

HX-1/FVX-1 WINDOWS VOICE EDITOR & EXPANDER

**USER'S GUIDE – Incomplete
Build 13.06.20**

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The Program Requirements.

Legalese.

The HX 1/3 & FVX-1 Voice Editor is freeware. All rights are reserved. The software is provided as is, expressly without a warranty of any kind. This means you use it at your own risk. You cannot sell or profit from any part of the software without my expressed permission.

I will improve or enhance the software and post changes on my dropbox site and or <https://mdrelimator.yolasite.com/>.

What is this Software.

The HX-1/3 FVX-1 voice editor is a Windows based program that gives the user access to all the HX-1 HX-3 & FVX-1 Yamaha Electone polyphonic voice parameters. This allows users to change existing or construct new user voices.

The software provides the functionality of both the previous Atari and FED-1 versions on a user friendly windows platform. However the program unlike the Atari or FED-1 versions does not limit editing and gives you full control of all the voice parameters.

Requirements.

1. The program runs on a Windows Computer operating system of XP, Win7, Win 8 or Win 10.
2. A minimum computer screen resolution of 1400 x 1050 is required (1600 x 900 or higher preferred).
3. A good (repeat good) USB to Midi cable is required. (A good cable comes with manufacturer's drivers).
The recommended USB to MIDI cable is the M-Audio UNO Sport.
4. You also need a Yamaha Electone HX-1 or HX-3 or a FVX-1 voice expander.
The software should work on all other HX models but is untested.

Downloading and Installation the Software.

Downloading

1. Go to <http://mdrelimator.yolasite.com/>
2. At the bottom of the page click on the *Download the* “HX_1VoiceEditor.zip” file.
3. Download the file to your Windows computer.

Installing.

1. Unzip the **HX_1VoiceEditor.zip** file to a directory of your choice.
(NB. As restrictions apply to 'C' directories in latter Window's platforms using an alternative root directory is recommended).
2. The zip file contains and installs the following mandatory files which **must** remain in the same directory.
 - a. **HX_1VoiceEditor.exe** – the main executive.
 - b. PolyOpConsDiag.hx1 – file containing the pre-set operators
 - c. HXPolySeek.hx1 – the addresses of the pre-set operators.
 - d. DELMID32.DLL – A Midi Connection dynamic link library.
 - e. qtintf.dll – a Borland file
3. Install the appropriate USB to MIDI cable software on your computer in accordance with the manufacturers installation instructions.

A Voice file list of all the HX/FVX-1 default voices is also included in the download.

Voice Files are saved as *.hxv – (**H X V**oice) files.

(Atari (*.psd) and FED-1 (*.h1p) voice files can also be used if you change their extensions to .hxv).

Functional Description of the External Parts.

There are three external parts required (Fig 1)

1. a Yamaha HX-1/3 or FVX-1
2. a Windows PC with a USB port, and a
3. a USB to MIDI converter cable.



Fig 1 Hardware Requirements

Connecting MIDI to the HX/FVX-1

1. Connect the Midi to USB cable Midi Plugs to your HX1/3 or FVX-1 Midi sockets.
The UNO MidiSport cable Midi plugs are labelled 'To Midi In' and 'To Midi Out' for ease of connection.
(If using another cable the Midi Out is connected to Midi In and Midi In is connected to Midi Out).
2. Connect the other end to a USB port on your Windows computer.
NB. Some computers have only one specific (higher current specification) USB port. Using this port is recommended and can be found by consulting your computer manufacturer's USB specifications. If necessary use the plug and play (trial and error) method by swapping USB ports on your computer until reliable communication is established.

An Overview of the External Parts Functions

1. The computer program converts a voice into the HX/FVX-1 polyphonic voice specification and when required transmits this data to the connected USB port to the HX of FVX.
2. The USB to MIDI cable converts the computer data to the MIDI data specifications.
(TTL to current loop).
3. The HX/FX-1 receives the new Midi voice data and stores the data in the user selected (user 1-8) location.

CONNECTING and SELECTING

MIDI Enable and Connection.

1. Connect the Yamaha HX1/3 or FVX-1 to your computer with the USB to MIDI cable.
2. Run (as administrator if necessary) the HX_1VoiceEditor.exe file to start the program
NB. The software will fail if there is no valid USB to MIDI cable connected to the computer.
3. The “Loading Algorithms Please Wait” screen will appear on successful launch of the program.
This will take 5 seconds or so depending on the speed of your computer.

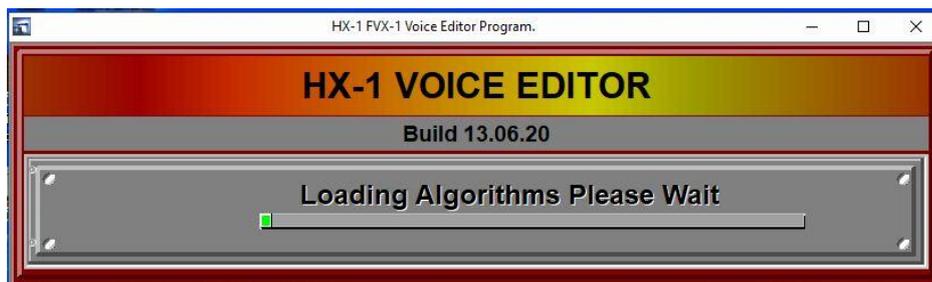


Fig 2 Initial Load.

4. Once the Algorithms have loaded the main “Select/Connect” panel appears (Fig 3).



Fig3

5. You must;
 - a. Click on the flashing ‘MIDI Select’ button and
 - b. Select a ‘Midi Output Device’ and ‘Midi Input Device’ before you can proceed.

If necessary change Model and User Number (the voice will be sent to this User No. on the HX or FVX).

