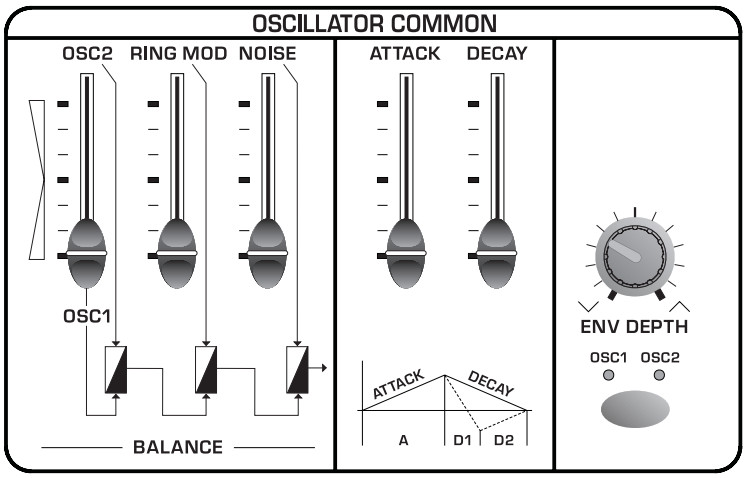
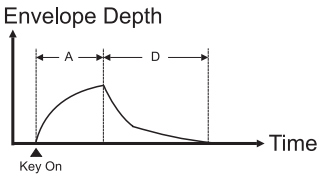
slider ([RING MOD]) balances the signal received from the first slider (i.e. Osc.1+Osc.2) with the Ring Modulator. As the slider is raised the amount of Ring Modulator signal increases. The third slider ([NOISE]) balances the signal received from the second slider (i.e. Osc.1+Osc.2+Ring Modulator) with the white noise. As the slider is raised, the amount of white noise increases.

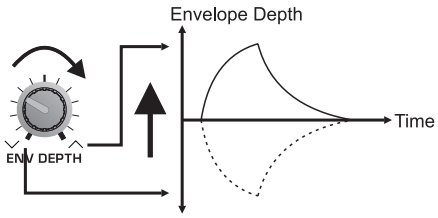


- **[ATTACK]** *(Attack Time)*: regulates the Attack Time parameter of the oscillator envelope, meaning the duration of the initial modification (attack) in the pitch.



- **[DECAY]** *(Decay Time)*: regulates the Decay Time parameter of the oscillator envelope, meaning the duration of the initial modification (decay) in the pitch.

- **[ENV DEPTH]** *(Envelope Depth)*: you can use this trimmer to regulate the depth of the envelope applied to Osc.1 and Osc.2. Turning the trimmer clockwise from the centre increases the modification of the pitch; when it is turned anti-clockwise from the central position the modification will be increased in the opposite direction, while with the trimmer in the central position the envelope will not affect the pitch.



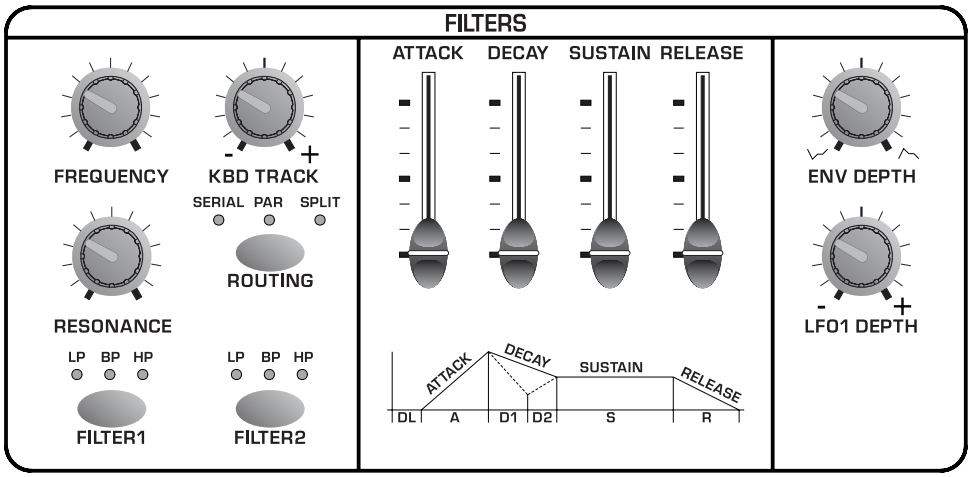
The envelope is assigned to the oscillators by means of the button under the trimmer [ENV.DEPTH]. The LEDs under the trimmer will display the assignment made in accordance with the following logic:

- LED [OSC.1] on: envelope assigned to the first oscillator
- LED [OSC.2] on: envelope assigned to the second oscillator

7.4 MODIFYNG the TIMBRE (FILTERS)

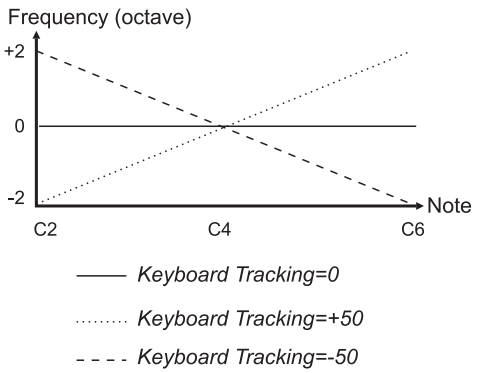
As we have mentioned when discussing the synthesis technique used by the OB-12, the signal generated by the oscillators is rich in harmonics, or in other words it has a very wide frequency content. The filter can be used to attenuate specific harmonics, or a given range of frequencies, in order to obtain the desired sound (with regard to the timbre quality).
In fact, the OB-12 FILTER section uses two filters which can be set up exactly as required with regard to type, cut-off frequency and their interconnection.

The filter control section is the following:

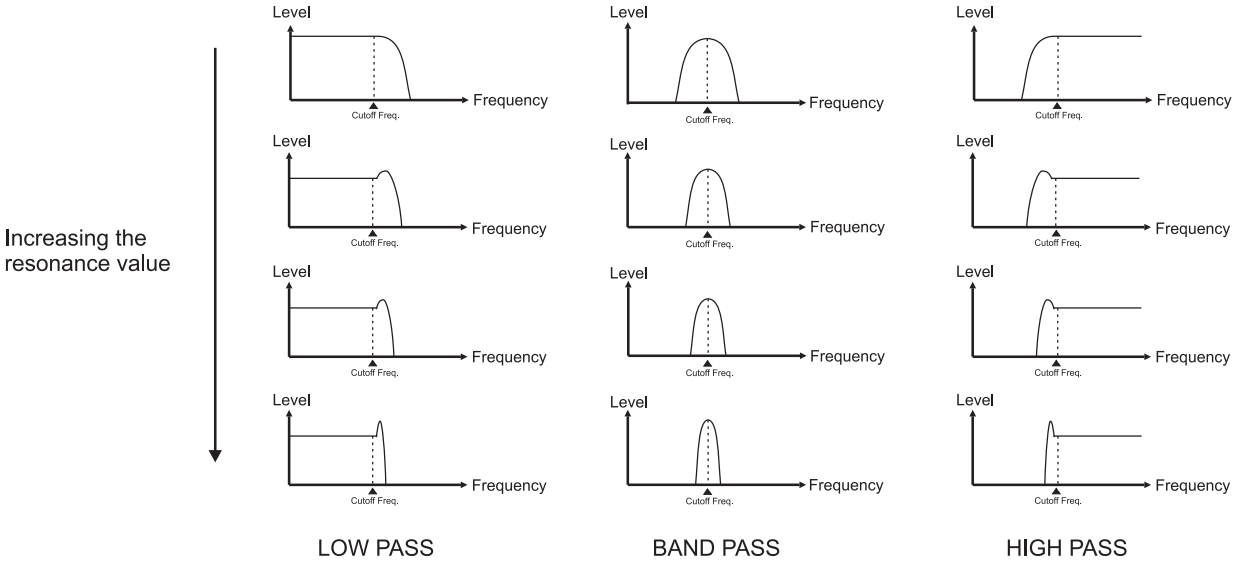


- **[FREQUENCY]**: regulates the filter cut-off frequency. Turning the trimmer anti-clockwise increases the cut-off frequency. Depending on the type of filter, the significance of the cut-off frequency varies: refer to the description of the [FILTER 1] button with regard to operation of the filters in relation to the cut-off frequency.

- **[KBD TRACK]** *(Keyboard Tracking)*: you can use this trimmer to vary the behaviour of the filter in relation to which key is pressed on the keyboard. Intermediate values will keep the trigger frequency the same throughout the keyboard range. This means that higher notes will have a softer sound than lower notes, with fewer partials. Turning the trimmer completely to the right will increase the harmonics in the higher notes, so that they are brighter while the lower notes are darker. Conversely, if the trimmer is turned completely to the left the higher notes will have even fewer harmonics than in the standard setup (trimmer in central position). The lower notes will therefore be brighter, and the higher notes darker.

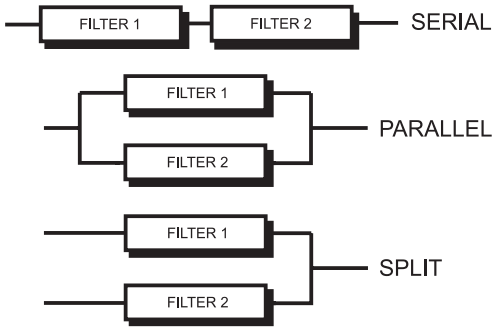


- **[RESONANCE]**: regulates the resonance coefficient. As the diagram shows, the resonance causes an enhancement of the frequencies close to the cut-off frequency value. Increasing the resonance will give greater selectivity in establishing the frequencies affected by the enhancement.



CAUTION! Excessively high resonance coefficient values might trigger unwanted oscillations.

- **[ROUTING]**: you can use this button to select the type of connection between the two filters, as follows:



The selection made will be shown by illumination of the corresponding LED.

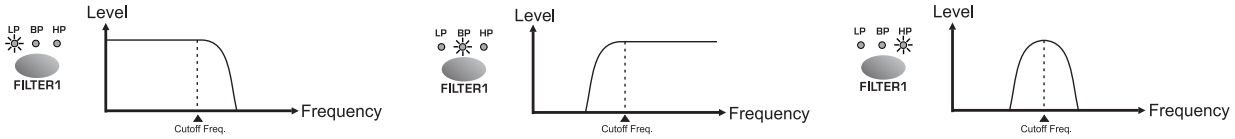
- **[FILTER 1]**: sets the type of filter, as follows:

  - **LP** (Low Pass Filter): you can use this filter to attenuate all the frequencies above the cut-off frequency, giving a darker, softer sound.
  - **HP** (High Pass Filter): you can use this filter to attenuate all the frequencies below the cut-off frequency, giving a sharper, brighter sound.
  - **BP** (Band Pass Filter): you can use this filter to attenuate all the frequencies not present in the area surrounding the cut-off frequency.

  The LED against the code identifying the type of filter illuminates to display the selection has been made. If no LED is on, the filter will be disabled (FLAT condition).

- **[FILTER 2]**: the procedure for selecting the type of the second filter is identical to that described for [FILTER 1].

  The behaviour of the various types of filters is described in the next page.



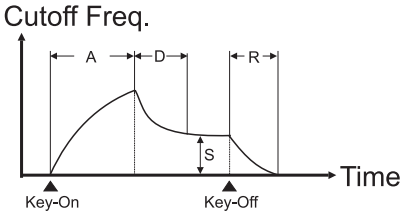
- **[ATTACK]** *(Attack Time)*: this slider allows you to regulate the attack time of the filter envelope, meaning the time the sound takes to reach the maximum cut-off frequency when the note has been played.

- **[DECAY]** *(Decay Time)*: this slider allows you to regulate the decay time, meaning the time from when the filter reaches the maximum cut-off frequency to when it reaches the Sustain condition.

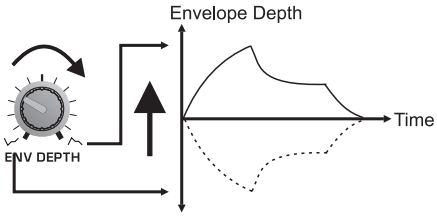
- **[SUSTAIN]** *(Sustain Level)*: regulates the level of maintenance of the cut-off frequency value. The duration of this segment is controlled by the Sustain Time parameter, displayed in the EDIT FILTERS / ADV-ENV display page (see point 8.4).

- **[RELEASE]** *(Release Time)*: regulates the release time, meaning the time from when the key is released to when the filter no longer affects the sound.

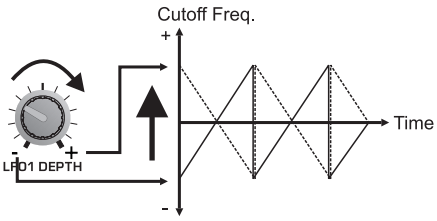
See next the example of a typical ADSR (Attack, Decay, Sustain, Release) envelope applied to the filter, which therefore specifies how the character of the sound changes over time:



- **[ENV DEPTH]** *(Envelope Depth)*: you can use this filter to regulate the depth of the envelope applied to the filter. Turning the trimmer clockwise from the centre increases the modification of the timbre; when it is turned anti-clockwise from the central position the modification will be increased in the opposite direction, while with the trimmer in the central position the envelope will not affect the filter cut-off frequency.



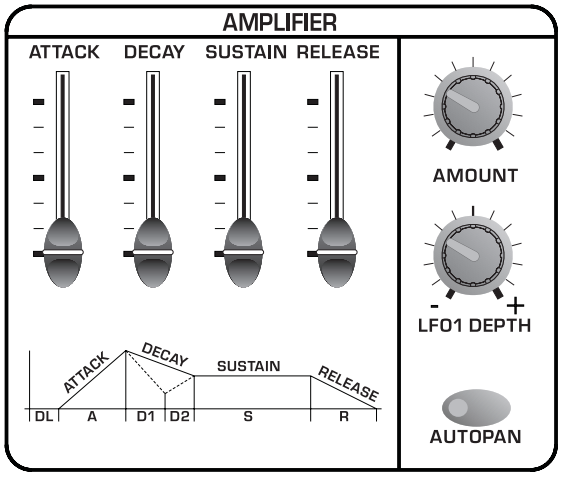
- **[LFO1 DEPTH]**: regulates the depth of the modulation by LFO1 of the timbre (with cyclic variation) of the signal leaving the filter, generating wah-wah type effects, for example. With the knob turned completely to the right the filter will be affected by the maximum LFO1 modulation depth, with the knob central the filter will be unaffected by the modulation, and with the control turned completely to the left the maximum modulation depth will be applied but with opposite phase to the first condition.



7.5 VOLUME CONTROL (AMPLIFIER)

The amplifier controls the volume of the sound, varying it in relation to time when required. This section allows you to set the envelope which will control the amplifier and the distribution of the sound within the stereophonic panorama.

The Amplifier section is as follows:



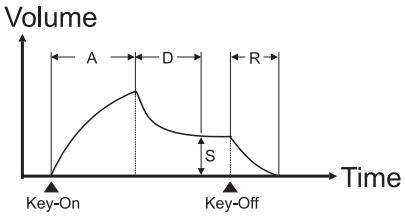
- **[ATTACK]** *(Attack Time)*: this slider allows you to regulate the attack time of the amplifier envelope, meaning the time the sound takes to reach the maximum signal level once the note has been played.

- **[DECAY]** *(Decay Time)*: this slider allows you to regulate the decay time, meaning the time from when the signal reaches the maximum level to when it reaches the Sustain condition.

- **[SUSTAIN]** *(Sustain Level)*: regulates the level of maintenance of the signal. The duration of this segment is controlled by the Sustain Time parameter, displayed in the EDIT FILTERS / ADV-ENV display page (see point 8.5).

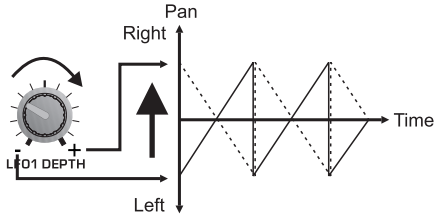
- **[RELEASE]** *(Release Time)*: regulates the release time, meaning the time from when the key is released to when the sound is no longer present.

See next the example of a typical ADSR (Attack, Decay, Sustain, Release) envelope applied to the amplifier, which therefore specifies how the level of the sound changes over time:



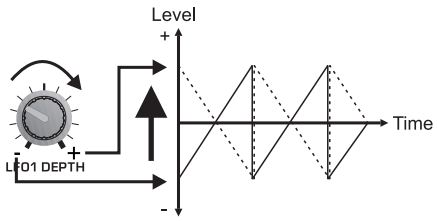
- **[AMOUNT]**: regulates the volume of the Timbre. Clockwise rotation provides higher sound volumes. This control therefore allows you to set different volumes for the various Timbres which make up a Program (the general volume of which can be controlled using the [MASTER VOLUME] trimmer).

- **[LFO1 DEPTH]**: this trimmer provides two specific functions. When the LED of the [AUTOPAN] button is on, the trimmer regulates the amount of signal which will be affected by the Pan function. In the central position, the sound will not move within the stereophonic panorama. In either of the extreme positions, the sound will be completely affected by the Pan effect and in opposite directions (depending the chosen end of the trimmer scale).



In case [AUTOPAN] is off and [WAVE SELECT] of LFO1 is setted as sawtooth (first selection to the left)

When the [AUTOPAN] LED is off, the trimmer regulates the depth of modulation by LFO1 on the sound volume, thus generating tremolo effects.



In case [AUTOPAN] is on and [WAVE SELECT] of LFO1 is setted as sawtooth wave (first selection to the left)

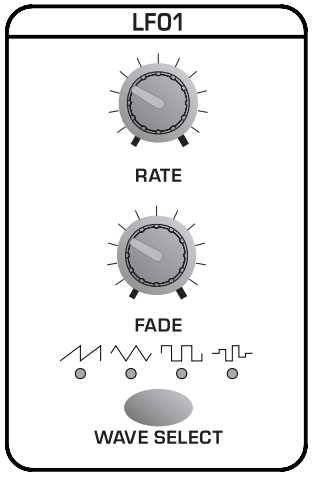
- **[AUTOPAN]**: this button establishes whether LFO1 is to be assigned to the Pan (i.e. cyclic shift of the signal from right to left); in this case the LED will illuminate. If the LED is off, the Autopan function will not be available and LFO1 will modulate the signal level in cyclic mode.

  N.B.: If you are using mono outputs (MAIN OUT [L/MONO], or AUX [1] or AUX [2] on its own) the Pan effect will not be audible.

7.6 MODULATING the SOUND CYCLICALLY (LFO1)

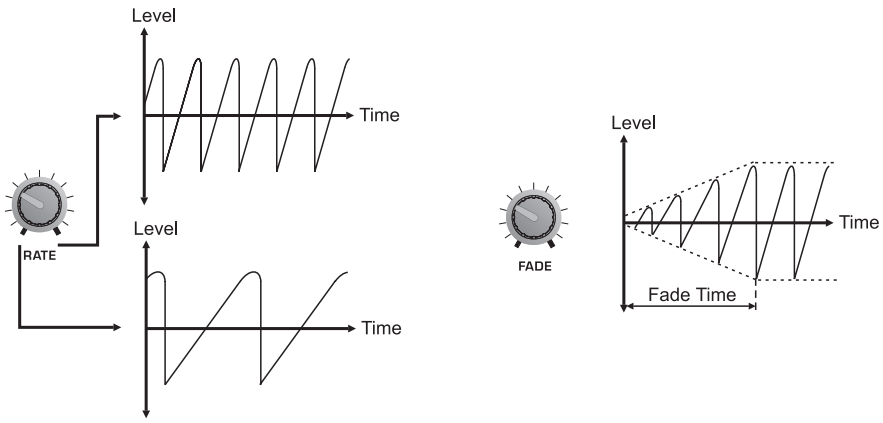
As we have already seen, LFO1 (Low Frequency Oscillator) generates a waveform which, when required, will modulate the signal present in the sections we have described so far. This allows you to vary the pitch of the sound (in the Osc.1 and 2 sections), the timbre (in the Filters), and the volume/Pan (in the Amplifier), all in cyclic mode.

We will now take a detailed look at this section:

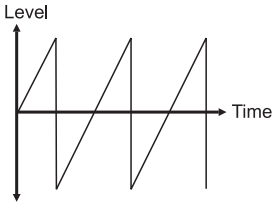


- **[RATE]**: regulates the frequency of the modulating signal. Turn the knob clockwise to increase the frequency of the signal and thus the modulation rate.

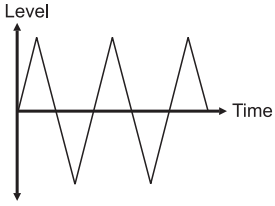
- **[FADE]**: sets the time in which the level of the modulating signal will reach the maximum modulation value specified with the [LFO1 DEPTH] trimmers in the various generation sections. Turn the trimmer clockwise to increase this delay.



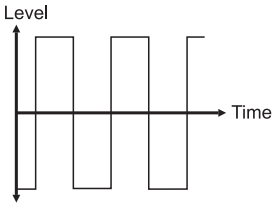
(sawtooth or ramp): the signal passes immediately from a maximum to a minimum value.



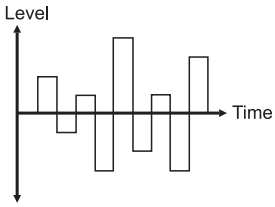
(triangular): starting from a minimum level, the signal rises to a maximum value in a given period of time, then returns to the minimum level in the same period of time.



(square): the signal assumes two single values.



(random): the signal assumes random values.

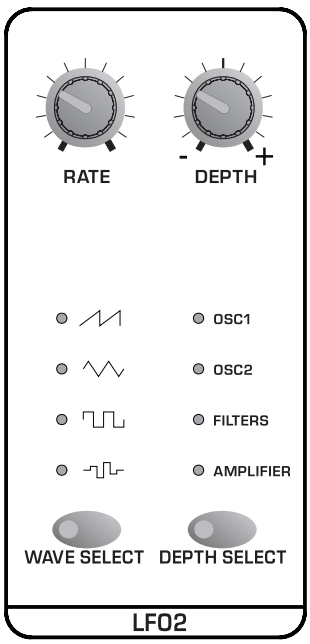


7.7 MODULATING the SOUND with the [MODULATION] WHEEL (LFO2)

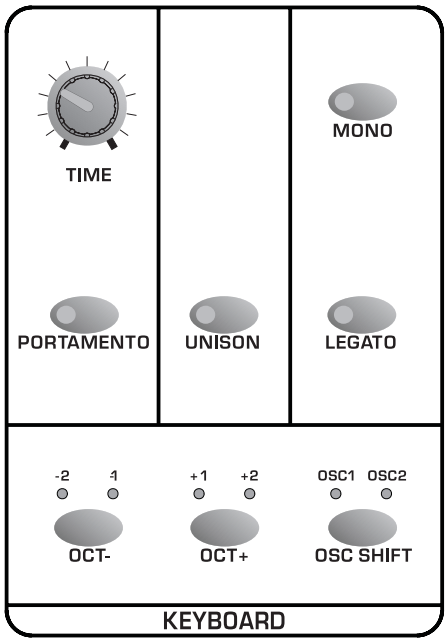
LFO2 works in exactly the same way as LFO1, with the sole difference that the amount of modulation can be adjusted using the [MODULATION] wheel.

The panel section comprises:

- **[RATE]**: regulates the frequency of the modulating signal. Turn the trimmer clockwise to increase the frequency of the signal.
- **[DEPTH]**: regulates the maximum modulation depth; this is then regulated by the [MODULATION] wheel, which sends it to the various sections.
- **[WAVE SELECT]**: specifies the waveform of the modulating signal. The waveforms are the same as those generated by LFO1.
- **[DEPTH SELECT]**: this button allows you to specify the section on which you are regulating the maximum LFO2 modulation depth by means of the [DEPTH] trimmer.



7.8 SETTING the KEYBOARD (KEYBOARD)



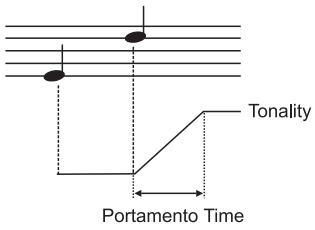
This section of the panel allows you to regulate the transposition of the oscillators and the keyboard modes.

The section contains the following controls, which as the illustration shows are subdivided into four subsections.

PORTAMENTO

When the Portamento is active, the pitch (tuning) of each new note played is not reached instantaneously and separately, but by means of a gradual shift of definable duration.

- **[TIME]**: sets the Portamento time, meaning the time the pitch takes to change (between the two notes). Turn the trimmer clockwise to increase the Portamento time.



- **[PORTAMENTO]**: use this button to enable / disable the Portamento status, following the usual logic:

  - LED on: function active
  - LED off: function disabled

UNISON

The UNISON function allows you to play three voices simultaneously by pressing one key on the keyboard, enriching the sound and giving it more body. When this function is used, the polyphony will be reduced to 4 notes.

- **[UNISON]**: activates and disables the Unison function following the rule:

  - LED on: function active
  - LED off: function disabled

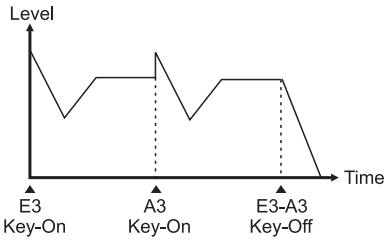
MONO

This subsection allows you to set the keyboard mode, i.e. polyphonic or monophonic. If the monophonic keyboard is used, the Legato function will also be available.
Using a polyphonic keyboard allows more than one note to be played at once, while if the keyboard is monophonic you will not be able to play more than one note at the same moment; this may cause problems on some occasions, but at other times it may be useful, for example when playing the timbres of wind instruments, or “old” analog synthesizers (which had polyphony of one note – i.e. they were monophonic).

The Legato function, only available with monophonic keyboard, allows a succession of notes to be played without interruption. This means the attack on the following note is eliminated and only the pitch is changed.

- **[MONO]** *(Monophonic)*: this button allows you to set the keyboard as monophonic following the rule:

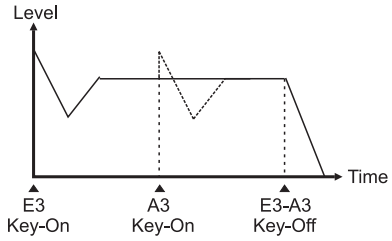
  - LED on: keyboard monophonic
  - LED off: keyboard polyphonic



Monophonic

- **[LEGATO]**: this button allows you to enable the Legato function, following the logic:

  - LED on: function active
  - LED off: function disabled



Monophonic with Legato

Since this function can only be used with the keyboard in monophonic mode, activating it also activates the MONO function (if this has not already been enabled).

OSC SHIFT

In this subsection of the KEYBOARD you can regulate the transposition of the oscillators, thus varying the pitch of the signal which they generate by octaves. This allows you to make use of two (or more) pitches using two (or more) timbres (and therefore two or more Parts). Another feature of the Osc Shift is that it allows you to play beyond the keyboard range, e.g. by playing a bass sound with notes lower than those actually available on the OB-12 keyboard.

- **[OCT -]**: decreases the oscillator pitch by one or more octaves. The LEDs display the pitch status, as follows

  -1: pitch one octave lower
  -2: pitch two octaves lower

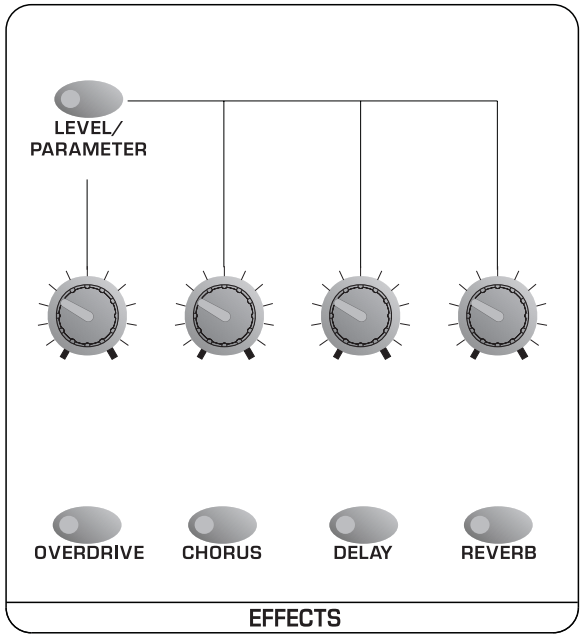
- **[OCT +]**: increases the pitch by one or more octaves. The LEDs display the pitch status, as follows

  +1: pitch one octave higher
  +2: pitch two octaves higher

- **[OSC SHIFT]**: sets the oscillator, displayed by means of the [OSC.1] and [OSC.2] LEDs, whose pitch is being modified.

7.9 ADDING EFFECTS to the SOUND (EFFECTS)

The OB-12 offers an effects section with which you can add four fully configurable algorithms to your sound.



The OB-12 allows you to make use of the following algorithms:

- **OVERDRIVE**: simulates an amplifier brought to saturation. Can be used when creating timbres which simulate a guitar.
- **CHORUS**: adds space and depth to the sound.
- **DELAY**: produces delayed copies of the signal, such as the echo effect.
- **REVERB**: simulates the diffusion of the sound in enclosed environments, bearing in mind the reflection and absorption of the walls.

the controls on the panel are:

- **[OVERDRIVE]**: adds / bypasses the Overdrive effect.
- **[CHORUS]**: adds / bypasses the Chorus effect.
- **[DELAY]**: adds / bypasses the Delay effect.
- **[REVERB]**: adds / bypasses the Reverb effect.

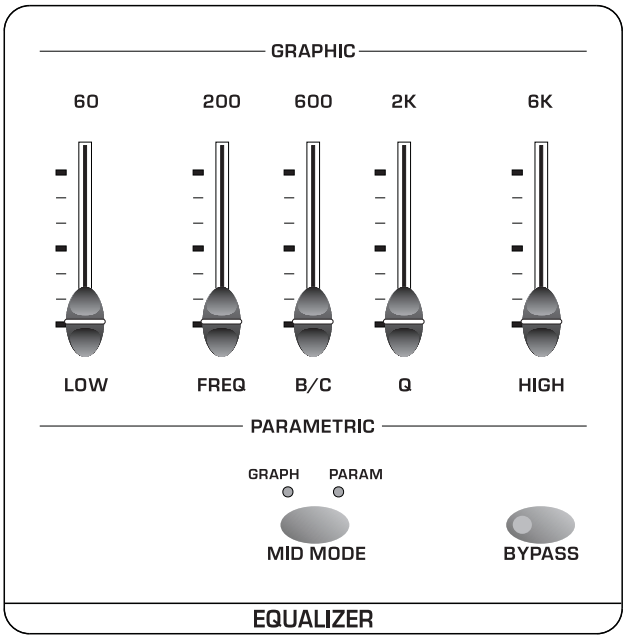
For all the buttons, the same logic applies:

- LED on: effect active
- LED off: effect disabled

- **[LEVEL/PARAMETER]**: this button allows you to set whether the four trimmers associated to the four effects are to be used to regulate the level of each algorithm (LED off) or a parameter defined in the EFFECTS SETTINGS video pages.

7.10 EQUALIZING the SOUND (EQUALIZER)

This section allows you to make use of a (mutually exclusive) graphic or parametric equalizer, used to regulate the equalization of the sound.



The section relating to the equalizer comprising the following controls:

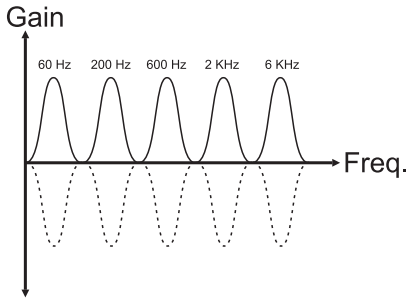
- **[MID MODE]**: defines the type of equalizer:

  - GRAPHIC: graphic equalizer
  - PARAM. (Parametric): parametric equalizer.

The names and functions of the controls relating to operation of the equalizer vary depending on the type of equalizer adopted. We will now see how they act on the signal:

MID MODE=GRAPHIC

- **[60]**: enhances / attenuates the signal in the frequency region centred on 60 Hz.
- **[200]**: enhances / attenuates the signal in the frequency region centred on 200 Hz.
- **[600]**: enhances / attenuates the signal in the frequency region centred on 600 Hz.
- **[2K]**: enhances / attenuates the signal in the frequency region centred on 2 KHz.

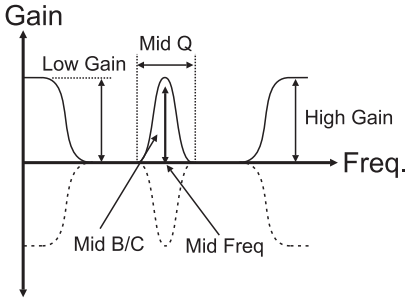


- **[6K]**: enhances / attenuates the signal in the frequency region centred on 6 KHz.

For all the sliders, the totally down position corresponds to an attenuation of the signal of -12 dB at that specific frequency. In the central position there will be no effect on the sound, while with the slider fully up there will be an enhancement of the signal of +12 dB.

MID MODE=PARAM.

- **[LOW]**: regulates the enhancement / attenuation of the signal with frequencies below 60 Hz.
- **[MID]**: sets the region of the medium band frequencies of the signal to be enhanced / attenuated.
- **[FREQ]** *(Frequency)*: regulates the enhancement / attenuation of the area of frequencies set using the [MID] trimmer.



- **[Q]**: sets the band-width of operation on the frequency set with the [MID] trimmer.

- **[HIGH]**: regulates the enhancement / attenuation of the signal with frequencies higher than 6 KHz.

  The trimmers which regulate the amount of action on the signal ([LOW], [FREQ] and [HIGH]) operate exactly as described for the graphic equalizer. For the [MID] and [Q] trimmers, higher slider positions set higher values of the parameters they control.

- **[BYPASS]**: sets whether the Equalizer section is to be bypassed (LED on) or not (LED off).

7.11 REGULATING the GENERAL VOLUME (VOLUME)

This section allows you to regulate the volume of the Program, and therefore not of the individual timbre.

- **[MASTER VOLUME]**: you can use this slider to regulate the final volume of the Program.

7.12 USING the [PITCH] and [MODULATION] WHEELS

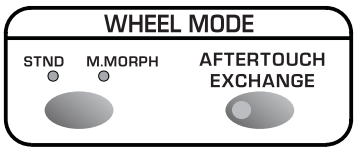
There are two wheels beside the OB-12 keyboard allowing the user to:

- **[PITCH]**: control the general pitch of the instrument, with consequent sending of MIDI Pitch Bend messages.

- **[MODULATION]**: control the depth of modulation by the LFO2 on the sections specified in the section of the same name; control the Manual Morphing effect; control the parameters associated to the Aftertouch.

As well as the two wheels, the WHEEL MODE section also contains the controls enabled for assignment of functions to the [MODULATION] wheel.

This section therefore contains the following controls:



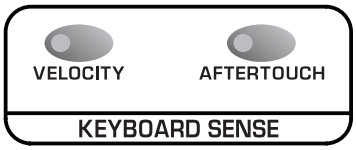
- **[STND-M.MORPH]** *(Standard-Manual Morph)*: enables the two modes for use of the [MODULATION] wheel, i.e. for modulating the signals by means of LFO2 ([STND] LED on) or for controlling the Manual Morph function ([M.MORPH] LED on). Refer to point 9.9 for further information concerning use of the [MODULATION] wheel for controlling the Manual Morph.
  N.B.: control of the Manual Morph can only be assigned to the [MODULATION] wheel if this function is active.

