



Records only the section between the punch in and punch out measures

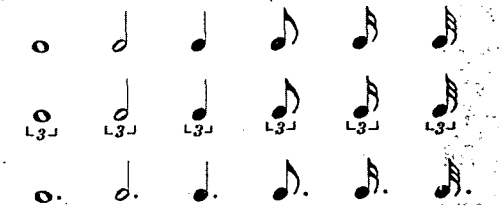
And because real time recording is automatically selected whenever you enter the Sequencer Mode, you can record your musical ideas as instantly and as easily as you would jot down memos in a notebook.

Moreover, a punch in recording feature allows you to re- record parts in which mistakes were made or to continue recording on a track that has already been recorded.

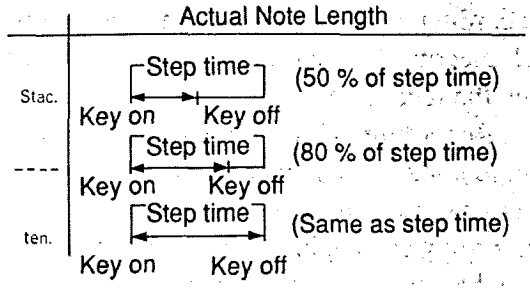
Step Recording

In step recording, the length and strength (volume) of each note is input by specifying the value and the pitch is input by playing the keys.

Available Note Values in Step Recording



Staccato and Tenuto



Selectable key dynamics for step recording

	Strength	Velocity value
ppp	Pianississimo (very weak)	24
pp	Pianissimo	44
p	Piano	54
mp	Mezzo piano (relatively weak)	64
mf	Mezzo forte (relatively strong)	74
f	Forte	84
ff	Fortissimo	94
fff	Fortissisimo (very strong)	114

Step recording input of even smaller units than on the SQD - 1 and SQD - 8 can be done.

The basic length of a note (or a rest) can be a whole note, half note, quarter note, eighth note, sixteenth note or a thirty-second note, with triplet and dotted note values available.

Staccato, which cuts the note length by 50 %, and tenuto, which holds to the full note value, can also be selected.

The full range of dynamics are also available in step recording, allowing you to program expressiveness into your tracks. Eight key dynamics settings from ppp (pianississimo) to fff (fortissisimo) have been included.

Pattern recording

This innovative method allows you to take sections of your song, assign them to patterns, and string together those patterns in any order you desire when creating songs. It is the quickest most efficient way to record compositions in which several short phrases are repeated and is tailor-made for building rhythm tracks.

As we mentioned in Part 5, one pattern can be from 1 to 8 measures long, and you can record as many as 100 different patterns. Patterns can be recorded both by the real time and step recording methods.

You can also take advantage of the pattern record functions to record motifs and themes as they occur to you, and save them for later revision and inclusion in songs.

Sequencer Editing Functions

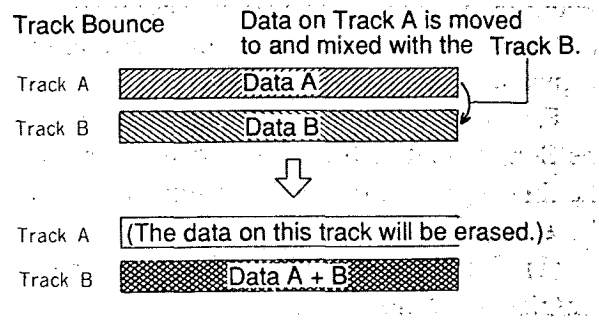
The M1 provides you with many advanced editing features that let you perform various changes on your music once you've recorded tracks to the sequencer. Let's examine each function in some detail.

Track Editing Functions

- *Track Copy*

This copies play data of one track to another.

- *Track Bounce*



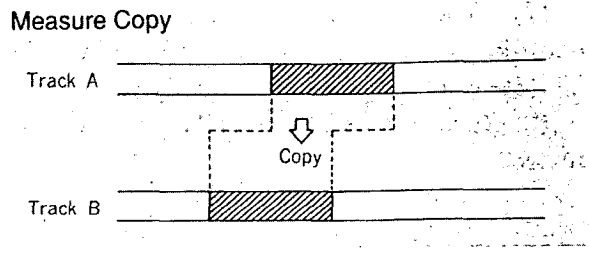
This combines the play data of two tracks into one.

- *Track Erase*

This erases the data of one track.