Click on the ‘Test’ button which will turn green indicating all communications are working.
This connection test ensures you have all the hardware connected correctly and the HX-1/3 or FVX-1 is communicating correctly with your computer.

On successful selection the panel will expand to allow Voice Loading Options.

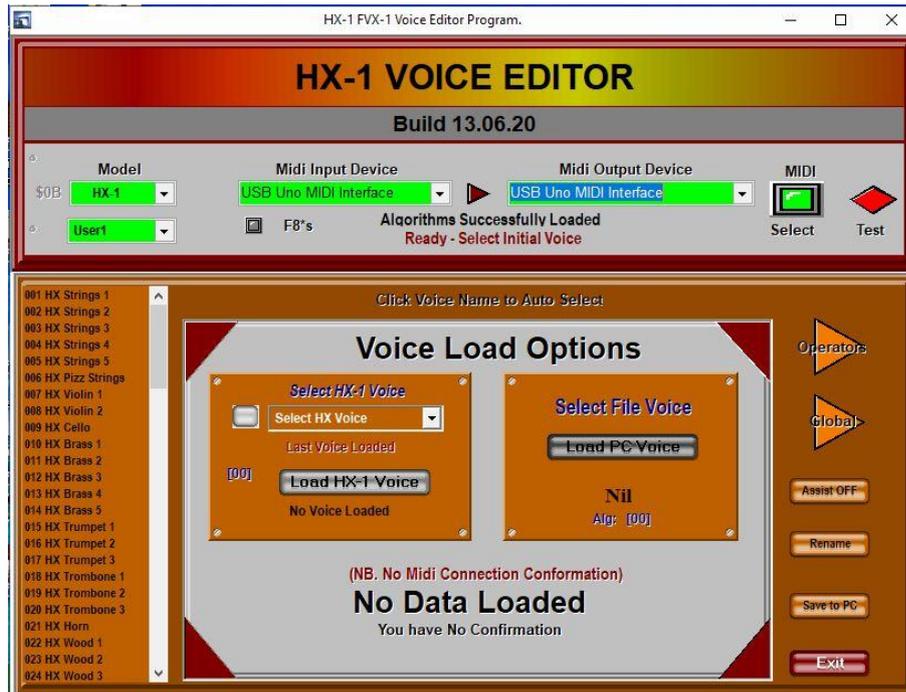


Fig 4

You can select a single voice from either the HX/FVX or from a file stored on your computer.

- a. Select an HX/FVX voice from the drop down voice list on the left or
- b. Click on the 'Load HX-1 Voice' or 'Load FVX-1 Voice' button.

To Load From Your PC.

- a. Click on the 'Load PC Voice' button to select a voice file from your PC.

The file selected will;

Load the data into the program for editing and

Send the loaded voice to the HX/FVX user number (User 1-8) previously selected.

The triangle buttons marked Operator and Global will flash and turn green allowing You to select either the Operator voice parameters or Global voice parameters.



Left to Right:

Change Rego to either 1 or 16.

By changing the Rego number from and back to the Rego being used (eg 1 to 16 and back to 1) the voice will become available on both the top and lower key boards. On the next data change the new voice will only be available on the top key board and the previous voice change will remain (providing you don't change the Rego) on the bottom key board. This is useful to use as an 'on board' comparisons of your latest change.

Play note on UKB or LKB.

Turn Effector On/Off and Volume (all Vol is routed thru an Effector if turned on).

Master HX Volume

Op1-8 (not connected)



Random Number Controls.



Generates random Voice parameters (no rules obeyed).

OVERVIEW OF A VOICE – Voice Architecture.

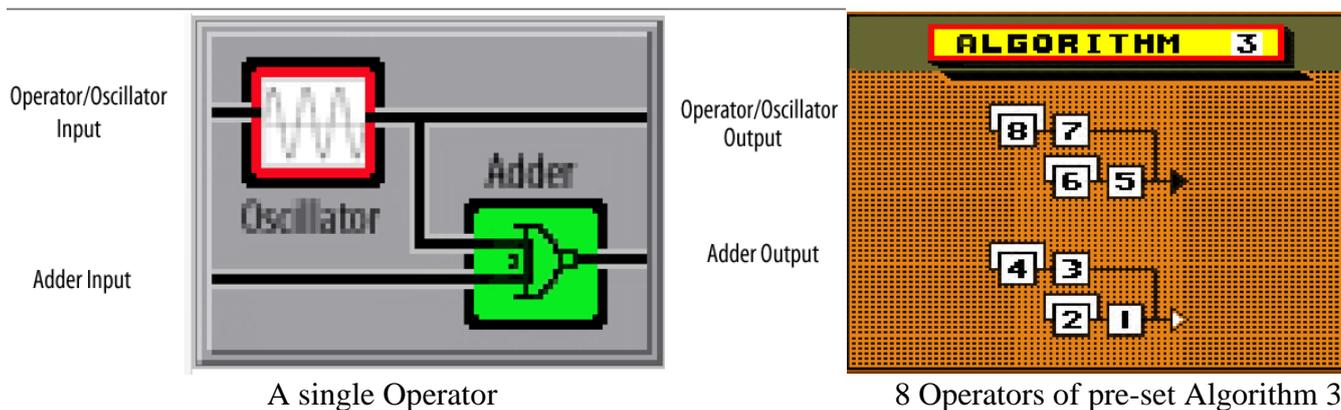
The polyphonic voice consists of a set number of data bytes each representing various parameters of the voice ‘Electronic Architecture’. There are two major fields “Global Data” and “Operator Data” which make up the voice.

1. **‘Global Data’** - those parameters which are common to the whole voice. E.g. stereo volume, reverberation and filter data.
2. **‘Operator Data’** – parameters or ‘electronic combinations’ which produce the variety of sounds. E.g. an operator could be a sinusoidal or square wave generator.
3. **‘Algorithm’** – the electronic formula representing how the operators are inter-connected.

