

---

## CONTENTS

Introduction .....	1
Front Panel .....	2
Front Panel-Features .....	3
Rear Panel .....	4
Connections .....	5
Quick Start .....	6
Operation .....	7
Effects Configuration .....	7
Getting Started .....	7
Input Level .....	7
BPM Display .....	8
Synchronisation Indicator .....	8
Activating The Effects .....	9
SUPERKILL .....	9
FILTER/LFO .....	10
CUTTER .....	12
DELAY .....	13
PANNING .....	14
Setting The BEATS .....	16
TAP/Clear .....	17
NUDGE Control .....	17
FX Mixer Joystick Control .....	20
PROGRAMS .....	22
USER BEATS .....	23
UTILITY .....	29
Headphone Monitoring .....	32
Hints & Tips .....	32
Specification .....	IBC

This operation manual uses the following symbols for identifying indicator conditions:

 = INDICATOR ON

 = INDICATOR FLASHING

## OPERATING CRITERIA

This product has been designed to operate most effectively with dance music - i.e. music based on strong regular beats and patterns. However, as the range of pre-recorded dance material is virtually limitless (and the audio mix of individual tracks unknown) we cannot guarantee the performance of the FEDERATION BPM FX with every style of dance music.

The FEDERATION's synchronisation performance may be affected if the beat information is either unavailable or indefinable within the audio track. Please note this when selecting your audio material.

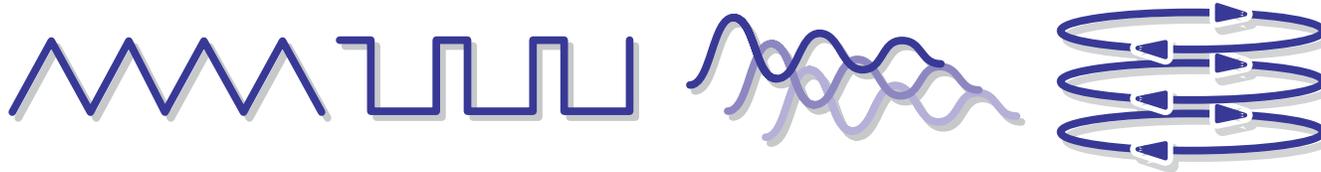
**[www.redsound.com](http://www.redsound.com)**

© Copyright / Software Copyright / Design Right RED Sound Systems Ltd. 1999

Printed in England - Issue 3

---

## WELCOME TO THE FEDERATION



Congratulations! By purchasing the FEDERATION BPM FX, you have joined an exclusive new club of musicians, remixers and Djs who have discovered a new level of power and control over the effects in their music. Previously, to make effects happen in time with music was a matter of painstaking analysis of the source signal and time-consuming tweaking of parameters on effects units to make sure that the tempo inherent in the effects did not clash with or break up the tempo of the music.

In one fell swoop the FEDERATION does away with all that tedious messing about (matching milliseconds to BPMs and hooking multiple effects units together) by assembling everything you need in one unit to filter, gate, delay and pan in perfect synchronisation with your music.

At the heart of the FEDERATION is Red Sound's acclaimed 'V2' BPM Analysis Engine (developed through ground-breaking products like the Voyager 1 and Micro-BPM), which shoulders the responsibility of calculating the tempo of the music. This leaves you free to concentrate on the real-time controls of the four simultaneous effects the FEDERATION offers.

Three of these effects have been available in various forms before, but never in such an easy-to-use and innovative form. By triggering the filtering in time with the music, you can seriously alter the harmonic shape of the sound without destroying the beat. The cutter makes gating and shaping the overall volume of the music in time a breeze but perhaps the greatest timesaving is in the automatic synchronization of delays to the tempo of the music. No more look-up tables for BPM equivalents in milliseconds, or complicated formulas that need a calculator. You just decide which beats you want to hear the delays coincide with and then you can move on to more creative decisions.

