FAIRLIGHT
COMPUTER MUSICAL INSTRUMENT

GENERAL INTERFACE CARD

F A I R L I G H T

- C M I -

MANUAL FOR THE GENERAL INTERFACE

(MIDI/SMPTE) CARD AND SUPPORT UNIT

Revision 1.2

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<u>The General Interface Card</u>

A SMPTE/MIDI/SYNC hardware option is now available for the Computer Musical Instrument. This is in the form of a circuit card which can be insertod into one of the spare expansion slots in the CMI. The card contains its own 32-bit 68000 processor, memory and peripheral interfaces providing SMPTE in and out, four independent MIDI ports in and four out, plus a gen•ral purpose SYNC pulse input and output for interfacing to non-MIDI sequencers and drum machines etc.

<u>Synchronizing with SMPTE - the industry standard</u>

The Fairlight CMI can now be programmed by the user to play sequences of music or produce sound effects triggered by SMPTE time code. SMPTE code can be produced and read by the CMI.

SMPTE time code is an internationally recognized digital code recorded on a spare sound track of a multi-track tape. The code carries timing information in hours, minutes seconds and frames. By recording SMPTE time code from the beginning to the end of the audio tape, it is possible to uniquely identify any place on tape by its time code at that point.

    Time code **00:00:00:00** would be the beginning of time code.
    Time code **01:28:45:19** would be 1 hour, 28 ainutes, 45 seconds and 19 frames from the beginning.

A frane is a subdivision of a second that is used in film and video and can be one of the following values:

    for film and cinema   - **24** frames per second
    for video (not U.S.A.) - **25** frames per second
    for video   - **30** frames per second

The Fairlight SMPTE system features include 24, 25 or 30 frames per second, "drop frame" capability for 30 fps and balanced line input and output. Signals conform to international standards.

<u>MIDI - Musical Instrument Digital Interface</u>

MIDI is the industry standard Digital keyboard interface that provides musical performance information in a standardised format which is compatible with a wide range of modern synthesizers, sequencers, drum machines, and keyboard (and other) controllers.

FairlightŽs MIDI controller has three independent MIDI inputs and four independent MIDI outputs. A powerful 32-bit processor provides the fastest possible speed throughout while allowing independent data configurations to be selected for different manufacturers instruments which may be used simultaneously.

Software is included on CMI system disk and is usad whenever the system is started with the General Interface card (CMI-28) pluggod in. MIDI is therefore active all the time.

The following information is subject to change - please check with your dealer when ordering to confirm latest specifications.

Fairlight Receivinq MIDI Data

Fairlight CMI will respond to the following messages received via MIDI IN.

    Voice messages: Note Off event
                              Note On event
                              Polyphonic key pressure
                              Control change
                              Channel pressure
                              Pitch bend change

    Any Fairlight effect on Page 7 may be patched to any CONTROL (or SWITCH)
    and thus be controlled by any other synthesizer via MIDI.

    Mode messages:

    All Channel Mode messages are accepted but ignored. The Fairlight operates
    in MIDI Mode 4. Within the Fairlight, keytoards can be assigned to any
    combination of REGISTERS/VOICES/CHANNELS.

Fairlight Transmitting MIDI Data

Fairlight transmits the following data via MIDI OUT.

    Voice Messages: Note Off
                              Note On
                              Polyphonic key pressure
                              Control change
                              Channel pressure
                              Pitch Bend change

Page I - General Interface Page

This page operates in conjunction with an optional hardware circult card, the General Interface Card (or SMPTE/MIDI card). It is inserted into slot 2 in the CMI and wired to a junction box attached to the rear of the CMI (or as a remote box). See diagram for external connection.

The CMI may be rapidly configured as a MIDI instrument, in a variety of **transit** and **receive** modes.