There are 8 operators available to produce polyphonic voices. There is also 63 pre-set algorithms connecting the 8 operators in various algorithmic configurations.

The software gives the user control over all the bytes which make up the polyphonic voice.

Example Diagrams of Operator Architecture.



Operator Voice Data

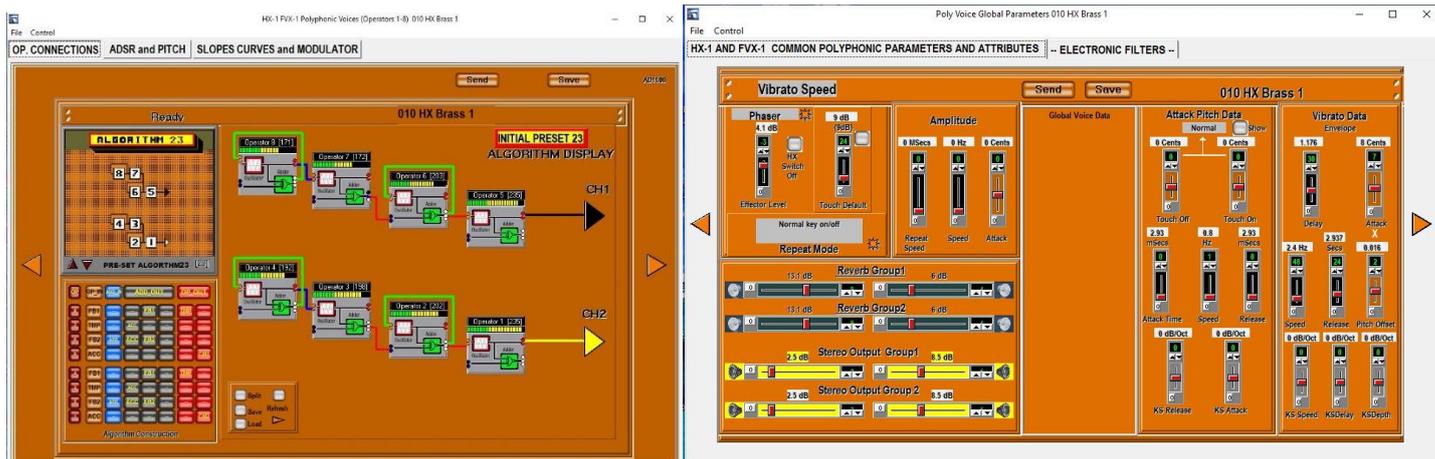
The Operator Voice Data is divided into three tabbed panels which will open a separate page of parameters for editing.

1. Op Connection.
2. ADSR and Pitch.
3. Slope Curves and Modulation.

Global Voice Data

The Global Voice Data is divided into two tabbed panels which will open a separate page of parameters for editing.

1. HX-1 and FVX-1 Common Polyphonic Parameters and Attributes, and
2. Electronic Filters.



How The Program Works.

Setting Up the HX-1/3

1. Select User 1 on the Upper Orchestral panel on the HX-1
2. Ensure the volume on the Upper Orchestral panel is turned up for pleasurable listening on speakers or head phones.
3. Program Rego 1 or 16 of the HX-1/3 (whichever is easier for your working position) with Upper Orchestral and ensure voice USER 1 is selected. (Also select User 1 on the lower keyboard if desired).

Setting Up the FVX-1

1. Set 'Data Entry 1' to Midi Channel #1
2. Select User 1 (Voice #249) on 'Data Entry 1'
3. Ensure 'Data Entry 1' Level and outlet volumes are turned up for pleasurable listening on speakers or head phones.

With the Voice Editor Program.

1. Edit the various voice parameters within the software program on the computer

The Digital Filters (Fig 8)

Each output has digital filters which are selected/changed by 19 variable bytes or
Each output has 19 digital filters which can be varied independently.

I couldn't find any information on these filters so you have access to adjust all the parameters.
In practice I have found that the first 4 and last 2 filters appear to "influence the biggest changes".

The filters will change to their programmed input/outputs when an HX pre-set voice is downloaded.
Evaluating the filter positions after downloading pre-set voices may be advantageous.

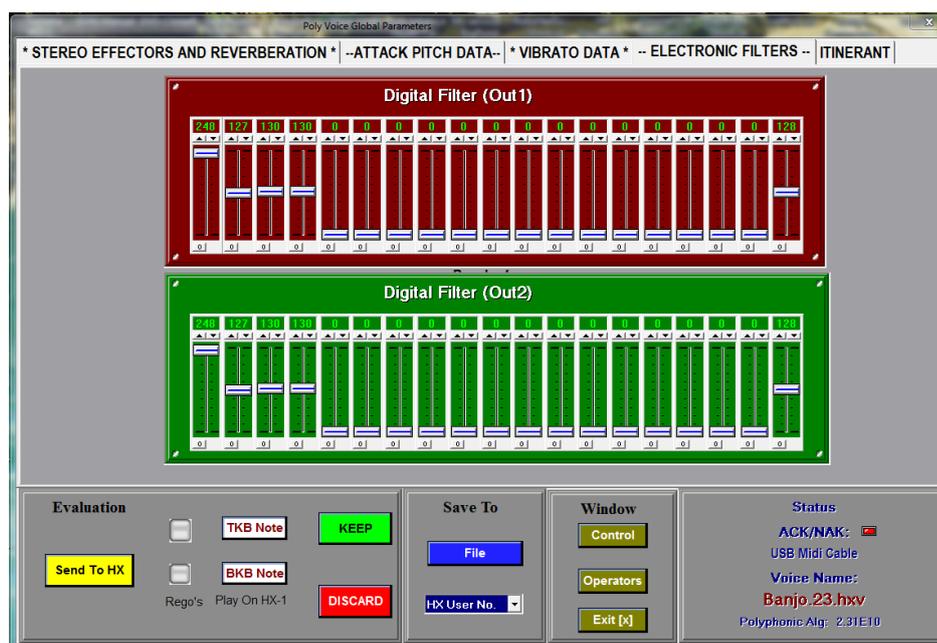


FIG 8

Operator Parameter Example – EG Control and Level (Fig 9)

Fig 9 shows the range of controls for the **EG Control and Level** voice parameters.