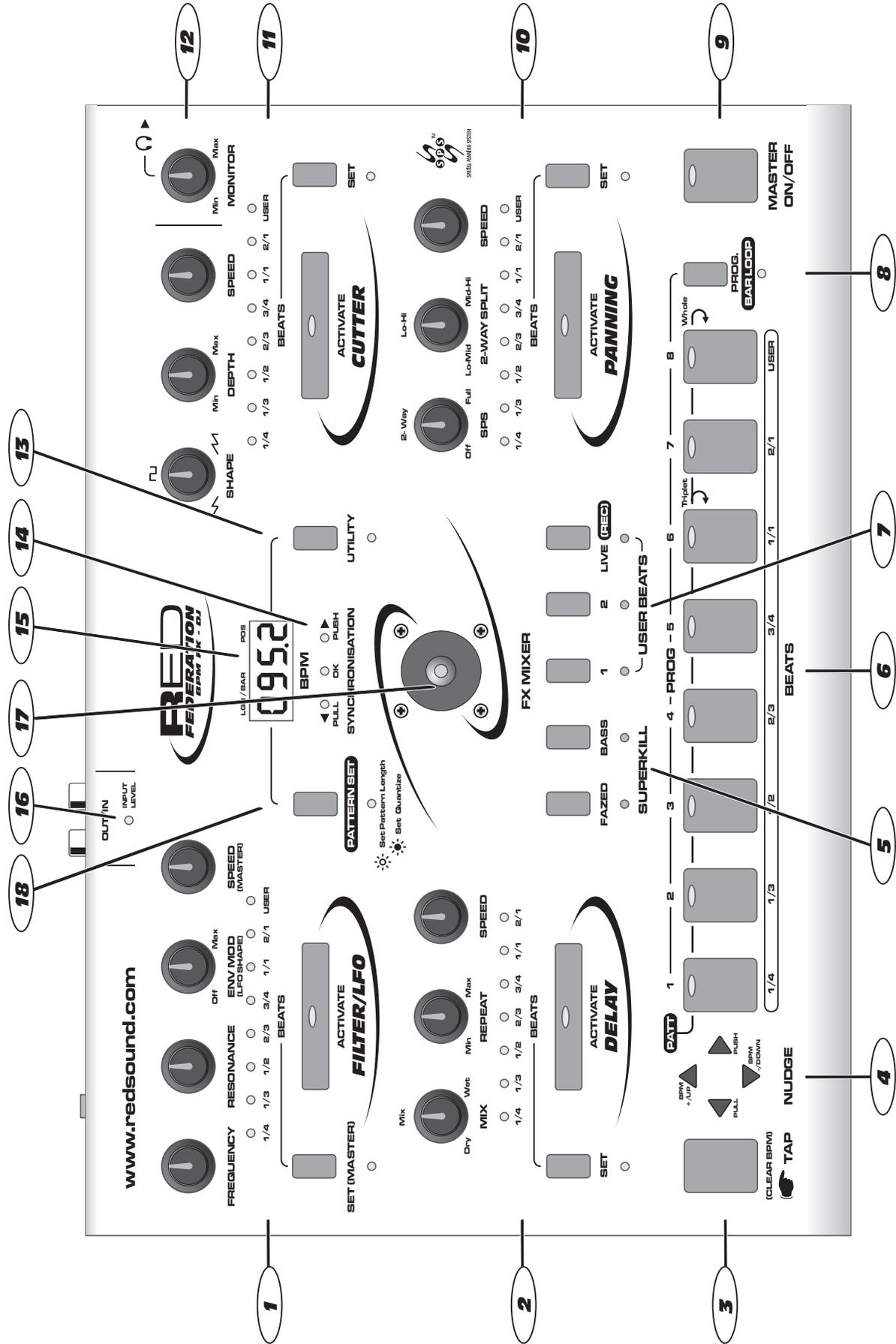
But even the unique combination of these facilities is dwarfed by the FEDERATION's ability to split the audio input into three bands (Low, Mid and High) which can then be panned around independently in the stereo field. Patented under the name of Spatial Panning System (SPS), this is a genuine first and will enable entirely new effect textures and beat-related movements in the music of the future.

In addition, the innovative SUPERKILL feature lets you take re-mixing to new dimensions with advanced DSP phase shift vocal elimination and bass kill.

This manual is designed (like the FEDERATION itself) to get you using the effects and sync'ing them to the music as quickly as possible. The simple real-time operation of the effects parameters and beat assignment is described in detail, but at no time does it try and define how these effects should be used. We tell you how the FEDERATION BPM FX works but never how to use it. That's down to you!



