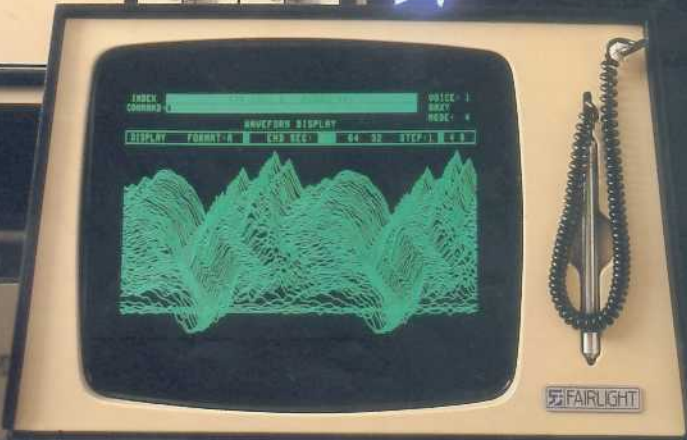# FAIRLIGHT
COMPUTER MUSICAL INSTRUMENT

The Integrated Solution to Music and Sound Production

With the Fairlight, you can sample natural and acoustic sounds from a microphone or tape and then play them musically. You can synthesize totally new types of sound, blend natural and synthesized sounds together, or create new composite sounds from a large range of favourites.

You can play the Fairlight live on its six-octave touch-sensitive keyboard, or on other instruments such as guitar.

The Fairlight can play complete musical compositions itself, or perform part of a composition while you play other parts live.

You can record a fifty-thousand note keyboard sequence onto its 'floppy disk' memory, or you can TYPE the notes of a composition into the Fairlight via the typewriter-style keyboard. As a piece of music is played back you can add 'live' dynamics, or full expression can be written into a Fairlight score. You can build up patterns of rhythmic percussion and melodies with individual expression control for each note. Notes can be actually 'drawn' onto Fairlight's Video Display with a Lightpen or played on the keyboard, automatically corrected for timing if you like. You can play different unique sounds together, and you can synchronize the Fairlight to tape, film and video.

New Standard for Operational Simplicity

Using the Fairlight is remarkably easy thanks to the flexibility of its Video Graphics display terminal and Lightpen.

Most functions can be achieved simply by pointing the Lightpen to the relevant part of the screen.

The screen displays a variety of 'Pages', each is designed to be easy to understand and use.

One page loads sounds, another is for sampling external sounds. Three other pages allow you to analyze, synthesize, blend, edit, mix, merge, invert, reverse or reflect sounds. A 'Control Parameter' page sets all the performance characteristics of any type of sound including control of Attack, Vibrato, Pitchbend, Glide, Sustain and Decay. Other pages are used for Music and Rhythm sequencing as well as a 'Real-Time Composition' facility.

The display pages also have a built in "how to use" manual. Type 'H' for help on the typewriter keyboard, and the full operating instructions are displayed.

ANY SOUND
in theory AND in practice

When the Fairlight introduced the ability to sample Natural and Acoustic Sounds and perform them polyphonically, a new era in personal music development began.

The Lightpen can be used directly to draw waveforms or alter those already in the memory.

Sounds can be synthesized by drawing individual harmonic curves. From these, the sound's waveform (see above) is automatically computed.

The Library facility keeps track of about two thousand sounds and musical sequences.

Natural-Sampled Sounds

Fairlight invented sound sampling for musical instruments — take any sound, from a tape or microphone and type 'S' (for sample). The C.M.I. 'digitizes' the whole audio sound and stores it in memory. The sound can be saved onto a floppy disk for later use. Being digital, there's no loss of quality when saving or transferring Fairlight sounds. The sound can be played across the six-octave touch-sensitive keyboard while under control of performance parameters including Attack, Delayed Vibrato, Pitchbend, Glissando, Portamento, Sustain Control and 'looping' of sound, Damping and Voice mixing.

For LIVE control, sounds can be mixed dynamically or merged into other sounds playing the same note. In fact, eight totally unique sounds can be played simultaneously from the one note, each with individual live control of its performance characteristics.

Synthesized Sounds

There are potentially many ways to synthesize sounds digitally, so rather than choose one or two specific techniques the Fairlight uses real-time waveform manipulation which allows extremely complex synthesized sounds to be computed prior to playing.

For example, you can draw harmonic overtone profiles individually to digitally synthesize sounds from scratch. As you draw the profiles, the Fairlight computes the waveforms, and from there you can re-draw waveforms with the Lightpen. The computer can merge your drawing in varying degrees with the rest of the sound. Now, the complete sound can be viewed on a three-dimensional waveform display. Every sound has its own appearance, its own visual 'feel'.

Mixing, Merging, Editing

Getting the RIGHT sound for the job.