You can select the remaining Operator (Op) Control parameter tabs, e.g. Op. Connections Wave and Modulation etc. from the tabs at the top of the Operator Parameter pages.

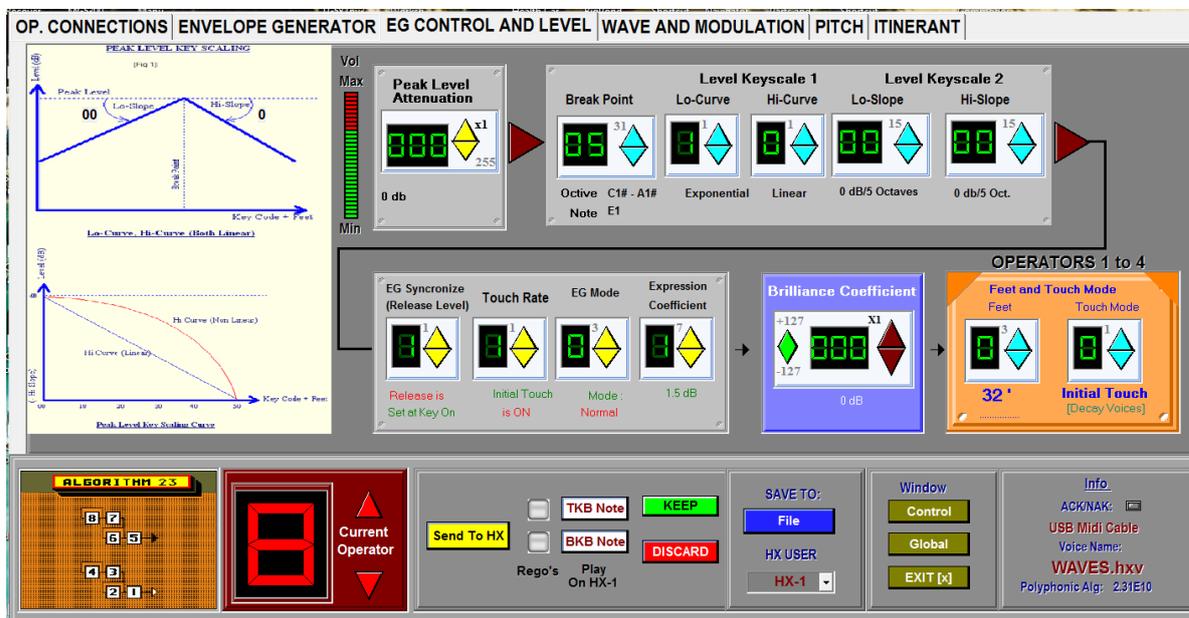


FIG 9

NB. Peak Level Attenuation is “attenuation applied” in dB to the selected operator.

In the above example Operator 8 has 000dB attenuation and therefore has maximum volume.

The Polyphonic Operator Connections (Fig 10)

The Op connections are a group of 8 oscillators (operators) connected together to produce a voice. The operators are normally connected in **two sets** (as shown in fig 10) of ops 8-5 (set 1) and ops 4-1 (Set 2) however the sets can be joined together if required.

The way the operators are connected together is by using an addressing formula called an **Algorithm**. To make life easy there are **63 pre-set algorithms** available (Algorithm pre-set 3 shown in Fig 10).

The voice editor program allows you to modify any of the pre-set algorithms or construct your very own algorithm so you can build a library of unrestricted voices and many sounds.

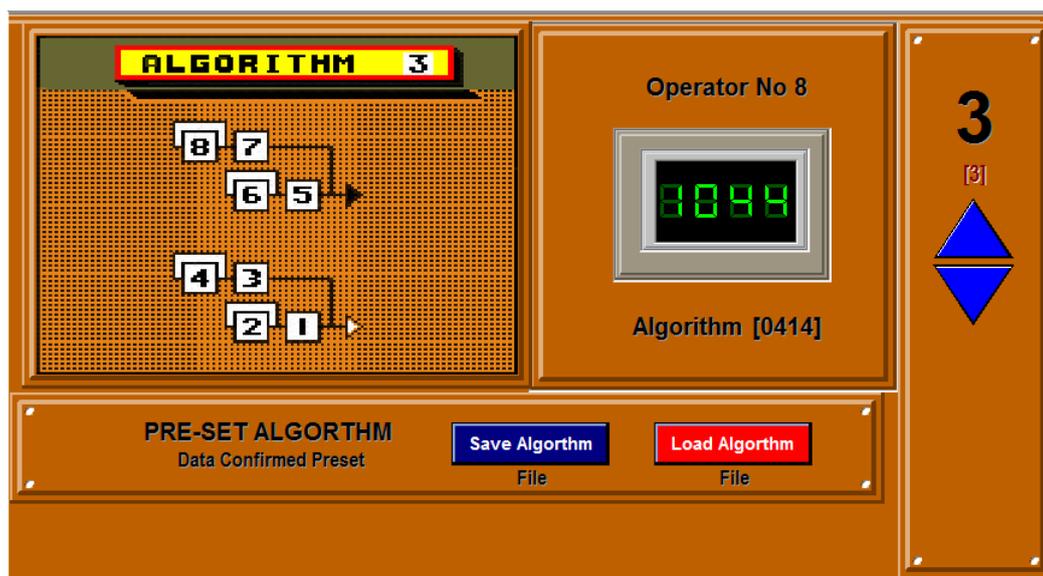


FIG 10

More About Understanding Operators.