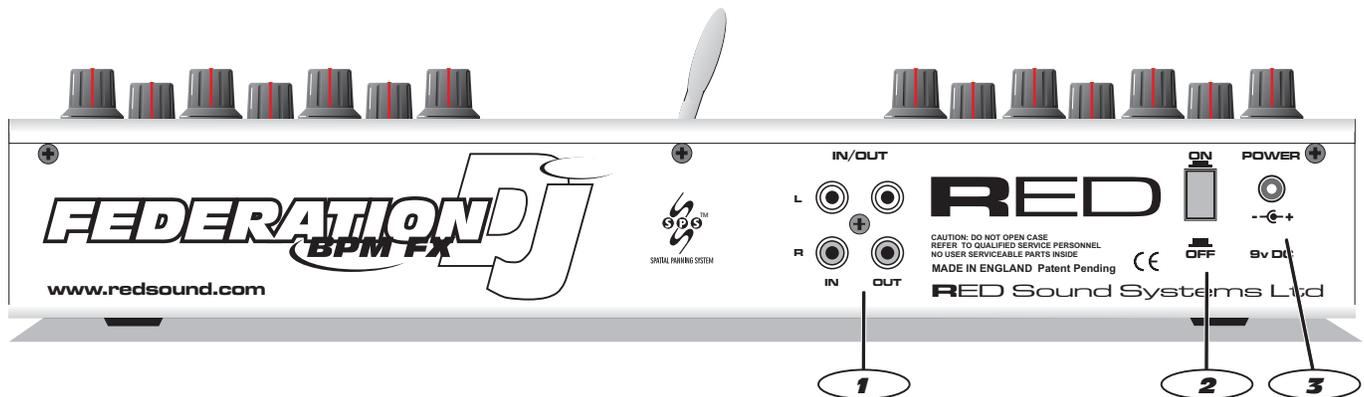
# FRONT PANEL



## FRONT PANEL FEATURES

- 1. FILTER/LFO:** This section features FREQUENCY, RESONANCE, ENVELOPE MOD and SPEED controls for the filter effect. The ACTIVATE button switches the effect on and off. The SET button can be used to change the BEATS trigger value of the FILTER or access the LFO SHAPE and master SPEED/BEATS functions.
- 2. DELAY:** This section features MIX, REPEAT and SPEED controls for the delay effect. The ACTIVATE button switches this effect on and off. The SET button is used to change the BEATS trigger value of the DELAY.
- 3. TAP (CLEAR BPM):** This button is used to manually 'tap' in a tempo or clear the current BPM reading.
- 4. NUDGE:** These buttons are used to make fine, manual adjustments to the BPM value and shift the audio/effect trigger sync point. Also used for general data entry.
- 5. SUPERKILL:** These two buttons select the DSP Fazed and Bass filtering.
- 6. BEATS:** This section features 8 buttons. In Select mode, they are used to set the BEATS synchronisation setting of the effects. In Program mode they are used to recall, compare and save the effect programs. In Pattern Record mode they are used to record, delete and edit events.
- 7. USER BEATS:** This section features 3 buttons. Buttons one and two store and recall the custom user patterns. When the 'LIVE' button is selected, the TAP button can be used to manually trigger effects 'on the fly'.
- 8. PROGRAM (BAR LOOP):** This button is used to select Program mode. In USER BEATS record mode, this button also selects BAR LOOP mode.
- 9. MASTER ON/OFF:** This button is used to switch the activated (or cued) effects on and off.
- 10. PANNING:** This section features SPS, 2-WAY SPLIT and SPEED controls for the panning effect. The ACTIVATE button switches this effect on and off. The SET button is used to change the BEATS trigger value of the PANNER.
- 11. CUTTER:** This section features SHAPE, DEPTH and SPEED controls for the cutter effect. The ACTIVATE button switches this effect on and off. The SET button is used to change the BEATS trigger value of the CUTTER.
- 12. MONITOR:** This feature lets you monitor the activated effects at the pre-Master on stage, allowing you to check the effects setup before committing it to the master output. The MONITOR control adjusts the output level.
- 13. UTILITY:** This button lets you access the utility parameters such as Input Gain, Effects Configuration etc.
- 14. SYNCHRONISATION:** This 3-way indicator shows any audio/effect synchronisation adjustments.
- 15. BPM Display:** The four digit BPM reading of the audio signal will be displayed here. Also, information will be displayed in Pattern, Program and Utility modes.
- 16. INPUT LEVEL:** The bi-colour input indicator is used to check the audio input level status.
- 17. FX MIXER:** This joystick control adjusts the relative balance between the activated effects. At the centre position, all activated effects will be heard equally. Moving the joystick about its axis will vary the combined balance of the activated effects.
- 18. PATTERN SET:** This button selects between SET PATTERN LENGTH (LED flashing) and SET QUANTIZE (LED on) in USER BEATS record pause mode.