- **[AFTERTOUCH EXCHANGE]**: with this function active (button LED on), the parameters controlled with the Aftertouch can only be controlled by means of the [MODULATION] wheel, while the depth of modulation by LFO2 (the LFO2 DEPTH parameter) will be controlled by the Aftertouch.
  N.B.: control of the Manual Morph is independent of the setting of this function. You can therefore control this function by means of the [MODULATION] wheel in both cases.

7.13 ENABLING the VELOCITY and AFTERTOUCH

The KEYBOARD SENSE section contains the controls for enabling and disabling the Velocity and/or the Aftertouch. You can use the Velocity, meaning the dynamic applied to the keyboard keys, to control up to 19 sound generation parameters (see point 8.9), while the Aftertouch, meaning the force applied to the key after it has been depressed, can be used to regulate up to 14 generation parameters (see point 8.9).

The relative front panel section is as follows:



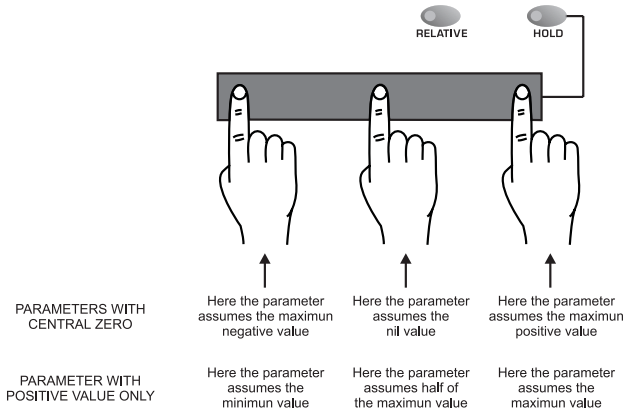
- **VELOCITY**: enables (LED illuminates) or disables (LED off) use of the note velocity to control generation parameters, which can be assigned using the CONTROLLERS section of the EDIT TIMBRE display menu (point 8.9).

- **AFTERTOUCH**: enables (LED illuminates) or disables (LED off) use of the Aftertouch to control generation parameters, which can be assigned using the CONTROLLERS section of the EDIT TIMBRE display menu (point 8.9).

7.14 USING the RIBBON CONTROLLER

The Ribbon Controller allows the user to modify two generation parameters simultaneously by simply placing a finger on and/or moving it over its surface. This allows you to modify the tone as if you were using the knobs on the front panel.

The OB-12 Ribbon Controller is illustrated below:



To assign the parameters you wish to control using this device, use the EDIT CONTROLLERS display menu (point 8.9).
As you can see, as well as the Ribbon Controller there are also two buttons close to it, as follows:

- **[RELATIVE]**: when this function is active, the Ribbon Controller “neutral” position (the position which does not produce any variation of the sound, or the central position for controls with positive and negative values and the far left position for controls with positive values only) is assumed on the basis of where the control surface is first touched.

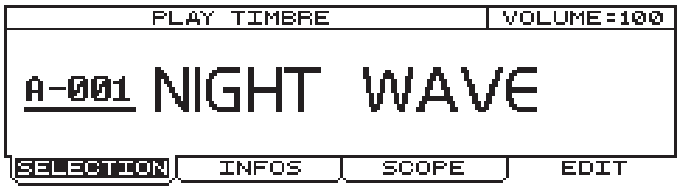
- **[HOLD]**: when this function is selected, each variation of the parameter (or parameters) assigned to the Ribbon Controller will be maintained even after the finger is removed from the control surface.

8. EDIT TIMBRE

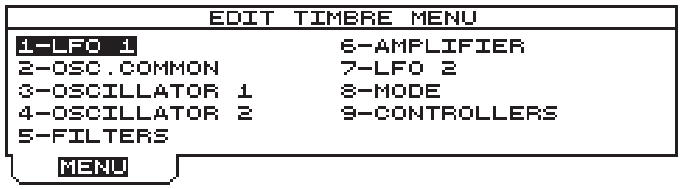
The Edit Timbre function allows the user to set all the parameters relating to the chain for generation of a given sound. Section 7 “Using the panel” has already illustrated the functions of all the controls needed to create the main parameters of a sound. The display pages allow you to define additional settings for total control of the editing of a timbre. This section explains all these settings. However, anyone who has decided to skip section 7 is advised to read that section of the manual before proceeding with this section.

For the procedures for selection of the menus and parameters, refer to point 6.1 – “Play Program”.

From any video page, press the [TIMBRE] button in the MODE&SET-UP section of the front panel. You have now selected the TIMBRE operating environment and the display will show:



The video pages which can be recalled by selecting the INFOS and SCOPE folders have already been described in point 6.2.
We will now examine all the procedures for modifying the sound generated by the OB-12.
Select the EDIT function; the display will change to:



This video page shows the menu for editing a Timbre. It consists of the following sections:

1-LFO1: regulation of the parameters relating to the first low frequency oscillator.
2-OSC.COMMON: regulation of the common parameters of Osc.1 and Osc.2.
3-OSCILLATOR 1: setting of the parameters for control of oscillator 1.
4-OSCILLATOR 2: setting of the parameters for control of oscillator 2
5-FILTERS: regulation of the parameters relating to the two filters.
6-AMPLIFIER: regulation of the amplifier setting parameters.
7-LFO2: setting of the controls of the second low frequency oscillator.
8-MODE: setting of the keyboard modes, unison and oscillator transposition.
9-CONTROLLERS: setting of the Velocity, Aftertouch, Ribbon Controller and [PITCH] and [MODULATION] wheels.

As you will see, when modifications are made to the parameters of the various sections, each change is shown on the display, not only numerically but also in graphic form, to give a full understanding of what is being adjusted.

To make the various sound generation sections clearer, the points which follow will not appear in the same sequence as on the panel and on the display from the EDIT TIMBRE MENU video page; instead, reference will be to their position within the generation chain (and therefore as

they have been described in section 7).
Alongside the name (or code) of the parameter whose function is being discussed, in round brackets you will find the full name of the parameter and of the panel control found in the section whose contents are being explained, used to modify the parameter in question. If the description of the panel control is accompanied by reference to the section in which it is found, this means that the control in question also appears in other sections of the front panel.

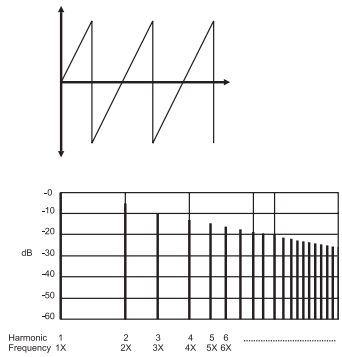
8.1 EDIT OSCILLATOR 1

In real musical instruments, there is always a mechanism which transforms a mechanical action (pressing a keyboard key, for example) or a fluid dynamic effect (blowing into a wind instrument, for example) into an energy wave (the sound wave). This energy, or the sound wave, is the basis for creating a sound.
In synthesizers, the basic waveform is generated by the oscillators.

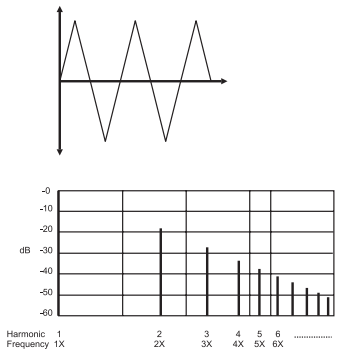
Oscillators may be analog (**VCO**: Voltage Controlled Oscillator) or digital (**DCO**: Digitally Controlled Oscillator, as in the case of the OB-12).

Oscillators normally generate three fundamental waveforms:

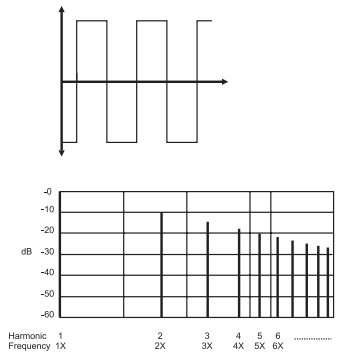
- a sawtooth waveform (or ramp).
- a triangular waveform;
- a square waveform (or pulse);



Harmonic content
of a sawtooth wave



Harmonic content
of a triangolar wave

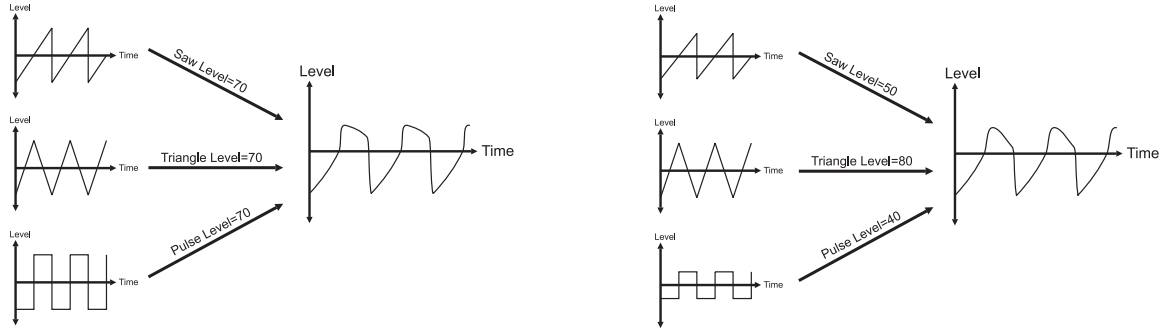


Harmonic content
of a square wave

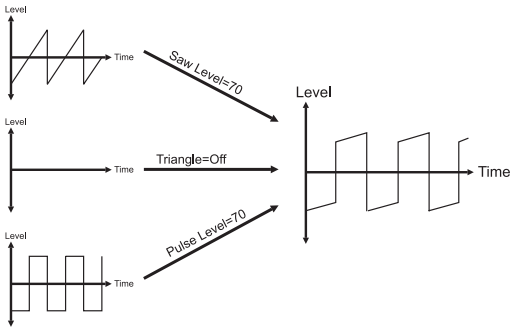
Using a DCO it is easy to obtain a waveform, but the nature of the resulting sound is flat and uninteresting. The waveform has an accuracy and constancy not found in the natural sounds mankind is used to, including the sounds of acoustic instruments.
What's more, if the aim is to create less real sounds, using simple waveforms does not guarantee the generation of complex unnatural sounds.

In order to solve this problem, the OB-12 uses two oscillators (the first of them will be described here) capable of generating three main totally configurable waveforms (as we have seen, they are a sawtooth wave, a triangular wave and a square wave) which are then added together to create a "sum" of the three initial waveforms.

The diagram in the next page will help you to understand this "combination" of waveforms:



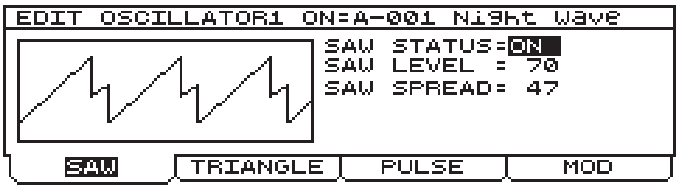
you can also annul one waveform (the triangular one, for example) to produce a waveform which is different again:



When the OSCILLATOR1 option is selected in the SCOPE video page from PLAY PROGRAM or PLAY TIMBRE, the display will show the sum of the three main waveforms in real time (see point 6.1).

We will now look at how to regulate the first oscillator.

In the EDIT TIMBRE MENU video page, select field 3-OSCILLATOR 1; the display will change to:



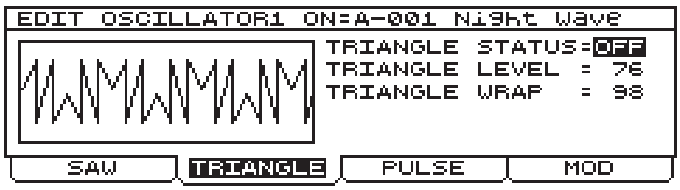
This video page contains the settings of the sawtooth waveform generated by the first oscillator. The video page consists of the following parameters:

- **SAW STATUS** *([WAVE SELECT] relating to the waveform concerned)*: enables (SAW STATUS=ON) / disables (SAW STATUS=OFF) generation of the waveform concerned.

- **SAW LEVEL** *([WAVE MIX] relating to the waveform concerned)*: regulates the level of the signal in a range from 0 (signal level zero) to 100 (maximum signal level).

- **SAW SPREAD** *([WAVE CTRL] assigned to the waveform concerned)*: sets the degree of modification of the waveform, in a range from 0 (waveform not modified) to 100 (maximum modification). Values of this parameter higher than 0 will give make the sound seem out of tune and give it a feeling of space.

Now select the TRIANGLE folder and the display will show the video page relating to the settings of the triangular waveform generated by the first oscillator. The video page comprises:

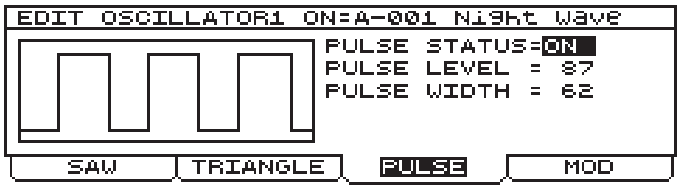


- **TRIANGLE STATUS** *([WAVE SELECT] relating to the waveform concerned)*: activates (TRIANGLE STATUS=ON) / deactivates (TRIANGLE STATUS=OFF) the triangular waveform.

- **TRIANGLE LEVEL** *([WAVE MIX] relating to the triangular waveform)*: regulates the level of the signal in a range from 0 (signal level zero) to 100 (maximum signal level).

- **TRIANGLE WRAP** *([WAVE CTRL] assigned to this waveform)*: sets the degree of deformation of the waveform in a range from 0 (waveform not modified) to 100 (maximum deformation). Using this parameter will allow you to add a large number of overtones to the fundamental.

If you now select the PULSE folder, you will select the page for programming the square (pulse) waveform generated by the first oscillator. The video page displayed is as follows:



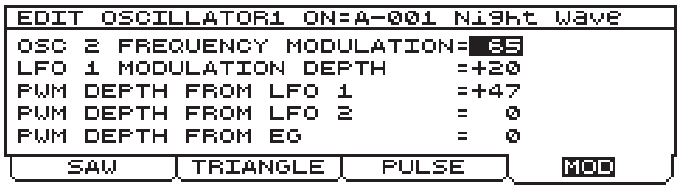
comprising the following parameters:

- **PULSE STATUS** *([WAVE SELECT] relating to the square waveform)*: activates (PULSE STATUS=ON) / deactivates (PULSE STATUS=OFF) the waveform concerned.

- **PULSE LEVEL** *([WAVE MIX] associated to the square waveform)*: regulates the level of the square waveform in a range between 0 (signal level zero) and 100 (maximum signal level).

- **PULSE WIDTH** *([WAVE CTRL] assigned to the waveform concerned)*: regulates the pulse width in a range between 0 (minimum pulse width) and 100 (maximum pulse width). Setting this parameter with minimum or maximum values allows you to enrich the harmonic spectrum of the sound.

If you now select the MOD folder you will display the parameters relating to the signals which will modulate Osc.1. The video page comprises:



containing the following options:

- **OSC 2 FREQUENCY MODULATION** *([FM])*: sets the depth of modulation of the frequency of the signal generated by Osc.1 by the signal originating from the second oscillator.

- **LFO1 MOD.DEPTH** *(LFO1 Modulation Depth, [LFO1 DEPTH] of the OSCILLATOR 1 section)*: regulates the depth of the frequency modulation of the signal originating from LFO1 on the signal leaving the first oscillator. The range of values is –50 (maximum frequency modulation with

opposite signal phase originating from LFO1), 0 (no modulation), +50 (maximum modulation).

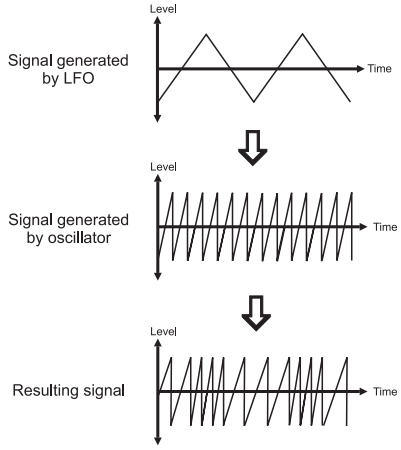
- **PWM DEPTH FROM LFO1** *(Pulse Width Modulation Depth From LFO1, [PWM DEPTH] of OSCILLATOR 1 section assigned to LFO1)*: regulates the depth of modulation of the pulse width (PWM=Pulse With Modulation) generated by Osc.1 by LFO1. The range of values is –50 (maximum modulation with opposite phase), 0 (no modulation), +50 (maximum modulation).

- **PWM DEPTH FROM LFO2** *(Pulse Width Modulation Depth From LFO2, [PWM DEPTH] of the OSC.1 section assigned to LFO2)*: regulates the depth of modulation of the pulse width generated by Osc.1 by LFO2. The range of values is –50 (maximum modulation with opposite phase), 0 (no modulation), +50 (maximum modulation).

- **PWM DEPTH FROM EG** *(Pulse Width Modulation Depth From EG, [PWM DEPTH] of the OSC.1 section assigned to EG)*: regulates the depth of modulation of the pulse width generated by Osc.1 by the envelope generator (EG). The range of values is –50 (maximum modulation with envelope reversed), 0 (no modulation), +50 (maximum modulation).

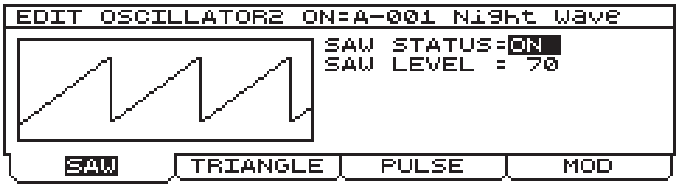
FREQUENCY MODULATION IN THE OB-12

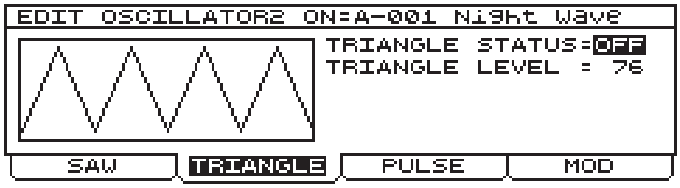
The OSCILLATOR 1 section offers two types of frequency modulation: that performed by the second oscillator (Osc.2) and that carried out by the two low frequency oscillators (LFO1 and LFO2).
In the first case the frequencies of the modulant signal (received from Osc.2) and the carrier (the Osc.1 signal) assume almost the same value. This means that the spectrum content of the modulated (carrier) signal is considerably enriched. In this case, while the carrier determines the height and intensity of the signal, the modulant establishes its timbre.
In case of modulation by the first or second LFO, the modulant signal (received from the LFO) has much lower frequency than the carrier signal. If the carrier is thus modulated with a triangular waveform, a “vibrato” effect is produced, while modulating with a square waveform provides a “trill” effect.

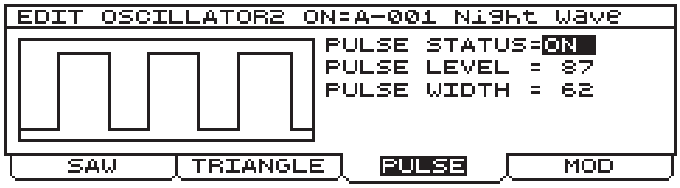


8.2 EDIT OSCILLATOR 2

For sound generation, the OB-12 offers two oscillators having output waveforms which are already complex (i.e. not the single triangular, pulse or ramp waves). This makes available two complex signals which can be added together by means of the OSC.COMMON section. The combinations of waveforms which can be obtained, generated by the second oscillator, are infinite in number, and are displayed by setting the SCOPE parameter of the video page of the same name at OSCILLATOR2 (see point 6.1).
To set this section of the generation chain, select option 4-OSCILLATOR 2 in the EDIT TIMBRE MENU video page.
With regard to setting of the waveform, the display video pages relating to the three primitive waveforms are identical to those already discussed for Osc.1, as follows:

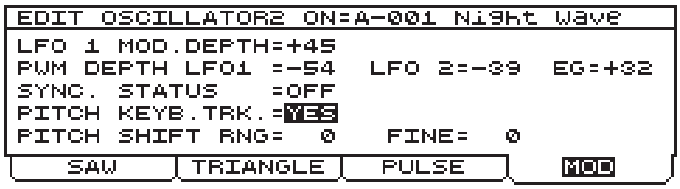






As can be seen, the SAW and TRIANGLE video pages differ from those displayed for Osc.1 in that the SAW SPREAD and TRIANGLE WRAP parameters are not present, while the PULSE is identical. Refer to the descriptions of the pages relating to the first oscillator for the information you require.

By selecting the MOD folder, you can how display the video page relating to the oscillator modulations and pitch.



containing the following settings:

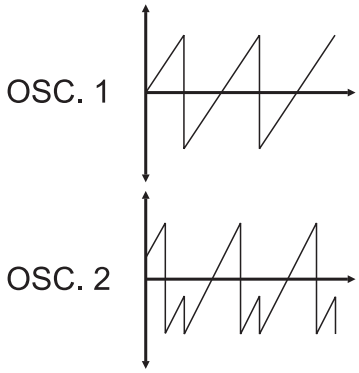
- **LFO1 MOD.DEPTH** *(LFO1 Modulation Depth, [LFO1 DEPTH] of the OSCILLATOR 2 section)*: regulates the depth of the frequency modulation of the signal originating from LFO1 on the signal leaving the second oscillator.
  The range of values is –50 (maximum frequency modulation with opposite signal phase originating from LFO1), 0 (no modulation), +50 (maximum modulation).

- **PWM DEPTH FROM LFO1** *(Pulse Width Modulation Depth From LFO1, [PWM DEPTH] of OSCILLATOR 2 section assigned to LFO1)*: regulates the depth of modulation of the pulse width (PWM=Pulse With Modulation) generated by Osc.2 by LFO1.
  The range of values is –50 (maximum modulation with opposite phase), 0 (no modulation), +50 (maximum modulation).

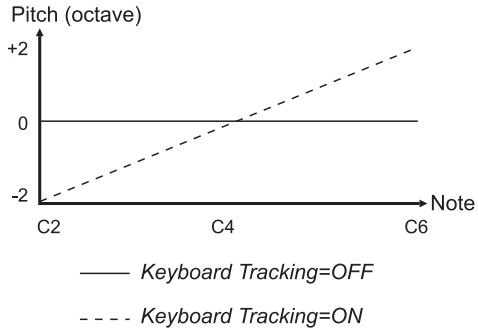
- **PWM DEPTH FROM LFO2** *(Pulse Width Modulation Depth From LFO2, [PWM DEPTH] of the OSC.2 section assigned to LFO2)*: regulates the depth of modulation of the pulse width generated by Osc.2 by LFO2.
  The range of values is –50 (maximum modulation with opposite phase), 0 (no modulation), +50 (maximum modulation).

- **PWM DEPTH FROM EG** *(Pulse Width Modulation Depth From EG, [PWM DEPTH] of the OSC.2 section assigned to EG)*: regulates the depth of modulation of the pulse width generated by Osc.2 by the envelope generator (EG).
  The range of values is –50 (maximum modulation with envelope reversed), 0 (no modulation), +50 (maximum modulation).

- **SYNC STATUS** *([SYNC])*: activates (SYNC STATUS=ON) and deactivates (SYNC STATUS=OFF) the synchronisation of the waveform leaving Osc.2 with that generated by Osc.1. This means that whenever the Osc.1 waveform returns to its starting point the Osc.2 waveform will also be reset (or returned to its cycle start), thus obtaining a more complex waveform.



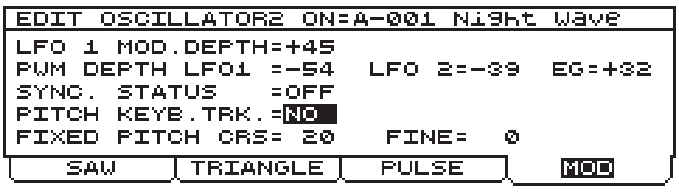
- **PITCH KEYB. TRK.** *(Pitch Keyboard Tracking, [KBD TRACK] of the OSCILLATOR 2 section)*: activates (PITCH KEYB. TRK.=YES) / deactivates (PITCH KEYB. TRK.=NO) the T*racking* function.
  This function is widely used to control the filter, as we will see later, and the oscillator. With the function enabled, the oscillator pitch (and thus the signal it generates) varies depending on which key is pressed; in this case, each key corresponds to one note. When this function is disabled the frequency of the signal generated by Osc.2 will no longer depend on the key pressed but on the FIXED PITCH CRS and FIXED PITCH FINE parameters, which specify its pitch.



- **PITCH SHIFT RNG** (*Pitch Shift Range, [RANGE]*): this option allows the pitch to be set in a range of +/-24 semitones, so that the pitch of the second oscillator is varied in relation to the first. The resulting waveform (in the OSC.COMMON suction) will be even more complex, as the signal is more “spacious” and richer in unharmonic and harmonic partials.

- **PITCH SHIFT FINE** (*Pitch Shift Fine, [FINE]*): regulates the fine tuning of the second oscillator in a range of +/- 1/2 semitone.

If the *Tracking* is disabled, the display shows the following fields:



in which we can see that the PITCH SHIFT RNG and PITCH SHIFT FINE parameters have been replaced by:

- **FIXED PITCH CRS** *(Fixed Pitch Course, [RANGE])*: sets the frequency of the signal generated by the second oscillator, and thus its fixed pitch.

- **FIXED PITCH FINE** *(Fixed Pitch Fine, [FINE])*: provides fine tuning of the fixed pitch of the signal leaving the second oscillator

8.3 EDIT OSCILLATOR COMMON

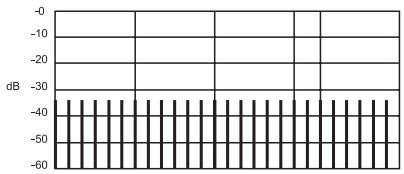
As we have already described, the waveform leaving the two oscillators is the sum of three basic waveforms, and is therefore a complex waveform. The OSC.COMMON section mixes the two waveforms to create the most widely varying combinations. As well as this, the resulting waveform can be combined with the result of the mixing of Osc.1 with Osc.2 with a Ring Modulator and white noise.

THE RING MODULATOR

This function modulates (or more technically multiplies) two signals, in our case the one from the first oscillator with the one generated by the second oscillator, with a *ring* modulation technique. The resulting sound features a large number of harmonic and unharmonic partials not present in the harmonic spectrum of the original signals, making it more metallic, dissonant and almost out of tune.

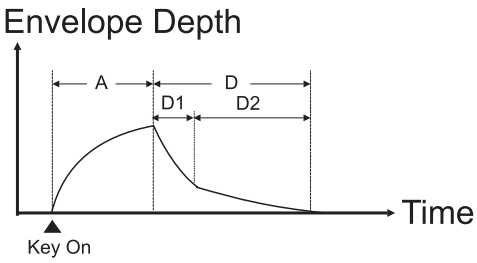
WHITE NOISE

When creating a timbre, it is sometimes necessary to bear in mind noises present in the original sounds, or unharmonic elements. This is done using white noise generators. White noise is a wide-band non-periodic signal containing all the frequencies in the audible band, which you can use to add a slight hiss to the original signal.



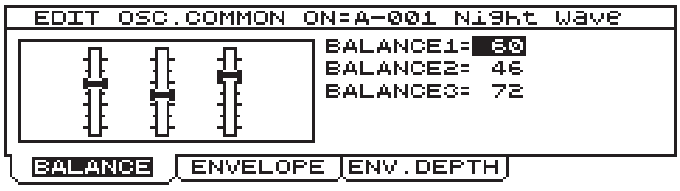
Harmonic content
of white noise

In addition, this section of the generation chain allows you to define the envelope which will control the two oscillators. The envelope concerned will specify how the frequency of the signals generated by Osc.1 and Osc.2 will vary over time, or in other words how the pitch of the sound will vary over time.



For further information about the envelopes, refer to point 8.4.

From the EDIT TIMBRE MENU, select point 2-OSC.COMMON; the display will show the first page of the section concerned:



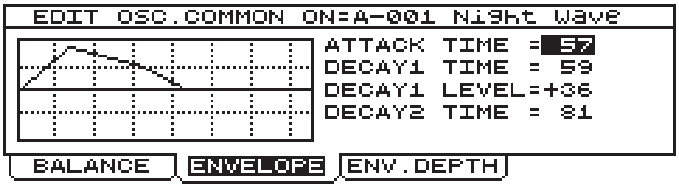
in which you can set the three mixing functions described at the start of this section using the following parameters:

- **BALANCE1** *([BALANCE], OSC.1⇨OSC.2slider):* regulates the balancing of the signals obtained from Osc.1 and Osc.2 in a range between 0 (Osc.1 signal only) and 100 (Osc.2 signal only). Intermediate values will give intermediate balances between the two signals.

- **BALANCE2** *([BALANCE], RING MOD slider)*: regulates the quantity of signal obtained from the first balancing block which will be modulated by the Ring Modulator, in a range of values from 0 (no modulation by the Ring Modulator) to 100 (signal totally modulated by the Ring Modulator). Intermediate values will give intermediate quantities of modulated signal.

- **BALANCE3** *([BALANCE], NOISE slider)*: sets the balancing between the signal obtained from the second balancing function and the white noise in a range of values between 0 (no white noise) and 100 (white noise only). Intermediate values will give intermediate balances between the two signals.

We will now move on to setting of the envelope dedicated to the two oscillators (described by the diagram at the start of the section). When the ENVELOPE folder is selected, the display will change to:



Containing the following programming parameters:

- **ATTACK TIME** *([ATTACK] in the OSCILLATOR COMMON section)*: sets the envelope attack time, i.e. the time from when the key is pressed to when the maximum pitch modification is reached, in a range of values from 0 (no attack time) to 100 (maximum attack time).

- **DECAY1 TIME** *([DECAY] in the OSCILLATOR COMMON section)*: sets the first portion of the envelope decay time, or the time from when the oscillator reaches the maximum degree of pitch modification to when the minimum level of DECAY1 is reached.

- **DECAY1 LEVEL**: regulates the level of the breakpoint between the DECAY1 and DECAY2 segments, thus allowing the use of two different time values for the envelope decay. The range of values is from -50 (pitch modification level the other side of zero from that reached with the ATTACK TIME segment) to +50 (pitch modification level identical to the maximum reached with the ATTACK TIME, throughout the duration of DECAY1). If this parameter is set as 0, the pitch modification will be annulled, with consequent elimination of the DECAY2 segment (the envelope is thus concluded).

- **DECAY2 TIME**: sets the second portion of the envelope decay time, or the time from when the pitch modification reaches the value specified by DECAY1 LEVEL to when the pitch modification is annulled. The range of values assumed by this parameter is from 0 (DECAY2 time portion absent and pitch modification annulled when the modification reaches the DECAY1 LEVEL) and 100 (maximum time value for the second decay portion).

Now select the ENV.DEPTH (Envelope Depth) folder; the video page relating to regulation of the envelope depth, separately for the two oscillators, will appear:

containing the following parameters:

- **OSCILLATOR1** *([ENV DEPTH] assigned to OSC.1)*: regulates the depth of the envelope, or the amount by which the pitch of the signal generated by the first oscillator will vary over time, in a range of values of +50 (maximum envelope, i.e. maximum pitch variation), 0 (no envelope, i.e. pitch variation zero) and –50 (maximum negative envelope).

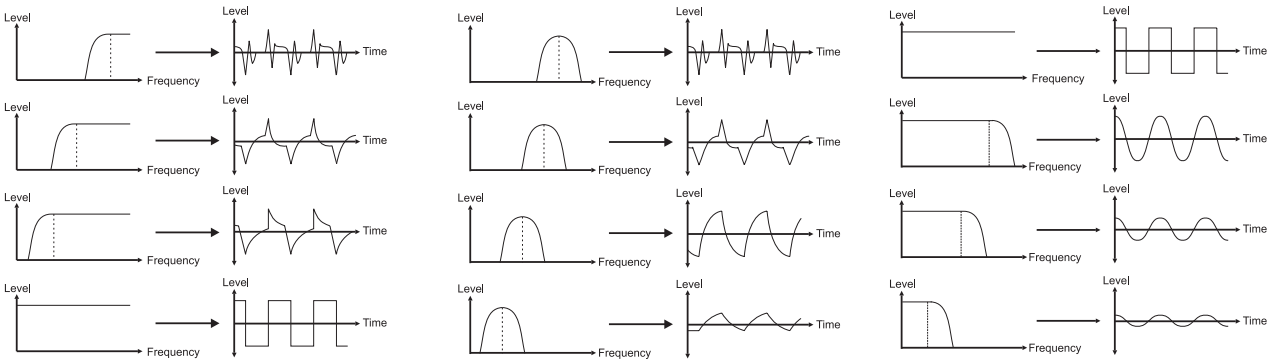
- **OSCILLATOR2** *([ENV DEPTH] assigned to OSC.2)*: regulates the depth of the envelope, or the amount by which the pitch of the signal generated by the second oscillator will vary over time, in a range of values of +50 (maximum envelope, i.e. maximum pitch variation), 0 (no envelope, i.e. pitch variation zero) and –50 (maximum negative envelope).

8.4 EDIT FILTERS

As we have seen in section 5, which explains how sound is generated, the OB-12 emulates the subtractive synthesis technique for sound generation. With this type of synthesis, the timbre is created starting from a waveform with a high harmonic content (in our case, the sum of the signal produced by the two oscillators, the Ring Modulator, white noise and the modulations of the various signals) which is then filtered to eliminate or attenuate the superfluous and/or unwanted harmonics.
The name “subtractive synthesis” therefore derives from the fact that harmonics are subtracted by a filter.

Analog synthesizers used normally to use **VCFs** (*Voltage Controlled Filters*), with voltage control used to vary the cut-off frequency. This allowed real-time control from a panel, and above all by an envelope generator.
In modern synthesizers VCFs have been supplanted by **DCFs** (*Digitally Controlled Filters*), which not only guarantee immunity from noise, but also offer unlimited flexibility of use. DCFs are produced in software version with DSPs (Digital Signal Processors).

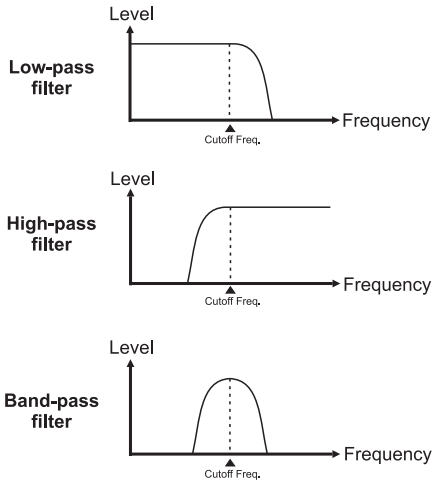
Let us see, for example, how a square waveform is modified by the action of the filter in the various mode and cut-off frequency configurations:



Naturally, the above diagrams are only an example of the waveform leaving the filter, since as we have seen, the waveforms generated by the two oscillators are much more complex.

Naturally, the above diagrams are only an example of the waveform leaving the filter, since as we have seen, the waveforms generated by the two oscillators are much more complex.

The OB-12 makes available two filters, with total configuration with regard to their type (low pass, band pass and high pass) and parameters of use.