Connecting operators or building algorithms is easy however the final audio result is dependent on the many other supporting variables contained in the Operator parameters found in the tab panels.

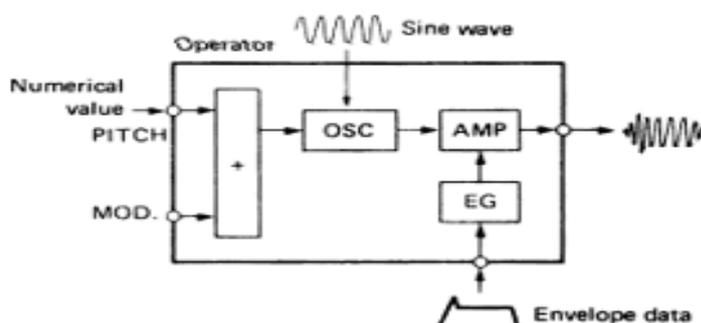
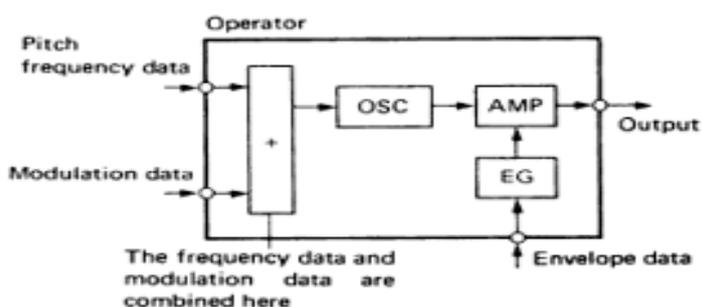
For reference the basic building blocks are shown below.

Operators are either **Modulators** or if connected to an output they are called **Carriers**.

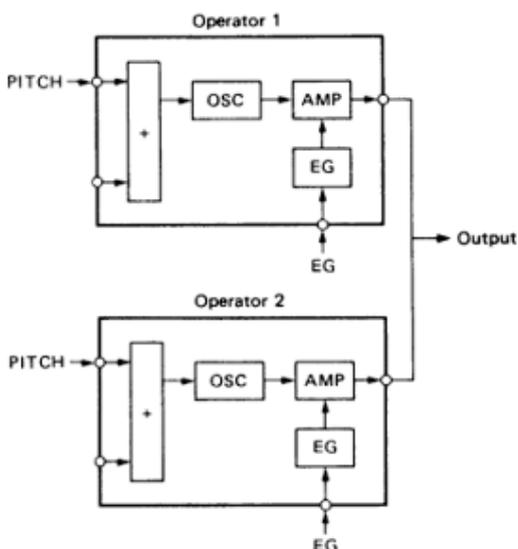
You can connect the 8 operators in any combination of carrier and carrier or modulators and carriers as you wish. Be aware however that small changes to the operator connections or supporting variables can have a dramatic effect on the voice.

Albeit there are only two operators shown in the last diagram of Fig 11 consider the impact of turning the volume off to the carrier - operator 2 – a dramatic voice change. (more on volumes later).

There is a plethora of information on FM synthesis on the internet should you want to learn more.



• Carrier and carrier combinations



1. Modulator and carrier combinations

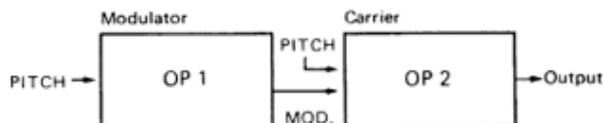


FIG 11

Our Programmable Operators.

Each operator consists of an internal oscillator (referred to as the actual operator) and an adder in the configuration shown below. Note that the operator/oscillator output is fed to and added to the adders input.

The Connection Rules.

1. Each operator/oscillator can only have one input – with one exception.
2. Each Adder can only have one input.
3. Only the operator/oscillator can be connected to a single output channel (CH1 or CH2).
4. There are more rules – see the final connection rules.

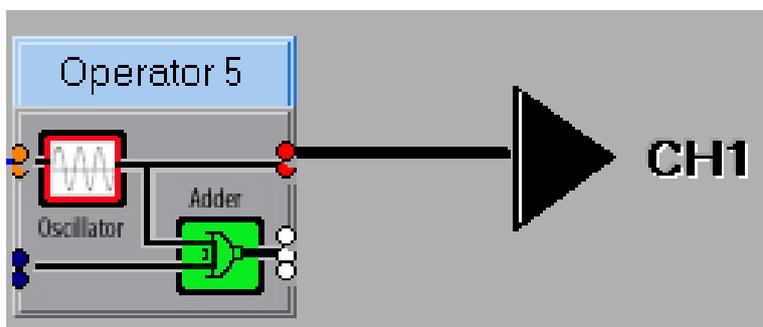
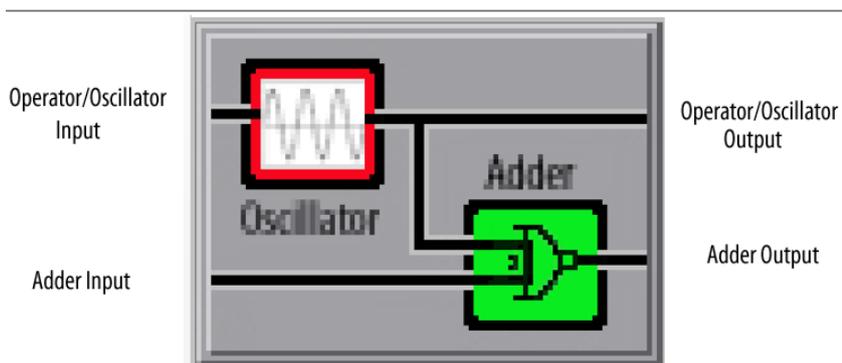


FIG 12

The Connections Explained.