## REAR PANEL



### 1. IN/OUT - RCA Phono Connectors

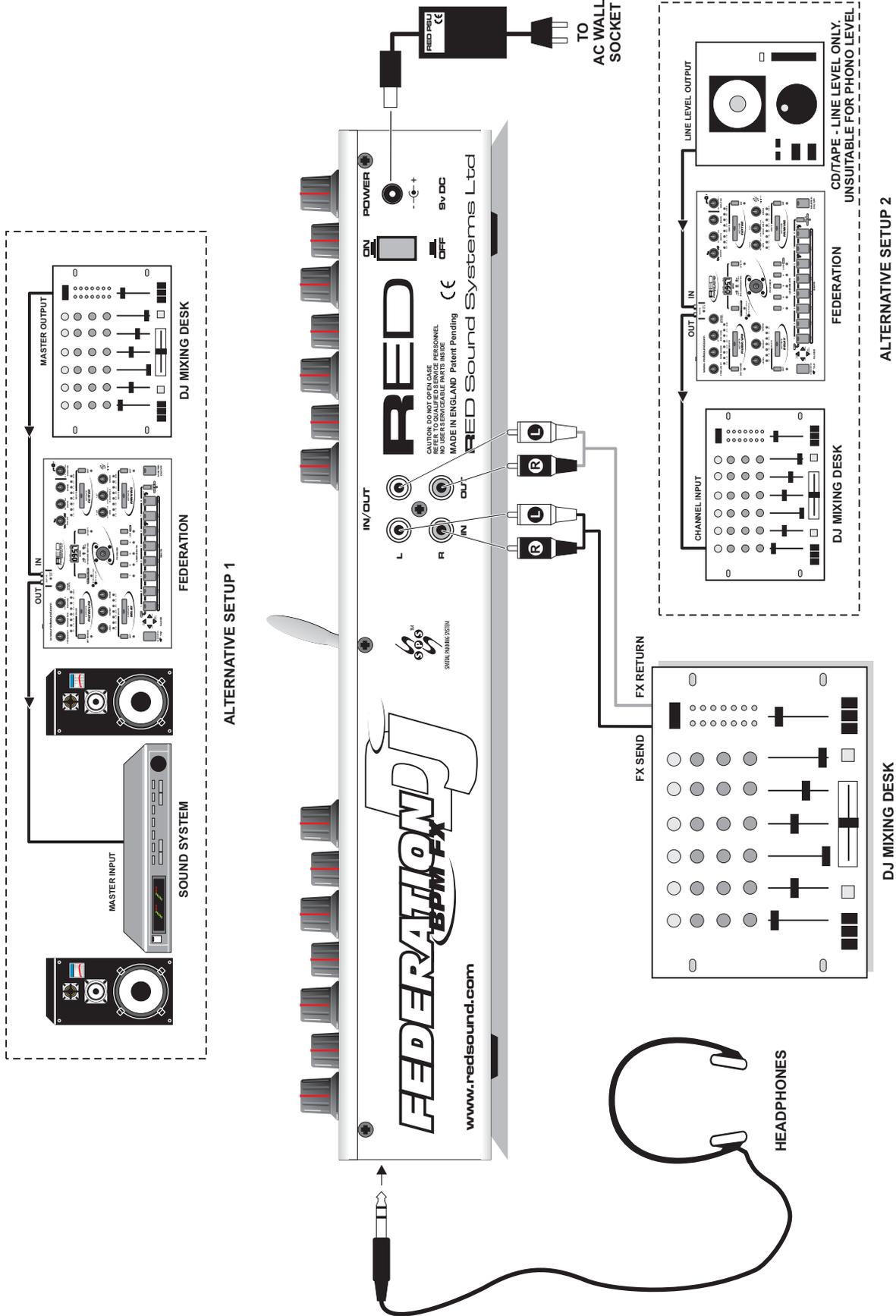
Use these sockets to connect the FEDERATION to your audio system, as shown on page 5.