Software is included on the CMI system disk (revision 14) and is used whenever the General Interface card (CMI-28) is plugged in. MIDI is therefore active all the time.
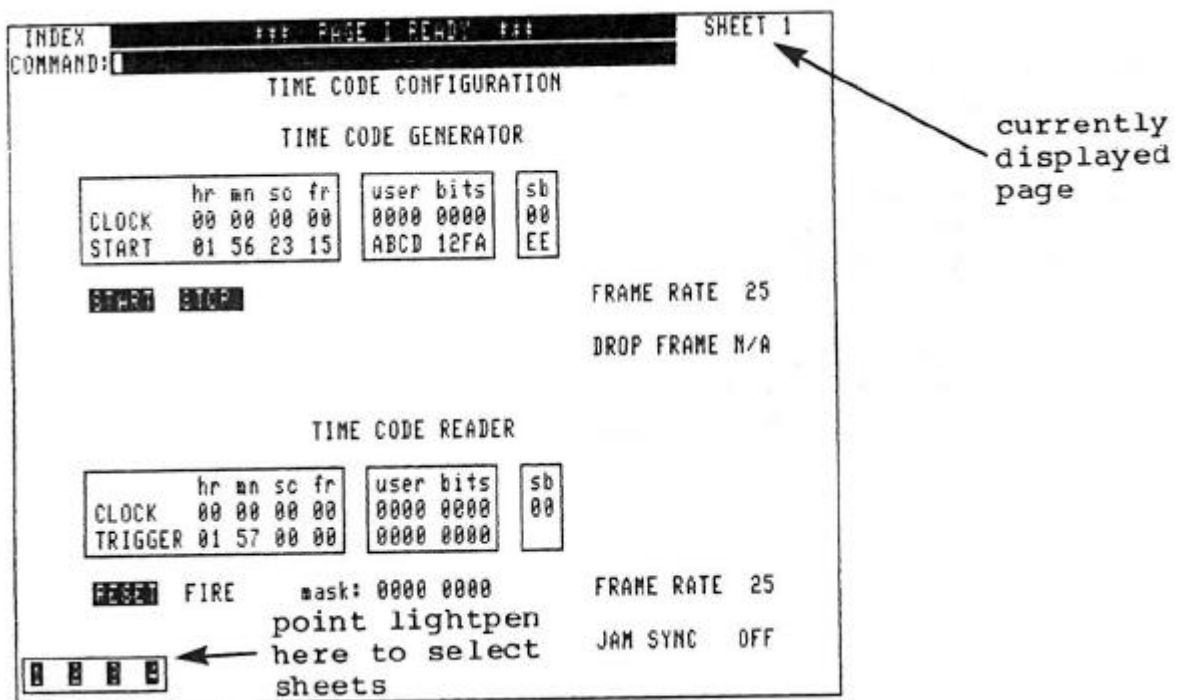
The General Interface card has three **input** ports, **A** to **C** and four **output** ports, **A** to **D**. At present, only input **A** is supportod by software.

The MIDI standard uses **sixteen channels** to **send** or **receive** music information. Switch and control fader information is also sent or received.

Present MIDI features of Page I allow the patching of any MIDI port/channel to any of the **eight** Fairlight keyoards for input and output. As well, MIDI switches/control fader s may be patched to Fairlight controls/switches for input and output.

PAGE I has a four sheets.

Select sheets by typing the sheet number; **1, 2, 3 or 4** followed by **<return>**. Alternatively, sheets can be selected by pointing the light-pen at the sheet selection box in the bottom left hand corner of the scrcen. The CMI will remember what shect you are worRing on at present and returning to Page I from another page will land you on the sheet that you last used.

SHEET 1 - SMPTE TIME CODE CONFIGURATION

This sheet is divided into Time Code **Generating** and Time Code **Reading**. PAGE I can read or generate SMPTE code in different modes. These modes are described below.

TIME CODE GENERATOR

Record time code onto high quality multi-track tape at levels between l0db to - 20db. This will minimise bleed-through to adjacent tracks. Avoid recording onto outside tracks (e.g., track 1 or track 24 on 24 track tape) as these are the first tracks to fray as the tape is extensively used. Also avoid recording instruments with heavy percussive bass content (e.g., bass drum) on an adjacent track as this may modulate the SMPTE track.

To generate time code for recording onto tape, firstly set up the START time by tabbing down to the numbers opposite START.

These numbers are: hr(hour), en(minute), sc(second), fr(frame)

Set the START time by typing **number<set>**.

Time code can now be generatod by either typing **S<return>** or pointing the lightpen at the **START** box.

To stop the time code generator, either type S<return> or point the lightpen at the STOP box.

Note that all time code readers need a few seconds to lock onto the time code, so make START time slightly early.

EXAMPLE   Record time code onto tape with a START time of 23 hours 59 minutes 55 seconds 00 frames. This will allow sufficient time to trigger a sequence of music at SMPTE time 00 OO O0 O0.