The output connections are electronically selected by addressing registers. (FED-1's connection 'register' terminology is used for backward compatibility). Further, for the various in-depth explanations of the various voice parameters you can refer to the FED-1 user manual.

Selecting Registers.

Definitions.

Downstream; means subsequent; going from a high number operator to a lower number operator (eg 8 to 6).

Upstream; means preceding;lower numbered op to a higher numbered op..

The Operator/Oscillator outputs.

1. Can be addressed to connect to output Channel 1 or Channel 2 by addressing registers CH1 or CH2.
2. Outputs can also be connect to other downstream operators inputs (either operator/oscillator and/or/adder inputs) by addressing a register called "TMP".

The Adder outputs.

1. The Adder output can be connected to other down-stream operator inputs (either operator and/or adder inputs) by addressing a register called "ACC".
2. It also has the only outputs that can;
 - a. connect the two sets of operators (8-4 and 4-1, either upstream or downstream) by addressing a register called "EXT"
 - b. connect feedback to its own and/or other 'upstream' operators/oscillators inputs (but not Adder inputs) by addressing a registers called FB1 or FB2.

The Operator and Adder Inputs. Simply change the inputs to accept upstream outputs or downstream FB1/2 outputs.

An exception to the rule that operator/oscillator and adder inputs can only have one input is if FB1 or FB2 are added to the operator/oscillator input.

The Final Connection Rules.

1. Each operator/oscillator can only have one input – with one FB1 or FB2 exception.
2. Each Adder can only have one input.
3. Only the operator/oscillator can be connected to a single output channel (CH1 or CH2).
4. CH1 or CH2 and EXT cannot be used together on the same operator.
5. Only two Adder Out feedbacks (FB1 and FB2) can be used in any one set.
6. Downstream input connections are upstream interrupted.
E.g. if Op8 TMP is connected to Ops7, Ops6 and Ops5 and you select Ops6 TMP output, Ops 6 will now connected to Ops 5 and break the Ops8 to Ops5 connection. (Ops8 to 7 and 6 will remain connected).
7. I can't think of any more rules.

How To Change the Algorithm/Connections. Fig 13

Simply click on the FED-1 operators input and output registers to change the connections and algorithms.

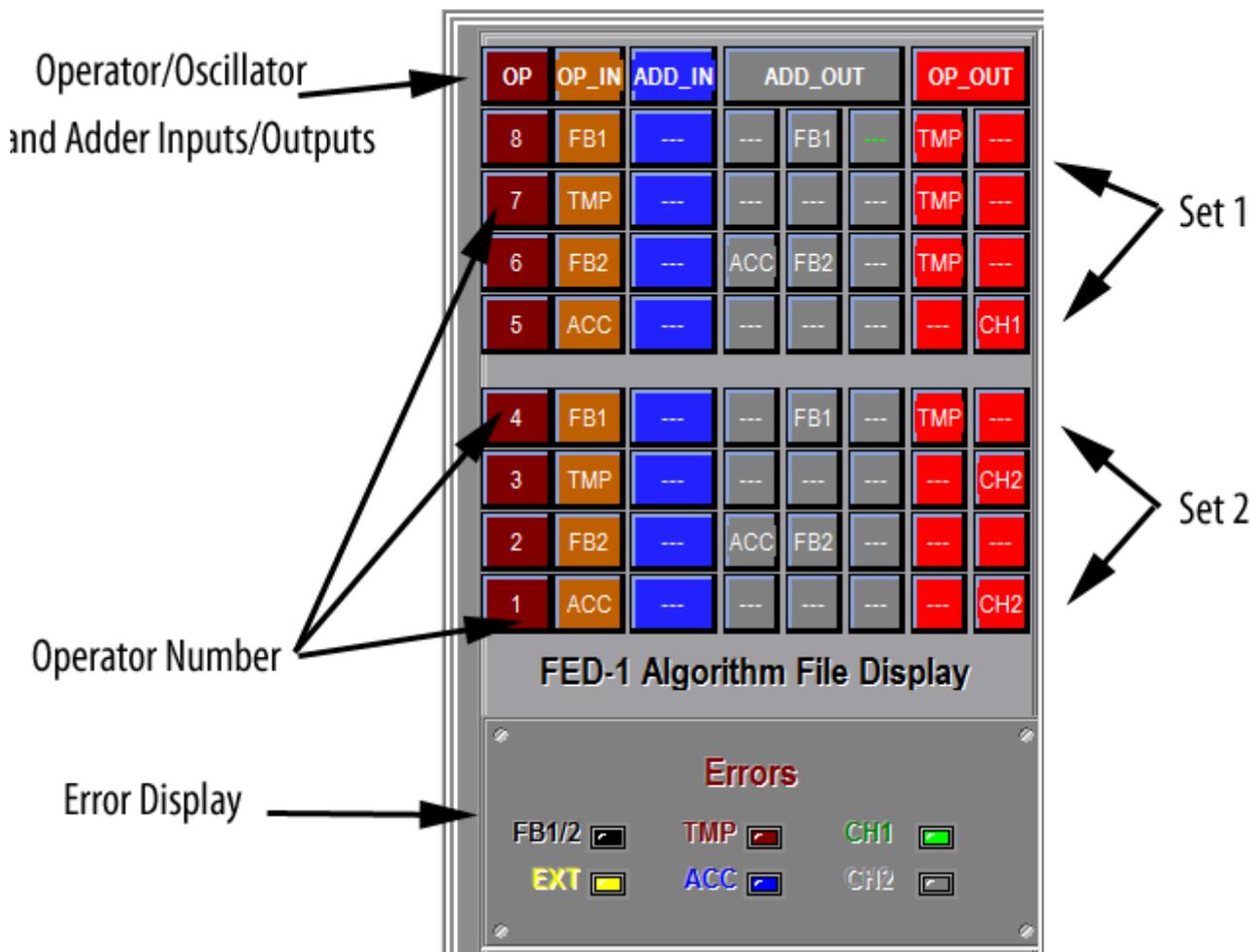


FIG 13

If the algorithm is detected as a pre-set algorithm the pre-set connection diagram (as originally OEM drawn) will be displayed as in the previous fig 10.