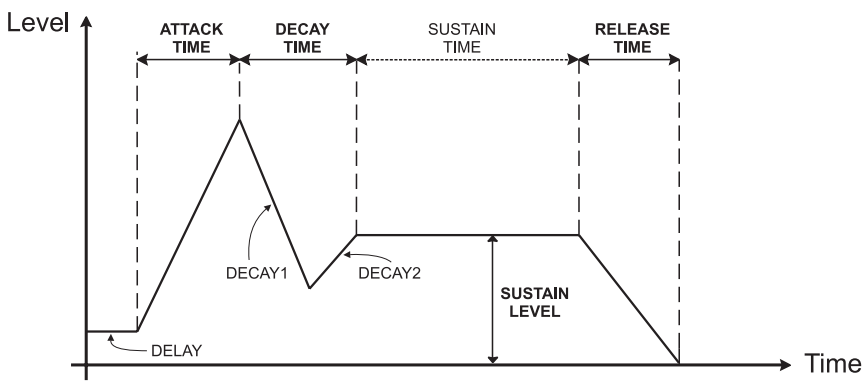


As can be seen, the two filters can be set as:

- **LOW PASS (LP)**: high pass filter which attenuates all the frequencies above the cut-off frequency. This attenuating action will affect all the harmonics above those present at the cut-off frequency, thus giving the sound a darker and/or softer timbre.
- **HIGH PASS (HP)**: high pass filter which attenuates all the frequencies below the cut-off frequency. Therefore, all the harmonics below those which coincide with the cut-off frequency are attenuated; the resulting sound will be sharper and brighter.
- **BAND PASS (BP)**: band pass filter which attenuates all the frequencies not present in a band having its centre at the cut-off frequency.
- **FLAT (no LED on)**: in this case the filter is not enabled and does not operate in any frequency area.

In addition to this, the user can set the envelope of the two filters, meaning how the filter cut-off frequency will change, thus regulating the timbre of the sound in relation to time.
An envelope generator supplies a time curve as output in real time. This is used to pilot the three main components of a synthesizer described previously, within the synthesis chain.

Generally the filter and amplifier are controlled (as in the OB-12) by an **ADSR** envelope, ADSR being the acronym of Attack, Decay, Sustain and Release.



An ADSR envelope is therefore subdivided into:

- ATTACK *Time*: the time which passes from when a key is pressed to when the maximum level is reached.

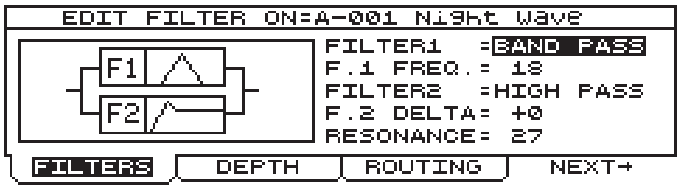
- DECAY *Time*: the time taken to pass from the maximum level to the SUSTAIN level:

- SUSTAIN *Level*: the level at which the signal remains as long as the key is kept pressed.

- RELEASE *Time*: time the level takes to return to zero once the key has been released.

In this example we have been talking about “level”: as we will see, when we are dealing with the filter, this is really the operating frequency of the filter. The envelope which controls a signal level is applied to the amplifier (see point 8.5).

But now we will move on to the Filters section programming pages.
From the EDIT TIMBRE MENU, select field 5-FILTER and the display will show:



containing the following programming parameters:

- **FILTER1** *([FILTER 1])*: sets the type of the first filter by means of the values LOW PASS, BAND PASS, HIGH PASS and FLAT, already described.

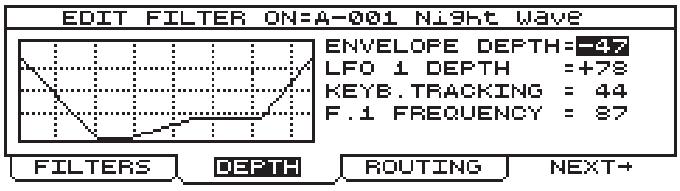
- **F.1 FREQ.** *(Filter 1 Frequency, [FREQUENCY])*: regulates the cut-off frequency of the first filter, in correspondence with the point of origin of the envelope.

- **FILTER2** *([FILTER 2])*: sets the type of the second filter by means of the values LOW PASS, BAND PASS, HIGH PASS and FLAT, already described.

- **F.2 DELTA** *(Filter 2 Ratio)*: sets the variation (Delta), in semitones, of the cut-off frequency of the second filter compared to that of the first filter. The values cover a range from –96 (eight octaves below F.1 Freq.) to +24 (two octaves above F.1 Freq.).

- **RESONANCE** *([RESONANCE])*: sets the resonance coefficient of the filter, which can be used to emphasise (enhance) the harmonics present in the cut-off frequency area, to create a more distinct sound. The values which can be assigned to this parameter range from 0 (no resonance) to 100 (maximum resonance). Look at this graphics on par. 7.4 for a clearer understanding of the resonance effect.

Now select the DEPTH folder and the display will show:



containing the present parameters:

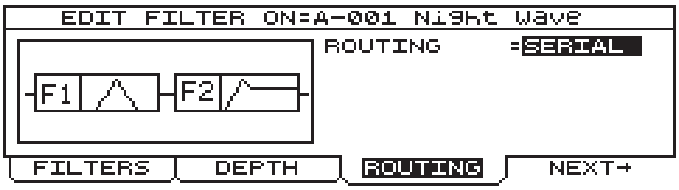
- **ENVELOPE DEPTH** *([ENV DEPTH] of the FILTERS section)*: regulates the depth of the envelope applied to the filters in a range of values from +50 (maximum envelope, so maximum variation of the sound timbre), 0 (no envelope, so no variation of the sound timbre) and -50 (maximum negative envelope).

- **LFO1 DEPTH** *([LFO1 DEPTH] of the FILTERS section)*: regulates the depth of modulation of the signal originating from LFO1 on the timbre of the signal leaving the FILTERS section, by modifying the filter cut-off frequencies and varying them continuously. The range of values is from +50 (maximum modulation), 0 (no modulation), +50 (maximum modulation with phase the reverse of the signal obtained from LFO1).

- **KEYB. TRACKING** (*Keyboard Tracking, [KBD TRACK] of the FILTERS section*): Sets the keyboard tracking depth relative to the cut-off frequency of the filters depending on which key has been pressed on the keyboard. In the case of a low pass filter, values close to zero mean that the cut-off frequency remains the same across the entire keyboard range. This means that higher notes will provide a softer sound than the lower notes, with fewer partials. When the parameter is set with values close to +50 there will be an increase in the harmonics in the higher notes, so that they will be brighter while the lower notes are darker. Conversely, if the parameter is set with values close to -50 the higher notes will have even fewer harmonics than in the standard configuration (trimmer in central position). Therefore, the lower notes will be brighter, while the higher notes will be darker.

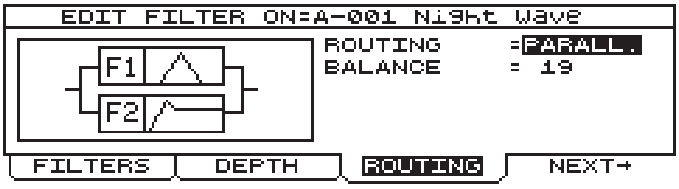
- **F.1 FREQUENCY** *(Filter 1 Frequency, [FREQUENCY])*: parameter identical to the parameter of the same name in the FILTERS video page, which sets the cut-off frequency of the first filter at the envelope point of origin. It is also displayed in this video page to allow faster programming of this section.

If we now select the ROUTING folder, it will be possible to display the parameters relating to the connection configuration of the two filters.



- **ROUTING** *([ROUTING])*: sets the connection between the two filters, using the values:

  - SERIAL: serial connection (previous video page);
  - PARALLEL: parallel connection

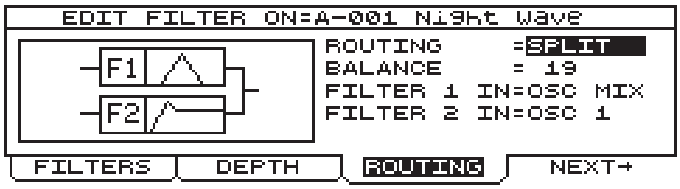


containing the parameter:

- **BALANCE**: regulates the balancing of the signal from the OSC.COMMON section, to be sent separately to the two filters. If BALANCE=0 is set, the signal will be sent only to FILTER 1, with BALANCE=100 the signal will only be present on FILTER 2. Intermediate values of

this parameter will provide intermediate balances between the quantities of signal sent without distinction to the two filters.

- SPLIT: connection in which the user can set which signal will be sent individually to the two filters.



containing the following parameters:

- **BALANCE**: regulates the balancing of the signal from the section specified by means of the FILTER 1 IN and FILTER 2 IN parameters, to be sent separately to the two filters. If BALANCE=0 is set, the signal will be sent only to FILTER 1, with BALANCE=100 the signal will only be present on FILTER 2. Intermediate values of this parameter will provide intermediate balances between the quantities of signal sent without distinction to the two filters.

- **FILTER 1 IN**: selects the source section from which the signal to be sent to FILTER 1 is to be obtained.

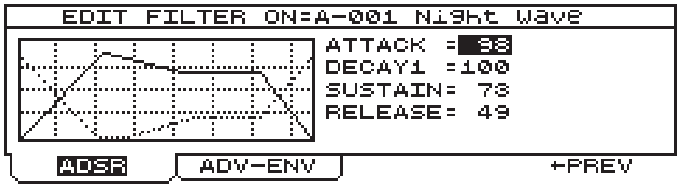
- **FILTER 2 IN**: selects the source section from which the signal to be sent to FILTER 2 is to be obtained.

  The values which can be assigned to the FILTER 1 IN and FILTER 2 IN are as follows:

  - OSC MIX: signal obtained from both the oscillators, added (when desired) to the Ring Modulator and white noise.
  - OSC 1: signal obtained from the first oscillator.
  - OSC 2: signal obtained from the second oscillator.
  - RING MOD: signal obtained from the ring modulator (Ring Modulator of the OSC.COMMON section).
  - NOISE: while noise only (Noise of the OSC.COMMON section).

If the NEXT function is now selected, the display will show the two pages relating to the programming of the envelope to be applied to the filters.

The first page comprises:



containing the following programming parameters:

- **ATTACK** *([ATTACK] of the FILTERS section)*: sets the time in which the filters reach the maximum cut-off frequency once the key has been pressed, with values from 0 (no attack time) to 100 (maximum attack time).

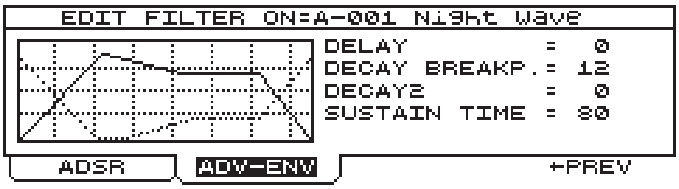
- **DECAY 1** *([DECAY] of the FILTERS section)*: regulates the first decay time, or a first section of

time taken to reach the DECAY 2 value or the SUSTAIN value (if the DECAY 2 moment of time is not present) from the moment when the maximum cut-off frequency (maximum level of the ATTACK section) is reached. The values available range from 0 (DECAY 1 time annulled) to 100 (maximum time taken to reach DECAY 2 or SUSTAIN)

- **SUSTAIN** *([SUSTAIN] of the FILTERS section)*: regulates the SUSTAIN level, i.e. the filter cut-off frequency kept stable until the key is released (see also SUSTAIN TIME). The range of values is from 0 (after DECAY 2 the cut-off frequency goes back to that set using the F.1 Freq. and F.2 Delta parameter) to 100 (maximum variation of the cut-off frequency, until release of the key).

- **RELEASE** *([RELEASE] of the FILTERS section)*: sets the release time, i.e. the time the cut-off frequency takes to reach the value set with the F.1 FREQ. and F.2 RATIO parameters. The range of values is from 0 (the cut-off frequency goes back to that set with F.1 Freq. and F.2 Delta) to 100 (maximum period of time taken to return to the values of the cut-off frequency set with the parameters mentioned above).

Thanks also to the display section which shows the envelope graph, the user can be informed about both the envelope referred only to the ADSR parameters (graph with continuous line), and the envelope referred to the Env. Depth, F.1 Freq. and F.2 Delta parameters (graph with dotted line).
If the ADV-ENV folder is now selected, the user can display the second page relating to the envelope to be applied to the filters. This video page comprises:



the parameters displayed are the following:

- **DELAY**: sets a delay time from when a key is pressed to when the filter cut-off frequency starts to be affected by the envelope, in a range of values from 0 (no delay) to 100 (maximum delay).

- **DECAY BREAKP.** *(Decay Breakpoint)*: sets the Breakpoint value for the Decay period, divided into Decay 1 and Decay 2. The Breakpoint value specifies the cut-off frequency after which Decay 2 will start, in a range of values from 0 (minimum cut-off frequency) to 100 (maximum cut-off frequency).

- **DECAY 2**: regulates the second period of time taken to reach the Sustain level by means of the usual range of values from 0 (no Decay 2 section) to 100 (maximum time to reach the Sustain level).

- **SUSTAIN TIME**: regulates the Sustain time, i.e. the period of time in which the cut-off frequency assumes a fixed value. If this period of time is less than the real time for which the key is pressed, the cut-off frequency of the filters will decrease (or increase if envelope is inverted) regardless of the status of the key (pressed / released). The range of values is from 0 (Sustain section absent) to OFF (the cut-off frequency is no longer controlled, and thus remains unchanged until the key is released).

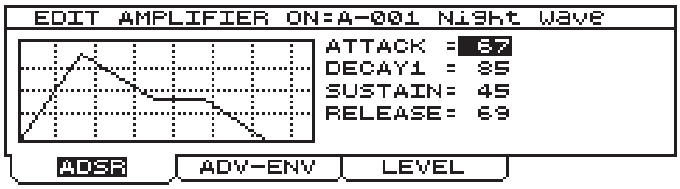
This video page also shows the envelopes referred both to just the ADSR parameters (continuous line) and to the Env. Depth, F.1 Freq. and F.2 Delta parameters (dotted line).

8.5 EDIT AMPLIFIER

The main function of an amplifier is to control the level of the signals received from the oscillators and the filters. Amplifiers may be Voltage Controlled Amplifiers (**VCA**s) or, as in the OB-12, Digitally Controlled Amplifiers (**DCA**s).
VCAs consist of operational or differential amplifiers, while in the case of DCAs, since all it takes to amplify a digital wave is to multiply its numerical width values by a given factor, amplification is carried out by applying a width modulation to the oscillators. However, it is preferable to the keep the two blocks (oscillator and amplifier) conceptually separate, for the sake of clarity.

As for the filter, an ADSR envelope (described in point 8.4) can be used to check the level of the signal for amplification over time.

We will therefore now take a look at the display pages relating to programming of the amplifier parameters. From the EDIT TIMBRE MENU page, select option 6-AMPLIFIER:



containing the following controls:

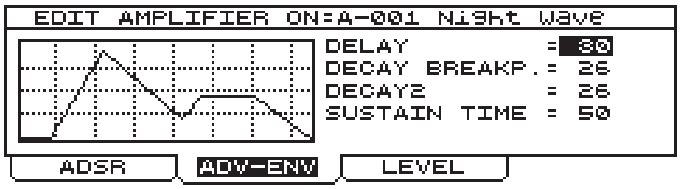
- **ATTACK** *([ATTACK] of the AMPLIFIER section)*: sets the time the signal takes to reach its maximum level once a note has been played. The values available range from 0 (no ATTACK time) to 100 (maximum ATTACK time).

- **DECAY 1** *([DECAY] of the AMPLIFIER section)*: regulates the time taken to reach the SUSTAIN level (or DECAY 2 level, if present) from the maximum level. The range of values is from 0 (no DECAY time (to 100 (maximum DECAY time).

- **SUSTAIN** *([SUSTAIN] of the AMPLIFIER section)*: sets the SUSTAIN level, or the level the signal maintains until the key is released (unless the SUSTAIN TIME is shorter than this period). The range of values is from 0 (no signal after the DECAY) to 100 (maximum signal level, until the key is released).

- **RELEASE** *([RELEASE] of the AMPLIFIER section)*: sets the time taken for the signal level to be annulled after the key is released, in a range of values from 0 (no signal on release of the key) to 100 (maximum signal release time).

You can now select the ADV-ENV folder to access the second page for programming of the envelope applied to the amplifier:



Featuring the following parameters:

- **DELAY**: sets a delay time from when a key is pressed to when the signal level starts to be

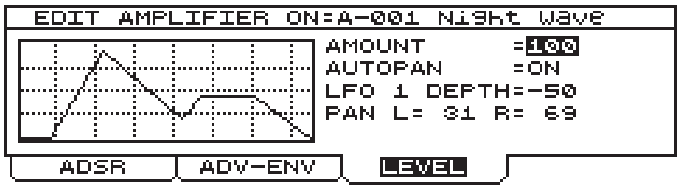
affected by the envelope, in a range of values from 0 (no delay) to 100 (maximum delay).

- **DECAY BREAKP.** *(Decay Breakpoint)*: sets the Breakpoint value for the DECAY period, divided into DECAY 1 and DECAY 2. The Breakpoint value specifies the signal level after which DECAY 2 will start, in a range of values from 0 (signal level zero) to 100 (maximum sound level).

- **DECAY 2**: regulates the second period of time taken to reach the Sustain level by means of the usual range of values from 0 (no DECAY 2 section) to 100 (maximum time to reach the SUSTAIN level).

- **SUSTAIN TIME**: regulates the SUSTAIN time, i.e. the period of time in which the signal level assumes a fixed value. If this period of time is less than the real time for which the key is pressed, the signal level will decrease even if the key is not released. The range of values is from 0 (SUSTAIN section absent) to OFF (the signal level is no longer controlled, and thus remains unchanged until the key is released).

When the LEVEL folder is selected, the third amplifier programming page will be displayed:



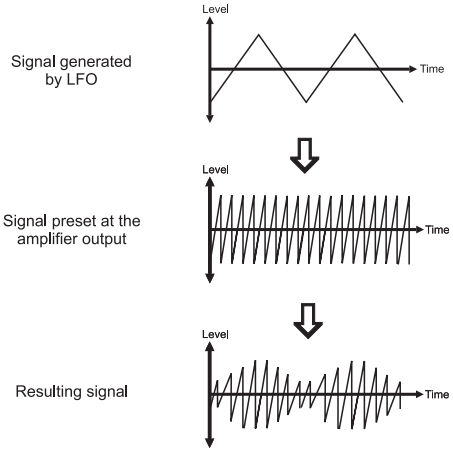
containing the following parameters:

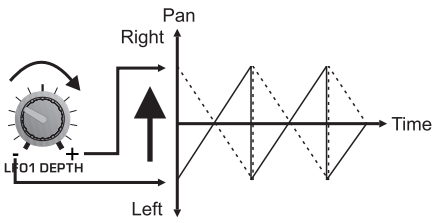
- **AMOUNT** *([AMOUNT])*: regulates the general level of the Timbre in a range of values from 0 (no signal) to 100 (maximum sound level).

- **AUTOPAN** *([AUTOPAN])*: if active (AUTOPAN=ON), you will have cyclic shift of the signal on the stereo front, guided by LFO1. In case of AUTOPAN=OFF, the stereophonic distribution of the signal will be governed by the PAN L and R parameter.

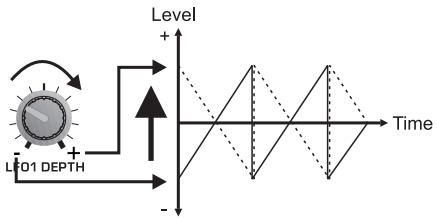
- **LFO1 DEPTH** *([LFO1 DEPTH] of the AMPLIFIER section)*: with AUTOPAN=OFF this parameter regulates the depth of the width modulation of the signal obtained from LFO1 on the signal leaving the AMPLIFIER section. The range of values is -50 (maximum width modulation with phase opposite to the modulant signal), 0 (no modulation) +50 (maximum modulation). Width modulation of the signal allows cyclic variation of its level, providing various tremolo effects.
  Intermediate values will provide intermediate modulant signal widths.

  With AUTOPAN=ON, it regulates the cyclic shift of the signal from the Left channel to the Right channel.





In case [AUTOPAN] is off and [WAVE SELECT] of LFO1 is setted as sawtooth (first selection to the left)

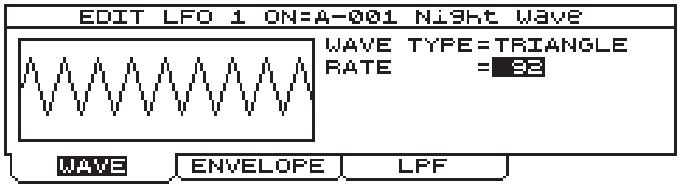


In case [AUTOPAN] is on and [WAVE SELECT] of LFO1 is setted as sawtooth wave (first selection to the left)

- **PAN L** and **R**: sets the distribution over the stereo panorama of the signal leaving the AMPLIFIER section, and thus of the final Timbre sound.

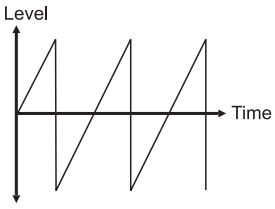
8.6 EDIT LFO1

The main function of an LFO (Low Frequency Oscillator) is to generate a low frequency signal which can be used as modulant for the signals leaving the synthesizer's main blocks, such as the oscillators, the filter and the amplifier.
The OB-12 allows not only regulation of the frequency of the output signal, but also setting of its waveform and regulation of its envelope and the parameters of a low-pass filter associated to the LFO.
Discussing the parameters relating to the OB-12 sections, we have already discussed the effects obtained by modulating the sound leaving the blocks referred to above using the signal obtained from LFO1 and LFO2.
We will therefore now look at the programming pages of the first LFO. From the usual EDIT TIMBRE MENU page, select field 1-EDIT LFO1. The display will show:

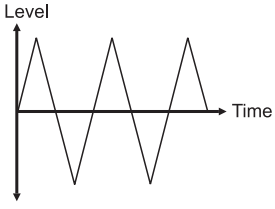


- **WAVE TYPE** *([WAVE SELECT])*: sets the waveform of the signal leaving the first LFO. The possible choices are:

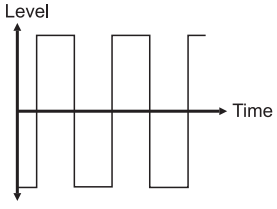
SAW: sawtooth waveform;



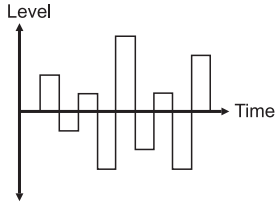
TRIANGLE: triangular waveform;



SQUARE: square waveform;

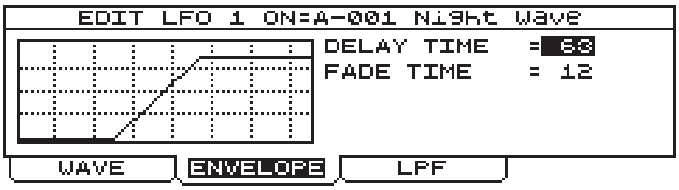


RANDOM: waveform which assumes random levels;



- **RATE** *([RATE] of the LFO1 section)*: regulates the frequency of the signal leaving the LFO1, in a range of values from 0 (minimum frequency) to 100 (maximum frequency).

Now select the ENVELOPE folder; the display will show the video page relating to programming of the envelope:

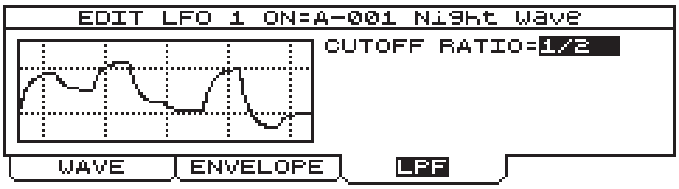


displaying the following parameters:

- **DELAY TIME**: sets the delay time, i.e. the time from when a note is played (and therefore from when the oscillator starts to generate a given signal) to when the signal leaving LFO1 starts to modulate the signals of the various sections to which it is applied. The range of possible values is from 0 (no delay) to 100 (maximum delay).

- **FADE TIME** *([FADE])*: regulates the time in which the signal generated by LFO1 will reach the maximum width (regulated using the LFO1 DEPTH parameters present in the various sections) once a keyboard key has been pressed, in a range of values from 0 (maximum width reached immediately) to 100 (maximum period of time to reach the width specified with the LFO1 DEPTH parameters).

If the LPF folder is now selected, the video will display the parameters relating to the low-pass filter to be applied to the signal leaving the LFO1:



- **CUTOFF RATIO**: sets the cut-off frequency of the filter referred to above, in relation to the frequency of the signal leaving the LFO, specified with the RATE parameter. The values which can be selected are the following:

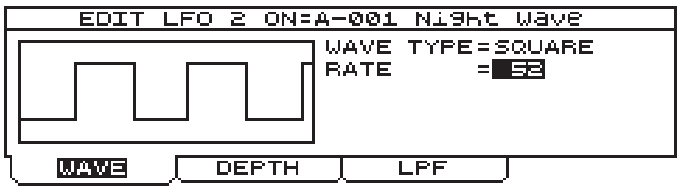
  -1/2: filter cut-off frequency half an octave lower than that of LFO1.
  0: filter cut-off frequency equal to that of LFO1.
  1/2: filter cut-off frequency half an octave higher than that of LFO1.
  1: filter cut-off frequency one octave higher than that of LFO1.
  1+1/2: filter cut-off frequency 1.5 times higher than that that of LFO1.
  2: filter cut-off frequency two octaves higher than that of LFO1.
  3: filter cut-off frequency three octaves higher than that of LFO1.
  OFF: filter disabled.

Using this filter is useful if modulant signals different from the standard signals generated by the LFO are required.

8.7 EDIT LFO2

As for LFO1, LFO2 allows you to modulate the signal in the various generation sections of the OB-12 with a low frequency signal. The main feature of the second low frequency oscillator is that the quantity of modulation can be regulated by means of the [MODULATION] wheel on the left of the keyboard.

From the EDIT TIMBRE MENU, select option 7 – EDIT LFO2. The display will show:



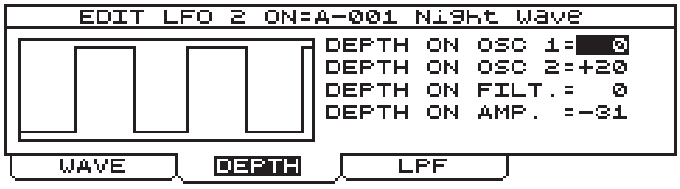
This video page contains the following programming parameters:

- **WAVE TYPE** *([WAVE SELECT] of the LFO2 section)*: sets the waveform of the signal leaving LFO2. The possible choices are:

  SAW: sawtooth waveform;
  TRIANGLE: triangular waveform;
  SQUARE: square waveform;
  RANDOM: waveform which assumes random levels;

- **RATE** *([RATE] of the LFO2 section)*: regulates the frequency of the signal leaving LFO2 in a range of values from 0 (minimum frequency) to 100 (maximum frequency).

If the DEPTH folder is now selected, the display will show the parameters for regulating the quantity of modulation to be applied to the various sections:



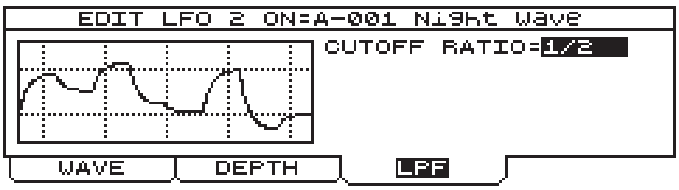
- **DEPTH ON OSC 1** *([DEPTH] with [DEPTH SELECT] on OSC 1)*: regulates the depth of the frequency modulation by LFO2 on the signal leaving Osc. 1.

- **DEPTH ON OSC 2** *([DEPTH] with [DEPTH SELECT] on OSC 2)*: regulates the depth of the frequency modulation by LFO2 on the signal leaving Osc. 2.

- **DEPTH ON FILT.** *(Depth on Filters, [DEPTH] with [DEPTH SELECT] on FILTERS)*: regulates the modulation depth by LFO2 on the signal leaving the Filters section.

- **DEPTH ON AMP.** *(Depth on Amplifier, [DEPTH] with [DEPTH SELECT] on AMPLIFIER)*: regulates the depth of the width modulation by LFO2 on the signal leaving the Amplifier section.

If the LPF folder is now selected, the video will display the parameters relating to the low-pass filter to be applied to the signal leaving the LFO2.

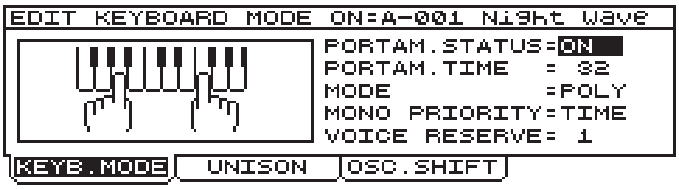


- **CUTOFF RATIO**: sets the cut-off frequency of the filter referred to above, in relation to the frequency of the signal leaving the LFO, specified with the RATE parameter. The values which can be selected are the following:

  -1/2: filter cut-off frequency half an octave lower than that of LFO2.
  0: filter cut-off frequency equal to that of LFO2.
  1/2: filter cut-off frequency half an octave higher than that of LFO2.
  1: filter cut-off frequency one octave higher than that of LFO2.
  1+1/2: filter cut-off frequency 1.5 times higher than that that of LFO2.
  2: filter cut-off frequency two octaves higher than that of LFO2.
  3: filter cut-off frequency three octaves higher than that of LFO2.
  OFF: filter disabled.

8.8 EDIT KEYBOARD MODE

The purpose of the KEYBOARD MODE section is to set the modes of the keyboard and its transposition. This allows use of the Portamento and Unison function, set the keyboard in monophonic mode (with addition of Legato) or polyphonic mode, and regulate the transposition of the oscillators (and thus of the notes played on the keyboard). From the EDIT TIMBRE MENU video page, select the 8-MODE field and the display will show the following editing page:

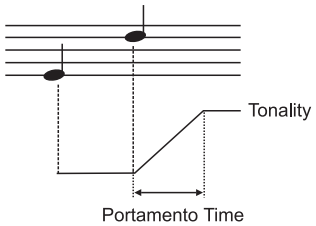


containing the following parameters:

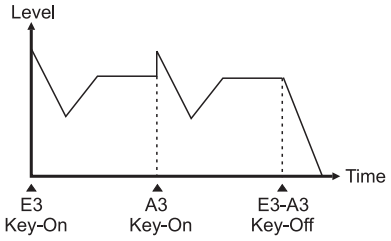
- **PORTAM.STATUS** *(Portamento Status, [PORTAMENTO])*: enables or disables the Portamento function. Portamento allows you to make changes in pitch between a note and the one played after it within a given period of time and not simultaneously with the pressure on the key, so that the intermediate tones are produced.

- **PORTAM.TIME** *(Portamento Time, [TIME])*: sets the time of the Portamento, meaning the continuous change in pitch between a note and the one played after it.

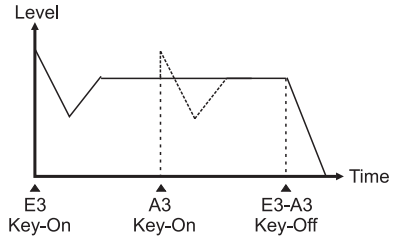
  For a clearer understanding of this function, look at the illustration below:



- **MODE** *([MONO] and [LEGATO])*: this parameter can be used to set the keyboard as polyphonic, by setting the parameter as POLY, or monophonic, by setting it as MONO. The Legato function can also be used by selecting the LEGATO option (in this case, MONO mode will also automatically be selected). Using a polyphonic keyboard allows more than one note to be played at once (up to 12 in standard conditions of use) while if the keyboard is monophonic you will not be able to play more than one note at the same moment; this may cause problems on some occasions, but at other times it may be useful, for example when playing the timbres of wind instruments, or "old" analog synthesizers (which had polyphony of one note – i.e. they were monophonic).



Monophonic



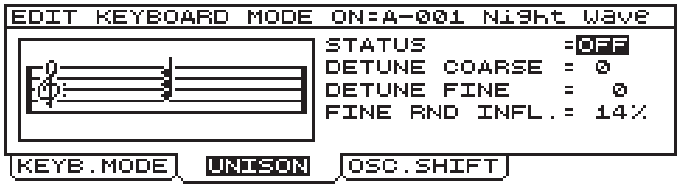
Monophonic with Legato

  The Legato function, only available with monophonic keyboard, allows a succession of notes to be played without interruption. This means the attack on the following note is eliminated and only the pitch is changed.
  The diagrams which follow illustrate operation of the Legato:

- **MONO PRIORITY**: defines the priority for selection of the note to be played in mono mode. When a note has priority, it means that those played before or after it will not be performed by the instrument. When the TIME option is selected, the note played will be the one associated to the key pressed last; with HIKEY set, the note taking priority over the others will be the highest, while if LOWKEY is set the lowest note takes priority.

- **VOICE RESERVE**: sets the minimum number of voices the instrument must play for the part considered. The OB-12 automatically adapts its maximum polyphony to the complexity of the timbre and what is being performed on the keyboard. This means that certain notes may be eliminated from the performance. This parameter allows the user to inform the instrument of the minimum number of voices which must always be performed, at the expense of what is being performed with other Parts.

If the UNISON folder is now selected, it will be possible to display the parameters relating to the function of the same name. This function allows the timbre to be played at the chosen moment as if three (identical) timbres were really active simultaneously, giving a sound with more body. In this case, the polyphony will be reduced by one third, since the instrument is generating three timbres simultaneously instead of one. You can also set the timbres out of tune with each to make the sound even deeper and more complex.



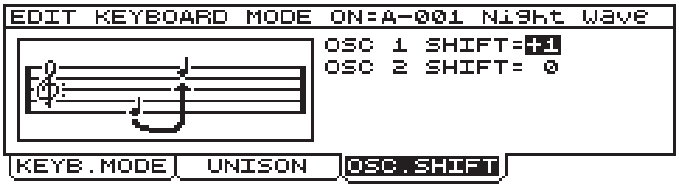
- **STATUS** *([UNISON])*: activates (ON) or deactivates (OFF) the Unison function.

- **DETUNE COARSE**: specifies the detuning in semitones in relation to the original pitch of two timbres. This will provide one timbre with standard pitch, another transposed downward by the value set, and the third transposed by the same value, but upward.

- **DETUNE FINE**: regulates the fine transposition of the three timbres in hundredths. This transposition is applied to the timbres as for the DETUNE COARSE parameter.

- **FINE RND INFL.** *(Fine Random Influence)*: specifies as a percentage by how much the pitch of the three timbres (specified using the (DETUNE COARSE and DETUNE FINE parameters) will be modified.

You can now use the [F3] associated to the OSC.SHIFT folder to display the video page relating to the transposition by octaves of the two oscillators individually. This allows you to use the two oscillators transposed by up to four octaves apart, creating deeper, more complex sounds, to play beyond the keyboard range (in both bass and treble direction) and to use different pitches in the various Parts which make up a given Program (to allow this, the TRANSPOSE parameter associated to the Part in question can also be used).



The video page consists of the following parameters:

- **OSC 1 SHIFT** *([OCT-] and/or [OCT+] with [OSC SHIFT] on OSC 1)*: increases or decreases the pitch of the first oscillator in a range of two octaves.

- **OSC 2 SHIFT** *([OCT-] and/or [OCT+] with [OSC SHIFT] on OSC 2)*: increases or decreases the pitch of the first oscillator in a range of two octaves.