Often it's necessary to quickly create a sound for a special application if it's not already in your sound library. It may be possible to sample exactly the right sound from a tape or microphone, but if not, then a quick bit of creative editing or sound merging is usually the solution. You can merge and mix sounds together on the Fairlight, whether synthesized or natural.

In fact, you can take a piece from one sound and do a quick 'edit' or merge with another one. You can even synthesize individual segments of the sound's waveform by winding thirty-two 'harmonic volume' faders up and down with the Lightpen.

Of course, you're always free to re-draw parts of the waveform which the Fairlight can automatically merge into the rest of the sound.


Analysing and re-Synthesizing

Sampled sounds often act as a catalyst to create entirely new sounds. Any sound, once in the Fairlight's memory can be "Fourier Analyzed" — this provides information about the "envelope" of each of the dozens of harmonics that go to make up a natural sound. Each of these harmonic envelopes can then be changed with the Lightpen and a new sound computed.
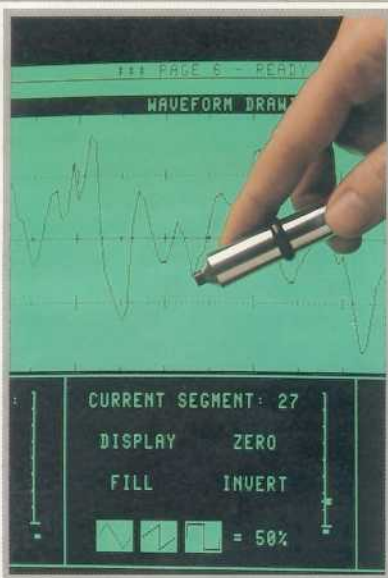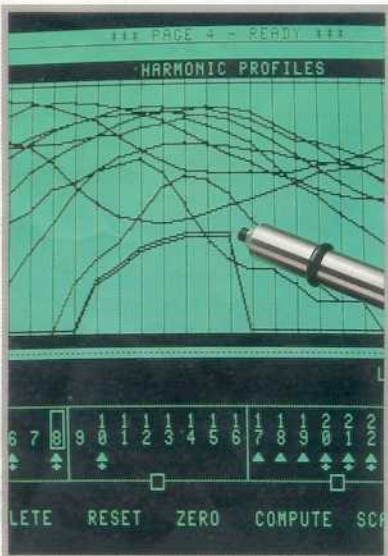
Save expensive studio time

Using the Fairlight's sequencers or composition facilities, time in the recording studio can be little more than the length of the music. There are no missed queues, wrong notes or timing problems. Fairlight's ability to synchronize to the outside world includes full M.I.D.I., S.M.P.T.E. and Sync tone compatibility (optional). Each Fairlight voice can be individually treated for equalization, reverb and effects.

HARD and SOFT

The Fairlight is designed for ongoing hardware and software development.

SOFTWARE comes on the floppy disks and stores the operating features, sounds and music.

There are two types of software: your personal library of sounds and compositions, and the 'SYSTEM' Software. The 'SYSTEM' Software is where most of Fairlight's design originates, and is written by Fairlight's design team.

It's all on one disk, held permanently in one of the C.M.I.'s disk drives.

The second drive holds your disks. These contain sounds as well as music compositions and sequences. The Fairlight comes with a standard library consisting of hundreds of instrumental and special sounds.

Over twenty sounds, or fifty thousand notes of musical sequences can be held on each floppy disk.

The optional Fairlight "Hard Disk" can provide instant access to thousands of sounds and compositions without the need to change floppy disks.

HARDWARE includes one or two music keyboards with live controls, a Video-Control console with Lightpen and the main cabinet, or chassis. The chassis holds the digital sound modules and a computing system with two floppy-disk drives, and various optional circuit modules.

What else can it do?

As well as Fairlight's unmatched capabilities for sound and music production, we have taken advantage of its powerful computing abilities to help in other areas. For example, you can print conventional music score notation as composed using the 'Music Composition Language' or the 'Real-Time Composer'. The Word Processor System utilizes the Lightpen to edit and locate text in a fully professional word-processing facility. The 'Film Music Processor' helps composers determine tempo for film and video queuing. The OS9 operating system is a UNIX-like system providing high level languages such as Pascal, Basic and C, for which a wide range of application software is available from a variety of software houses.

## M.I.D.I./S.M.P.T.E./ANALOGUE

Special Hardware Interfaces are also available such as the MIDI/SMPTE and Analogue Interfaces which enables the Fairlight to control other devices. A special MIDI page provides exact interface capabilities with most popular MIDI devices.

Music production – Approaching the speed of inspiration

Fairlight's open-ended design means that you have the option of using the facility that best suits the occasion. Music composition and performance can proceed in the fastest possible way.