Non Pre-Set Algorithms.

If the algorithm is not a pre-set then 99 will appear in the right hand display panel and a static algorithm "Map" Fig 14 will appear in place of the pre-set algorithm connection drawing.

To view a dynamic map of the connections click on "Algorithm Map" The connections on this map will change as you address the various registers to give you a pictorial perspective.

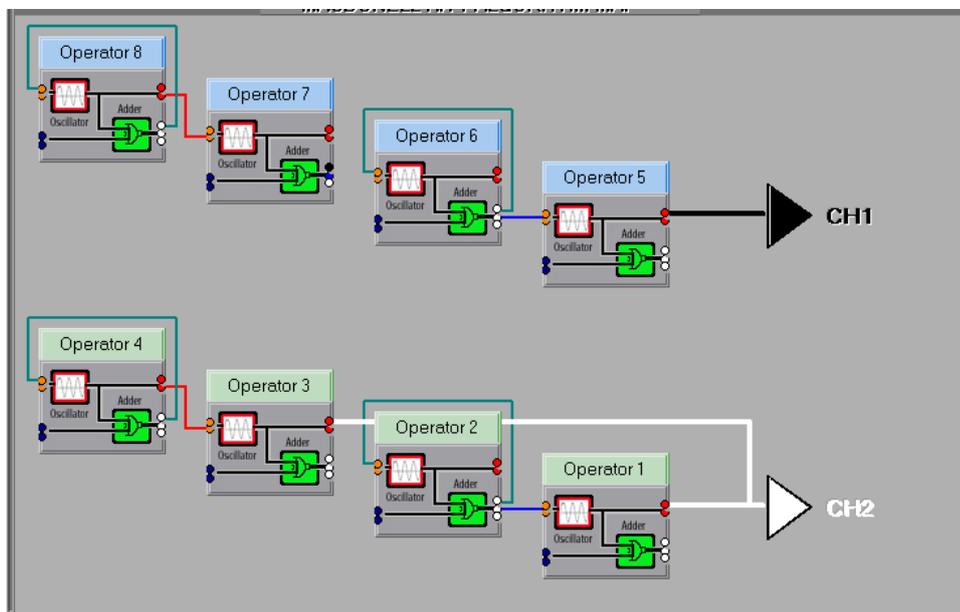


Fig 14

The map concept was introduced to compliment the connection diagrams in the FED-1 program. The map shows the specific connections to overcome some of the FED-1's 'conceptual connection patterns'.

NB. The HX-1 will accept any combination of algorithm. Further it will send back the algorithm unchanged in that voice. This program will not restrict your ‘algorithm constructions’ being sent to the HX-1 however if you have an input missing or an output not connected the HX-1 will program and accept your changes albeit they are voice constructed redundancies.

The Op Connection Page. Fig 15

The volumes for each operator have been made available on the OP Connection page so you can turn volumes off/on for each operator. This allows you to quickly ascertain the contribution (if any) of each operator. NB. The actual volume levels are adjusted using ‘Peak Level Attenuation’ in the EG Control and Level section.

Algorithm Split.

To split two groups of algorithms from different voices;

1. Save the current voice with “KEEP”.
2. Click on the “Algorithm” button and select set 1 or 2 of the current algorithm – NB. The current algorithms Global Data is included in the final split voice.
3. Load and edit a new voice.
4. When ready click on the Split button and select set1 or set 2 from the new voice.
5. Send and play on the HX-1
6. Fine tune (particularly volumes) as required.