The CLOCK area above the START area will display the SMPTE code as it is generated. Similarly the CLOCK in the Time Code reader section will display the code as it is read in.

FRAMB RATE can be set to **24, 25** or **30** frames per second for either generating or reading time code. When generating code at 30 fps, there is a **Drop Frame** option. This is used mainly with NTSC colour television applications.

User bits can be used to name a tape or section of tape. User bits are set and remain constant during the generating of a section of code. They may be changed when the time code generator is stopped.

TIME CODE READER

The CMI SMPTE time code reader needs a minimum level of around 1 volt p-p.

TRIGGER time is the point where music sequences may be startod. It is set up in a similar way to START TIME, described previously.

The CMI has three sequencers, PAGE 9 - Keyboard Sequencer, PAGE C Music Composition Language and PAGE R - Real Time Composer. These sequencers may be triggered to start at a particular SMPTE time code. Source of the time code may be from tape, another SMPTE generator, or indeed from the CMI SMPTE time code generator.

At present these sequencers will not lock with SMPTE on tape so that any variations in tape speed will not be reflected in the speed of Page 9, C or R. If this is a problem, record a ~y~__one on another track of the tape so that any tape speed variations can be taken into account.

Set up your SMPTE/SYNC equipment as shown in the connection diagram.

Using the time code reader with **PAGE R**:

You can set the trigger time either on Page I or on PAGE R itself. In this release of software, there is no error checking software and hence invalid times can be loaded (e.g., loading 29 frames when reading 25 fps time code). So for the moment, take care in setting the trigger on PAGE R. PAGE R can be set to its own internal sync or to an external sync.

To have PAGE R start from the trigger point type **P;S<return>.**

PAGE R will go into a wait state (similar to the **P;W** option) until the clock time reaches the trigger time.

P;S<return> .

This can be over-ridden by pressing any key. This will start the sequencer.

Once the sequence has startod, PAGE R will update time code as each new pattern is displayed on the screen.

Using the time code reader with **PAGE 9** and **PAGE C:**

These sequencers will start at the TRIGGER time shown on Page I. At present, there are no time code indicators.

SHEET 2 - MIDI PORT CONFIGURATION

The upper two boxes on SHEET 2 enable you to use the thrce input and four output ports with different manufacturers' MIDI equipment. This initial software release provides four different protocols: **FAIRLIGHT, YAMAHA, SYNTHAXE** and **NORMAL**, (the 'standard' MIDI protocol). More will be available shortly.

To setup the MIDI ports, firstly connect the MIDI equipment to the appropriate MIDI input/output port on the MIDI/SMPTE junction box at the rear of the CMI. Secondly, on SHEET 2, tab to the INSTRUMENT field opposite the appropriate port and type the manufacturers name followed by **<set>**. Just the first letter will suffice, for example, **Y<set>**.

The MODE field enables you to specify options to the manufacturers' equipment in which the MIDI port is to operate.
A hexadecimal code number is assigned to the appropriate field to select special modes. At present this is only available for the Synthaxe as follows;

With the low digit   = 0, the Synthaxe vibrato arm affects control
no. 1 (see below);
if it is   = 1, the vibrato arm does pitch bend.
With the high digit   = 0, all strings damp together;
if it is   = 1, independent string damping.

Here's a typical setup ...

PORT	INSTRUMENT	MODE
A IN	YAMAHA	00
B IN	SYNTHAXE	01
C IN	NORMAL	00

PORT	INSTRUMENT	MODE
A OUT	YAMAHA	00
B OUT	NORMAL	00
C OUT	FAIRLIGHT	00
D OUT	FAIRLIGHT	00

SHEET 2 - MIDI channels/FAIRLIGHT KEYBOARDS

This sLect is usad to map MIDI channels to FAIRLIGHT keyLoard for input ports, and vice versa for output ports. To do this patching, move cursor to the fields relating to the FAIRLIGHT keytoard in question, and assign both port code, A, B, C or D, and MIDI channel number, 1 to 16.

For example ...