PRESENT FEATURES

- Plays effectively ANY sound musically
- Natural, Acoustic, Digitally Synthesized and Composite sounds
- Samples sounds from external sources
- Sounds can be mixed, and blended live
- Tuning and scale control
- Eight monophonic sounds can be played simultaneously
- Eight note polyphony or eight music sounds simultaneously (Series II)
- All patching done via the video display
- Everything can be 'memorized' onto floppy disks
- Sounds cannot deteriorate by copying or transferring
- Over twenty sounds on a single floppy disk, hard disk available
- Two six-octave touch-sensitive keyboards (slave is optional)
- Music composition via live keyboard playing
- Page R-Real Time Composer
- Light-pen provides interactive graphics control of sound and music generation
- Composition via the M.C.L. (Music Composition Language) — music can be typed in
- Previous computer programming experience is not required
- Operational 'Help' manual on disk for instant reference
- Eight independent balanced outputs for separate equalization and audio processing
- Inbuilt 20 watt RMS amplifier for monitoring
- Digital audio metronome click-track
- All audio inputs and outputs via balanced studio-compatible Cannon-type connectors
- Printer output — compatible with daisy wheel (letter quality), dot matrix and digital pen plotter (graphics) printers (RS 232C 9600 BAUD)
- External synchronization to another system, tape and film (SMPTE)
- Open-ended design allows for future hardware and software expansion
- All facilities under software (program) control
- Continuous software and hardware development and update
- Software options include word processing. High-level languages such as BASIC, C, and PASCAL. Film Music Processor and 'Stavewriter' Music Scoring
- Sounds and music compositions are transportable between users in standard Fairlight format
- 2 x 16 Bit and one 32 Bit (68 000) microprocessor plus approximately 1,500 integrated circuits on exchangeable plug-in circuit modules for easy servicing and upgrade
- MIDI/SMPTE
- 85 db System dynamic range 20 Hz to 16 kHz
- One megabyte of disk storage plus approximately 400K kilobytes of Random Access Memory in standard configuration
- World-wide service and distribution.
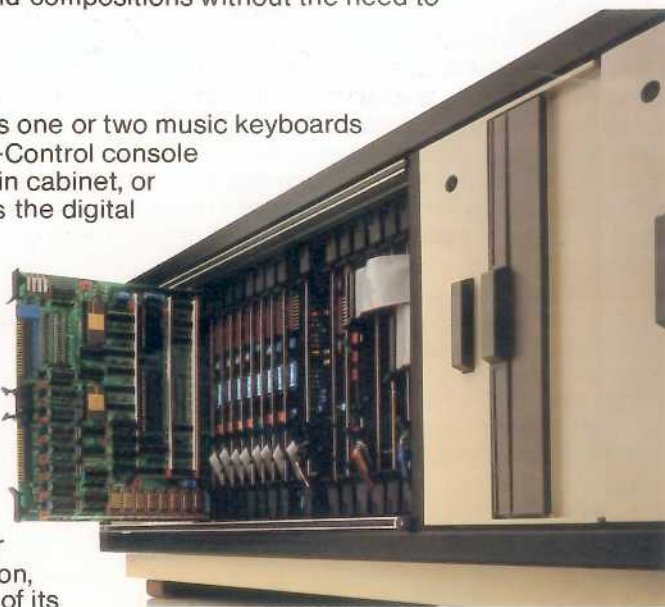
The Real Time Composer

It is possible, on the Fairlight, to enter notes into hundreds of unique patterns or rhythm sequences which can be linked together to play indefinitely. Being interactive, notes are displayed as they are played on the keyboard and the Fairlight recalls Touch Sensitivity, pitch and duration for every note. Playing inaccuracies can be automatically corrected and the position of each note is displayed on the screen. Notes can also be edited with the Lightpen (see cover photograph). This is probably the fastest and most interactive tool available for the rapid development of rhythmic and musical composition. Every detail of the composition is displayed instantaneously on screen as the music proceeds.

For 'live' playing, several facilities are available for putting your favourite sounds on various areas of the keyboard. A second touch-sensitive 'slave' keyboard can also be added. Up to eight completely different sounds can be allocated anywhere over both keyboards and tuned in 1/100th's of a semitone to ± six octaves, and saved for later use exactly as set up. Only two keystrokes are needed to set up your keyboards again.

In live performance use, a special command 'Keypad' located on the master keyboard can be used to load pre-arranged Sounds from the floppy disks.

When the Fairlight is performing a musical sequence or composition itself, you can still perform 'live' over the top. The Fairlight can provide the rhythm backing, for instance, while you solo.

The Multitrack Sequencer

Fairlight's 'Keyboard Sequencer' can capture and record live playing and subsequent takes can be merged together much in the form of over-dubbing. Being digital, there is no degradation in sound quality as subsequent tracks are added. Each voice retains its integrity, while keytouch and control fader and footpedal movements are also recorded.