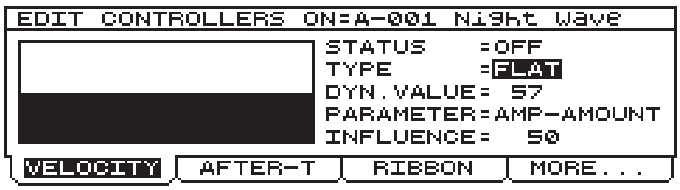
N.B.: When the oscillators are transposed, the MIDI Note On and Note Off messages received by the MIDI [IN] port will be played on the basis of the transposition carried out.
Conversely, the Note On messages (since the Note Off is sent like Note On with Velocity=0) sent to the MIDI [OUT] port will not be affected by the transposition.

8.9 EDIT CONTROLLERS

Thanks to the Velocity and Aftertouch-sensitive OB-12 keyboard, the CONTROLLERS section of the EDIT TIMBRE MENU allows specific generation control parameters to be assigned to the Velocity, the Aftertouch and the Ribbon Controller, and enabling and disabling of the [PITCH] and [MODULATION] wheels.

N.B.: the Ribbon Controller, the Velocity and the Aftertouch are controlling the assigned parameters according to the value of the parameter when assigning a parameter with 0 value, the concerning control will not have any sound variation

From the EDIT TIMBRE MENU select field 9-CONTROLLERS and the display will show the video page relating to the assignment of parameters to the Velocity.
The Velocity (dynamic) is the speed at which the keyboard key is pressed and released. This function therefore allows you to play the keyboard keys in a way which gives extra expressiveness to the timbres, without having to use the panel controls. Normally the note velocity is associated to the signal level, but using this function you can assign the cut-off frequency, for example, to the Velocity, in order to extend the spectrum of the timbre being played in relation to the force with which a key has been pressed. So in short, the huge advantage of this function is that several parameters can be controlled without having to take your fingers off the keyboard.



- **STATUS** *([VELOCITY ON])*: enables (ON) or disables (OFF) control of the generation parameters by means of the Velocity.

- **TYPE**: sets the type of dynamic. A fixed dynamic can be obtained by setting the parameters as FLAT, or various dynamic curves can be obtained by selecting CURVE (see next video page illustration).

- **DYN.VALUE** *(Dynamic Value)*: regulates the value of the fixed dynamic.

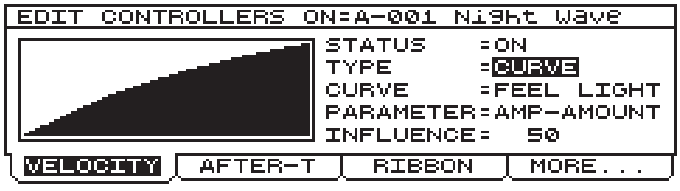
- **PARAMETER**: selects the generation parameter for which the influence of Velocity-control is to be set by means of the INFLUENCE field.

  This is the list of the parameters available and the relative panel controls:

SELECTIONS	CONTROLLED PARAMETERS	CONTROLS ON PANEL	SELECTIONS	CONTROLLED PARAMTERS	CONTROLS ON PANEL
AMP-AMOUNT	timbre level	[AMOUNT] of AMPLIFIER	OSCC-ATCKT	attack time of the OSC.1 and OSC.2 envelope	[ATTACK] of OSC.COMON
AMP-ATCK T	attack time of the AMPLIFIER envelope	[ATTACK] of AMPLIFIER	OSCC-DEC T	decay time of the OSC.1 and OSC.2	[DECAY] of OSC.COMMON
AMP-DECAYT	decay time of the AMPLIFIER envelope	[DECAY] of AMPLIFIER	OSCC-DPTH1	OSC.1 envelope depth	[ENV DEPTH] on OSC.1 of OSC.COMMON
FLT-CUTOFF	filter cut-off frequency	[FREQUENCY] of FILTER	OSCC-DPTH2	OSC.2 envelope depth	[ENV DEPTH] on OSC.2 of OSC.COMMON
FLT-ATCK T	attack time of the FILTERS envelope	[ATTACK] of FILTERS	OSC1-PWDTH	modulation depth to the OSC.1 impulse	[PWM DEPTH] of OSC.1
FLT-DECAYT	decay time of the FILTERS envelope	[DECAY] of FILTERS	OSC2-PWDTH	modulation depth to the OSC.2 impulse	[PWM DEPTH] of OSC.2
FLT-ENVDPT	FILTERS envelope depth	[ENV DEPTH] of FILTERS	LFO1-FADE T	time for reach the max. level of LFO1 signal	[FADE] of LFO1]
BALANCE 1	balance between OSC.1 and OSC.2	[BALANCE 1] of OSC.COMMON	OSC1-FM	modulation depth of OSC.2 on OSC.1	[FM] of OSCILLATOR1
BALANCE 2	balance between OSC.1+OSC.2 and RING MODULATOR	[BALANCE 2] of OSC.COMMON	OSC2-DTUNE	fine tuning of OSC.2	[FINE] of OSC.2
BALANCE 3	balance between OSC.1+OSC.2+RING MODULATOR and NOISE	[BALANCE 3] of OSC.COMMON			

- **INFLUENCE**: sets the influenced of the Velocity in controlling the parameter specified in the PARAMETER field.

If TYPE=CURVE is set, the dynamic of the notes is no longer fixed, but varies depending on the pressure on the key and the dynamic curve.

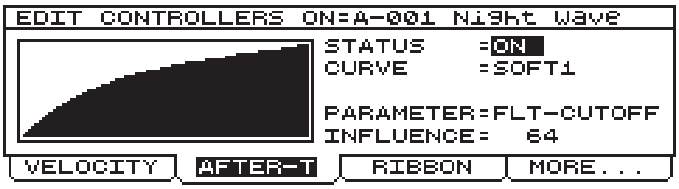


displaying the following parameter:

- **CURVE**: displays the name of the dynamic curve (drawn on the left of the display) assigned to the note. The curves are as follows:

  - LIGHT: Light dynamic response curve, in which the maximum dynamic values are reached quickly.
  - FEEL LIGHT: Variation on the LIGHT curve, featuring a hardening in the central zone. High dynamic values can still be reached.
  - LINEAR: Straight (also known as standard) curve so that the pressure applied to the key is converted into a dynamic in direct proportion.
  - FEEL HEAVY: Slightly hard dynamic curve which is still fairly linear, so that the maximum dynamic values can still be reached.
  - HEAVY: Hard dynamic response curve, with which strong pressure has to be applied to the key to reach high dynamic values.
  - CUSTOM: Custom dynamic curve which has zero response for low dynamic values applied to the key and an almost linear response, leading to the maximum dynamic values, starting from medium levels of pressure applied to the key.
  - REVERSED1: Reversed curves reverse the logic of the dynamic; in other words, low levels of pressure on the key give high dynamic values generated by the instrument and vice-versa. This curve has a linear but reversed trend.
  - REVERSED2: Reversed curve with values which remain high even with medium-strong pressures on the keyboard. When the level of force applied to the key is increased to the maximum, the dynamic generated will fall sharply.

The AFTER-T folder can now be selected to display the video page relating to setting of the Aftertouch. Unlike the Velocity, the Aftertouch is the pressure applied to a given key after it has been pressed.
Thanks to this function, you can control several parameters after a keyboard key has been pressed by applying further pressure to the key.



containing the following parameters:

- **STATUS** *([AFTER ON])*: activates (ON) or deactivates (OFF) the Aftertouch.

- **CURVE**: selects the Aftertouch curve (shown on the left of the display). The curves which can be selected are:

  - SOFT1: Light response curve which allows high Aftertouch values to be reached quickly.
  - SOFT2: Response curve less light than SOFT1, which still guarantees that high Aftertouch values are reached quickly, although in a more controllable manner.
  - LINEAR: Straight response curve, so that the pressure applied to the key (after it has been depressed, naturally) is converted in linear proportion into Aftertouch data.
  - HEAVY1: Although a certain degree of linearity is maintained, with this curve it will be more difficult to reach high Aftertouch values.
  - HEAVY2: Hard curve in which strong pressures will have to be applied to the key to reach high Aftertouch values.
  - CUSTOM: Curve with responses which are not uniform throughout the range of values. This curve is soft for low levels of pressure on the key, heavy for medium values and then soft again

for high pressure values.
- DELAYED: Curve which delays the emission of data, which are not generated until high pressures are applied to the key, after which high Aftertouch values are reached easily.
- INVERTED: Inverted Aftertouch curves have the same properties as reversed Velocity curves.

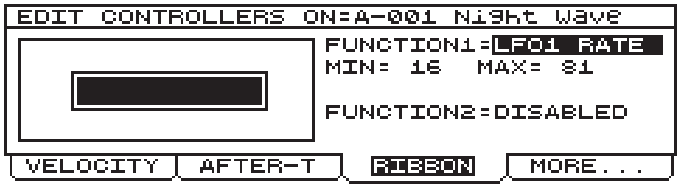
- **PARAMETER**: selects the generation parameter for which the influence of Aftertouch-control is to be set by means of the INFLUENCE field.

  This is the list of the parameters available and the relative panel controls:

SELECTIONS	CONTROLLED PARAMETERS	CONTROLS ON PANEL	SELECTIONS	CONTROLLED PARAMTERS	CONTROLS ON PANEL
AMP-AMOUNT	timbre level	[AMOUNT] of AMPLIFIER	OSC2-LFO1D	modulation depth of LFO1 in OSC.2	[LFO1 DEPTH] of OSC.2
FLT CUTOFF	filter cut-off frequency	[FREQUENCY] of FILTER	FLT-LFO1 D	modulation depth of LFO1 in FILTER	[LFO1 DEPTH] of FILTER
BALANCE 1	balance between OSC.1 and OSC.2	[BALANCE 1] of OSC.COMMON	AMP-LFO1 D	modulation depth of LFO1 in AMPLIFIER	[LFO1 DEPTH] of AMPLIFIER
BALANCE 2	balance between OSC.1+OSC.2 and RING MODULATOR	[BALANCE 2] of OSC.COMMON	OSC1-FM	frequency modulation depth of OSC.2 in OSC.1	[FM] of OSC.2
BALANCE 3	balance between OSC.1+OSC.2+RING MODULATOR and NOISE	[BALANCE 3] of OSC.COMMON	OSC2-DTUNE	fine tuning of OSC.2	[FINE] of OSC.2
OSC1-PWDTH	modulation depth to the OSC.1 impulse	[PWM DEPTH] of OSC.1	LFO1-RATE	LFO1 signal frequency	[RATE] of LFO1
OSC2-PWDTH	modulation depth to the OSC.2 impulse	[PWM DEPTH] of OSC.2	LFO2-RATE	LFO2 signal frequency	[RATE] of LFO2
OSC1-LFO1D	modulation depth of LFO1 in OSC.1	[LFO1 DEPTH] of OSC.1			

- **INFLUENCE**: sets the influence of the Aftertouch in controlling the parameter specified in the PARAMETER field.

You can now use the [F3] key to select the RIBBON folder, thus displaying the video page relating to the assignments of parameters to the Ribbon Controller.
This device allows you to control both the parameters relating to sound generation by moving a finger over the surface of the control.



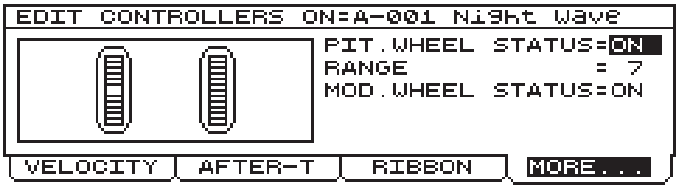
- **FUNCTION1**: assigns the first function to the Ribbon Controller.

- **FUNCTION2**: assigns the second function to the Ribbon Controller.

- **MIN** and **MAX** referred to FUNCTION1 and 2: set the minimum and maximum values of the parameters to which they refer.

SELECTIONS	CONTROLLED PARAMETERS	CONTROLS ON PANEL	SELECTIONS	CONTROLLED PARAMTERS	CONTROLS ON PANEL	SELECTIONS	CONTROLLED PARAMTERS	CONTROLS ON PANEL
DISABLED	none		OSC1 LFO1DP	modulation depth of LFO1 on OSC.1	[LFO1 DEPTH] of OSCILLATOR1	FILT.REL.	release time of the FILTERS envelope	[RELEASE] of FILTERS
LFO1-FADE	time for reach the max. level of LFO1 signal	[FADE] of LFO1]	OSC1PWMLFO1	pulse with modulation depth of LFO1 on OSC.1	[PWM DEPTH] assigned to LFO1 of OSCILLATOR1	FILT.ENV.D	FILTERS envelope depth	[ENV DEPTH] of FILTERS
LFO1-RATE	LFO1 signal frequency	[RATE] of LFO1	OSC1PWMLFO2	pulse with modulation depth of LFO2 on OSC.1	[PWM DEPTH] assigned to LFO2 of OSCILLATOR1	FILT.LFO1D	modulation depth of LFO1 on OSC.1	[LFO1 DEPTH] of FILTERS
BALANCE 1	balance between OSC.1 and OSC.2	[BALANCE 1] of OSC.COMMON	OSC1PWMEG	pulse width modulation depth of EG on OSC.1	[PWM DEPTH] assigned to EG of OSCILLATOR1	AMPL.ATK	attack time of the AMPLIFIER envelope	[ATTACK] of AMPLIFIER
BALANCE 2	balance between OSC.1+OSC.2 and RING MODULATOR	[BALANCE 2] of OSC.COMMON	OSC2 SAW LV	saw wave level generated by OSC.2	[WAVE MIX] of the saw wave of OSCILLATOR 2	AMPL.DECAY	decay time of the AMPLIFIER envelope	[DECAY] of AMPLIFIER
BALANCE 3	balance between OSC.1+OSC.2+RING MODULATOR and NOISE	[BALANCE 3] of OSC.COMMON	OSC2 TRI.LV	triangle wave level generated by OSC.2	[WAVE MIX] of the triangle wave of OSCILLATOR2	AMPL.SUST.	sustain level of the AMPLIFIER envelope	[SUSTAIN] of AMPLIFIER
OSC.COM.AT	attack time of the OSC.1 and OSC.2 envelope	[ATTACK] of OSC.COMON	OSC2 PUL.LV	square wave level generated by OSC.2	[WAVE MIX] of the square wave of OSCILLATOR2	AMPL.REL.	release time of the AMPLIFIER envelope	[RELEASE] of AMPLIFIER
OSC.COM.DE	decay time of the OSC.1 and OSC.2	[DECAY] of OSC.COMMON	OSC2 PUL.WD	square wave pulse width generated by OSC.2	[OSC CTRL] assigned to square wave of OSCILLATOR2	AMPL.AMOUN	Timbre level	[AMOUNT] of AMPLIFIER
OSC1COM.EN	OSC.1 envelope depth	[ENV DEPTH] on OSC.1 of OSC.COMMON	OSC2 LFO1DP	modulation depth of LFO1 on OSC.2	[LFO1 DEPTH] of OSCILLATOR2	AMPL.LFO1D	modulation depth of LFO1 on AMPLIFIER	[LFO1 DEPTH] of AMPLIFIER
OSC2COM.EN	OSC.2 envelope depth	[ENV DEPTH] on OSC.2 of OSC.COMMON	OSC2PWMLFO1	pulse with modulation depth of LFO1 on OSC.2	[PWM DEPTH] assegnato a LFO1 di OSCILLATOR2	LFO2 RATE	LFO2 signal frequency	[RATE] of LFO2
OSC1 SAW L	saw wave level generated by OSC.1	[WAVE MIX] of the saw wave of OSCILLATOR 1	OSC2PWMLFO2	pulse with modulation depth of LFO2 on OSC.2	[PWM DEPTH] assigned to LFO2 of OSCILLATOR2	LFO2 DP.OS1	modulation depth of LFO2 on OSC.1	[MODULATION]
OSC1 SAW SP	saw wave modification generated by OSC.1	[WAVE CTRL] assigned to saw wave of OSCILLATOR1	OSC2PWMEG	pulse width modulation depth of EG on OSC.2	[PWM DEPTH] assigned to EG of OSCILLATOR2	LFO2 DP.OS2	modulation depth of LFO2 on OSC.2	[MODULATION]
OSC1 TRI.L	triangular wave level generated by OSC.1	[WAVE MIX] of the triangular wave of OSCILLATOR1	FILT.FREQ.	cut-off frequency of FILTERS	[FREQUENCY] of FILTERS	LFO2 DP.FLT	modulation depth of LFO2 on FILTERS	[MODULATION]
OSC1 TRI.WR	triangle wave modification generated by OSC.1	[WAVE CTRL] assigned to triangle wave of OSCILLATOR1	FILT.RES.	resonance of FILTERS	[RESONANCE] of FILTERS	LFO2 DP.AMP	modulation depth of LFO2 on AMPLIFIER	[MODULATION]
OSC1 PUL.LV	square wave level generated by OSC.1	[WAVE MIX] of the square wave of OSCILLATOR1	FILT.ATK	attack time of the FILTERS envelope	[ATTACK] of FILTERS	PORTAM.TIM	Portamento time	[TIME] of PORTAMENTO
OSC1 PUL.WD	square wave pulse width generated by OSC.1	[OSC CTRL] assigned to square wave of OSCILLATOR1	FILT.DECAY	decay time of the FILTERS envelope	[DECAY] of FILTERS	PITCH BEND	trasposition of the notes	[PITCH]
OSC1 FM	modulation depth of OSC.2 on OSC.1	[FM] of OSCILLATOR1	FILT.SUST.	sustain level of the FILTERS envelope	[SUSTAIN] of FILTERS			

Activating the MORE... folder displays the video page relating to activation or deactivation of the [PITCH] and [MODULATION] wheels. You can use [PITCH] for real-time control of the Timbre pitch, while [MODULATION] allows regulation of the modulation depth of LFO2 on the sections to which the modulant signal is sent.

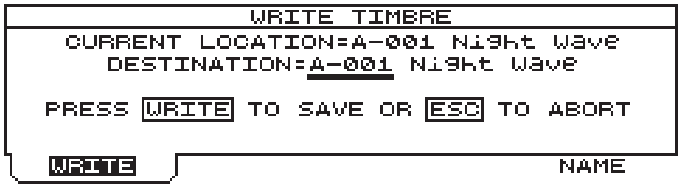


This video page displays the following parameters:

- **PIT.WHEEL STATUS** *(Pitch Wheel Status)*: enables (ON) or disables (OFF) the [PITCH] wheel
- **RANGE**: sets the range [PITCH] in semitones.
- **MOD.WHEEL STATUS** *(Modulation Wheel Status)*: enables (ON) or disables (OFF) the [MODULATION wheel.

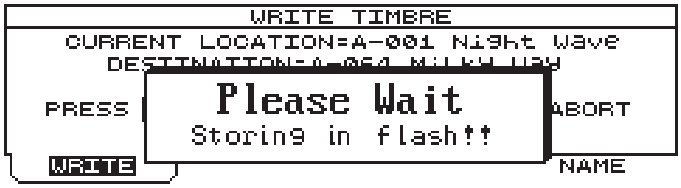
8.10 WRITE TIMBRE

After making all the desired settings, you can use the WRITE TIMBRE procedure to save the timbre you have edited in one of the 256 memory locations assigned to the Timbres. From any Timbre environment video page, press the [WRITE] button in the MODE&SET-UP section of the front panel, and the display will show:



The CURRENT LOCATION field displays the current memory location, and DESTINATION, the one where the Timbre will be saved. By default, the two fields offer the same memory location: in this case, if the memorisation procedure is concluded, the timbre will be overwritten with consequent loss of the original settings.

Pressing the [F1] button or [WRITE] button will confirm the memorisation procedure, and the display will show everything with the Pop-Up:



Conversely, if the [F4] button is pressed from the video page shown previously, you can assign a new name to the Timbre; in this case, the display will show:

You can now use the encoder or number keypad to assign a new name to the Timbre displayed in square brackets. As the screen-printing on the panel shows, each number pad button offers three letters of the alphabet as well as the number associated to it. Moreover, the function keys can be used to recall the following functions:

- INS ([F1]) function: inserts a space before the character on which the cursor is located;
- CAPS ON/OFF ([F2]) function: selects the type of character (uppercase / lowercase);
- DELETE ([F3]) function: deletes the character on which the cursor is located;

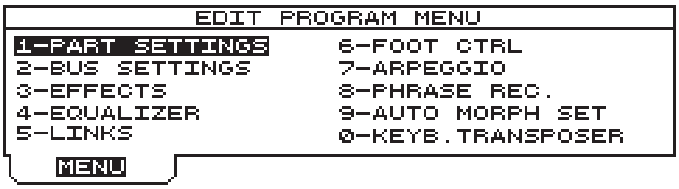
After typing the name of your choice, press button [F4] (DONE function), and assignment of the new name will be completed.

9. EDIT PROGRAM

As we have already explained in point 5.2, a Program is able to contain up to four Timbres. This is possible because the Program can be divided into Parts, to which a given Timbre, a given portion of the keyboard and a specific function of the pedal connected to the rear connectors can be assigned.

As for the TIMBRE operating environment, you can also define the various functions associated to the PROGRAM.
Display the PLAY PROGRAM video page using the [PROGRAM] button in the MODE & SET-UP section of the central panel:

The functions of the INFOS and SCOPE folders have already been explained in point 6.1. We will now examine the functions used to set a Program. Press button [F4] to select the EDIT field; the display will show the EDIT PROGRAM MENU:



in which you can recall the following functions:

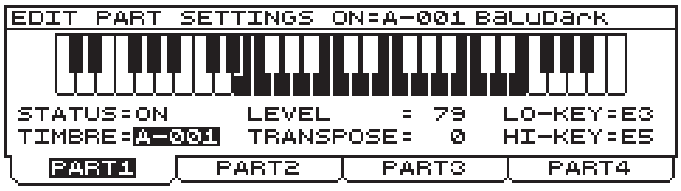
1-PART SETTINGS: definition of the Parts and their assignment to the keyboard zones.
2-BUS SETTINGS: assignments of the outputs present on the rear panel to the Parts.
3-EFFECTS: activation and regulation of the effects and their connection.
4-EQUALIZER: setting of the equalizer.
5-LINKS: setting of the LINKS function.
6-FOOT CTRL: assignment of the functions to the pedals.
7-ARPEGGIO: setting of the ARPEGGIO function.
8-PHRASE REC: regulation of the PHRASE RECORDER function.
9-AUTO MORPH SET: regulation of the MORPH function.
0-KEYB. TRANSPOSER: definition of the keyboard transposition.

Let us now take a detailed look at the functions applied to the Program.
Alongside the name (or code) of the parameter whose function is being discussed, in round brackets you will find the full name of the panel control found in the section whose contents are being explained, used to modify the parameter in question. If the description of the panel control is accompanied by reference to the section in which it is found, this means that the control in question also appears in other sections.

9.1 EDIT PART SETTINGS

The main feature of a Program is that it can be subdivided into four Parts, to which one Timbre each is assigned. This allows you to play a multi-timbre Program and also assign the Parts to different zones of the keyboard, in order to obtain different sounds (for example, you can play Parts 1 and 3 in a given zone of the keyboard and Parts 2 and 4 in another position) by simply using the same Program.

From the EDIT PROGRAM MENU select field 1-PART SETTING; the display will show:



As you can see, buttons [F1]-[F2]-[F3]-[F4] can be used to select the four video pages relating to definition of the Parts. Here we will describe the first page, which is identical to the later pages and can therefore be taken as reference for them all.

First of all, under the heading (i.e. where the name of the video page and of the Program of reference appear) there is a drawing of the OB-12 keyboard which shows the range (the keys displayed in reverse) of the Part currently selected.
The following parameters are then present:

- **STATUS**: activates (ON) and/or deactivates (OFF) the Part in question. If it is disabled, it will not be possible to play the Timbre it contains. If no other Part is present in the keyboard zone to which the Part in question is associated, that portion of the keyboard will not produce any sound.

- **TIMBRE**: assigns a given Timbre (displaying its memory location) to the Part.

- **LEVEL**: regulates the level of the Part. If LEVEL=0 is set, the part in question will not produce any sound.

- **TRANSPOSE**: sets the transposition of the Part (and not of the keyboard) in a range of ± 12 semitones.

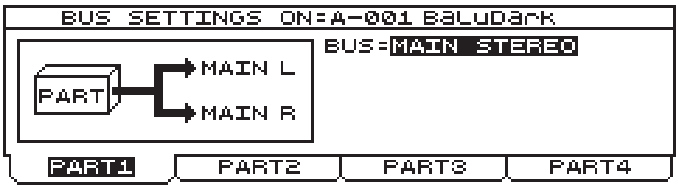
- **LO-KEY**: sets the lowest note of the portion of the keyboard associated to the Part. As well as using the usual data input tools, you can also select the desired value by pressing the keyboard key itself.

- **HI-KEY**: sets the highest note of the portion of the keyboard associated to the Part. As well as using the usual data input tools, you can also select the desired value by pressing the keyboard key itself.

N.B.: In order to have a better MIDI compatibility with any eventual connected instrument, LO-KEY and HI-KEY parameters are setted beyong the real keyboard range. When a given Part is transposed, the MIDI Note On messages (since the Note Off is sent like Note On with Velocity=0) relating to the Part concerned will be sent to the MIDI [OUT] port on the basis of the transposition. Conversely, the Note On messages received by the MIDI [IN] port will not be affected by the transposition. However, refer to point 10.1 with regard to the settings of the MIDI channels assigned to the Parts.

9.2 BUS SETTINGS

This Edit Program section allows you to assign each individual Part to a given output bus. This enables you to exploit the extraordinary feature of having each single Part on each single connector, guaranteeing easier mixing procedures outside the instrument.
Another very important feature of this section is that it interacts with the effects Routing (see point 9.3 – Routing Configuration) since when a Part (and thus a Timbre) is assigned to given outputs, and the effects (or effect) is (are) placed on the buses of the outputs concerned, you can obtain the most widely varying Timbre ⇨ effect configurations.
From the EDIT PROGRAM MENU, select field 2-BUS SETTINGS; the display will show:



containing the **BUS** parameter, which indicates the destination connector(s) of the Part to which the video page refers. This parameter can be set with the following procedures:

- **MAIN STEREO**: the Part is sent to the MAIN OUT [L-Mono] and [R] connectors.
- **MAIN MONO L**: the Part is sent to the MAIN OUT [L-Mono] connector.
- **MAIN MONO R**: the Part is sent to the MAIN OUT [R] connector.
- **AUX STEREO**: the Part is sent to the AUX OUT [1] and [2] connectors.
- **AUX MONO 1**: the Part is sent to the AUX OUT [1] connector.
- **AUX MONO 2**: the Part is sent to the AUX OUT [2] connector

To display the video page relating to the part for which you wish to make these settings, use the function keys.

N.B.: Equalizer will not affect the AUX outputs signal.

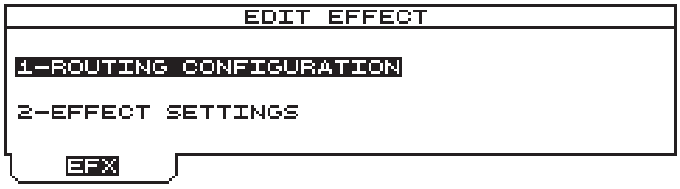
9.3 EDIT EFFECTS

The OB-12 section relating to the effects for processing of the sounds is an important, useful feature.
The instrument makes available four main types of algorithm, fully programmable and configurable within the effects chain:

- **OVERDRIVE**: 16 types of distortion effects which simulate various amplifiers brought to saturation.
- **CHORUS**: algorithm capable of modulating the signal to add depth and space to the sound:
- **DELAY**: by adding delayed copies to the original signal, this algorithm enables you to obtain delay and echo effects.
- **REVERB**: effect capable of simulating 16 types of room and reproducing their sound characteristics, such as the reflection and absorption of the walls.

As we have said, in addition to programming the type and characteristics of the effects, thanks to the Effect Routing function the instrument allows selection of 11 setups relating to the configuration of the effects within the buses which collect the signal from the sound generation section and send it to the outputs. These setups can then in turn be configured with regard to the position of the algorithms within the effects chain. As already described in 9.2 – Bus Settings, thanks to this

algorithms within the effects chain. As already described in 9.2 – Bus Settings, thanks to this function you can associate the effect of your choice to one or more Timbres, in order to set the configurations best suited to the sound required.
We will therefore now see how to proceed with configuration of the EFFECTS section.
From the EDIT PROGRAM MENU select field 3-EFFECTS; the display will show the page enabled for selection of the effects section the user wishes to display.



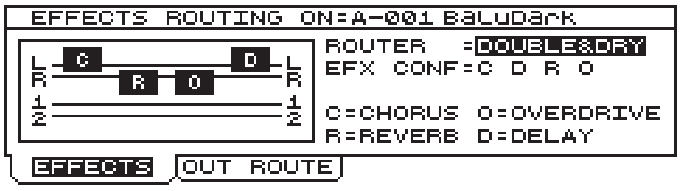
containing two selection fields:

1-ROUTING CONFIGURATION: section relating to the configuration and positioning of the algorithms within the output buses.

2-EFFECT SETTINGS: section enabled for programming of the effects.

ROUTING CONFIGURATION

From the EDIT EFFECT video page just described, select field 1-ROUTING CONFIGURATION. The display will show:

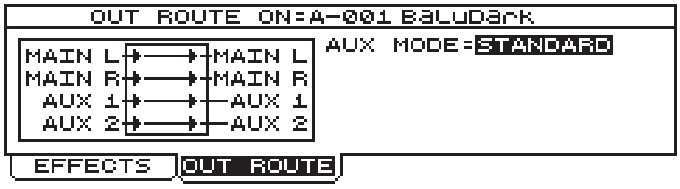


in which we can see a graph (on the left of the screen) showing the configuration and position of the algorithms, and then the parameters:

- **ROUTER**: sets the configuration of the algorithms in the effects chain.

- **EFX CONF** *(Effect Configuration)*: establishes the position of the effects in relation to the Router selected.

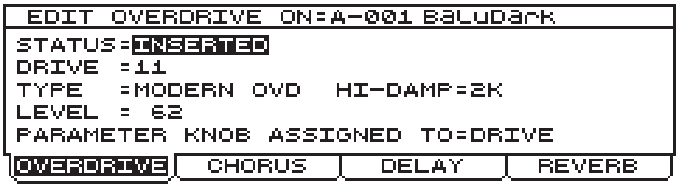
Once the effect positioning operations have been carried out, you can display the OUT COUPLER video page to set up the outputs. This allows you to assign the four buses which you have configured to the four (MAIN [L/Mono], [R] e AUX OUT [1] and [2]) outputs, or exclusively to the MAIN outputs (if these are the only outputs used). Press button [F2] to select the OUT ROUTE folder and the display will show:



You can use the AUX MODE parameter to decide whether to use the output ports in standard mode, by setting AUX MODE as STANDARD, or to address the AUX [1] and [2] ports to the MAIN [L-Mono] and [R], by setting AUX MODE as COUPLED.

EFFECTS SETTINGS

From the EDIT EFFECT video page select field 2-EFFECTS SETTINGS; the display will show the video page relating to setting of the parameters of the OVERDRIVE effect.
This algorithm allows the distortion required to be inserted in the effects chain. Conventional '60s-style light distortions can be obtained, but the instrument can also produce powerful sounds typical of contemporary rock music.
The video page is as follows:



containing the following programming parameters:

- **STATUS** *([OVERDRIVE])*: inserts the Overdrive effect in the effects chain (INSERTED) or bypasses it (BYPASSED).

- **DRIVE**: regulates the degree of distortion of the signal.

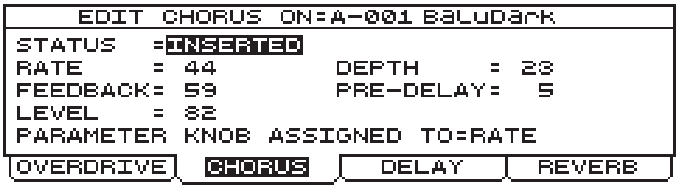
- **TYPE**: sets the type of simulated amplifier brought to saturation.

- **HI-DAMP**: regulates the cut-off frequency of a low-pass filter capable of eliminating all the frequencies above that set, to allow control of the signal timbre.

- **LEVEL** *([LEVEL] with the LED of the [LEVEL/PARAMETER] button off)*: regulates the level of the signal leaving the effect.

- **PARAMETER KNOB ASSIGNED TO**: defines which of the parameters shown in the video page can be regulated using the trimmer associated to the Overdrive effect (the first on the left in the EFFECTS section of the front panel) when the LED of the [LEVEL/PARAMETER] key is on.

Now use the [F2] button to select the CHORUS folder and thus display the page for programming the effect. The Chorus is generated using two lines: one remains unchanged (signal received as input) while the pitch of the other is slightly and cyclically by means of a modulant. The final sound obtained is a little fuller, richer and "spacious" than the original.



The following effect parameters can be set:

- **STATUS** *([CHORUS])*: inserts the Chorus effect in the effects chain (INSERTED) or bypasses it (BYPASSED).

- **RATE**: regulates the modulation speed of the effect on the input signal.

- **DEPTH**: regulates the modulation depth of the effect on the input signal.

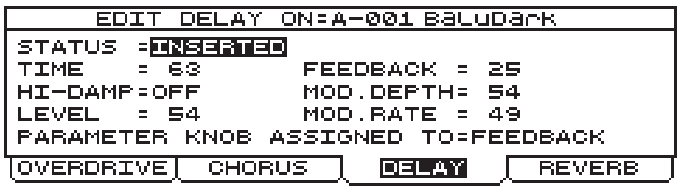
- **FEEDBACK**: sets the feedback of the processed signal, meaning how much signal leaving the algorithm is to be returned to the input.

- **PRE-DELAY**: regulates the delay time for activation of the effect. With short delay times you will obtain a more immediate Chorus; longer Pre-Delay times add an acoustic background effect to the sound.

- **LEVEL** *([LEVEL] with the LED of the [LEVEL/PARAMETER] button off)*: regulates the level of the signal leaving the Chorus effect.

- **PARAMETER KNOB ASSIGNED TO**: defines which of the parameters shown in the video page can be regulated using the trimmer associated to the Chorus effect (the second from the left in the EFFECTS) when the LED of the [LEVEL/PARAMETER] key is on.

The DELAY folder can now be selected to display the video page relating to the effect of the same name. The Delay (or echo) supplies separate repetitions of the signal. If feedback is added, or in other words if part of the delayed signal (leaving the algorithm) is returned to the effect input, you can obtain a succession of repetitions, each with a lower dynamic level than the previous ones. A modulated Delay (i.e. a Delay+Chorus) can also be obtained by means of the MOD. DEPTH and MOD. RATE parameters.



The programming parameters are the following:

- **STATUS** *([CHORUS])*: inserts the Delay effect in the effects chain (INSERTED) or bypasses it (BYPASSED).

- **TIME**: sets the time which passes between one repetition and the next, in a range of values from a few milliseconds (TIME=0) to 800 msec. (TIME=100).

- **FEEDBACK**: sets the quantity of signal to be sent to the delay line input, and thus the repetition decay time.

- **HI-DAMP**: displays the cut-off frequency used by a low-pass filter which eliminates all the frequencies above that set, from the repetitions of the modulated line. If this parameter is set with a relatively high value, it is able to re-create the sound of an analog delay or a tape echo, in which the successive delayed repetitions have a warm, sweet timbre.

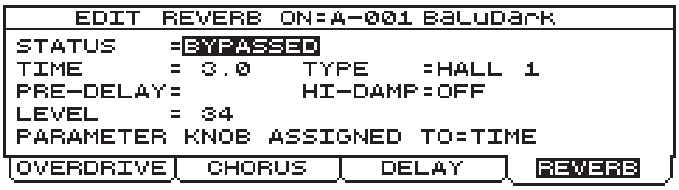
- **LEVEL** *([LEVEL] with the LED of the [LEVEL/PARAMETER] button off)*: regulates the level of the signal leaving the Delay effect.