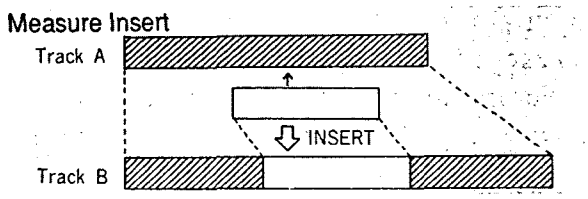
Measure Editing Functions

- *Measure Copy*

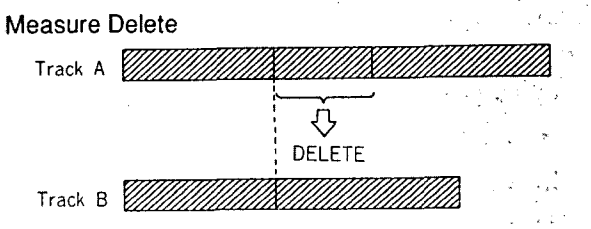


Copies play data of a specified range from one track to another.

- *Measure Insert*



This function inserts an empty measure of a specified length to a track.



- *Measure Delete*

This deletes play data in the specified range.

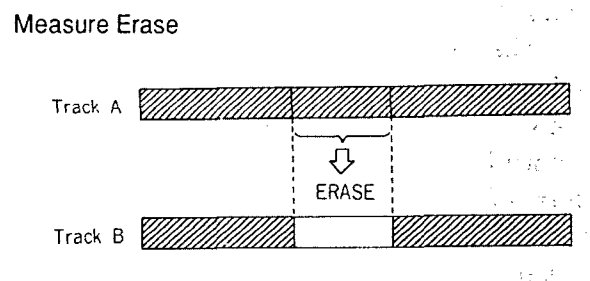
- *Measure Erase*

This function deletes play data from specified measures. It also allows you to select the type of data you wish to delete.

* ALL...Deletes all data

* NOTE...Deletes only note data (from the keyboard)

* CTRL...Deletes only control data such as



that of the pitch bend wheel, after-touch, and modulation.

Pattern Editing Functions

- *Get Pattern*

Patterns can be created very easily by copying play data from already recorded tracks.

- *Pattern Copy*

Copies from one pattern to another.

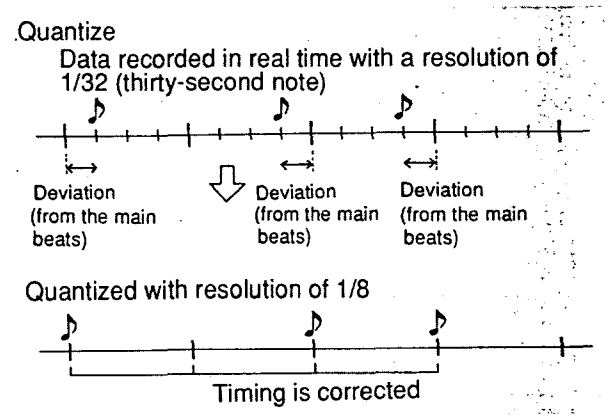
- *Pattern Bounce*

Combines the play data of two patterns into one.

Data Editing Functions

- *Quantize*

This function automatically corrects the

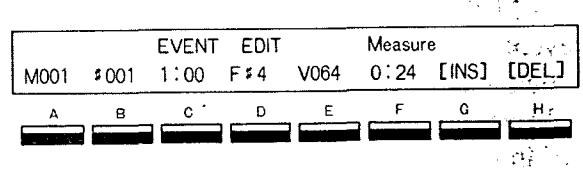


timing of all play data in a specified range to a pre-selected beat length. The type of data to be quantized may also be selected.

- *Event Edit*

Any play data of tracks or patterns indicated in the display as numeric values can be changed, inserted or deleted separately from all other data.

Sample Event Edit Display

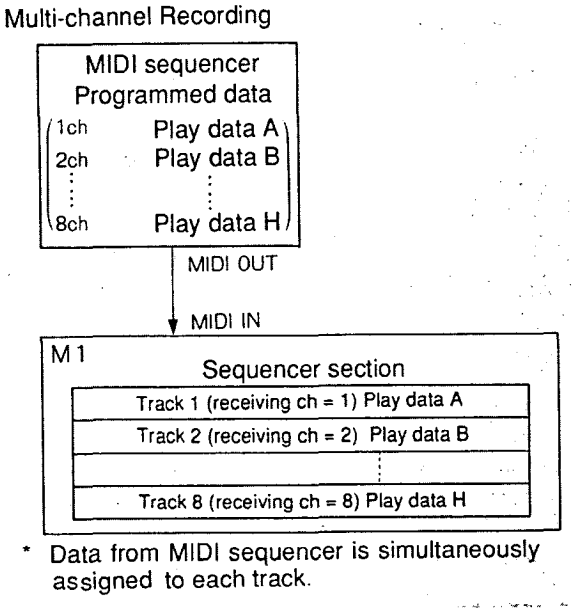


The value and the timing of any type of data, from note to program change and control change can be revised.