The Music Composition Language

Yet another method of music input by the Fairlight is available, the Music Composition Language (M.C.L.). Notes, time values, value and effects can be TYPED into the C.M.I.'s memory. You can now specify any complex poly-rhythms and poly-tonalities that might be impossible to perform by any other means. Incorporating multi-level repeat and 'nesting' facilities and a powerful video screen editing feature, the Music Composition Language minimises typing required for complex musical pieces. Whole blocks of music can be moved, transposed, changed in tempo and copied. Simple macro-instructions enable you to make complete overall changes to the music with only a few keystrokes.

An external 'Sync' track, from tape for example, can be applied to the C.M.I. Up to fifty-six parts can be perfectly synchronized using an eight-track tape recorder. For greater precision, music can be recorded at a slow speed and then replayed faster without any pitch change. The Fairlight can also generate a 'click' track so live playing can be added, and can interface to MIDI and SMPTE time code from film, video or multitrack. (optional)

Just for a moment, let some music come to mind . . .

What sounds can you hear — classical instruments, electronic, some sounds of nature perhaps, maybe a mixture of all these?

And Melody . . . a simple tune, a percussion backing, or sixty-part arrangement?

Expression, how does it feel; exciting, mysterious, monstrous or charming?

Of all the visions of musical expression that we have, only rarely can we actually realise what is in our mind.

This is the story about a new concept in music production. It goes well beyond the ideas of musical instruments as we know them.

It is a concept inspired by the wish to create literally ANY type of music, no matter how complex or difficult to express. To incorporate literally ANY type of sound — not only classical and modern instruments but sounds of the world; sounds reflecting the full spectrum of life, from the subtlety and force of nature to the sounds of civilization and synthesis.

Now that wish is a reality. An easy to use computer-based musical instrument with capabilities that were unthinkable only a few years ago.

FAIRLIGHT CMI

Computer Musical Instrument

A BRIEF DEMONSTRATION

When the C.M.I. is turned on, the 'System' disk is inserted into the left hand Disk Drive, and the Display Index automatically appears. This is 'Display Page 1'.

'Display Page 2' is the USER'S 'disk control' page. The disk containing the required sound is placed into the right hand Disk Drive. Page 2 displays and controls the contents of the user's disk and can now be selected by touching the Lightpen to 'PAGE 2 — Disk Control' on the index.

Now Page 2 will appear, showing all of the Sounds (Voices or .VC's) that are available on that particular disk. Select the Voice name by touching it with the Lightpen. Touch the 'Load' command with the Lightpen and in a few seconds the sound is ready to play.

'Display Page 7' sets the 'control parameters' for all sounds. At present these include: Volume (Level), Attack and Decay (Damping) time, Pitch bend and bend width, Portamento, Glissando, Vibrato, Delayed Vibrato and Sustain characteristics (Loop). From here you can connect Fairlight's live control devices — faders, footpedals, switches and Keyboard touch sensitivity — to any of these parameters for live expression. Other parameters can be 'fixed' by simply 'typing' a number into its 'box'. Once set and 'saved' onto the disk, the whole setup loads automatically when the Voice is next used.
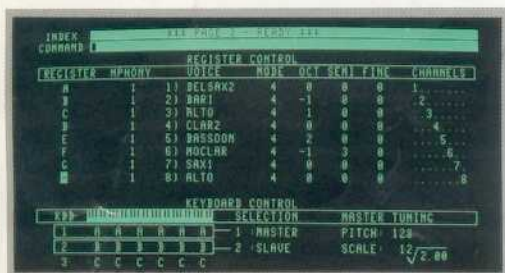
'Display Page 3' is the Keyboard control page. On this page you can arrange up to eight voices to play. Voices can be tuned in separate 'registers', which can then be arranged to play in separate octaves of the keyboard. A wide range of musical scales can be used. Here, music sequences which come from the Music Keyboard Sequencer (Page 9), or the Real-Time Composer (Page R), or the Music Composition Language (Page C), are directed to the right sounds. The Sequencer produces note and 'touch sensitivity' information and even the movements of control faders and footpedals. The Sequencers can be thought of as (up to) eight music keyboards whose outputs arrive at the keyboard 'Map' on Page 3. From here, the desired voices are easily assigned to their respective players, keyboards 1 to 8. Keyboard 1 is also the master 'live' keyboard supplied with the Fairlight as standard, while keyboard 2 is an optional live 'Slave' keyboard. Every detail of this page can be saved onto the user's disk for recall at a later time. Once saved, the arrangement of Page 3 becomes an 'Instrument' file on Page 2 (a name ending in .IN) and can be loaded in the same way as the voice was loaded with the Lightpen. When an instrument file is loaded, it automatically loads all the desired voices with their Controls for Page 7.

FAIRLIGHT INSTRUMENTS