- **MOD. DEPTH** *(Modulation Depth)*: regulates the depth of modulation on the delayed signal.

- **MOD. RATE** *(Modulation Rate)*: regulates the speed of modulation on the delayed signal.

- **PARAMETER KNOB ASSIGNED TO**: defines which of the parameters shown in the video page can be regulated using the trimmer associated to the Delay effect (the second from the right in the EFFECTS section) when the LED of the [LEVEL/PARAMETER] key is on.

To conclude, selecting the REVERB folder allows you to display the page relating to programming of the Reverb effect.
Reverb originates as the sum of the various acoustic reflections produced by a sound in a natural environment. If you clap your hands inside a large reflective environment, such as a church, you will hear a strong resonance which gradually dies away; this is due to the church's internal reverberation.
The acoustic response of a specific type of reverb depends on a large number of factors. These include the size and design of the room, the material with which it is lined, and many other aspects. The Reverb algorithm is able to reproduce all these factors digitally.



The video page contains the following parameters:

- **STATUS** *([CHORUS])*: inserts the Reverb effect in the effects chain (INSERTED) or bypasses it (BYPASSED).

- **TIME**: sets the reverb time, meaning the time for which the sound is propagated and reflected inside a room, in a range of values from 0.2 sec. to 24 sec.

- **TYPE**: sets the type of environment in which the reverb occurs. The possible options are the following:

  - HALL 1: reverb in a large hall with highly reflective walls, such as a church.
  - HALL 2: reverb inside a room smaller than the LARGE HALL and with less reflective rooms, such as a concert hall.
  - ROOM 1: reverb in a medium sized room with not very absorbent walls.
  - ROOM 2: reverb in a small room, with highly absorbent walls.
  - VOCAL: reverb picked up with a microphone.
  - PLATE: reverb generated by means of a metal plate, using the simulation method of the '70s.

- **PRE-DELAY**: regulates the cut-off frequency of a low-pass filter capable of eliminating all frequencies above that set.

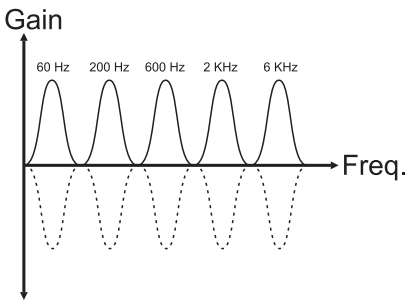
- **LEVEL** *([LEVEL] with the LED of the [LEVEL/PARAMETER] button off)*: regulates the level of the signal leaving the Reverb effect.

- **PARAMETER KNOB ASSIGNED TO**: defines which of the parameters shown in the video page can be regulated using the trimmer associated to the Reverb effect (the first from the left in the EFFECTS) when the LED of the [LEVEL/PARAMETER] key is on.

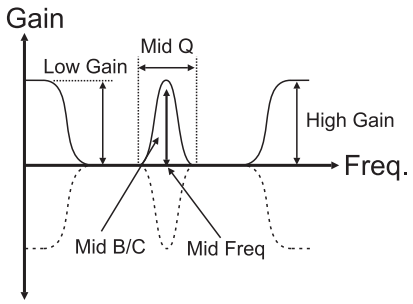
9.4 EDIT EQUALIZER

Another selection relating to configuration of a Program is the EQUALIZER. This function allows you to make use of an equalizer in order to be able to control the tone of the sound you are producing. One very important functional feature of the Equalizer is the fact that it can be configured as either parametric or graphic.

A parametric equalizer consists of three sections. Two analog sections are used to attenuate / enhance two opposite frequency bands (low-pass and high-pass), while a third can be positioned without restriction in a medium frequency range. This allows the user to set not only the frequencies to be affected, but also their enhancement / attenuation, and the band width.
A graphic equalizer, on the other hand, allows control of given preset frequency bands, and attenuation / enhancement of these bands are the only operations possible.

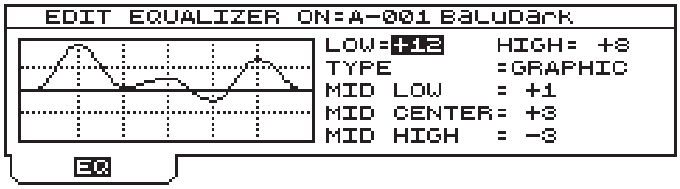


GRAPHIC EQUALIZER



PARAMETRIC EQUALIZER

From the EDIT PROGRAM MENU video page select field 4-EQUALIZER; the display will show:



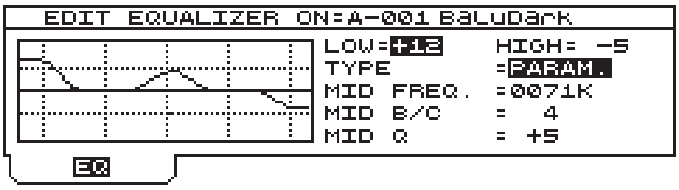
The parameter allowing definition of the equalizer operating mode is **TYPE**.
Therefore, if a graphic equalizer (illustrated by the above video page) is required, set **TYPE=GRAPHIC**.
The parameters used are the following:

- **LOW** *([60])*: enhances / attenuates the signal in the frequency region with centre on 60 Hz.
- **HIGH** *([200])*: enhances / attenuates the signal in the frequency region with centre on 200 Hz.
- **TYPE** *([MID MODE])*:sets the equalizer mode.
- **MID LOW** *([600])*: enhances / attenuates the signal in the frequency region with centre on 600 Hz.
- **MID CENTER** *([2K])*: enhances / attenuates the signal in the frequency region with centre on 2 KHz

- **MID HIGH** *([6K])*: enhances / attenuates the signal in the frequency region with centre on 6 KHz.

If these equalization parameters (and therefore not TYPE) are set at –12 you will obtain attenuation of the signal of -12 dB; conversely, setting them at +12 will give an enhancement of +12 dB. If the parameters are set at 0, the signals will be unaffected by the influence of the equalizer.

If you now wish to set the equalizer as parametric, set parameter **TYPE=PARAM**.



In this case, the parameters are the following:

- **LOW** *([LOW])*: enhances / attenuates the signal in the frequency region with centre on 60 Hz.

- **HIGH** *([HIGH])*: enhances / attenuates the signal with frequencies over 6 KHz.

- **TYPE** *([MID MODE])*: sets the equalizer mode.

- **MID FREQ.** *(Mid Frequency, [MID])*: sets the region of frequencies, in the medium range, of the signal to be enhanced / attenuated.

- **MID B/C** *(Mid Boost/Cut [FREQ])*: regulates the enhancement / attenuation of the area of frequencies equal to that set with the MID FREQ parameter.

- **MID Q** *([Q])*: regulates the band width of operation in the medium range specified with the MID FREQ parameter.

If the LOW, MID B/C and HIGH parameters are set at –12 you will obtain attenuation of the signal of -12 dB; conversely, setting them at +12 will give an enhancement of +12 dB. If the parameters are set at 0, the signals will be unaffected by the influence of the equalizer.

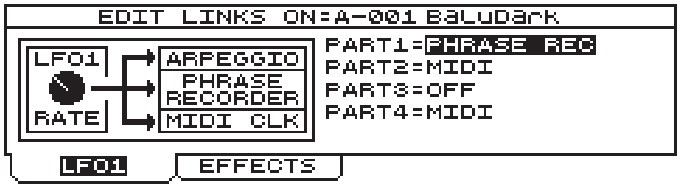
9.5 LINKS

The LINKS function allows the RATE parameter of LFO1 and of CHORUS effect and the DELAY TIME to be linked to the TEMPO parameter of the ARPEGGIO or the PHRASE RECORDER, and to the MIDI Clock message present on the MIDI [IN] port. All this is in order to guarantee perfect synchronisation of the above sections or with a remote MIDI instrument.
See also point 10.3 for further information concerning MIDI synchronisation.

N.B.: If the MIDI signal referred to above is not present on the MIDI [IN] port in case of Link to the MIDI Clock, the parameters linked to it will be set with the respective lowest value.

In order to provide information about the status of the parameters which may be linked, when the video pages relating to the parameters referred to above are displayed from the Program environment (therefore, in order to display the LFO1 Rate you will have to carry out a Swapping operation), the display will show an “L” in square brackets against the parameters which have been linked.

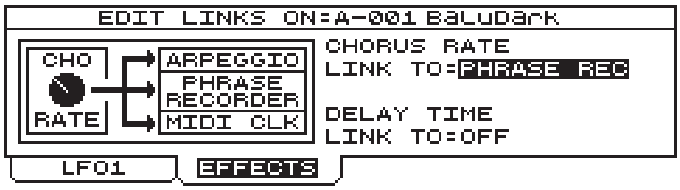
To display the video page relating to setting of the Links, select the field 5-LINKS from the EDIT PROGRAM menu. The display will show:



This first video page allows you to make Links assigned to LFO1.
As the illustration shows, the video page indicates the four Parts in which a Link can be set (to the LFO1 of the Timbre present in the selected Part). The possible settings are:

- OFF: no Link function selected. The LFO1 RATE works independently.
- ARPEGGIO: the LFO1 RATE is linked to the ARPEGGIO TEMPO. Each Arpeggio beat coincides with the start of the modulant wave generated by LFO1. It is not possible to control the RATE with the trimmer of the same name, but only by means of the ARPEGGIO [TEMPO].
- PHRASE REC: the LFO1 RATE is linked to the PHRASE RECORDER TEMPO. Each bar of performance of the phrase coincides with the start of the modulant wave generated by LFO1. It is not possible to control the RATE with the trimmer of the same name, but only by means of the PHRASE RECORDER [TEMPO].
- MIDI: the LFO1 RATE is linked to the MIDI Clock supplied as input to the MIDI [IN] port. Each Clock corresponds to a new cycle of the modulant wave generated by LFO1. It is not possible to control the RATE with the trimmer of the same name, but only by means of control of the MIDI Clock of the transmitter device.

Selecting the EFFECTS folder now allows you to set the Links assigned to the RATE parameter of the CHORUS effect and the DELAY TIME. The video displayed is as follows:



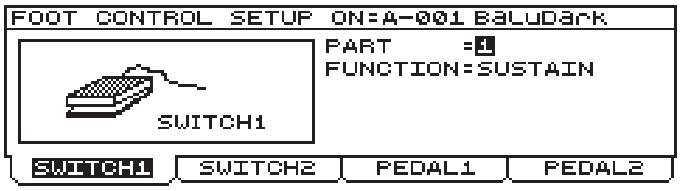
where we can see the two LINK TO fields in line with the sections to be linked, i.e. CHORUS RATE and DELAY TIME. The possible settings are identical to those for the LFO1 RATE. You may therefore refer to the description given previously. Clearly, in this case the parameter to be Linked will not be the LFO1 RATE but the CHORUS RATE and/or the DELAY TIME.

9.6 FOOT CONTROL SETUP

This section allows specific functions to be assigned to the pedals which can be connected to the rear connectors. In view of their operating mode, the switch pedals can be used to control “two-state” or “on/off” functions; in other words, you can activate or deactivate the note Sustain, or a waveform, for example. On the other hand, the expression pedals can be assigned “continuous” functions, such as control of the LFO1 modulation frequency, filter envelope attack time, etc.

As described in point 10.5, functions can also be assigned to the pedals in the System environment; in this case, the function is independent of the Program selected. However, in the Program environment you can assign different functions to the same pedal for the different parts which make up a Program. The pedal will carry out both the functions assigned in a System environment and the functions assigned in a Program environment.

From the EDIT PROGRAM MENU video page, select field 5-FOOT CTRL. The display will show:



This video page allows a given function to be assigned to the foot-switch pedal connected to the PEDALS [SWITCH 1] connector.
The parameters displayed are:

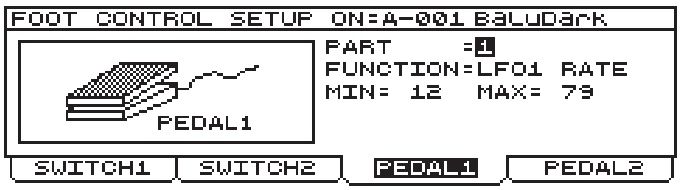
- **PART**: defines the Part to which the function specified with the FUNCTION parameter refers. When other Parts are selected, the function assigned to the previous Part remains in the memory.

- **FUNCTION**: assigns the function to the foot-switch pedal, for the Part specified with the parameter of the same name.

The parameters which can be controlled are the following:

SELECTIONS	FUNCTIONS	CONTROLS ON PANEL	SELECTIONS	FUNCTIONS	CONTROLS ON PANEL
DISABLED	no function applied		AUTOPAN	it activates and disactivates the Autopan function	[AUTOPAN] of AMPLIFIER
SUSTAIN	the notes played after having pressed the pedal will remain hanging till it will be released		LFO1 WAVE	it activates cyclically the 4 waves of LFO1	[WAVE SELECT] of LFO1
TIMBRE UP	it activates the Timbre following the one actually active in Part	Encoder	LFO2 WAVE	it activates cyclically the 4 waves of LFO2	[WAVE SELECT] of LFO2
TIMBRE DOWN	it activates the Timbre previous to the one actually active in Part	Encoder	PORTAMENTO	it activates and disactivates the Portamento function	[PORTAMENTO] of KEYBOARD
OSC1 SAW	in activates and disactivated the saw wave generated by OSC.1	[WAVE SELECT] of SAW of OSC.1	UNISON	it activates and disactivates the Unison function	[UNISON] of KEYBOARD
OSC1 TRIANG	in activates and disactivated the triangular wave generated by OSC.1	[WAVE SELECT] of TRIANGLE of OSC.1	MONO/POLY	it cyclically varies the keyboard mode: monophonic and polyphonic	[MONO] of KEYBOARD
OSC1 PULSE	in activates and disactivated the square wave generated by OSC.1	[WAVE SELECT] of PULSE of OSC.1	LEGATO	in activates and disactivates the legato function	[LEGATO] of KEYBOARD
OSC2 SAW	in activates and disactivated the saw wave generated by OSC.2	[WAVE SELECT] of SAW di OSC.2	OSC 1 SHIFT	it cyclically modifies OSC.1 tuning	[OCT+] and [OCT-] of KEYBOARD with [OSC SHIFT] on OSC1
OSC2 TRIANG	in activates and disactivated the triangular wave generated by OSC.2	[WAVE SELECT] of TRIANGLE of OSC.2	OSC 2 SHIFT	it cyclically modifies OSC.2 tuning	[OCT+] and [OCT-] of KEYBOARD with [OSC SHIFT] on OSC2
OSC2 PULSE	in activates and disactivated the square wave generated by OSC.2	[WAVE SELECT] of PULSE of OSC.2	VELOCITY	it activates and disactivates the Velocity	[VELOCITY] of KEYBOARD SENSE
OSC2 SYNC	it activates and disactivated the syncronisation between OSC.1 and OSC.2	[SYNC] of OSC.2	VEL TYPE	it cyclically changes the Velocity type	
OSC2 KEYB T	it activates and disactivated the Keyboard Tracking of OSC.2	[KBD TRACK] of OSC.2	AFTERTOUCH	it activates and disactivates the Aftertouch	[AFTERTOUCH] of KEYBOARD SENSE
FILTER ROUT	it cyclically changes the connection type of the two filters in FILTER section	[ROUTING] of FILTERS	AFTERT TYPE	it cyclically changes the Aftertouch types	
FLT 1 L/B/H	cyclically type variation for FILTER1	[FILTER 1] of FILTERS	PITCH BEND	it activates and disactivates the [PITCH] wheel	
FLT 2 L/B/H	cyclically type variation for FILTER2	[FILTER 2] of FILTERS	MODULATION	it activates and disactivates the [MODULATION] wheel	

The [F2] button allows you to select the SWITCH2 folder, and display the video page relating to the second pedal connected to the PEDALS [SWITCH2] connector. Follow the instructions provided for the settings of Switch1 for the Switch2 video page.
By selecting the PEDAL1 folder you can now display the video page relating to the settings of the expression pedal connected to the PEDALS [EXP.1] connector.



containing the following parameters:

- **PART**: defines the Part to which the function specified with the FUNCTION parameter refers. When other Parts are selected, the function assigned to the previous Part remains in the memory.

- **FUNCTION**: assigns the function to the expression pedal, for the Part specified with the parameter of the same name.

- **MIN** and **MAX**: set the minimum and maximum values of the parameter controlled by the pedal.

The parameters which can be assigned to the expression pedal are the following:

SELECTIONS	CONTROLLED PARAMETERS	CONTROLS ON PANEL	SELECTIONS	CONTROLLED PARAMETERS	CONTROLS ON PANEL
DISABLED	none		OSC1 PUL.WD	square wave pulse width generated by OSC.1	[OSC CTRL] assigned to square wave of OSCILLATOR1
LFO1-FADE	time for reach the max. level of LFO1 signal	[FADE] of LFO1]	OSC1 FM	modulation depth of OSC.2 on OSC.1	[FM] of OSCILLATOR1
LFO1-RATE	LFO1 signal frequency	[RATE] of LFO1	OSC1 LFO1DP	modulation depth of LFO1 on OSC.1	[LFO1 DEPTH] of OSCILLATOR1
BALANCE 1	balance between OSC.1 and OSC.2	[BALANCE 1] of OSC.COMMON	OSC1PWMLFO1	pulse with modulation depth of LFO1 on OSC.1	[PWM DEPTH] assigned to LFO1 of OSCILLATOR1
BALANCE 2	balance between OSC.1+OSC.2 and RING MODULATOR	[BALANCE 2] of OSC.COMMON	OSC1PWMLFO2	pulse with modulation depth of LFO2 on OSC.1	[PWM DEPTH] assigned to LFO2 of OSCILLATOR1
BALANCE 3	balance between OSC.1+OSC.2+RING MODULATOR and NOISE	[BALANCE 3] of OSC.COMMON	OSC1PWMEG	pulse width modulation depth of EG on OSC.1	[PWM DEPTH] assigned to EG of OSCILLATOR1
OSC.COM.ATT	attack time of the OSC.1 and OSC.2 envelope	[ATTACK] of OSC.COMON	OSC2 SAW LV	saw wave level generated by OSC.2	[WAVE MIX] of the saw wave of OSCILLATOR 2
OSC.COM.DEC	decay time of the OSC.1 and OSC.2	[DECAY] of OSC.COMMON	OSC2 TRI.LV	triangle wave level generated by OSC.2	[WAVE MIX] of the triangle wave of OSCILLATOR2
OSC1COM.ENV	OSC.1 envelope depth	[ENV DEPTH] on OSC.1 of OSC.COMMON	OSC2 PUL.LV	square wave level generated by OSC.2	[WAVE MIX] of the square wave of OSCILLATOR2
OSC2COM.ENV	OSC.2 envelope depth	[ENV DEPTH] on OSC.2 of OSC.COMMON	OSC2 PUL.WD	square wave pulse width generated by OSC.2	[OSC CTRL] assigned to square wave of OSCILLATOR2
OSC1 SAW LV	saw wave level generated by OSC.1	[WAVE MIX] of the saw wave of OSCILLATOR 1	OSC2 LFO1DP	modulation depth of LFO1 on OSC.2	[LFO1 DEPTH] of OSCILLATOR2
OSC1 TRI.LV	triangular wave level generated by OSC.1	[WAVE MIX] of the triangular wave of OSCILLATOR1	OSC2PWMLFO1	pulse with modulation depth of LFO1 on OSC.2	[PWM DEPTH] assegnato a LFO1 di OSCILLATOR2
OSC1 PUL.LV	square wave level generated by OSC.1	[WAVE MIX] of the square wave of OSCILLATOR1	OSC2PWMLFO2	pulse with modulation depth of LFO2 on OSC.2	[PWM DEPTH] assigned to LFO2 of OSCILLATOR2
OSC1 SAW SP	saw wave modification generated by OSC.1	[WAVE CTRL] assigned to saw wave of OSCILLATOR1	OSC2PWMEG	pulse width modulation depth of EG on OSC.2	[PWM DEPTH] assigned to EG of OSCILLATOR2
OSC1 TRI.WR	triangle wave modification generated by OSC.1	[WAVE CTRL] assigned to triangle wave of OSCILLATOR1	FILT.FREQ.	cut-off frequency of FILTERS	[FREQUENCY] of FILTERS

SELECTIONS	CONTROLLED PARAMETERS	CONTROLS ON PANEL	SELECTIONS	CONTROLLED PARAMETERS	CONTROLS ON PANEL
FILT.RES.	resonance of FILTERS	[RESONANCE] of FILTERS	AMPL.REL.	release time of the AMPLIFIER envelope	[RELEASE] of AMPLIFIER
FILT.ATTACK	attack time of the FILTERS envelope	[ATTACK] of FILTERS	AMPL.AMOUNT	Timbre level	[AMOUNT] of AMPLIFIER
FILT.DECAY	decay time of the FILTERS envelope	[DECAY] of FILTERS	AMPL.LFO1DP	modulation depth of LFO1 on AMPLIFIER	[LFO1 DEPTH] of AMPLIFIER
FILT.SUST.	sustain level of the FILTERS envelope	[SUSTAIN] of FILTERS	LFO2 RATE	LFO2 signal frequency	[RATE] of LFO2
FILT.REL.	release time of the FILTERS envelope	[RELEASE] of FILTERS	LFO2 DP.OS1	modulation depth of LFO2 on OSC.1	[MODULATION]
FILT.ENV.DP	FILTERS envelope depth	[ENV DEPTH] of FILTERS	LFO2 DP.OS2	modulation depth of LFO2 on OSC.2	[MODULATION]
FILT.LFO1DP	modulation depth of LFO1 on OSC.1	[LFO1 DEPTH] of FILTERS	LFO2 DP.FLT	modulation depth of LFO2 on FILTERS	[MODULATION]
AMPL.ATTACK	attack time of the AMPLIFIER envelope	[ATTACK] of AMPLIFIER	LFO2 DP.AMP	modulation depth of LFO2 on AMPLIFIER	[MODULATION]
AMPL.DECAY	decay time of the AMPLIFIER envelope	[DECAY] of AMPLIFIER	PORTAM.TIME	Portamento time	[TIME] of PORTAMENTO
AMPL.SUST.	sustain level of the AMPLIFIER envelope	[SUSTAIN] of AMPLIFIER			

By selecting the PEDAL2 folder you can assign the function of choice to the pedal connected to the rear PEDAL [EXP.2] connector. The video page will be identical to that relating to the PEDAL1 setting.

9.7 ARPEGGIO SETTINGS

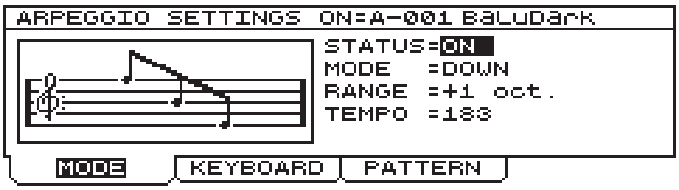
The ARPEGGIO function allows arpeggios to be performed by playing a chord on the keyboard or pressing just one note and creating octave arpeggios on it.

The HOLD function (activated using the button of the same name in this section) allows you to play arpeggios even after the keyboard notes have been released. Notes played subsequently will replace the previous ones with the arpeggio mode active.
You can therefore use regular arpeggios, by selecting the beat required, or irregular arpeggios, for which there are a choice of Patterns.

This section of the Program environment allows you to set the modes, the range in octaves and the tempo of the arpeggio, and the keyboard section and Parts affected by the function.

This section is independent of the PART SETTINGS: the arpeggio notes will be performed with the Timbres present in the Parts enabled for the function.

From the EDIT PROGRAM MENU select field 6-ARPEGGIO. The display will show the first video page relating to the settings of this function:

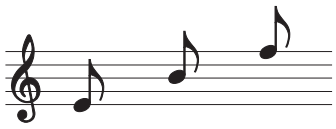


the parameters this video page contains are the following:

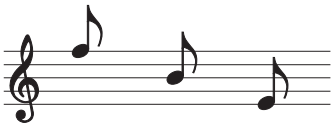
- **STATUS** *(Arpeggio Status, [ON/OFF] in the ARPEGGIO section)*: activates (ON) or disables (OFF) the Arpeggio function.

- **MODE** *([MODE])*: sets the arpeggio mode as follows:

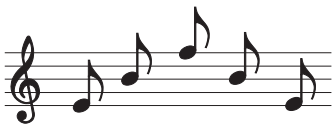
  - **UP**: the arpeggio is performed cyclically from the lowest to the highest note as shown in the diagram:



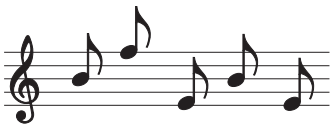
  - **DOWN**: the arpeggio is performed cyclically from the highest to the lowest note as shown in the diagram:



  - **UP & DOWN** (UP and DOWN LEDs on): the arpeggio is performed cyclically from the lowest to the highest note and vice-versa, as shown in the diagram:



  - **RANDOM** (RND): the arpeggio notes will be played at random, as shown in the diagram:

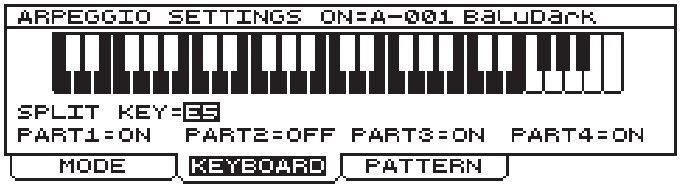


- **RANGE** *([RANGE])*: sets the range of the arpeggio in octaves. The possible settings are:

- **+0 oct**: arpeggio range one octave.
- **+1 oct.**: arpeggio range one octave above the one played.
- **+2 oct.**: arpeggio range two octaves above the one played.
- **+3 oct.**: arpeggio range three octaves above the one played.

- **TEMPO** *([TEMPO] or [TAP TEMPO] of the ARPEGGIO section)*: sets the arpeggio time in a range of 25÷250 BPM. If there are MIDI Clock messages on the MIDI [IN] port and its assignment to this function has been enabled (see point 10.3), the value of this parameter will be that specified by the MIDI message.

When button [F2] is pressed, the display will show the video page relating to assignment of a keyboard section and Parts to the arpeggio.

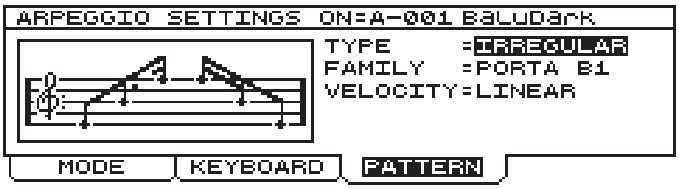


The parameters displayed perform the following functions:

- **SPLIT KEY**: sets the split key for definition of the keyboard section in which arpeggios can be performed. If notes beyond the split point are played, they will not be used for an arpeggio, but will be played normally with the Parts to which the Arpeggio has not been assigned.
  This allows you to use the Arpeggio as accompaniment and the Parts not associated to this function for playing the solo lines.
  As well as the usual data input devices (encoder, number keypad) this parameter can also be set using the keyboard key which acts as split for the section.

- **PART1, 2, 3, 4**: these options allow you to set which Part (and therefore which Timbre) is to perform the arpeggio.

If the PATTERN folder is now selected, the display will show the video page for setting the type of arpeggio:



- **TYPE**: if this parameter is set as REGULAR you will be able to play regular arpeggios, in a beat which you can preset. Conversely, if the option IRREGULAR is selected, various irregular arpeggios can be played.

- **FAMILY**: if the TYPE parameter has been set as REGULAR, this field allows you to set the arpeggio beat. The possible settings are: 1/4, 1/4t (triplet), 1/8, 1/8t, 1/16, 1/16t, 1/32.
  If TYPE has been set as IRREGULAR, the FAMILY parameter allows you to select one of the seven irregular arpeggio patterns.

- **VELOCITY**: defines the dynamic of the arpeggio notes. The possible settings are:

  LINEAR: linear dynamic
  MOST SIGN: the note played with the highest dynamic value will assign the dynamic to the arpeggio
  FIXED 40: dynamic set at 40
  FIXED 64: dynamic set at 64
  FIXED 100: dynamic set at 100

9.8 PHRASE RECORDER

The PHRASE RECORDER allows musical phrases to be recorded and repeated by simply pressing a keyboard key, which from now on we will call the *pilot key*.
The musical phrase selected will thus be repeated until the key mentioned above is released. If the HOLD function is enabled it will not be necessary to keep the key pressed since the musical phrase will be played even after its release. If another pilot key assigned to another musical phrase is pressed, this phrase will replace the previous one in the playback function. To activate / deactivate the Hold function, press the button of the same name in the PHRASE section of the front panel.

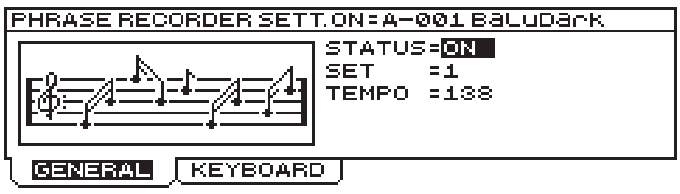
One very important feature of the Phrase Recorder is that while a given musical phrase is being repeated with the Hold function active, you will be able to vary the parameters relating to generation of the sound, to obtain continuous variation of the timbre with which it is performed. What's more, once you have set the correct keyboard split point and the Parts assigned to the Phrase Recorder, you will be able to play without restriction in the keyboard zone not enabled for this function, while the phrase is being repeated.

The internal memory enabled for the recording of phrases is divided into four SETS, one of which can be assigned to each Program. Each Set can be viewed as a memory bank in which the recorded phrases can be saved. Therefore, a key can be configured as the pilot key of four phrases, each saved in one Set. If the phrases are then placed in the desired Sets, you will be able to use given groups of phrases depending on the Program active at the time.
In theory, the Phrase Recorder can contain up to 196 musical phrases; in fact, the memory associated to it can contain 16000 notes. Thanks to the MEMORY STATISTIC section in the SYSTEM environment (see point 10.8) you can be constantly informed about the amount of memory available.

The PHRASE RECORDER function is divided into two programming sections.
One can be recalled from the EDIT PROGRAM MENU and is called PHRASE RECORDER SETTINGS; this allows you to enable or disable the function and Set of phrases associated to the Program active at that moment, regulate the metronome tempo, and enable a keyboard zone and the Program Parts (and therefore the timbres) for performance of the musical phrase.
Another, called RECORD PHRASE, can be recalled by pressing the [REC] button in the PHRASE section of the front panel, and enables the recording or monitoring of a given phrase.

PHRASE RECORDER SETTINGS

From the EDIT PROGRAM MENU, select field 7-PHRASE REC.; the display will show the video page relating to the main settings of the Phrase Recorder:



in which the following parameters can be set:

- **STATUS** *([ON/OFF] of the PHRASE section)*: enables (ON) or disables (OFF) the Phrase Recorder.

- **SET**: sets the Set of phrases active when the Program is recalled.

- **TEMPO** *([TEMPO] or [TAP TEMPO] of the PHRASE section)*: sets the metronome tempo for performance of the phrases in a range of 25-250 BPM. If there are MIDI Clock messages on the MIDI [IN] port and its assignment to this function has been enabled (see point 10.3), the value of this parameter will be that specified by the MIDI message.

When the KEYBOARD folder is selected the display will show the video page for definition of the keyboard range and the Parts associated to the Phrase Recorder:

- **SPLIT KEY**: sets the split key for definition of the keyboard zone in which the Phrase Recorder can be recalled. If a note beyond the split point is played, the Phrase Recorder cannot be activated even if the key concerned is acting as pilot key for a given musical phrase. However, you will be able to play freely in this zone of the keyboard (by means of the Parts not assigned to the Phrase Recorder), with the phrase being repeated as an accompaniment, for example. As well as the usual data input devices (encoder, number keypad) this parameter can also be set using the keyboard key which acts as split for the section.

- **PART1, 2, 3, 4**: these options allow you to set which Part (and therefore which Timbre) is to perform the musical phrases. If a Part is assigned to the Phrase Recorder, it will no longer respond to the notes played on the keyboard.

RECORD PHRASE MAIN MENU

We will now see how to record a musical phrase.
When the [REC] button in the front panel PHRASE section is pressed, the display will show the main menu of this function:

in which the user can select:

1-RECORD PHRASE: selecting this field enables the function for recording a musical phrase.

2-PHRASE EVENT EDITOR: this option allows you to show on the display and modify the contents of the musical phrases in the memory.

RECORD PHRASE

The RECORD PHRASE function allows the user to record new musical phrases (or to modify existing phrases) and to save them inside the Set of choice, also assigning their pilot key. We will now see how to record a musical phrase.

In the video page described above, select field 1-RECORD PHRASE; the display will show the video page for preparation for recording:

```
                    RECORD PHRASE
SET          =1          TRIGGER NOTE=C2
TEMPO        =120
MEASURE      = 6         TIME SIGN.   =4/4
REC MODE     =OVERDUB    METRON.STAT.=ON
LAYER STAT.=PROGRAM      METRON.LEVEL= 7
                         CLEAR       GO!
```

containing the following programming parameters:

- **SET**: establishes the Set in which the musical phrase to be recorded will be saved, or which contains the phrase to be modified.

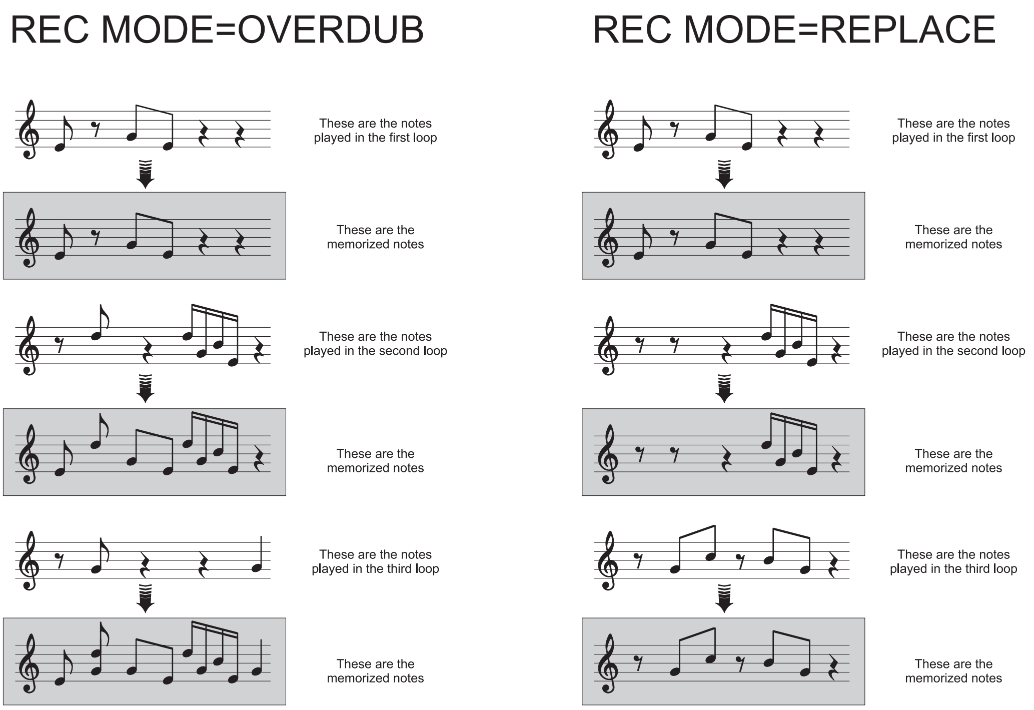
- **TRIGGER NOTE**: defines the pilot key, meaning the keyboard key enabled to start the musical phrase. The value can also be entered by pressing the keyboard key of choice. In case of over-recording or modifications of songs already in the memory, this parameter can also be used to recall a phrase once the relative pilot key is known. This allows display of the relative recording parameters.