Full MIDI Functions

With its complete MIDI capabilities, the sequencer of the M1 is comprehensive enough to stand on its own as an independent sequencer.

Both transmitting and receiving channels can be set separately for each track. Therefore, you can control other synthesizers from the play data



* Data from MIDI sequencer is simultaneously assigned to each track.

of the M1's sequencer over MIDI, or use an external sequencer (with or without the M1's sequencer) to control the sounds of the M1.

Multi-channel recording, which simultaneously assigns all the data sent over multiple MIDI channels to separate sequencer tracks, according to the receiving channel set.

A MIDI filtering function is also included to prevent unnecessary or unwanted data from being written to a track.

In addition, the sequencer of the M1 can be used in various combinations with external sound sources.

Internal Memory Allocation

Now you have a fairly good idea of the capabilities of the M1 Music Workstation. Finally, though, let us give you a small tip on how to get the most out of the instrument.

For those who see the M1 as a music work station, with the emphasis on the creation or composition of music, the sequencer section is the most important part of the instrument. Others might concentrate on the sound shaping advantages of the AI Synthesis system.

For this reason, the M1 has a function which allows you to choose how you want to divide up the available memory space. This function is called the Internal Memory Allocation.

Two memory allocation settings are available, one of which will suit your particular data storage needs. Depending on the selection, the memory capacity for storing sound programs or sequencer data changes, as shown below:

- *Large Sequence Allocation*

In this setting, most of the memory space is reserved for the sequencer's data. The memory capacity is:

* 50 combinations, 50 programs

* 10 songs, 100 patterns (a total of approximately 7,700 steps)

- *Large Program Allocation*

In this setting, most of the memory space is reserved for program and Combination data. The memory capacity is:

* 100 combinations, 100 programs

* 10 songs, 100 patterns (a total of approximately 4,400 steps)

* These selections must be made in the Global Mode; switch between them according to your memory requirements. Keep in mind that once memory is allocated to 50 programs + 50 combinations and 7700-note sequencer data, Programs and combinations 50 through 99 will be permanently lost.

The M1 Music Workstation is a remarkably comprehensive and sophisticated musical instrument, but one that is also incredibly easy to use. It's an all-in-one musical creation/performance/production tool and the ideal means for unleashing the full power of your imagination.

THE EVER-EXPANDING WORLD OF THE M1 :

PCM PROGRAM CARD & RAM CARD

PCM PROGRAM CARD

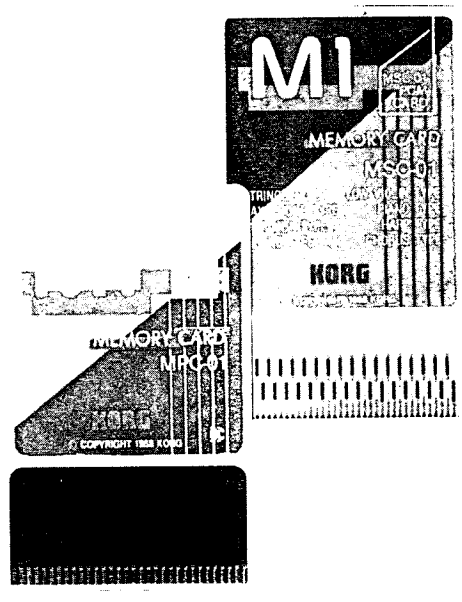
The sound creation possibilities are extended even further with the availability of PCM program cards.

In addition to the 144 kinds of sound source waveforms stored in the 2-megaword sound data bank, the PCM card supply specially selected sounds of various kinds recorded with high-quality 16-bit sampling. A whole synthesizer's worth of sounds are available in just the contents of this one card.

And, of course, any of the waveforms of the PCM card can be, along with the sounds in the internal memory of the M1, be freely assigned to the two oscillators.

The Program card supplies 60 different programs made with internal sound data, 40 programs using new PCM card data, and 100 different combined programs.

The PCM CARD and PROGRAM CARD are now available as a set. Additional sound libraries, created by expert programmers both in Japan and elsewhere are being readied for release. Each contains 100 programs and 100 Combinations that utilize the internal sound data of the M1.