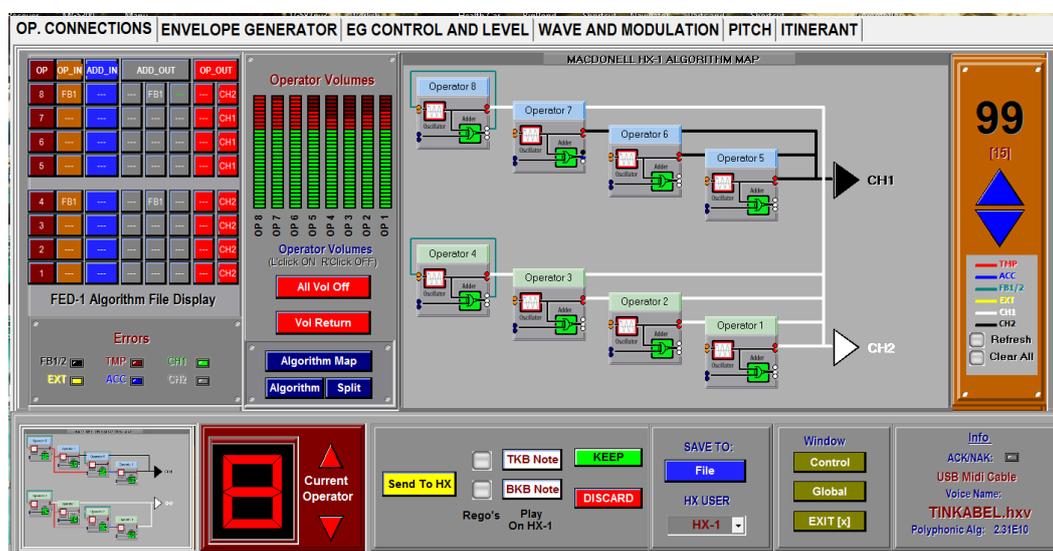
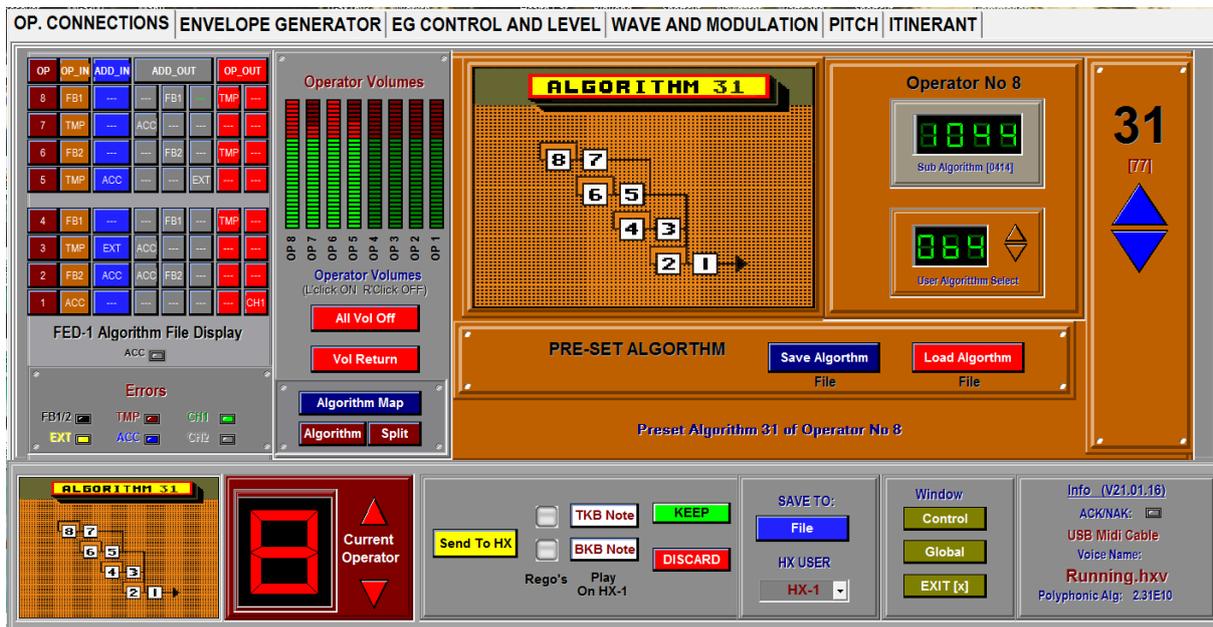


Fig 15

My Notes.

An ACC LED has been added to the FED-1 Algorithm File Display. If checked this allows ACC to be connected to its own ADD_IN input. Accepted by the HX-1 and allows greater voice versatility by allowing an “Adder Feedback” to each operator.

‘User Algorithm Pre-set’ has been added to allow you to set your own algorithm number (between 64 – 999) for ease of future download identification.



More On Volumes.

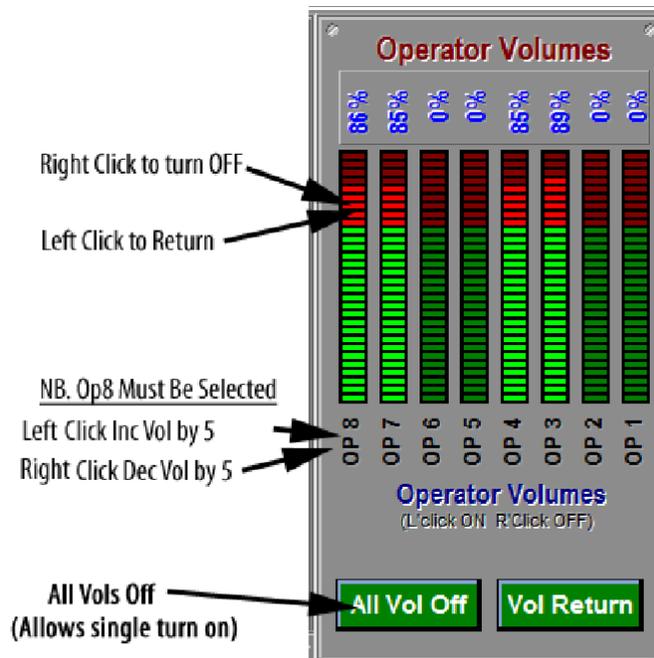
For ease of voice editing the volume controls are ganged together on a convenient panel.

By clicking on the individual operator gages either turns them off (right click) or returns them (left click) to their original value. If the Current Operator is 8 you can adjust the individual volumes by left/right clicking on the vol labels (Op8-Op1) under the gages.

Example.

Say you want to listen to the contribution of a single carrier Operator.

1. click on the 'All Vol Off' button
2. Left click on the Op Vol gage you want to turn on.
3. Send to Hx-1
4. Adjust the vol level by clicking on the operators (Op8-1) label.
5. Send to Hx-1
6. Turn the other required operator volumes on.
7. Send to Hx-1
8. Keep or Discard



If you want to listen to the contribution of a single modulator Operator you must first turn it into a carrier by connecting it To CH1 or CH2. Turn all other operator volumes off and proceed as the example above.

As an example of the importance of the volume controls compare the volumes of the HX-1's 'strings 1' and 'strings 2', both of which use pre-set algorithm 3. In fact many of the HX-1's voices use pre-set algorithm 3 and manage to produce many very different sounds simply by adjusting both the global and supporting operator data.

----- END -----