- **TEMPO** *([TEMPO or [TAP TEMPO] of the PHRASE section)*: regulates the metronome tempo with which the Phrase is to be recorded in a range of 25÷250 BPM.

- **MEASURE**: sets the number of bars (measures) of which the phrase to be recorded consists. If the preset number of bars is exceeded, the data which follow (the notes played after the last bar) will be recorded in a new loop, and will overwrite or replace (see REC MODE parameter) the notes played previously. Musical phrases with a maximum length of 32 bars can be recorded.

- **TIME SIGN.** *(Time Signature)*: sets the time signature of the recording to be made. The values available are: 2/4, 3/4, 4/4, 5/4, 3/8, 5/8, 6/8, 7/8, 9/8, 12/8.

- **REC MODE**: sets the type of recording. If OVERDUB is selected, the data are over-recorded, so each new note will be added those already present (recorded in a previous session or loop). If the parameter is set as REPLACE, each new datum will replace those already present. If no new events are present, the data recorded in previous sessions or loops will be retained.

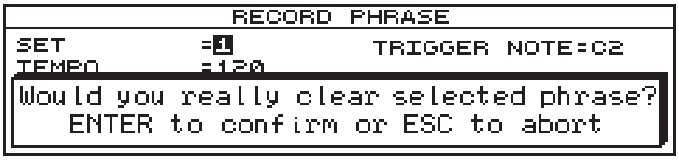


- **LAYER STAT.** *(Layer Status)*: if this parameter is set as PROGRAM, during recording you can play (but not record) the phrase bearing in mind the Program settings (Part, Split / Layer, Effects, etc...). If TMB-SOLO is selected, the phrase will be played with the Timbre sounds current at that moment.

- **METR.STATUS** *(Metronome Status)*: if this parameter is set as ON, the metronome will be audible throughout the recording phase. If PREC is selected, the metronome will only be heard in the Precount phase, i.e. the bar inserted by the instrument before recording starts. Lastly, with OFF selected the metronome will be disabled.

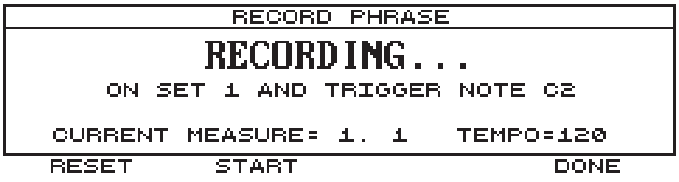
- **METR.LEVEL** *(Metronome Level)*: regulates the metronome level.

You can press button [F3] to select the CLEAR function to delete the contents of the Phrase currently selected (assigned to the key indicated by the TRIGGER NOTE parameter and present in the set defined by the PHRASE SET field). The display will then request confirmation to proceed by means of the following video page:

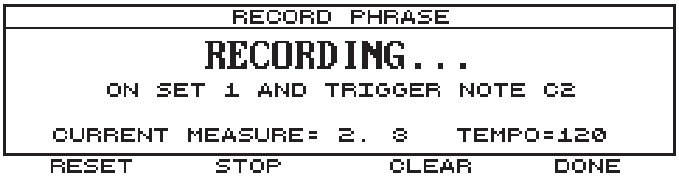


As the display indicates, if the [ESC] button is pressed the procedure will be aborted, while pressing [ENTER] confirms it. In this case the display will inform the user that the data in the Phrase are being deleted:

If the GO! function is selected using the [F4] button, the recording procedure will be started. The display will show:



The START command can now be selected using the [F2] button to start recording:



The CURRENT MEASURE parameter shows the numbers of the bars as they pass ((useful during over-recording to allow optimum placing of any added notes), while the TEMPO field indicates the metronome tempo for the recording.
The screen also contains the STOP ([F2]) command for stopping the recording and CLEAR ([F3]) for deleting the data present when the key itself is pressed.
If RESET (button [F1]) is selected, the recording will be returned to bar 1.1.

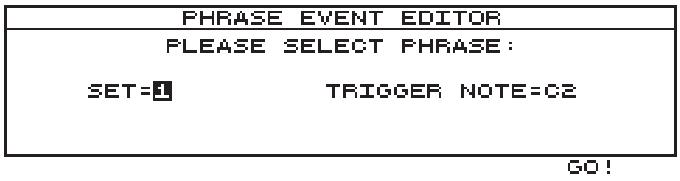
After you have played the musical phrase of your choice, select the DONE option using button [F3] to save the data in the Set, already selected, of the Phrase Recorder memory. The display will indicate that saving is taking place by means of the following video page:

PHRASE EVENT EDITOR

The PHRASE EVENT EDITOR allows the contents of the musical phrases recorded with the Phrase Recorder to be shown on the display in the form of note events.
However, the main feature of this function is that you can edit the musical phase whose contents are displayed as you wish, by deleting unwanted events, for example, or creating new ones.

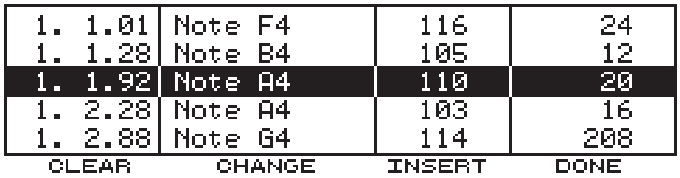
From the following video page:

Select field 2-PHRASE EVENT EDITOR; the display will show:



The **SET** indicates the Set of phrases containing the one to be monitored, while **TRIGGER NOTE** identifies its pilot key. After making the desired selection, press key [F2] with the GO! function; the display will show the contents of the musical phrase:

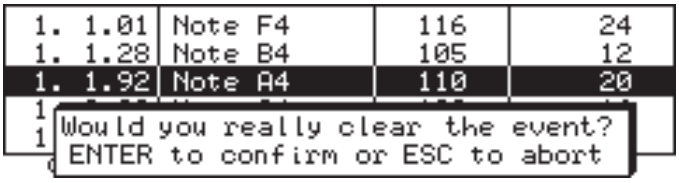
The video page is subdivided into four columns:



- The first column on the left indicates the position of the note event inside the Phrase, expressed as BAR.CROTCHET.FRAME;
- The second column displays the identity of the note;
- The third column displays the dynamic with which the note has been played;
- The fourth column displays the duration of the event expressed in Frames.

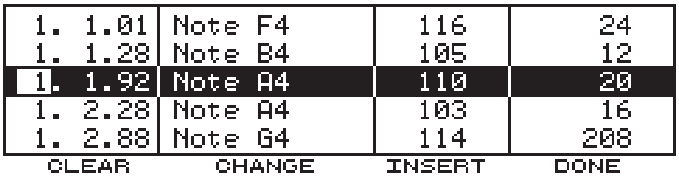
You can use the encoder or the [CURSOR] keys to scroll through all the events and select the one which you require by placing it in the zone of the screen in reverse.

You can use the function keys to perform the functions described on the display in relation to the selected note.
Therefore, button [F1] enables the CLEAR function, used to delete the selected note event. The display will then request confirmation before proceeding:



As the Pop-Up menu states, if the [ENTER] is pressed, the note event will be deleted, while [ESC] will abort the deletion command.

Button [F2] is associated to the CHANGE command allowing you to change the value of the parameters relating to the selected note event. After this button is pressed, the display will show a cursor on the position value of the note



If the cursor is located in the first column (default when the function is accessed), you can vary the position of the note event within the Phrase. After using the [CURSOR] keys to locate the cursor in the second column, you can change the identity of the note, in the third column you can change its dynamic and in the fourth column the duration.
To modify this parameters you can use also the keys of the keyboard.
Press [ENTER] to confirm the settings made or the [ESC] button to abort the function.

Another function available in this video page can be recalled using button [F3] (INSERT), and allows another note event to be inserted in the musical phrase.
Therefore, when this button is pressed, an event will be inserted (before the note currently selected) with:

- note identity: C4
- dynamic: 127
- duration: 96

You can then use the CHANGE command to vary the above values and set the event you require. As for the other functions, use the [ENTER] to confirm the operation or the [ESC] button to abort the insertion of the note event.

After making the changes you require, select the DONE command with the [F4] button to save them, or press [ESC] to abort.

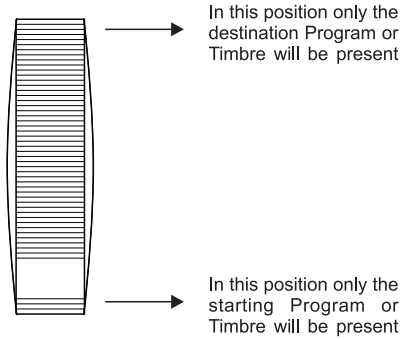
9.9 AUTO-MANUAL MORPH

The MORPH function allows the sound produced by a Program or a single Timbre to be transformed into another sound generated by another Program or Timbre. During the time, you may listen to all variarions of the “continuous” parameters (like F.1 FREQ. for example) concerning the sound generation creating extraordinary effects. The “non continuous” parameters (i.e. ON/OFF) will be set automatically as per the final location.
Moreover, if the pages relative to the generation sections are displayed while this function is in progress, you can observe the changes in the parameters from one Timbre to the other.
Therefore, the Program / Timbre which generates the original sound will be known as the starting (or origin) Program / Timbre, while the one which generates the final sound will be called the destination Program / Timbre.

The OB-12 allows you to perform two types of Morph:

- an automatic Morph, with which the sound transformation takes place within a programmable time or number of bars.
- a manual Morph, with which you can control the passage from one Program / Timbre to another by means of the [MODULATION] wheel. The minimum position of the [MODULATION] wheel will be associated to the starting location and its maximum position to the destination location. Intermediate positions of the [MODULATION] wheel will correspond to intermediate parameter interpolation conditions.

N.B.: The Manual Morph can only be controlled by means of the [MODULATION] wheel if the [M.MORPH] LED in the WHEEL MODE section is on (see also point 7.12).



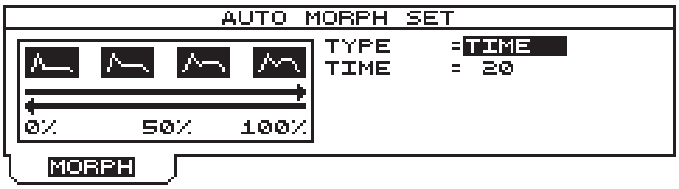
The buttons in the AUTOMATION section can be used to select the two types of Morph: the [AUTO] button enables the automatic Morph, while [MANUAL] activates the manual Morph. When the selection is made, the display will show:

in case of automatic Morph. If the manual Morph is activated, the message AUTO MORPH in the video page heading will be replaced by MANUAL MORPH.
In addition, with the Timbre operating environment active you can perform a Morph of two timbres with the screen showing the message PLAY TIMBRE instead of PLAY PROGRAM. In this case, the automatic Morph time depends on the setting made in the Program currently selected.

The **SRC** (Source) field indicates the starting memory location (whether referred to a Program or a Timbre), while **DST** (Destination) displays the destination location. You can use the encoder or the number keypad to set the destination location, since the starting location is automatically set with that active when the function is activated.

After making the desired settings, in case of automatic Morph pressing the [ENABLE] button will activate the function. In case of manual Morph the function will be carried out immediately when the [MODULATION] wheel is turned to its minimum setting or pressing the above button: this button can also be used to interrupt and restart the function.
Pressing [AUTO] or [MANUAL] again (depending on which Morph has been selected) disables the function.

The EDIT PROGRAM MENU also allows you to regulate the parameters associated to the automatic Morph. From the menu described above, select field 8-AUTO MORPH SET; the display will show:



in which you can set:

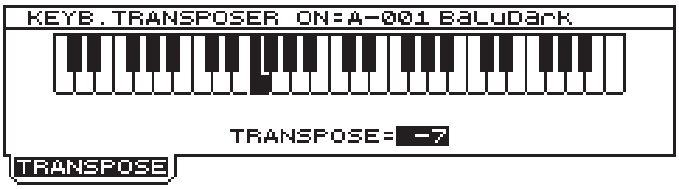
- **TYPE**: setting this parameter as TIME allows you to set the period of time taken to pass from one location to another with a time value. If MEASURE is set, the Morph time can be set with a value in bars.

- **TIME**: (displayed if TYPE=TIME) sets the Morph time, meaning the time taken to pass from one Program (or Timbre) to another.

- **MEASURE**: (displayed if TYPE=MEASURE) sets the number of bars taken to carry out the Morph.

9.10 KEYBOARD TRANSPOSE

The KEYBOARD TRANSPOSE allows transposition of the whole keyboard in semitones.
Unlike transposition applied to the individual Parts or individual oscillators, transposition of the whole keyboard is useful when the user wishes to play beyond its normal range (in a treble or bass direction) while retaining the difference in pitch between the Parts.



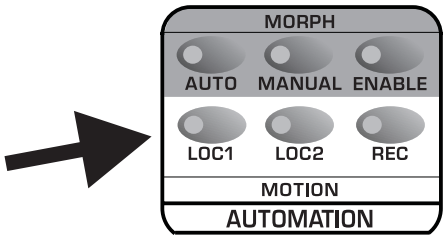
N.B.: When the keyboard is transposed, the MIDI Note On messages will be sent to the MIDI [OUT] function in relation to the transposition. Conversely, the messages received by the MIDI [IN] port will be unaffected by the transposition. However, refer to point 10.1 for details of setting of the MIDI channels assigned to the Parts.

9.11 MOTION RECORDER

The MOTION RECORDER automation feature present in the OB-12 allows the user to save and repeat as a loop a series of events generated on the sections of the front panel in the form of trimmer and/or slider movements. This allows loops of these events to be played back in order to obtain “continuous modifications” of the timbric structure of the sound even while songs are being performed, with no need for the player to remove his or her hands from the keyboard.

A Motion, meaning a series of panel control movements, will enable you to create complex changes in tone both in what you are playing on the keyboard and in arpeggios and playback phrases.

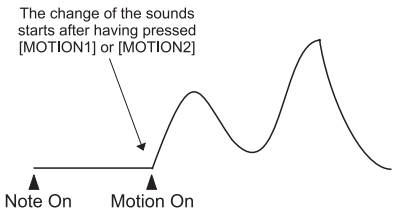
For the Motion Recorder function the instrument has two associated memory locations, in which the user can record 16000 events with a resolution of 96 t.p.q.n., equivalent to a two-minute recording.



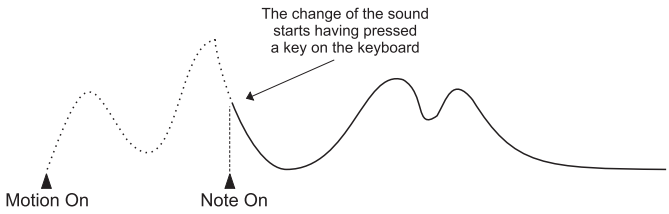
The front panel section contains the [LOC1] and [LOC2] buttons which recall the two memory locations in which the panel movements are recorded and the [REC] for activating the procedure for recording and/or modifying a Motion. The LED on the buttons themselves indicates the status of the function. When on, the LEDs of the buttons [LOC1] and [LOC2] show that the Motion is being played back; whenever the playback loop ends, the LED will go out for a moment. The REC] button LED indicates whether or not the recording / modification procedure is active.
You can use the [TEMPO] trimmer or [TAP TEMPO] button of the Phrase Recorder section to regulate the metronome time for performance of the Motion. If the Phrase Recorder is already active, the Motion will be performed with the metronome tempo value assigned to the Phrase, in order to guarantee perfect synchronisation between the two sections. To deactivate the Motion, press the [LOC1] or [LOC2] button associated to it.

PLAYING BACK A MOTION

During playback, you can use a Motion in two different ways.
In one operating mode, a Motion is activated while you are playing. Therefore during the performance you press the [LOC1] or [LOC2] button associated to the Motion you require and the sound will start to change when the Motion starts to be played back.



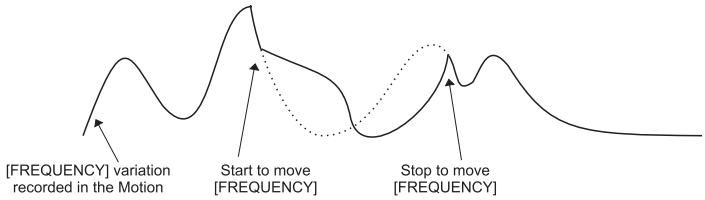
In the other mode of use, you activate the Motion you require before starting to play. This means you can make use of variations in the timbric structure of the sound right from the beginning of your performance, arpeggio or Phrase.



In both cases, to stop playback of the Motion press the relative button. The LED in question will go out to confirm that the function has been disabled. When the playback ends, the sound will have the timbric structure set at the end of the Motion; to restore the original settings, select the Program or Timbre again.

N.B.: the MIDI data relating to the controls modified using a Motion will be transmitted to the MIDI [OUT] connector. Consult point 10.2 for details of assignment of Control Changes to the panel controls.

As well as normal playback of a Motion, you can also vary the sound by controlling the panel trimmers or sliders by hand. If you move a control whose movement was recorded in the Motion, the new value of the trimmer/slider in use will have priority over the Motion recording. When manual control of the trimmer/slider finishes, the variation in sound will again depend on the event recorded in the Motion.



Naturally, however, when a control is moved by hand in a given direction (for example, from 0 to 100), if the recorded movement of the same control varies in the opposite direction (from 100 to 0) you risk cancelling out the effect produced by the Motion.
If you move a trimmer/slider for which no movement was recorded, the effect it produces will be added to those generated by the Motion.

MOTION RECORDER MAIN MENU

When the [REC] of the AUTOMATION section is pressed, the display will show the Main Menu relating to the Motion section:

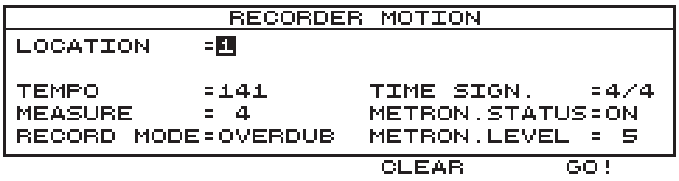
In this menu, you can select the following functions:

1-RECORD MOTION: function for recording a Motion.

2-MOTION EVENT EDITOR: function for displaying the contents of a pre-recorded Motion.

RECORD MOTION

We will now see how to record a Motion.
From the menu described above, select field 1-RECORD MOTION with button [F1]; the display will show the video page containing the recording parameters:



The recording can now be set with the following parameters:

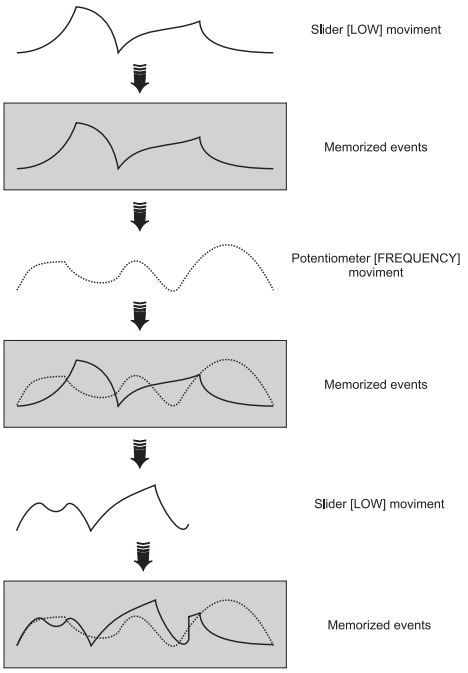
- **LOCATION**: sets the location in which the sequence of events to be recorded will be saved, or containing the Motion to be modified.

- **TEMPO** *([TEMPO or [TAP TEMPO] of the PHRASE section)*: regulates the metronome tempo with which the Phrase is to be recorded in a range of 25÷250 BPM.

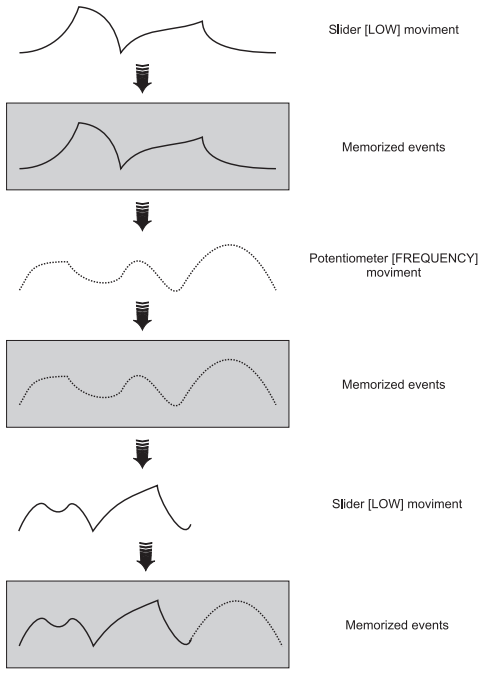
- **MEASURE**: sets the number of bars (measures) of which the Motion to be recorded consists. If the preset number of bars is exceeded during recording, the data which follow (the events generated after the last bar) will be recorded in a new loop, and will overwrite or replace (see RECORD MODE parameter) the events generated previously. A Motion with a maximum length of 32 bars can be recorded.

- **RECORD MODE**: sets the type of recording. If OVERDUB is selected, the data are over-recorded, so each new event generated will be added to those already present (recorded in a previous session or loop). If the parameter is set as REPLACE, each new datum (regardless of the trimmer / slider which generates it) will replace those already present. If no new events are generated, the data recorded in previous sessions or loops will be retained.

REC MODE=OVERDUB



REC MODE=REPLACE

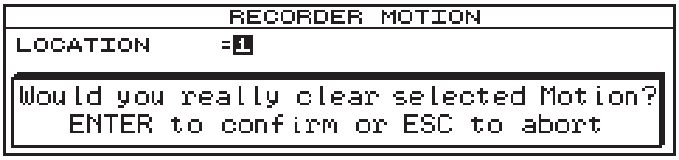


- **TIME SIGN.** *(Time Signature)*: sets the time signature of the recording to be made. The values available are: 2/4, 3/4, 4/4, 5/4, 3/8, 5/8, 6/8, 7/8, 9/8, 12/8.

- **METR.STATUS** *(Metronome Status)*: if this parameter is set as ON, the metronome will be audible throughout the recording phase. If PREC is selected, the metronome will only be heard in the Precount phase, i.e. the bar inserted by the instrument before recording starts. Lastly, with OFF selected the metronome will be disabled.

- **METRON.LEVEL** *(Metronome Level)*: regulates the metronome level.

You can use button [F1], assigned to the CLEAR function, to delete the Motion displayed by the MOTION LOCATION parameter. When the above key is pressed, the display will ask confirmation before proceeding:

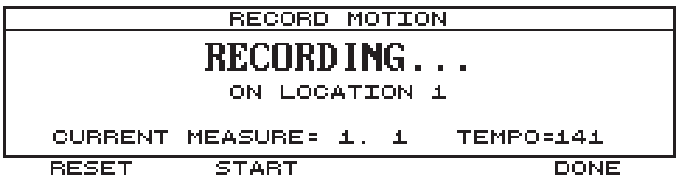


As the display indicates, pressing the [ENTER] key deletes the Motion, while the [ESC] button can be pressed to abort the deletion procedure.
If the contents of the Motion are deleted, the display will show the operation by displaying the pop-up menu:

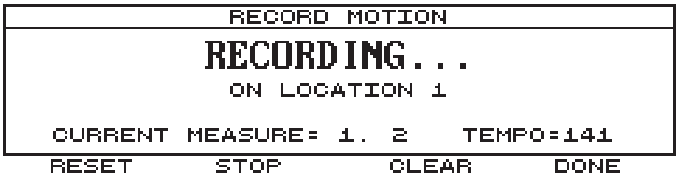
From the previous video page, pressing button [F2] associated to the GO! function starts the recording procedure.
One very important feature of the Motion Recorder is that, as well as moving the controls you wish to record, you can also play on the keyboard in order to check the quality of the Motion immediately.

N.B.: Only “continuous” controls, i.e. trimmers and/or sliders, can be saved in a Motion. This means that the pressing of a button will not be recorded.

If the GO! function is then selected, the instrument will enable recording and the display will show:



You can now select the START using the [F2] button to start recording:



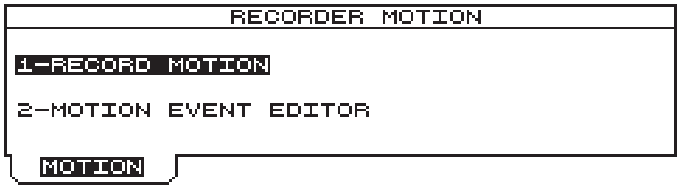
The CURRENT MEASURE parameter shows the numbers of the bars as they pass ((useful during over-recording to allow optimum placing of any added notes), while the TEMPO field indicates the metronome time for the recording.
The screen also contains the STOP ([F2]) command for stopping the recording and CLEAR ([F1]) for deleting the data present when the key itself is pressed.
If RESET (button [F3]) is selected, the recording will be returned to bar 1.1.

After you have played the Motion you require, select the DONE option using button [F3] to save the data in the Motion Location already selected. The display will then signal that saving is in progress:

MOTION EVENT EDITOR

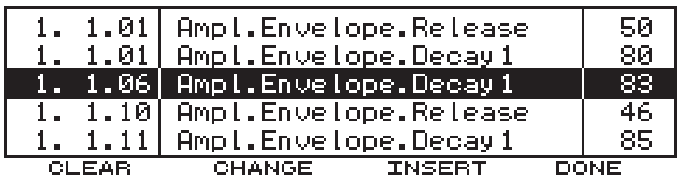
The MOTION EVENT EDITOR allows the contents of a Motion to be shown on the display in the form of events generated by the panel controls. This function also allows you to modify the contents of the Motion of your choice as you wish, by deleting unwanted events, for example, or creating new ones.

From the Motion Recorder Main Menu:



Select field 2-MOTION EVENT EDITOR; the display will show the page for selection of the Motion whose contents are to be displayed:

Use the PLEASE SELECT MOTION LOCATION option to select the Motion to be monitored, then press button [F2] and the display will show its contents:



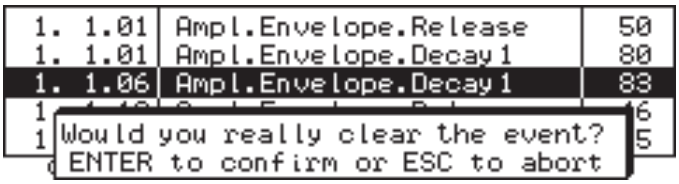
As can be seen, the video page is divided into three columns:

- The first column on the left shows the position of the event within the Motion expressed in BAR.CROTCHET.FRAME;

- The second column indicates the trimmer / slider whose movement has been recorded;
- The third column displays the value assumed by the control at that moment.

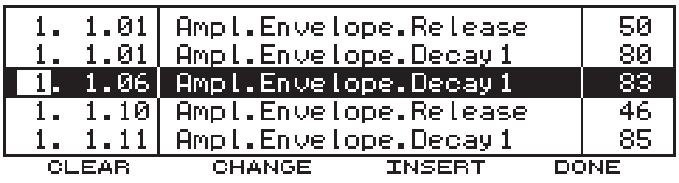
The encoder or the [CURSOR] keys can be used to scroll through all the events and select the one you require, setting it in the display zone in reverse.

You can use the function keys to perform the functions described on the display in relation to the selected note.
Therefore, button [F1] enables the CLEAR function, used to delete the selected note event. The display will then request confirmation before proceeding:



As the Pop-Up menu states, if the [ENTER] key is pressed, the event will be deleted, while [ESC] will abort the operation.

You can use button [F2] to enable the CHANGE command allowing you to change the value of the parameters relating to the selected event. After this button is pressed, the display will show a cursor on the position value of the event:



If the cursor is located in the first column (default when the function is accessed), you can vary the position of the event within the Motion. After using the [CURSOR] keys to locate the cursor in the second column, you can change the type of control recorded, while in the third column you can change the value assumed by the control in the selected moment of time.
To modify this parameters you can use also the controls on the front panel.
Press [ENTER] to confirm the settings made or the [ESC] button to abort the function.

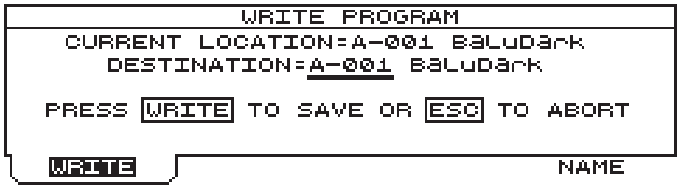
Another function available in this video page can be recalled using button [F3] (INSERT), and allows another note event to be inserted in the Motion.
When this button is pressed, a movement of the LFO1 section [RATE] trimmer with value 50 will be inserted (before the event currently selected).

You can then use the CHANGE command to vary the above values and set the event you require. As for the other functions, use the [ENTER] to confirm the operation or the [ESC] button to abort the insertion of the event.

After making the changes you require, select the DONE command with the [F4] button to save them, or press [ESC] to abort.

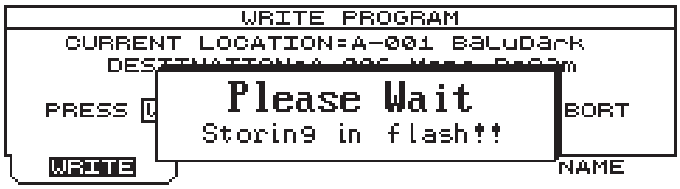
9.12 WRITE PROGRAM

The WRITE PROGRAM function allows a Program to be saved in one of the 256 memory locations assigned to it. To enable the function, press the [WRITE] from any Program environment video page; the display will show:



The CURRENT LOCATION field displays the current memory location, and DESTINATION the one where the Program will be saved. By default, the two fields offer the same memory location: in this case, if the memorisation procedure is concluded, the Program will be overwritten with consequent loss of the original settings.

Pressing the [F1] button will confirm the memorisation procedure, and the display will show everything with the Pop-Up menu:



From the video page shown previously, pressing the [F5] allows a new name to be assigned to the Program; in this case the display will show:

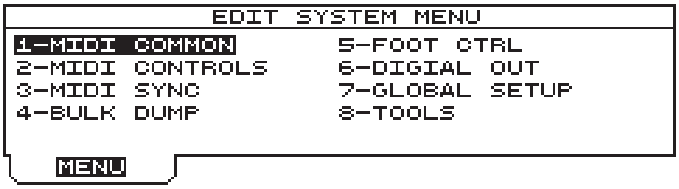
You can now use the encoder or number keypad to assign a new name to the Program displayed in square brackets. As the screen-printing on the panel shows, each number pad button offers three letters of the alphabet as well as the number associated to it. Moreover, the function keys can be used to recall the following functions:

- INS ([F1]) function: inserts a space before the character on which the cursor is located;
- CAPS ON/OFF ([F2]) function: selects the type of character (uppercase / lowercase);
- DELETE ([F3]) function: deletes the character on which the cursor is located;

To confirm the name assigned to the Program, press button [F4].

10. EDIT SYSTEM

The SYSTEM operating environment comprises all the functions used for optimum setting of operation of the OB-12. The System functions do not relate to sound generation or Program setting, but this does not make them any less important.
In fact, the System environment allows you to set all the MIDI parameters, such as channel assignment, filter regulation, the assignment of Program Changes to the programs, the MIDI Clock setting, data Bulk Dump, etc.
As well as the MIDI, you can assign further functions (since this can already be done at the Program level) to the pedals connected to the PEDAL connectors. Another utility function is the setting of the output port for the digital signal, the pitch in (Hz) of the instrument, the setting of the display and further functions relating to the internal memory.
To enable the System operating environment, press the [SYSTEM] button in the MODE&SET-UP section of the front panel from any video page. The display will show the System main menu:



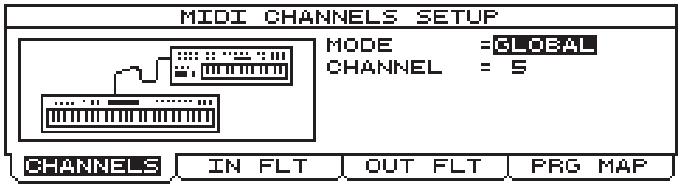
from which the following functions can be recalled:

1-MIDI COMMON: setup of the MIDI channels, reception and transmission filters and MIDI Program Map.
2-MIDI CONTROLS: assignment of Control Changes to the panel trimmers / sliders and enabling of transmission of exclusive system messages assigned to the controls.
3-MIDI SYNC: setting of the MIDI Clock, Start, Stop and Continue messages in reception and transmission.
4-BULK DUMP: activation of the Bulk Dump procedure.
5-FOOT CONTROL: assignment of system functions to the pedals.
6-DIGITAL OUT: enabling of the [DIGITAL OUTPUT] rear connector.
7-GLOBAL SETUP: system global settings.
8-TOOLS: utility function relating to the internal memory of the instrument.

N.B.: the settings made in the System environment are automatically saved when another operating environment is selected.

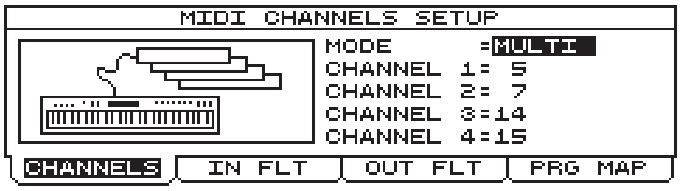
10.1 MIDI COMMON

The MIDI COMMON section comprises four subsections called: MIDI Channels Setup, MIDI In Filter Setup, MIDI Out Filter Setup and MIDI Program Map Settings.
We will now take a detailed look at these sections. From the EDIT SYSTEM MENU select field 1-MIDI COMMON; the display will show the video page relating to the MIDI Channels Setup function:



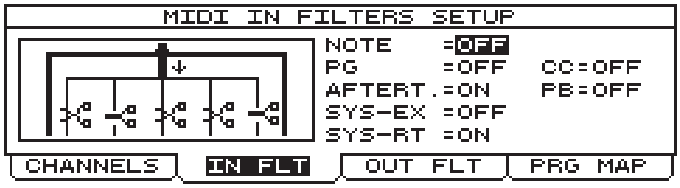
The purpose of this function is setting of the procedure for reception and transmission of MIDI messages, with consequent definition of the channels.
This video page contains the **MODE** parameter which defines this procedure: by setting this parameter as GLOBAL, you can set the single MIDI channel for reception and transmission of messages using the **CHANNEL** option. In this case, the message received will be played on the basis of the Split settings present on the instrument at that time.

If the **MODE** parameter is set as MULTI, the video page will change to:



In this case, you will be able to assign one channel to each individual Part. The **CHANNEL 1**, **2**, **3**, **4** fields identify the four Parts to which the MIDI channel can be assigned. For example, if CHANNEL 1 = 2 is set, the message generated with Part 1 will be sent on MIDI channel 2, just as messages received on channel 2 will be played by Part 2, regardless of the keyboard zone assigned to the Part concerned. This allows you to obtain optimum multi-timbre setups by sending the messages in relation to the Part being used to play, as well as recording the channelled messages on a sequencer. During reception, on the other hand, the main feature of this setting is that it allows the Part split settings to be ignored, so that the Parts can be played throughout the whole keyboard range.