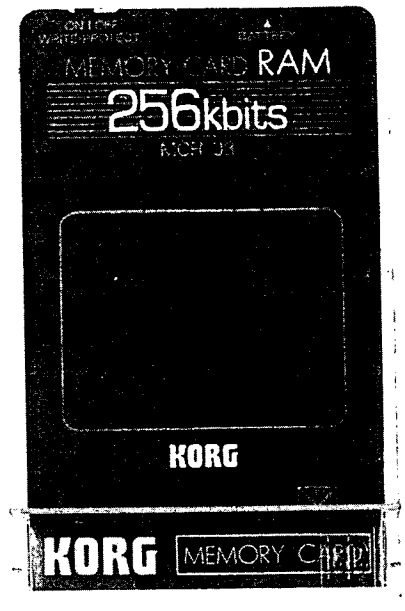


PCM PROGRAM CARD
MSC-1S

RAM CARD

With the RAM card, you can save internal memory data or the data you've created yourself. Program data, Combination data, and sequence data can be stored separately to the card.

The card can be formatted for Program/Combination use only, Sequence use only, or for both, according to the internal memory allocation setting selected.



RAM CARD **MSR-03**

SPECIFICATIONS

Sound generation method	: AI Synthesis system (full digital sound processing)
Sound source	: 16 voice, 16 oscillator (Single mode)
	: 8 voice, 16 oscillator (Double mode)
Keyboard	: 61 key (with initial and after touch)
Waveform memory	: PCM; 2 Mword (4 Mbyte)
Quantization	: 16 bit
Effect section	: 2-system digital multi-effects
Program memory capacity	: 100 Programs *1
Combination memory capacity	: 100 Combinations *1
Sequencer section	: 10 songs, 100 patterns, max. 7700 notes *2 8 tracks, 8-timbre multi-timbral operation (Dynamic Voice Allocation)
Controller inputs	: Damper pedal, assignable footswitches (pedals) 1/2
Outputs	: 1/L, 2/R, 3, 4, stereo headphones
MIDI terminals	: IN, OUT, THRU
Display	: Backlit LCD (40 characters x 2 lines)
Optional accessories	: RAM card (MCR-03), ROM card, PCM card
Power requirements	: 11 W
Dimensions	: 1058 (W) x 356 (D) x 110 (H)
Weight	: 13.5 kg

*1 Memory allocation can be changed to 50 Programs and 50 Combinations.

*2 A capacity of 4400 notes when 100 Program/100 Combination memory allocation is selected.

• Specifications are subject to changes and improvements without notice.

M1 MIDI IMPLEMENTATION CHART

FUNCTION	Transmitted	Recognized	Remarks
Basic Default Channel Change	1 ~ 16 1 ~ 16	1 ~ 16 1 ~ 16	Memorized
Mode Default Messages Altered	x ********	3 x	
Note number: Sound range	24 ~ 108 ********	0 ~ 127 0 ~ 127	Seq. Data is 0 to 127 in transmission
Velocity Note on Note off	o 9n, V=10 ~ 127 x	o 9n, V=1 ~ 127 x	Seq. Data is 2 to 126 in transmission
After Keys Touch Ch's	x o	x o	Transmit/receive when AFTER TOUCH is set to ENA in GLOBAL Mode.
Pitch bend	o	o	*1
Control 1 Change 2 6 7 38 64 96 97 100 101 0-101	o o o o o o o o x x o	o o o o o o o o o o o	Pitch MG VDF modulation *1 Data entry (MSB) *2 Volume Data entry (LSB) *2 Sustain Data increment *2 Data decrement *2 LSB of RPC for master tune *2 MSB of RPC for master tune *2 Sending and receiving Seq. *2 Data only
Program Change Actual No.	o 0 ~ 99 ********	o 0 ~ 127 0 ~ 99	Transmit/receive when PROG/C-OMBI CHANGE is set to ENA in GLOBAL Mode.
System Exclusive	o	o	*2, *4
System : Song pos. Common : Song sel. : Tune	o o 0 ~ 19 x	o o 0 ~ 19 x	*3 *3
System : Clock Real time : Commands	o o	o o	*3 *3
Aux :Local ON/OFF Message : All note off : Active sensing : Reset	x x o x	o o 123 ~ 127 o x	
NOTES: *1 Transmit/receive if CONTROL is set to ENA in GLOBAL Mode. *2 Transmit/receive if EXCLUSIVE is set to ENA in GLOBAL Mode. *3 When Clock is Internal, it transmits but does not receive. When External, the opposite is true. *4 Dumps and edits the Program data. Compatible with universal exclusive (Device ID).			

Mode 1: OMNI ON, POLY Mode 2: OMNI ON, MONO o: Yes
Mode 3: OMNI OFF, POLY Mode 4: OMNI OFF, MONO x: No

KORG

MUSIC POWER

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