CHANNEL/KEYBOARD ASSIGNMENT

INPUT

PORT	CHAN	KEYBRD
A	1	KBD.1
A	12	KBD.2
A	16	KBD.3
A	4	KBD.4
A	5	KBD.5
A	15	KBD.6
A	8	KBD.7
A	10	KBD.8

OUTPUT

KEYBRD	PORT	CHAN
KBD.1	A	1
KBD.2	A	1
KBD.3	A	1
KBD.4	A	1
KBD.5	A	1
KBD.6	C	14
KBD.7	B	15
KBD.8	D	16

SHEET 3 - MIDI/FAIRLIGHT CONTROL/SWITCH NUMBER CONFIGURATION

Fairlight control/switch numbers are split into groups of **eight**, as seen in the patching boxes. To patch, assign a port and channel to the relevant CN/SW numbers.
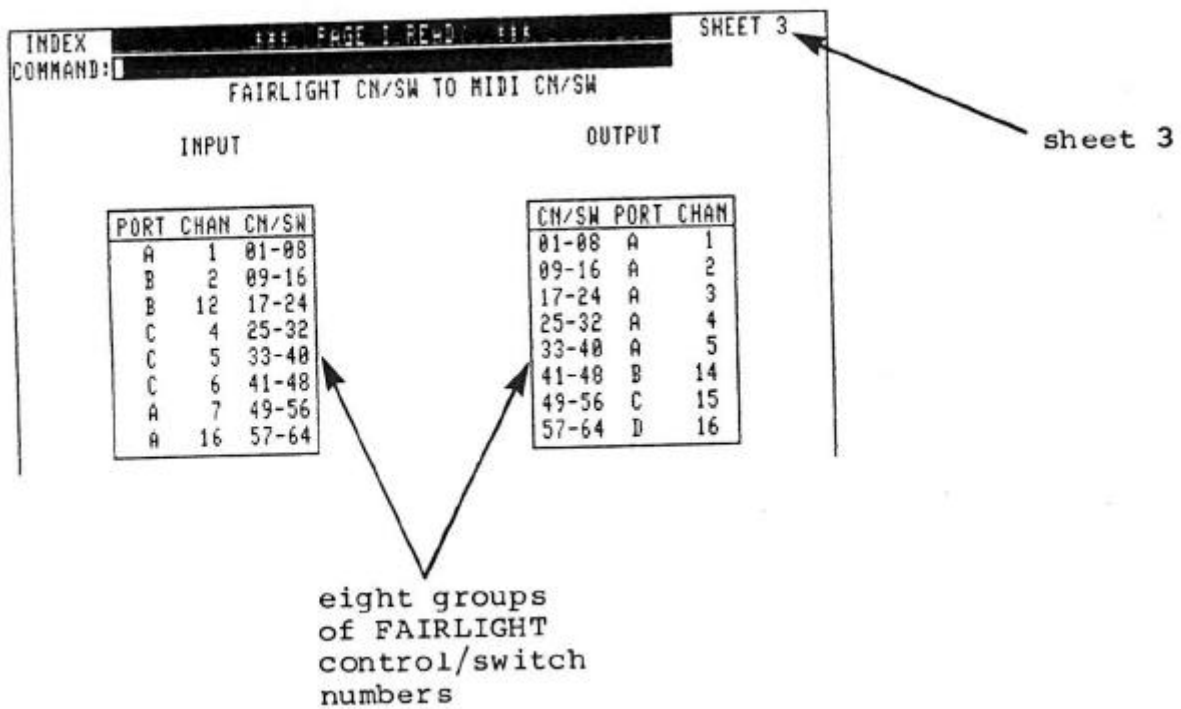
For **output** ports, each bank of eight FAIRLIGHT Control/Switch numbers can be mapped to MIDI CN/SW numbers 0-7 via the selectod port and channel. Current software allows MIDI **CN/SW** numbers no greater than 7 on output channels.

For **input** ports, patching is the same, but MIDI Control/Switch numbers greater than 7 are avaliable. Numbers outside the range are mapped on a rotating basis to the selected bank of FAIRLIGHT Control/Switch numbers, via port and channel combinations which you have selected.

For example, if you mapped input port **A**, channel 5 to FAIRLIGHT Control/Switch numbers in the group **09 - 16** then any MIDI CN/SW number information arriving via "A/5" will be mapped thus: MIDI 0,8,16,24 - FAIRLIGHT 1 (Control/Switch numbers 1 to 8); MIDI 1,9,17,25 - FAIRLIGHT 2 (Control/Switch numbers 9 to 16), and so on

NOTE: If it is desired to prevent this four to one cyclic mapping from occuring, the sending MIDI device must ensure that it "routes" each bank of eight Control/Switch numbers via a different port/channel.

A typical control/switch allocation ...

eight groups
of FAIRLIGHT
control/switch
numbers