After selecting the IN FLT folder using the [F2] function key, you can display the video page relating to the setup of the MIDI filters on the incoming messages. If a message is filtered (i.e. with the filter set as ON), it will be ignored. Therefore if the reception filters are activated, the messages subject to the action of the filter will not be acquired, regardless of the channel on which they are received.
The following is the video page:

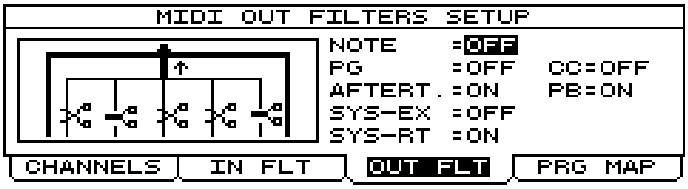


showing the types of message to which the reception filter can be applied:

- **NOTE**: enables (ON) or disables (OFF) the filter for the note messages.
- **PG** *(Program Change)*: enables (ON) or disables (OFF) the filter for the Program Changes messages.
- **CC** *(Control Change)*: enables (ON) or disables (OFF) the filter for the Control Change messages.
- **AFTERT.** *(Aftertouch)*: enables (ON) or disables (OFF) the filter for the Aftertouch messages.
- **PB** *(Pitch Bender)*: enables (ON) or disables (OFF) the filter for the Pitch Bend messages.
- **SYS-EX** *(System Exclusive)*: enables (ON) or disables (OFF) the filter for the System exclusive messages.

- **SYS-RT** *(System Realtime)*: enables (ON) or disables (OFF) the filter for the System Real Time messages.

You can now select the OUT FLT folder with function key [F2] to display the video page relating to setting of the MIDI filters on outgoing messages. Filtering a message (by setting the filter as ON) means not transmitting it. These filters are also independent of the channel setting. Therefore, a message for transmission will be affected by the action of the filter regardless of the channel on which it is transmitted. Please refer to the IN FLT video page concerning the displayd MIDI messages types.
The display will show the following video page:

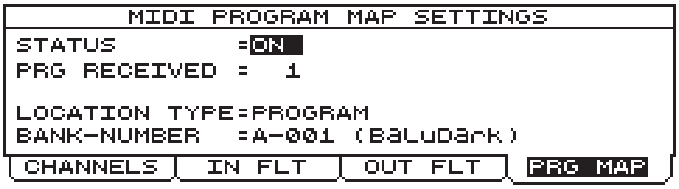


You can how use function key [F4] to display the MIDI PROGRAM MAP video page, allowing you to assign the incoming Program Changes freely to the individual Programs or Timbres. With the function disabled, Program Change 1 will recall Program or Timbre A-001 (depending on the Bank Select messages). Thanks to the MIDI Program Map you can assign Program A-023 to Program Change 1, for example: if this is done, when the instrument receives this PG it will activate Program A-023 and not A-001. You can also assign another PG to a Timbre, so when this PG is received the Timbre associated to it will be activated.

As we have described, when the MIDI Program Map is disabled, the instrument's Program Change⇨memory location associations are standard. You can use the BANK SELECT MSB and BANK SELECT LSB to select whether to recall Program or Timbre memory locations.
The BANK SELECTS are used as follows:

BANK SELECT MSB	BANK SELECT LSB	RECALLED MEMORY SECTION
0÷63	0÷63	bank A of TIMBRE section
0÷63	64÷127	bank B of TIMBRE section
64÷127	0÷63	bank A of PROGRAM section
64÷127	64÷127	bank B of PROGRAM section

The video page relating to the MIDI Program Map comprises:



containing the following programming parameters:

- **STATUS**: enables (ON) or disables (OFF) the MIDI Program Map.

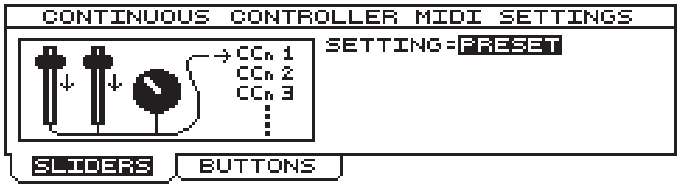
- **PRG RECEIVED** *(Program Change Received)*: selects the Program Change which recalls the memory location set using the LOCATION TYPE and BANK NUMBER parameters.

- **LOCATION TYPE**: selects the type of memory location which will be recalled on reception of the PG concerned. If PROGRAM is set Programs will be recalled, while selecting TIMBRE obtains recall of the Timbres.

- **BANK-NUMBER**: sets the memory location (the name of which is displayed on the right) which will be recalled on receipt of the PG defined with the PRG RECEIVED parameter.

10.2 MIDI CONTROLS

This function allows setting of the Control Change and Sys-Ex messages which can be assigned to the controls on the instrument's front panel. For the trimmers and sliders, you can use a standard setup or personally create the control⇨Control Change associations.
From the EDIT SYSTEM MENU select field 2-MIDI CONTROLS; the video page for assigning the CCs to the trimmers and sliders will be displayed:

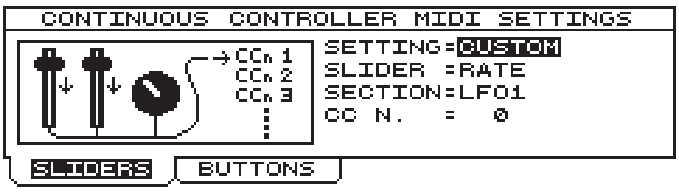


containing the **SETTING** parameter. If this parameter is set as PRESET (as in the illustration) you can use the standard Control Change assignment. Refer to the table below for details of this assignment.

SECTION	PARAMETER	NRPN MSB	NRPN LSB	DATA ENTRY LSB	SECTION	PARAMETER	NRPN MSB	NRPN LSB	DATA ENTRY LSB
LFO 1	WAVE TYPE	0	72	0÷3	OSCILLATOR 2	FIXED PITCH FINE	0	28	14÷114
LFO 1	RATE	0	73	0÷127	OSCILLATOR 2	PITCH SHIFT RANGE	0	29	40÷88
LFO 1	DELAY TIME	0	74	0÷127	OSCILLATOR 2	PITCH SHIFT FINE	0	30	14÷114
LFO 1	FADE TIME	0	75	0÷127	FILTERS	ATTACK	0	51	0÷127
LFO 1	CUTOFF RATIO	0	76	0÷7	FILTERS	DECAY 1	0	52	0÷127
OSC. COMMON	BALANCE 1	0	33	0÷127	FILTERS	SUSTAIN	0	53	0÷127
OSC. COMMON	BALANCE 2	0	34	0÷127	FILTERS	RELEASE	0	54	0÷127
OSC. COMMON	BALANCE 3	0	35	0÷127	FILTERS	DELAY	0	55	0÷127
OSC. COMMON	ATTACK TIME	0	36	0÷127	FILTERS	DECAY BREAKP.	0	56	0÷127
OSC. COMMON	DECAY1 TIME	0	37	0÷127	FILTERS	DECAY 2	0	57	0÷127
OSC. COMMON	DECAY1 LEVEL	0	38	0÷127	FILTERS	SUSTAIN TIME	0	58	0÷127
OSC. COMMON	DECAY2 TIME	0	39	0÷127	FILTERS	FILTER 1 TYPE	0	59	0÷2
OSC. COMMON	OSC1 ENV. DEPTH	0	12	0÷127	FILTERS	F.1 FREQUENCY	0	60	0÷127
OSC. COMMON	OSC2 ENV. DEPTH	0	31	0÷127	FILTERS	FILTER 2 TYPE	0	61	0÷2
OSCILLATOR 1	SAW STATUS	0	1	0÷Max Level	FILTERS	F.2 DELTA	0	62	0÷127
OSCILLATOR 1	SAW LEVEL	0	1	0÷0-127l	FILTERS	RESONANCE	0	63	0÷127
OSCILLATOR 1	TRIANGLE STATUS	0	2	0÷Max Level	FILTERS	ENVELOPE DEPTH	0	64	0÷127
OSCILLATOR 1	TRIANGLE LEVEL	0	2	0÷127	FILTERS	LFO 1 DEPTH	0	65	0÷127
OSCILLATOR 1	PULSE STATUS	0	3	0÷Max Level	FILTERS	KBD TRACK	0	66	0÷127
OSCILLATOR 1	PULSE LEVEL	0	3	0÷127	FILTERS	ROUTING	0	67	0÷2
OSCILLATOR 1	SAW SHAPE	0	4	0÷127	FILTERS	BALANCE	0	68	0÷127
OSCILLATOR 1	TRIANGLE OFFSET	0	5	0÷127	FILTERS	FILTER 1 IN	0	69	0÷4
OSCILLATOR 1	PULSE WIDTH	0	6	0÷127	FILTERS	FILTER 2 IN	0	70	0÷4
OSCILLATOR 1	FM	0	7	0÷127	AMPLIFIER	ATTACK	0	40	0÷127
OSCILLATOR 1	LFO 1 DEPTH	0	8	0÷127	AMPLIFIER	DECAY 1	0	41	0÷127
OSCILLATOR 1	PWM DEPTH LFO 1	0	9	0÷127	AMPLIFIER	SUSTAIN	0	42	0÷127
OSCILLATOR 1	PWM DEPTH LFO 2	0	10	0÷127	AMPLIFIER	RELEASE	0	43	0÷127
OSCILLATOR 1	PWM DEPTH EG	0	11	0÷127	AMPLIFIER	DELAY	0	44	0÷127
OSCILLATOR 2	SAW LEVEL	0	15	0÷127	AMPLIFIER	DECAY BREAKP.	0	45	0÷127
OSCILLATOR 2	TRIANGLE LEVEL	0	16	0÷127	AMPLIFIER	DECAY 2	0	46	0÷127
OSCILLATOR 2	PULSE LEVEL	0	17	0÷127	AMPLIFIER	SUSTAIN TIME	0	47	0÷127
OSCILLATOR 2	PULSE WIDTH	0	20	0÷127	AMPLIFIER	LFO 1 DEPTH	0	48	0÷127
OSCILLATOR 2	LFO 1 DEPTH	0	21	0÷127	AMPLIFIER	AUTOPAN	0	49	0-64
OSCILLATOR 2	PWM DEPTH LFO 1	0	22	0÷127	LFO 2	WAVE SELECT	0	77	0÷3
OSCILLATOR 2	PWM DEPTH LFO 2	0	23	0÷127	LFO 2	RATE	0	78	0÷127
OSCILLATOR 2	PWM DEPTH EG	0	24	0÷127	LFO 2	CUTOFF RATIO	0	79	0÷7
OSCILLATOR 2	SYNC	0	25	0-64	LFO 2	DEPTH ON OSC.1	0	13	0÷127
OSCILLATOR 2	KBD TRACK	0	26	0-64	LFO 2	DEPTH ON OSC.2	0	32	0÷127
OSCILLATOR 2	FIXED PITCH RANGE	0	27	0÷127	LFO 2	DEPTH ON FILT.	0	71	0÷127

SECTION	PARAMETER	NRPN MSB	NRPN LSB	DATA ENTRY LSB	SECTION	PARAMETER	NRPN MSB	NRPN LSB	DATA ENTRY LSB
LFO 2	DEPTH ON AMP.	0	50	0÷127	PART SETTING	PART 4 HI-KEY	1	60	21÷108
UNISON	STATUS	0	80	0-64	PART SETTING	PART 1 TRANSP.	1	61	52÷76
UNISON	DETUNE FINE	0	81	0÷100	PART SETTING	PART 2 TRANSP.	1	62	52÷76
UNISON	DETUNE COARSE	0	82	0÷24	PART SETTING	PART 3 TRANSP.	1	63	52÷76
UNISON	FINE RND INFL.	0	83	0÷127	PART SETTING	PART 4 TRANSP.	1	64	52÷76
KEYB.MODE	VOICE RESERVE	0	84	1÷12	BUS SETTING	PART 1 BUS	1	39	0÷5
OSC SHIFT	OSC 1 SHIFT	0	0	62÷66	BUS SETTING	PART 2 BUS	1	40	0÷5
OSC SHIFT	OSC 2 SHIFT	0	14	62÷66	BUS SETTING	PART 3 BUS	1	41	0÷5
VELOCITY	STATUS	0	85	0-64	BUS SETTING	PART 4 BUS	1	42	0÷5
VELOCITY	TYPE	0	86	0-1	EFFECTS	ROUTER	1	12	0÷10
VELOCITY	CURVE	0	87	0÷7	EFFECTS	EFX CONF	1	13	1÷23
VELOCITY	DYN. VALUE	0	88	1÷127	EFFECTS	AUX MODE	1	14	0-1
VELOCITY	AMP-AMOUNT INFL	0	89	0÷127	EFFECTS	OVERDRIVE STATUS	1	15	0-64
VELOCITY	AMP-ATCK INFL	0	90	0÷127	EFFECTS	OVERDRIVE LEVEL	1	16	0÷127
VELOCITY	AMP-DECAYT INFL	0	91	0÷127	EFFECTS	OVERDRIVE DRIVE	1	17	0-64
VELOCITY	FLT-CUTOFF INFL	0	92	0÷127	EFFECTS	OVERDRIVE TYPE	1	18	0÷10
VELOCITY	FLT-ATCKT INFL	0	93	0÷127	EFFECTS	OVERDRIVE HIDAMP	1	19	0÷15
VELOCITY	FLT-DECAYT INFL	0	94	0÷127	EFFECTS	CHORUS STATUS	1	20	0÷64
VELOCITY	FLT-ENVDPT INFL	0	95	0÷127	EFFECTS	CHORUS LEVEL	1	21	1÷127
VELOCITY	BALANCE 1 INFL	0	96	0÷127	EFFECTS	CHORUS RATE	1	22	1÷127
VELOCITY	BALANCE 2 INFL	0	97	0÷127	EFFECTS	CHORUS DEPTH	1	23	1÷127
VELOCITY	BALANCE 3 INFL	0	98	0÷127	EFFECTS	CHORUS FEEDBACK	1	24	14÷114
VELOCITY	OSCC-ATCKT INFL	0	99	0÷127	EFFECTS	CHORUS PREDELAY	1	25	0÷100
VELOCITY	OSCC-DEC T INFL	0	100	0÷127	EFFECTS	DELAY STATUS	1	26	0÷64
VELOCITY	OSCC-DPTH1 INFL	0	101	0÷127	EFFECTS	DELAY LEVEL	1	27	0÷127
VELOCITY	OSCC-DPTH2 INFL	0	102	0÷127	EFFECTS	DELAY TIME	1	28	0÷127
VELOCITY	OSC1-PWDTH INFL	0	103	0÷127	EFFECTS	DELAY FEEDBACK	1	29	14÷114
VELOCITY	OSC2-PWDTH INFL	0	104	0÷127	EFFECTS	DELAY HIDAMP	1	30	0÷15
VELOCITY	LFO1-FADET INFL	0	105	0÷127	EFFECTS	DELAY MOD. DEPTH	1	31	0÷127
VELOCITY	OSC1-FM INFL	0	106	0÷127	EFFECTS	DELAY MOD. RATE	1	32	0÷127
VELOCITY	OSC2-DTUNE INFL	0	107	0÷127	EFFECTS	REVERB STATUS	1	33	0-64
AFTERTOUCH	STATUS	0	108	0-64	EFFECTS	REVERB LEVEL	1	34	0÷127
AFTERTOUCH	CURVE	0	109	0÷7	EFFECTS	REVERB TIME	1	35	0÷119
AFTERTOUCH	AMP-AMOUNT INFL	0	110	0÷127	EFFECTS	REVERB TYPE	1	36	0÷5
AFTERTOUCH	FLT-CUTOFF INFL	0	111	0÷127	EFFECTS	REVERB PRE-DELAY	1	37	0÷100
AFTERTOUCH	BALANCE 1 INFL	0	112	0÷127	EFFECTS	REVERB HI-DAMP	1	38	1÷15
AFTERTOUCH	BALANCE 2 INFL	0	113	0÷127	EQUALIZER	BYPASS	1	0	0-64
AFTERTOUCH	BALANCE 3 INFL	0	114	0÷127	EQUALIZER	TYPE	1	1	0÷1
AFTERTOUCH	OSC1-PWDTH INFL	0	115	0÷127	EQUALIZER	EQ.GR. LOW	1	2	52÷76
AFTERTOUCH	OSC2-PWDTH INFL	0	116	0÷127	EQUALIZER	EQ.GR.MID LOW	1	3	52÷76
AFTERTOUCH	LFO1-OSC1D INFL	0	117	0÷127	EQUALIZER	EQ.GR. MID CENTER	1	4	52÷76
AFTERTOUCH	LFO-OSC2D INFL	0	118	0÷127	EQUALIZER	EQ.GR. MID HIGH	1	5	52÷76
AFTERTOUCH	LFO1-FLT D INFL	0	119	0÷127	EQUALIZER	EQ.GR. HIGH	1	6	52÷76
AFTERTOUCH	LFO1-AMP D INFL	0	120	0÷127	EQUALIZER	EQ.PAR. LOW	1	7	52÷76
AFTERTOUCH	OSC1-FM INFL	0	121	0÷127	EQUALIZER	EQ.PAR. MID FREQ.	1	8	52÷76
AFTERTOUCH	OSC2-DTUNE INFL	0	122	0÷127	EQUALIZER	EQ.PAR. MID Q	1	9	52÷76
AFTERTOUCH	LFO1-RATE INFL	0	123	0÷127	EQUALIZER	EQ.PAR. MID B/C	1	10	52÷76
AFTERTOUCH	LFO2-RATE INFL	0	124	0÷127	EQUALIZER	EQ.PAR. HIGH	1	11	52÷76
PART SETTING	PART 1 LEVEL	1	43	0÷127	LINKS LFO 1	PART 1	1	47	0÷3
PART SETTING	PART 2 LEVEL	1	44	0÷127	LINKS LFO 1	PART 2	1	48	0÷3
PART SETTING	PART 3 LEVEL	1	45	0÷127	LINKS LFO 1	PART 3	1	49	0÷3
PART SETTING	PART 4 LEVEL	1	46	0÷127	LINKS LFO 1	PART 4	1	50	0÷3
PART SETTING	PART 1 LO-KEY	1	53	21÷108	LINKS EFFECTS	CHORUS LINK TO	1	51	0÷3
PART SETTING	PART 1 HI-KEY	1	54	21÷108	LINKS EFFECTS	DELAY LINK TO	1	52	0÷3
PART SETTING	PART 2 LO-KEY	1	55	21÷108	TRANSPOSE	TRANSPOSE	1	65	52÷76
PART SETTING	PART 2 HI-KEY	1	56	21÷108	PORTAM. TIME	KEYBOARD	CC 5		0÷127
PART SETTING	PART 3 LO-LEY	1	57	21÷108	PORTAM.STATUS	KEYBOARD	CC 65		0-64
PART SETTING	PART 3 HI-KEY	1	58	21÷108	AMOUNT	AMPLIFIER	CC 7		0÷127
PART SETTING	PART 4 LO-KEY	1	59	21÷108					

If the parameter is set as **CUSTOM** the video page will change to:



displaying the following parameters:

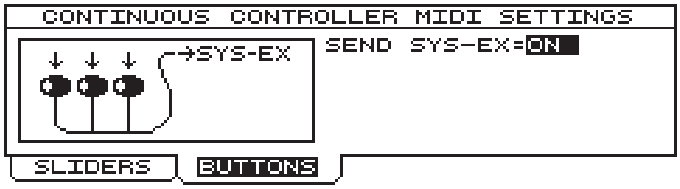
- **SLIDER**: selects the control to which a Control Change is to be assigned. All the trimmers /

sliders on the front panel can be selected.

- **SECTION** (not selectable): displays the section containing the control specified with the SLIDER parameter.

- **CC N.** *(Control Change Number)*: assigns the Control Change to the control specified with the SLIDER parameter.

Using function key [F2] to select the BUTTONS folder allows you to display the video page relating to the exclusive system messages:



You can use the **SEND SYS-EX** parameter to decide whether to send (ON) or not to send (OFF) the exclusive system strings assigned to the panel controls.

SWITCH	SECTION	SYSTEM EXCLUSIVE	SWITCH	SECTION	SYSTEM EXCLUSIVE
[F1]	DISPLAY	F0 31 30 00 04 00 39 01 60 F7	[MODE]	ARPEGGIO	F0 31 30 00 04 00 67 01 32 F7
[F2]	DISPLAY	F0 31 30 00 04 00 3A 01 5F F7	[RANGE]	ARPEGGIO	F0 31 30 00 04 00 68 01 31 F7
[F3]	DISPLAY	F0 31 30 00 04 00 3B 01 5F F7	[ON/OFF]	PHRASE	F0 31 30 00 04 00 69 01 30 F7
[F4]	DISPLAY	F0 31 30 00 04 00 3C 01 5D F7	[REC]	PHRASE	F0 31 30 00 04 00 6A 01 2F F7
[LEFT]	CURSOR	F0 31 30 00 04 00 3D 01 5C F7	[TAP TEMPO]	PHRASE	F0 31 30 00 04 00 6B 01 2E F7
[UP]	CURSOR	F0 31 30 00 04 00 3E 01 5B F7	[MODE]	EQUALIZER	F0 31 30 00 04 00 6C 01 2D F7
[RIGHT]	CURSOR	F0 31 30 00 04 00 3F 01 5A F7	[BYPASS]	EQUALIZER	F0 31 30 00 04 00 6D 01 2C F7
[DOWN]	CURSOR	F0 31 30 00 04 00 40 01 59 F7	[HOLD]	RIBBON CONTROLLER	F0 31 30 00 04 00 6E 01 2B F7
[ENCODER UP]	CURSOR	F0 31 30 00 04 00 41 01 58 F7	[RELATIVE]	RIBBON CONTROLLER	F0 31 30 00 04 00 6F 01 2A F7
[ENCODER DOWN]	CURSOR	F0 31 30 00 04 00 42 01 57 F7	[VELOCITY]	KEYBOARD SENSE	F0 31 30 00 04 00 70 01 29 F7
[ESC]	DISPLAY	F0 31 30 00 04 00 43 01 56 F7	[STND-M.MORPH]	WHELL MODE	F0 31 30 00 04 00 71 01 28 F7
[ENTER]	NUMERIC PAD	F0 31 30 00 04 00 44 01 55 F7	[AFTERTOUCH]	KEYBOARD SENSE	F0 31 30 00 04 00 72 01 27 F7
[WAVE]	LFO 1	F0 31 30 00 04 00 45 01 54 F7	[AFTER. EXCHANGE]	WHELL MODE	F0 31 30 00 04 00 73 01 26 F7
[WAVE]	LFO 2	F0 31 30 00 04 00 46 01 53 F7	[DISP HOLD]	DISPLAY	F0 31 30 00 04 00 74 01 25 F7
[DEPTH]	LFO 2	F0 31 30 00 04 00 47 01 52 F7	[PART 1]	KEYBOARD MODE AND...	F0 31 30 00 04 00 75 01 24 F7
[OSC 1 OSC 2]	OSCILLATOR COMMON	F0 31 30 00 04 00 48 01 51 F7	[PART 2]	KEYBOARD MODE AND...	F0 31 30 00 04 00 76 01 23 F7
[SAW ON/OFF]	OSCILLATOR 1	F0 31 30 00 04 00 49 01 50 F7	[PART 3]	KEYBOARD MODE AND...	F0 31 30 00 04 00 77 01 22 F7
[TRIANGLE ON/OFF]	OSCILLATOR 1	F0 31 30 00 04 00 4A 01 4F F7	[PART 4]	KEYBOARD MODE AND...	F0 31 30 00 04 00 78 01 21 F7
[PULSE ON/OFF]	OSCILLATOR 1	F0 31 30 00 04 00 4F 01 4A F7	[SPLIT]	KEYBOARD MODE AND...	F0 31 30 00 04 00 79 01 20 F7
[PWM LFO1-LFO2-EG]	OSCILLATOR 1	F0 31 30 00 04 00 4C 01 4D F7	[LAYER]	KEYBOARD MODE AND...	F0 31 30 00 04 00 7A 01 1F F7
[SAW ON/OFF]	OSCILLATOR 2	F0 31 30 00 04 00 4D 01 4C F7	[SINGLE]	KEYBOARD MODE AND...	F0 31 30 00 04 00 7B 01 1E F7
[TRIANGLE ON/OFF]	OSCILLATOR 2	F0 31 30 00 04 00 4E 01 4B F7	[PROGRAM]	MODE & SET-UP	F0 31 30 00 04 00 7C 01 1D F7
[PWM LFO1-LFO2-EG]	OSCILLATOR 2	F0 31 30 00 04 00 50 01 49 F7	[TIMBRE]	MODE & SET-UP	F0 31 30 00 04 00 7D 01 1C F7
[SYNC]	OSCILLATOR 2	F0 31 30 00 04 00 51 01 48 F7	[PANEL SCAN]	MODE & SET-UP	F0 31 30 00 04 00 7E 01 1B F7
[KBD TRACK]	OSCILLATOR 2	F0 31 30 00 04 00 52 01 47 F7	[SYSTEM]	MODE & SET-UP	F0 31 30 00 04 00 7F 01 1A F7
[FILTER 1]	FILTERS	F0 31 30 00 04 00 53 01 46 F7	[EFFECTS]	MODE & SET-UP	F0 31 30 00 04 01 00 01 18 F7
[FILTER 2]	FILTERS	F0 31 30 00 04 00 54 01 45 F7	[WRITE]	MODE & SET-UP	F0 31 30 00 04 01 01 01 17 F7
[ROUTING]	FILTERS	F0 31 30 00 04 00 55 01 44 F7	[AUTOMORPH]	MODE & SET-UP	F0 31 30 00 04 01 02 01 16 F7
[AUTOPAN]	AMPLIFIER	F0 31 30 00 04 00 57 01 42 F7	[MANMORPH]	MODE & SET-UP	F0 31 30 00 04 01 03 01 15 F7
[MONO]	KEYBOARD	F0 31 30 00 04 00 58 01 41 F7	[MOTION 1]	AUTOMATION	F0 31 30 00 04 01 05 01 13 F7
[PORTAMENTO]	KEYBOARD	F0 31 30 00 04 00 59 01 40 F7	[MOTION 2]	AUTOMATION	F0 31 30 00 04 01 06 01 12 F7
[UNISON]	KEYBOARD	F0 31 30 00 04 00 5A 01 3F F7	[MOTION REC]	AUTOMATION	F0 31 30 00 04 01 07 01 11 F7
[LEGATO]	KEYBOARD	F0 31 30 00 04 00 5B 01 3E F7	[BANK]	NUMERIC PAD	F0 31 30 00 04 01 08 01 10 F7
[OCT-]	KEYBOARD	F0 31 30 00 04 00 5C 01 3D F7	[0 SPACE]	NUMERIC PAD	F0 31 30 00 04 01 09 01 0F F7
[OCT+]	KEYBOARD	F0 31 30 00 04 00 5D 01 3C F7	[1 ABC]	NUMERIC PAD	F0 31 30 00 04 01 0A 01 0E F7
[OSC SHIFT]	KEYBOARD	F0 31 30 00 04 00 5E 01 3B F7	[2 DEF]	NUMERIC PAD	F0 31 30 00 04 01 0B 01 0D F7
[LEVEL/PARAMETER]	EFFECTS	F0 31 30 00 04 00 5F 01 3A F7	[3 GHI]	NUMERIC PAD	F0 31 30 00 04 01 0C 01 0C F7
[OVERDRIVE]	EFFECTS	F0 31 30 00 04 00 60 01 39 F7	[4 JKL]	NUMERIC PAD	F0 31 30 00 04 01 0D 01 0B F7
[CHORUS]	EFFECTS	F0 31 30 00 04 00 61 01 38 F7	[5 MNO]	NUMERIC PAD	F0 31 30 00 04 01 0E 01 0A F7
[DELAY]	EFFECTS	F0 31 30 00 04 00 62 01 37 F7	[6 PQR]	NUMERIC PAD	F0 31 30 00 04 01 0F 01 09 F7
[REVERB]	EFFECTS	F0 31 30 00 04 00 63 01 36 F7	[7 STU]	NUMERIC PAD	F0 31 30 00 04 01 10 01 08 F7
[TAP TEMPO]	ARPEGGIO	F0 31 30 00 04 00 65 01 34 F7	[8 VWX]	NUMERIC PAD	F0 30 31 00 04 01 11 01 07 F7
[ON/OFF]	ARPEGGIO	F0 31 30 00 04 00 66 01 33 F7	[9 YZ!]	NUMERIC PAD	F0 31 30 00 04 01 12 01 96 F7

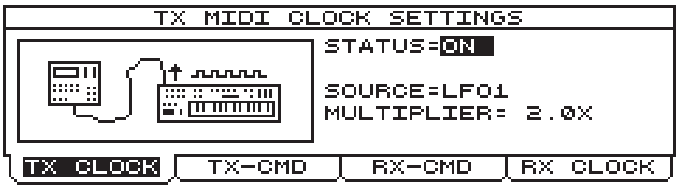
10.3 MIDI SYNC

This section of the SYSTEM menu allows you to set the parameters relating to the MIDI Clock for synchronisation of the Phrase Recorder, the Arpeggio, LFO1 and LFO2 with remote MIDI units.
If, for example, you are using a remote sequencer to control the OB-12 sound generation section and you are also playing on the instrument's keyboard, by synchronising the Arpeggio or LFO1 or LFO2 with the sequencer performance time (identified by the MIDI Clock transmitted by the sequencer itself), you can use an arpeggio tempo and/or LFO1/2 modulation frequency identical to the sequencer performance tempo.
You can also synchronise the OB-12 Phrase Recorder recording time with the performance time of a remote sequencer, to ensure perfect recording of the data contained in the sequencer.

N.B.: Some MIDI instruments only transmit MIDI Clock messages during recording and/or playback. Consult the user manuals of these units to check the exact MIDI Clock transmission mode. Moreover, if the remote MIDI instrument connected to the OB-12 transmits MIDI Real Time STOP messages at the end of the playback the synchronisation might not take place correctly.

Other settings in this function concern the MIDI Real Time START, STOP and CONTINUE messages transmitted and received. The OB-12 is able to transmit these MIDI messages on the basis of the commands used on the Arpeggio, the Phrase Recorder, the Motion Recorder and the Auto Morph. This means that you can send these MIDI messages (to start and stop a MIDI sequence recorded in a sequencer, for example) by activating and deactivating the functions referred to above (by pressing and releasing a keyboard key for the Arpeggio and Phrase Recorder, and using the [LOC1] / [LOC2] buttons for the Motion Record and the [AUTO] button for the Auto Morph). You can also set the section (Motion 1, Motion 2 and Auto Morph) to which incoming MIDI Real Time messages will be sent.

But we will now see how to set the parameters associated to the MIDI Clock.
From the SYSTEM menu, select option 3-MIDI SYNC; the display will show the following video page:



containing the following parameters:

- **STATUS**: activates (ON) and/or deactivates (OFF) transmission of the MIDI Clock.

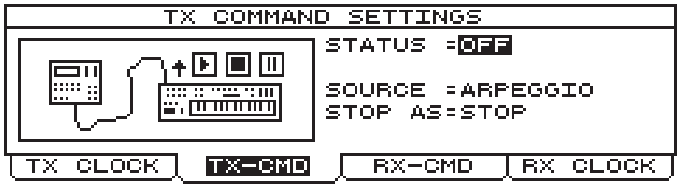
- **SOURCE**: sets the section from which the MIDI Clock is to be generated. This MIDI message can be linked to the following sections:

  - LFO1: the MIDI Clock transmitted will be synchronised to the LFO1 RATE parameter.
  - LFO2: the MIDI Clock transmitted will be synchronised to the LFO2 RATE parameter.
  - ARPEGGIO: the MIDI Clock transmitted will be synchronised with the Arpeggio TEMPO parameter.
  - PHRASE RECORDER: the MIDI Clock transmitted will be synchronised with the Phrase Recorder TEMPO parameter.

- **MULTIPLIER**: sets the multiplication factor of the MIDI Clock in relation to the parameter to which it is linked. For example, if this parameter is set at 2.0X, the message will be transmitted

at twice the speed of the signal (for example, the arpeggio tempo or the LFO Rate) with which it is synchronised. The values available range from 0.1X to 10X.

Pressing the [F2] function key displays the video page relating to the MIDI Real Time messages transmitted:



These are the parameters which can be adjusted:

- **STATUS**: enables (ON) and/or disables (OFF) transmission of the MIDI Real Time messages.

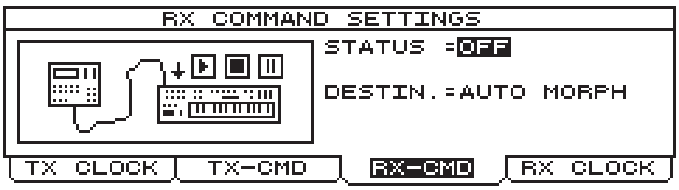
- **SOURCE**: specifies the system from which the Start, Stop and Continue instructions are to be taken. The possible choices are:

  - ARPEGGIO: when the Arpeggio is activated by pressing a keyboard key, the MIDI START message will be sent. When the key is released (interrupting the Arpeggio), the STOP message will be sent.
    Depending on the setting of the STOP AS parameter, pressing a key again will send the START/STOP or CONTINUE messages.
  - PHRASE REC: when a Phrase is recalled by pressing a keyboard key, the MIDI START message will be sent. When the key is released (interrupting the playing of the phrase), the STOP message will be sent.
    Depending on the setting of the STOP AS parameter, pressing a key again will send the START/STOP or CONTINUE messages.
  - MOTION REC1: when Motion 1 is activated, the START message will be sent. When it is interrupted, the STOP message will be sent.
    Depending on the setting of the STOP AS parameter, reactivating the Motion will send the START/STOP or CONTINUE messages.
  - MOTION REC2: when Motion 2 is activated, the START message will be sent. When it is interrupted, the STOP message will be sent.
    Depending on the setting of the STOP AS parameter, reactivating the Motion will send the START/STOP or CONTINUE messages.
  - AUTO MORPH: when the automatic Morphing is activated, the START message will be sent. When performance of the Morphing is interrupted, the STOP message will be sent. Depending on the setting of the STOP AS parameter, reactivating the function concerned will send the START/STOP or CONTINUE messages.

- **STOP AS**: defines which MIDI Real Time messages will be transmitted when the section with which they are associated is activated and/or disabled.
  The table below indicates the messages sent depending on the setting of the parameter.

	STOP AS: STOP	STOP AS: CONTINUE
Function start	START	START
Function stop	STOP	PAUSE
Next function start	START	CONTINUE

The next video page, displayed by pressing the [F3] function key, allows you to set the parameters relating to the MIDI Real Time messages received.



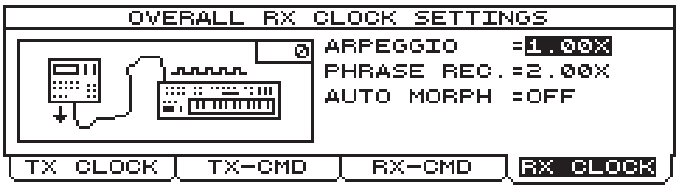
these are the parameters displayed in the video page:

- **STATUS**: enables (ON) or disables (OFF) the reception of MIDI Real Time messages.

- **DESTIN.** *(Destination)*: specifies the system to be controlled by the Real Time commands. The possible choices are:

  - MOTION REC1: the Real Time messages control the starting and interruption of Motion 1.
  - MOTION REC2: the Real Time messages control the starting and interruption of Motion 2
  - AUTO MORPH: the Real Time messages control the starting and interruption of the automatic Morph.

If the RX CLOCK folder is now selected using function key [F4] it will be possible to display the video page relating to setting of the MIDI Clock message being received. The video page displayed is the following:



in which the following parameters can be seen:

- **ARPEGGIO**: sets the multiplication factor (from 0.1X to 8X) of the incoming MIDI Clock assigned to the Arpeggio. If the parameter is set as OFF the Arpeggio Tempo will not be linked to the MIDI message mentioned.

- **PHRASE REC.**: sets the multiplication factor (from 0.1X to 8X) of the incoming MIDI Clock assigned to the Phrase Recorder. If the parameter is set as OFF the Phrase Recorder Tempo will not be linked to the MIDI message mentioned.

- **AUTO MORPH**: sets the multiplication factor (from 0.1X to 8X) of the incoming MIDI Clock assigned to the automatic Morph. If the parameter is set as OFF the Auto Morph Tempo will not be linked to the MIDI message mentioned.

The top right-hand corner of the bitmap diagram also shows the MIDI Clock transmission speed in bpm (Bits Per Minute).

10.4 BULK DUMP

The Bulk Dump procedure allows the OB-12's internal programming data to be sent in the form of exclusive system MIDI messages to the MIDI [OUT] port.
This function can be used to send the internal programming of the OB-12 to another analog instrument, in order to set it identically to the transmitter instrument, or to another remote memorisation unit, such as a Personal Computer or a sequencer, in order to create backup copies of the data which can therefore be restored in case of accidental loss of the internal settings.

To access the Bulk Dump procedure setting video page, select the field 4-BULK DUMP from the SYSTEM menu. The display will show the following video page:

The procedure setting parameters are the following:

- **TX SPEED**: sets the transmission speed for exclusive system data, to allow optimum adaptation of the transmission to the memorisation times of the receiver instrument. The transmission modes are the following:

  - SLOW: low-speed transmission in case of connection with machines no longer at the state of the art.
  - NORMAL: transmission suitable for standard modern machines.
  - FAST: high-speed transmission for machines with especially short memorisation times.

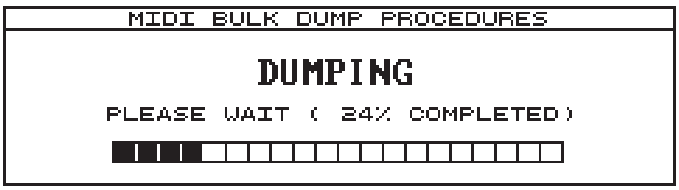
- **SECTION**: defines the internal memory section on which the Bulk Dump is to be carried out. The following sections can be sent:

  - ALL: all the internal programming (Program, Timbre, Phrase Recorder, Motion Recorder, operating system, System).
  - TIMBRE: the Timbre memory locations.
  - PROGRAM: the Program memory locations.
  - PHRASE RECORDER: the phrases recorded with the Phrase Recorder and the corresponding Trigger Notes.
  - MOTION RECORDER: the two Motions.
  - OPER. SYSTEM CPU: the CPU operating system.
  - OPER. SYSTEM DSP: the DSP operating system.
  - SYSTEM PARAM.: the parameter settings in System environment.

- **FROM LOCATION** (only available for the Program, Timbre, Phrase Recorder and Motion Recorder sections): sets the first location on which the Bulk Dump is to be carried out.

- **TO LOCATION** ((only available for the Program, Timbre, Phrase Recorder and Motion Recorder sections): sets the last location on which the Bulk Dump is to be carried out.

As the video page shows, pressing the [ENTER] key starts the Bulk Dump. In this case the display will show:



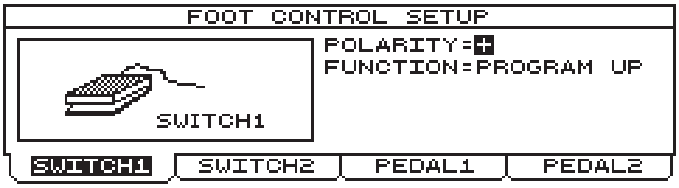
which displays a progression bar with the relative percentage value of the portion of the data transmitted.
Conversely, the [ESC] key can be pressed to abort the Bulk Dump procedure with consequent confirmation in the form of the display:

To reload the data in the instrument, connect the transmitter device to the MIDI [IN] port. On receipt of the MIDI data, the UPDATING PROCEDURE (see point 11.1) will be displayed, after which the instrument will reset itself to allow the internal circuits to set themselves up with the new settings.

10.5 FOOT CONTROL SETUP

As we have seen in point 9.6 of this manual, the OB-12 allows specific functions to be assigned to the pedals which can be connected to the rear sockets. We have already discussed how to assign functions to the pedals in the Program environment, with definition of various assignments on the basis of the Parts which the Program comprises. In this case, the functions assigned to the pedals depend on the Program selected.
On the other hand, if functions are assigned to the pedals in the System environment, they will remain active regardless of the Program selected. You can therefore use more common functions with the aid of the assignments in the System environment and use more customised functions, suitable for the selected Program, with assignment of functions in the Program environment.

To access the video pages for assignment of the functions to the pedals, select field 5-FOOT CTRL in the EDIT SYSTEM MENU. The display will show the following video page:



in which the setting parameters of the footswitch pedal connected to the PEDAL [SWITCH1] connector can be modified:

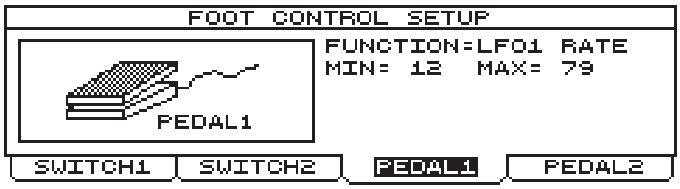
- **POLARITY**: sets the polarity of the pedal connected. Consult the information provided on the pedal or on its information sheets for details of the exact setup.

- **FUNCTION**: assigns the function to the footswitch pedal. The functions which can be assigned are the following:

SELECTIONS	FUNCTIONS	CONTROLS ON PANEL	SELECTIONS	FUNCTIONS	CONTROLS ON PANEL
DISABLED	No function applied		MOT2 ST/STP	Motion Location 1 start/stop	[LOC2] of AUTOMATION
PROGRAM UP	single Program forward	Encoder	AUTO MORPH	it cyclically activates and disactivates the Auto Morph	[AUTO] of AUTOMATION
PROGRAM DOWN	single Program reward	Encoder	MANUAL MORPH	it cyclically activates and disactivates the Manual Morph	[MANUAL] of AUTOMATION
ARP. ON/OFF	Arpeggio on/off	[ON/OFF] of ARPEGGIO	START MORPH	start of selected Morph	[ENABLE] of AUTOMATION
ARP/PHR HLD	it cyclically activates and disactivates the HOLD function of Arpeggio and Phrase Recorder	[HOLD] of ARPEGGIO	RIB. CTL HLD	it cyclically activates and disactivates the Hold of the Ribbon Controller	[HOLD] of Ribbon Controller
ARP. MODE-UP	Arpeggio mode change with the sequency UP>DOWN>UP/DOWN>RANDOM	[MODE] of ARPEGGIO	RIB. CTL REL	it cyclically activates and disactivates the Relative of the Ribbon Controller	[RELATIVE] of Ribbon Controller
ARP MODE-DW	Arpeggio mode change with the sequency RANDOM>UP/DOWM>DOWN>UP	[MODE] of ARPEGGIO	OVD. BYPASS	bypass/activation cyclical of Overdrive	[OVERDRIVE] of EFFECTS
ARP. OCT-UP	single Arpeggio range change with the sequency 0>+1>+2>+3	[RANGE] of ARPEGGIO	CHOR. BYPASS	bypass/activation cyclical of Chorus	[CHORUS] of EFFECTS
ARP. OCT-DW	single Arpeggio range change with the sequency +3>+2>+1>0	[RANGE] of ARPEGGIO	DEL. BYPASS	bypass/activation cyclical of Delay	[DELAY] of EFFECTS
PHR. ON/OFF	Phrase Recorder on/off	[ON/OFF] of PHRASE	REV. BYPASS	bypass/activation cyclical of Reverb	[REVERB] of EFFECTS
MOT1 ST/STP	Motion Location 1 start/stop	[LOC1] of AUTOMATION	EQ. BYPASS	bypass/activation cyclical of Equalizer	[BYPASS] of EQUALIZER

You can use the [F2] key to select the SWITCH2 folder and display the video page relating to setting of the second pedal connected to the PEDALS [SWITCH2] connector. Refer to the information given for the settings relating to Switch1 for the Switch2 video page.

If you now select the PEDAL1 folder you can display the video page relating to the settings of the expression pedal connected to the PEDALS [EXP.1] connector.



The parameters which can be modified are the following:

- **FUNCTION**: assigns the function to the expression pedal.
- **MIN** and **MAX**: set the minimum and maximum values of the parameter controlled by the pedal.

The functions which can be assigned to the pedal are described in the table on next page.

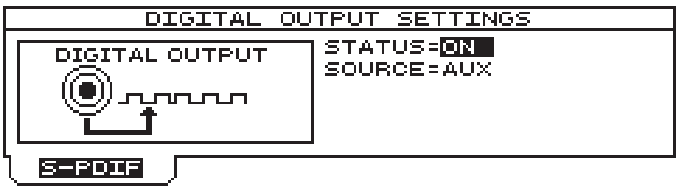
SELECTIONS	CONTROLLED PARAMETERS	CONTROLS ON PANEL	SELECTIONS	CONTROLLED PARAMTERS	CONTROLS ON PANEL
DISABLED	none		OVD.DRIVE	degree of Overdrive	[LEVEL/PARAMETER] of EFFECTS associated to DRIVE of OVERDRIVE
MASTER VOL	master volume of the instrument	[MASTER VOLUME] of VOLUME	CHOR.LEVEL	Chorus level	[LEVEL/PARAMETER] of EFFECTS associates to LEVEL of CHORUS
MAN.MORPH	control of the Manual Morph	[MODULATION]	CHOR.RATE	modulation speed of Chorus	[LEVEL/PARAMETER] of EFFECTS associates to RATE of CHORUS
OVD.LEVEL	Overdrive level	[LEVEL/PARAMETER] of EFFECTS associated to LEVEL of OVERDRIVE	CHOR.DEPTH	modulation depth of Chorus	[LEVEL/PARAMETER] of EFFECTS associates to DEPTH of CHORUS

SELECTIONS	CONTROLLED PARAMETERS	CONTROLS ON PANEL	SELECTIONS	CONTROLLED PARAMTERS	CONTROLS ON PANEL
CHOR.FDBK	feedback of the processed signal by Chorus	[LEVEL/PARAMETER] of EFFECTS associates to FEEDBACK of CHORUS	REV.PRDLY	delay to activate Reverb	[LEVEL/PARAMETER] of EFFECTS associates to PRE-DELAY of REVERB
CHOR.PRDLY	delay to activate Chorus	[LEVEL/PARAMETER] of EFFECTS associates to PRE-DELAY of CHORUS	LOW LEVEL	controls LOW (parametric eq.) or the region of frequency around 60 Hz (graphic eq.)	[LOW] or [60] of EQUALIZER
DELAY LEV.	Delay level	[LEVEL/PARAMETER] of EFFECTS associates to LEVEL of DELAY	MID1 LEVEL	controls FREQ (parametric eq.) or the region of frequency around 200 Hz (graphic eq.)	[FREQ] o [200] di EQUALIZER
DELAY FDBK	feedback of the processed signal by Delay	[LEVEL/PARAMETER] of EFFECTS associates to FEEDBACK of DELAY	MID2 LEVEL	controls B/C (parametric eq.) or the region of frequency around 600 Hz (graphic eq.)	[B/C] o [600] di EQUALIZER
DELAY MDPT	depth of modulation on the delayed signal by Delay	[LEVEL/PARAMETER] of EFFECTS associates to MOD.DEPTH of DELAY	MID3 LEVEL	controls Q (parametric eq.) or the region of frequency around 2 KHz (graphic eq.)	[Q] o [2K] di EQUALIZER
DELAY MRAT	speed of modulation on the delayed signal by Delay	[LEVEL/PARAMETER] of EFFECTS associates to MOD.RATE of DELAY	HIGH LEVEL	controls HIGH (parametric eq.) or the region of frequency around 6 KHz (graphic eq.)	[HIGH] o [6K] di EQUALIZER
REV. LEVEL	Reverb level	[LEVEL/PARAMETER] of EFFECTS associates to LEVEL of REVERB			

By selecting the PEDAL2 folder, you can assign the function of choice to the pedal connected to the PEDAL [EXP.2] rear connector. The video page is identical to those relating to the PEDAL1 setup procedure.

10.6 DIGITAL OUTPUT SETTINGS

In this section of the System environment, you can set up transmission of the **digital** signal in S-PDIF format. Using the [DIGITAL OUTPUT] port, you can pick up the digital signal generated by the instrument, useful for high-quality recordings in this format.
From the SYSTEM menu, select field 6-DIGITAL OUT; the following video page will be displayed:

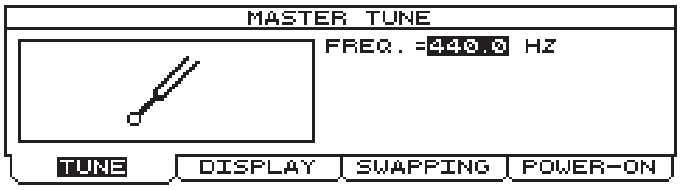


containing the following settings:

- **STATUS**: enables (ON) and/or disables (OFF) transmission of the digital signal.
- **SOURCE**: specifies the output section from which the signal is to be taken.

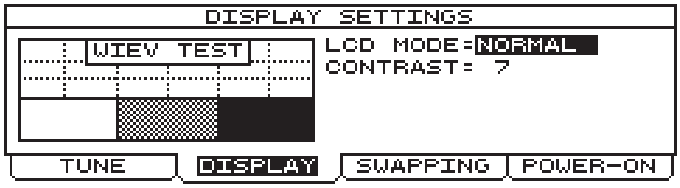
10.7 GLOBAL SETUP

The GLOBAL SETUP section allows you to adjust the setting of the instrument's general parameters, such as the pitch, display adjustment, Swapping function (see point 5.2) and switch-on procedures. To access these functions, from the EDIT SYSTEM MENU select field 7-GLOBAL SETUP; the display will show the first video page relating to the pitch of the instrument:



Containing the **FREQ.** Parameter, allowing adjustment of the pitch in a range of frequencies for A4 from 427.5 Hz to 452.9 Hz.

You can now select the DISPLAY folder to access the video page for setting up the display. The video page comprises:



in which you can adjust the following parameters:

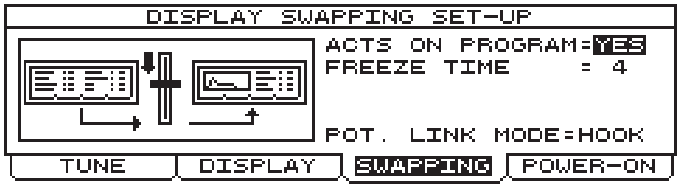
- **LCD MODE**: sets the display operating modes as follows:

  - NORMAL: standard display, white on black.
  - REVERSE: reverse display, black on white.

- **CONTRAST**: regulates the contrast of the display for optimum adaptation to the angle assumed between the display and the observer.

The SWAPPING folder, on the other hand, gives access to setting of the Swapping function, described in full in point 5.2.

When function key [F3] is pressed, the following video page will be displayed:



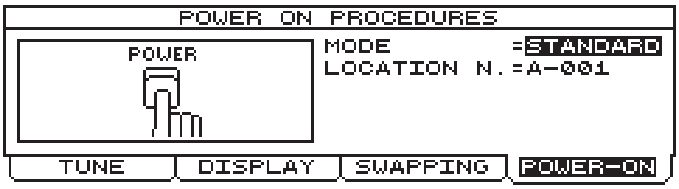
allowing you to adjust the following setting parameters:

- **ACTS ON PROGRAM**: specifies whether Swapping will also be carried out from the PLAY PROGRAM video page (YES) or only in the Timbre environment (NO).

- **FREEZE TIME**: sets the period of time, in seconds, for which the video page which generated the Swapping is displayed, after which the display will return to display of the previous video page (unless the Display Hold is active – LED of the [DISP HOLD] button on).

- **POT. LINK MODE** *(Potentiometer Link Mode)*: specifies whether the user wishes to set the parameter controlled by the control which generated the Swapping immediately with the value assumed by the control itself (by selecting HOOK) or to wait until the control reaches the value shown on the display and then start to modify the value on the display (by selecting VALUE).
  This function can sometimes be useful if the user wishes to display a given programming page by just moving a panel control, without modifying the value of the parameter associated to it.

The last section of the GLOBAL SETUP function relates to setting of the OB-12 switch-on mode. To access the relative video page select the POWER-ON folder. The video page comprises:



in which the following fields can be modified:

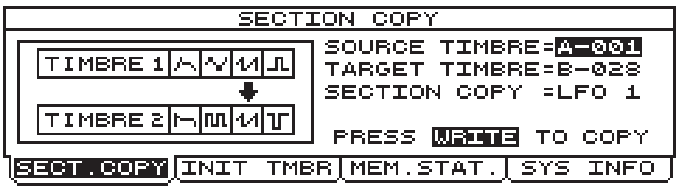
- **MODE**: sets the switch-on procedure, with a choice of normal (with NORMAL selected) or slow (with SLOW selected), in which case all the instrument's presentation video pages will be displayed.

- **LOCATION N.**: sets which Program will be recalled when the instrument is switched on.

10.8 TOOLS

The TOOLS section of the SYSTEM environment groups together a number of useful functions for optimum control of the instrument. These functions include the copying of single sections of one Timbre into another, Timbre initialisation (reset), display of the memory occupied by the Phrases or Motions and the information relating to the software versions installed in the instrument.

To access these functions, select field 8-TOOLS in the SYSTEM menu; the display will show the video page relating to copying of specific sections of a Timbre:



in which you will find the following parameters:

- **SOURCE TIMBRE**: specifies from which Timbre memory location the section specified by the SECTION COPY parameter is to be copied.

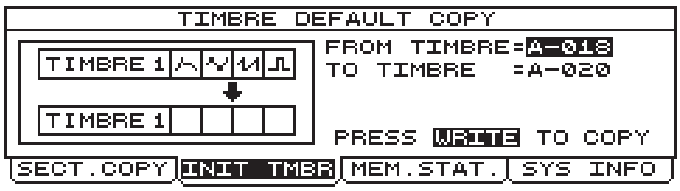
- **TARGET TIMBRE**: specifies into which Timbre memory location the section specified by the SECTION COPY parameter present in the Timbre set with the SOURCE TIMBRE parameter is to be copied.

- **SECTION COPY**: sets the section to be copied into the Timbre specified by the TARGET TIMBRE parameter.

When the [WRITE] key is pressed, the instrument will show a Pop-Up menu with the request "**Are you sure?**" to ask for confirmation of the procedure. When the [WRITE] key is pressed again, the copying procedure will be carried out; if [ESC] is pressed it will be aborted.

Now pressing the [F2] function key (in other words, selecting the INIT TIMBRE folder) gives you access to the functions for initialising one or more Timbres.
Initialising a Timbre means setting it up with simple settings from which the creation of a new timbre can be started.

The video page relating to this function is the following:



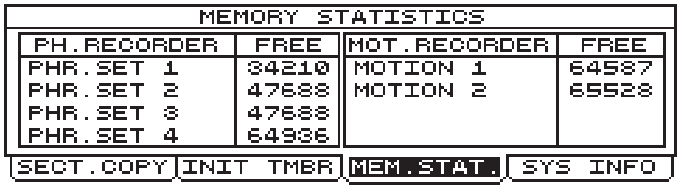
in which the following setup parameters can be adjusted:

- **FROM TIMBRE**: sets the first Timbre memory location to be initialised.

- **TO TIMBRE**: sets the last Timbre memory location to be initialised.

The memory locations in the interval between the one specified in FROM TIMBRE and the one indicated for TO TIMBRE will undergo initialisation.
When the [WRITE] key is pressed, the instrument will show a Pop-Up menu with the request "Are you sure?" to ask for confirmation of the procedure. When the [WRITE] key is pressed again, the initialisation procedure will be carried out; if [ESC] is pressed it will be aborted.

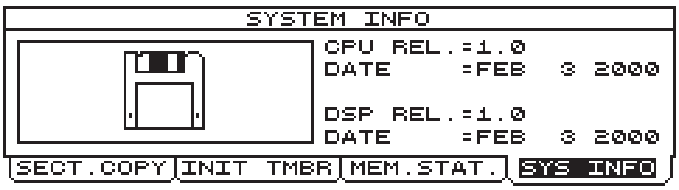
You can now select the MEM.STAT. folder to display the video page relating to the information concerning the internal memory assigned to the Phrases and Motions yet unused.



As you can see, the video page contains an easily interpreted table, containing:

- in the PH.RECORDER column, the four PHRASE SETS.
- in the first FREE column, the memory space, in bytes, still not used for each PHRASE SET.
- in the MOT.RECORDER column, the two MOTION locations
- in the second FREE column, the memory space, in bytes, still not used for each MOTION

The last utility function in the TOOLS section is SYS INFO, selected using the [F4] function key, which provides information about the main data concerning the softwares installed.



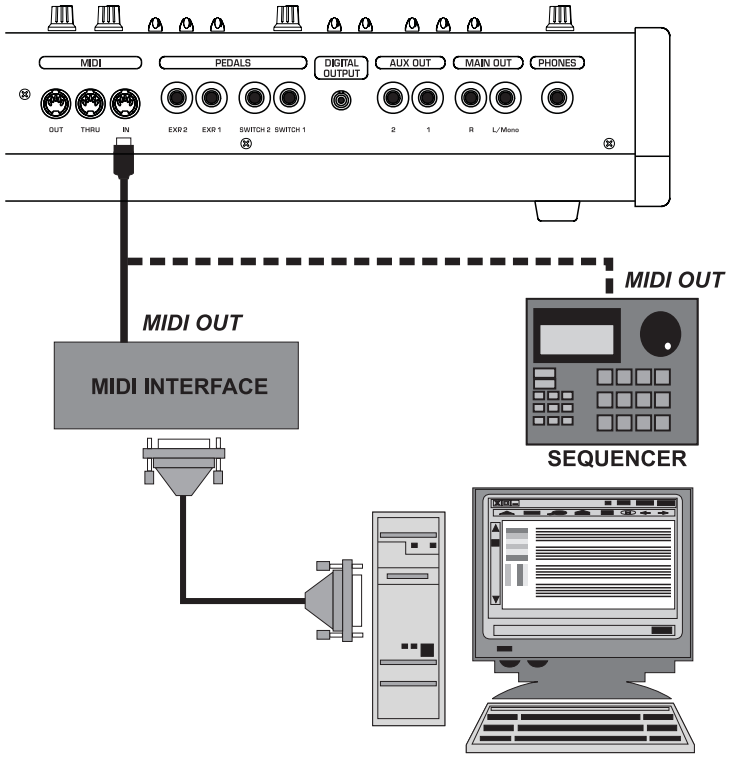
displaying the following information:

- **CPU REL.**: displays the release version of the CPU software currently installed in the instrument.
- **DATE**: displays the date of creation of the CPU software release.
- **DSP REL.**: displays the release version of the DSP software currently installed in the instrument.
- **DATE**: displays the date of creation of the DSP software release.

11. APPENDIX

11.1 SOFTWARE INSTALLATION

The OB-12 offers the immense advantage that the internal software packages for the instrument supplied by Oberheim can be installed by just sending the data by means of the MIDI [IN] port. This means you will not have to open the instrument and fit the chip containing the software each time.
First connect the OB-12 to a Personal Computer or a sequencer as shown in the diagram.



When sending the MIDI datas, OB-12 will automatically abilitate the updating procedure and show on the display:

```
    OBERHEIM-VISCOUNT OB 12
      UPDATING PROCEDURE


. Sect. [Software]  dim=307025
Ver.1.0      JAN 13 2000  11:57
*
```

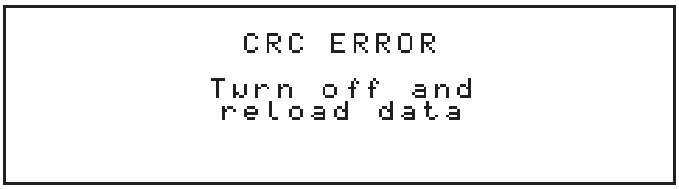
As can be seen, the video page indicates the section being installed in the instrument, the file size, the version, the date and time of creation of the program, and a series of asterisks displaying the portion of the program installed. When the procedure is complete the instrument will reset itself to allow the internal circuits to set themselves up with the new settings.

WARNING!!
Do not try to change the files for the up dating of the software.

If the first software installation has not succeeded (because for ex. of transmission faults), the instrument cannot be switch on in the normal way as in such a case the internal memory content is not the correct one.
In such a case please proceed with the updating procedure manually by pressing button [ESC] when you switch it on. The display will show "**Waiting for MIDI Data**" and will wait for the MIDI messages concerning the software that has to be installed.

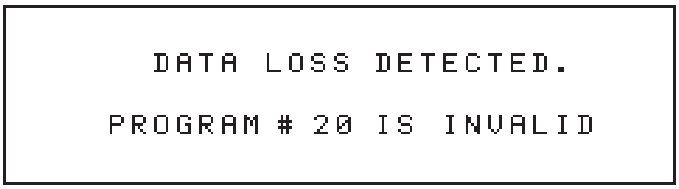
11.2 ERROR MESSAGES

CRC ERROR



It occured an error in the installation of the software up-date (error in reading the datas, transmission interruption, etc...). Swithc off the instrument and start the installation procedure (see par. 11.1).

DATA LOSS DETECTED – PROGRAM



There is a loss Program datas (by switching the instrument off during the memorization). The screen displays the unusable Program datas (compared to the maximun number) and one in the check phase. The unusuable Program will be replaced by default Program.

DATA LOSS DETECTED – TIMBRE

There is a loss Timbre datas (by switching the instrument off during the memorization). The screen displays the unusable Timbre datas (compared to the maximun number) and one in the check phase. The unusuable timbres will be replaced by INIT TIMBRE.

11.3 MIDI

WHAT MIDI IS

The MIDI (**M**usical **I**nstrument **D**igital **I**nterface) allows instruments of different makes and types to communicate with each other by means of this clearly specified protocol of codes.
This makes it possible to create systems of MIDI instruments offering much greater versatility and control than would be possible with isolated instruments.
To make this communication possible, all MIDI instruments have two or three 5-pin DIN connectors called:

- **MIDI IN**: Connector by means of which the device receives the MIDI data emitted by other units.
- **MIDI OUT**: Connector by means of which the device transmits the MIDI data it has generated to other units.
- **MIDI THRU**: This connector, used to connect several units in series, emits the MIDI data exactly as received by the respective MIDI IN port.

For example, most instruments equipped with MIDI interface transmit MIDI messages which specify which note has been played and with what dynamic through the MIDI OUT connector. If this connector is connected to the MIDI IN of another MIDI instrument, such as a synthesizer or an expander, this device will respond precisely to the notes played on the transmitter instrument. This allows in you in effect to play two instruments at once, and obtain special multi-instrument sounds.

The same type of information transfer is used for recording MIDI sequences. A PC or a sequencer can be used to record the MIDI data transmitted by the OB-12 or by any other instrument. When these recorded data are sent to the OB-12, it automatically plays back the recorded performance.

CAUTION! *Always use cables of the best quality for the MIDI connections to and from the OB-12. You are also advised never to use cables more than 5 metres long.*

MIDI Channels

MIDI is able to transmit a multitude of digital data by means of a single cable and therefore a single connector, thanks to the MIDI channels. There are 16 MIDI channels, so the MIDI messages are processed when the channels of the receiver and transmitter devices correspond. The OB-12 is able to receive and transmit information on one or four MIDI channels simultaneously (see point 10.1).

Main MIDI messages transmitted and received by the OB-12

MIDI includes various types of messages used to communicate various types of data. MIDI messages can be subdivided into messages managed separately on each channel and messages dedicated to the entire system.

The channel messages include:

- **Note On:** this message is transmitted when a note is played, i.e. when a keyboard key is pressed. Each Note On message includes the following codes:
  Note On: when a key was pressed;
  Note Number: the key and thus the relative note which has been played;
  Velocity: dynamic of the note (the force with which the key was pressed).
  Note messages are expressed as a number from 0 to 127, with Middle C represented by the number 60.

- **Note Off:** this message is transmitted when the key pressed previously is released. When it is received, the sound of the note of that key is deactivated. Each Note Off message includes the following codes:
  Note Off: a key has been released;
  Note Number: which key has been released;
  Velocity: dynamic (force) with which it has been released.

  N.B.: *The Note On message with Velocity=0 is considered as equivalent to a Note Off message. The OB-12 sends the Note On message with Velocity=0.*

- **Pitch Bend:** this message indicates the position assumed by the [PITCH] wheel.
- **Aftertouch:** this message transmits the value of the pressure applied to a key after it has been depressed. There are two types of Aftertouch messages: the channel Aftertouch, which transmits the value of this control regardless of the test pressed, and polyphonic Aftertouch which specifies the key to which the pressure has been applied.
- **Program Change:** this message is used to select programs, since many instruments have a large number of memories, each corresponding to a given program or timbre. Once the correspondence between the number assigned to the memory and the Program Change number is known, you can select the type of sound you require.
- **Control Change:** these are control messages (often associated to the sliders or pedals) used to add expressiveness to the performance, allowing definition (and if required real-time control) of the timbre parameters, including for example the volume (CC n.7) or the Portamento time (CC n.5), etc...
  The Control Change messages also include the NRPN (Non Registered Parameter Numbers) LSB and MSB, which specify which control on the OB-12 panel has been regulated, and the Data Entry LSB message specifying the value it has assumed.

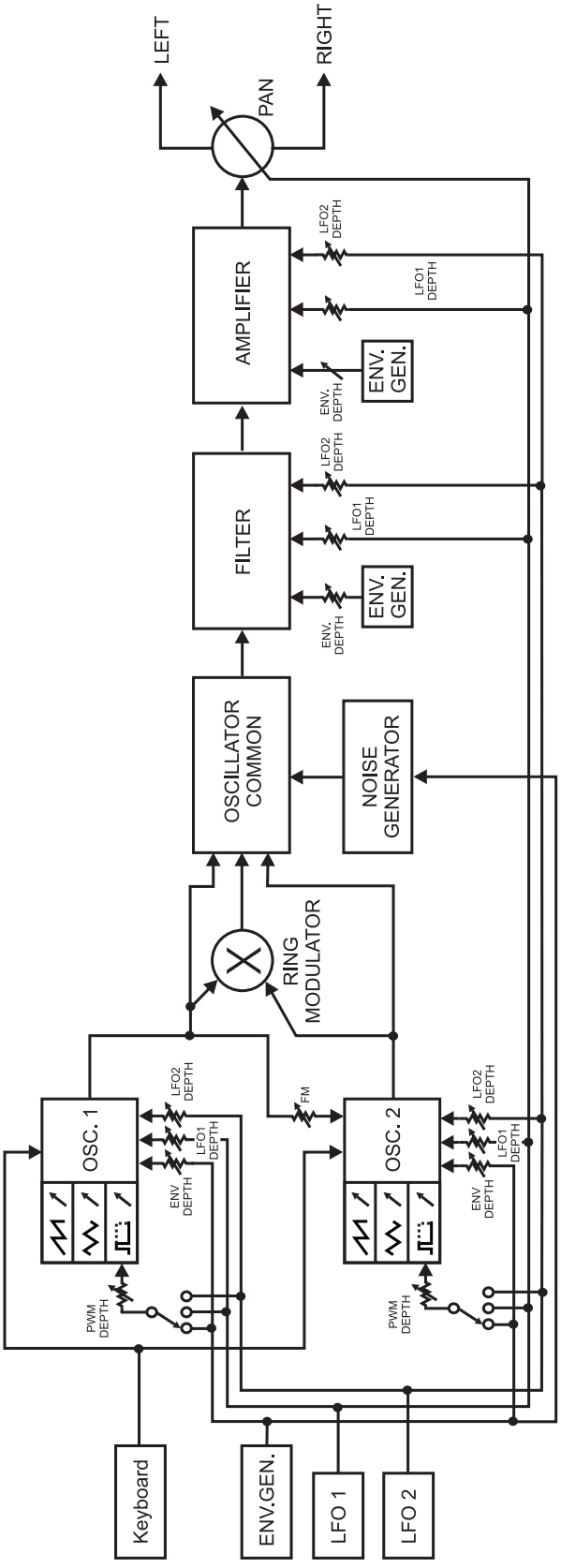
The system messages are subdivided into three categories: System Common Messages, System Real Time Messages and System Exclusive Messages. Of these categories, the OB-12 does not handle the System Common Messages.

The System Real Time Messages comprise:

- **Clock:** a MIDI message used to synchronise MIDI instruments connected together. This message is sent 24 times for each crotchet.
- **Start:** message used to position the MIDI instrument at the beginning of a song (or a Phrase as in the OB-12) and start playback or recording.
- **Continue:** this message allows the playback/recording to be restarted from the bar after the last Stop carried out.
- **Stop:** this message interrupts the playback/recording.
- **Active Sensing:** this message is transmitted to keep the dialogue between the connected MIDI devices active and is sent every 300 msec. if no other MIDI messages are transmitted. If a MIDI instrument does not receive MIDI messages or a fresh Active Sensing after 300 msec. it deactivates its functions and signals a “MIDI Error”, supposing that the connection has been interrupted or the connected device has been switched off.

System Exclusive Messages are those instructions which can only be interpreted by device identical to the one which generated them. These messages include the BULK DUMP data, i.e. the device’s programming instructions. These instructions contain the programming parameters normally saved in a memory location. They are used to transfer these parameters from one device to another of similar kind, or to save them in a remote memorisation unit such as a computer or a sequencer, allowing them to be restored in case of accidental loss or cancellation. Another system exclusive message is the one used to identify the transmitter instrument if the receiver instrument requests this.

11.4 BLOCK DIAGRAM



MIDI IMPLEMENTATION CHART

Oberheim-Viscount OB-12
Z-Domain Synthesizer

Date: 04/03/2000
Version: 1.0

FUNCTION ...		TRANSMITTED	RECOGNIZED	REMARKS
BASIC	**DEFAULT**	1-16	1-16	
CHANNEL	**CHANGED**	1-16	1-16	
MODE	Default	Mode 3 – 4	Mode 3 – 4	On each part
	Messages	CC 126 – 127	CC 126 – 127	
	Altered	Mode 3 – 4	Mode 3 – 4	
NOTE		24 – 96	0 – 127	
NUMBER	True Voice		0 – 127	
VELOCITY	Note ON	O	O	
	Note OFF	X	X	
AFTER	Key's	X	X	
TOUCH	Ch's	O	O	
PITCH BENDER		O	O	
CONTROL CHANGE		0 – 127	0 – 127	See chapt. 10.2 for more informations
PROGRAM CHANGE	True #	0 – 127	0 – 127	Use Bank Select messages to select Banks, Program and Timbre
SYSTEM EXCLUSIVE		O	O	
SYSTEM	Song Pos	X	X	
COMMON	Song Sel	X	X	
	Tune	X	X	
SYSTEM	Clock	O	O	Can be switched On/Off
REAL TIME	Commands	O	O	
AUX	Local On-Off	X	X	
MESSAGES	All note Off	O	O	
	Active Sense	O	O	
	Reset	X	O	
NOTES:				

Mode 1: Omni On, Poly
Mode 2: Omni On, Mono
Mode 3: Omni Off, Poly
Mode 4: Omni Off, Mono

O = YES
X = NO

FCC RULES

NOTE: This equipment has been tested and found to comply with the limits for a **Class B** digital Device, persuant to Part 15 if the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio comunications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determinated by turning the equipment off and on, the user is encuraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced Radio/Tv technician for help.

The user is cautioned that any changes or modification not expressly approved by the party responsable for compliance could void the user's authority opearate the equipment.