### 2. POWER - Switch

This turns the power on and off.

### 3. DC POWER IN - Connector

Only use the 9vDC 800 mA PSU supplied with the FEDERATION to power the unit.



## QUICK START

If you want to quickly try out the performance of the FEDERATION, please read the following points carefully:

**CONNECTIONS:** Before making any connections, make sure that the power on all your equipment is turned OFF. Connect the power supply (included) to the 'power in' socket on the rear panel of the FEDERATION and plug it into a suitable AC outlet. Connect the audio cables for a basic system setup as shown on page 5.

**TURNING ON THE POWER:** Make sure all connections have been made correctly and the volume controls on the mixing desk and amplifier system are turned completely down. Press the rear panel power switch on the FEDERATION. Turn on the power of the mixing desk and then turn on the power of the amplifier system.

**START UP INDICATIONS:** When the FEDERATION is powered up, the BPM display will briefly show the software version and then change to show four illuminated centre bars. If this does not happen, check the power supply is of the correct type and the unit is switched on.

**SELECTING A PROGRAM:** We've already stored a selection of typical effects setups in the FEDERATION. To select one of the eight factory presets, press and hold down the 'PROG' button (LED on) and then press one of the main BEATS buttons marked 1-8.

**INPUT LEVELS:** Select a suitable audio track (dance orientated music with defined beat information), start the playback on the connected sound source and check the status of the front panel bi-colour level indicator marked 'IN/OUT' level. The audio input is setup to work with normal line level output signals therefore, the level indicator should now be coloured green, occasionally flashing red. If the indicator is off or constantly red, adjust the gain and/or output levels on the mixing desk. (Also see the "Input Gain" section in UTILITY mode on page 29)

**ACTIVATING THE EFFECTS:** The BPM display should now be reading the tempo of the selected audio track in beats per minute.

Press the 'MASTER ON/OFF' button. The audio signal will now be processed through the effects, as setup by the selected program.

Try adjusting the controls on any activated effect (LED on within 'Activate' buttons) to hear how they alter the sound in real-time. To change a 'BEATS' trigger setting, simply press the 'SET' button (LED on) of the desired effect and then press one of the main 'BEATS' buttons near the front of the main panel (also used to select programs). The timing of the effect triggering will instantly change to the new setting. Try the whole range of preset timings (always press the SET button first before selecting a new BEATS setting) to hear the way they can completely change the feel or 'groove' of the music.

Now try editing the other effects in a similar manner (use the ACTIVATE buttons to select or de-select each effect) and, when you're ready, activate all four at once with different BEATS trigger settings.

As a final touch, try moving the FX MIXER joystick about it's axis to hear the effects blend into each other and interact in a myriad of combinations.

Please read the following "OPERATION" section fully to totally appreciate the range of features and facilities the FEDERATION BPM FX-DJ has to offer.

## EFFECTS CONFIGURATION

The FEDERATION BPM FX 'DJ' model is ideal for those who are new to the world of digital FX, or will be using the product in high-pressure situations such as live gigs. All four effects are chained together into a single signal path, automatically taking the output of the first effect and feeding it to the second, the second to third etc. We have arranged the effects in a logical order; Filter, Cutter, Delay, Panning. This means that you are unlikely to end up with a later effect upsetting what you have already setup for an earlier one in the chain (if you are worried about this restricting your creativity, read "Setting the effects configuration" in the "UTILITY MODE" section on page 29).

Connecting the FEDERATION into your sound system couldn't be easier. Simply take the FX send from your mixer and plug this into the pair of inputs on the rear panel of the FEDERATION labelled 'IN'. Then, connect the outputs to the FX return on your mixing desk - see page 5 for further details. Now all the effects are connected together and you can use whichever combination you like straight away. Alternatively, you can connect the FEDERATION in-line between a single sound source (line level) and the mixing desk input. With this setup, the effects will only operate on the single sound source - see 'Alternative Setup 2' on page 5.

## GETTING STARTED

After connecting the FEDERATION to your system as detailed above, press the power switch on the rear panel to turn the power on. The version of software fitted to your unit will now be shown briefly on the main display:



Afterwards, the four centre bars will illuminate to indicate the 'IDLE' status of the BPM engine, as shown below:



## INPUT LEVELS

The bi-colour 'INPUT LEVEL' indicator at the top edge of the front panel monitors the input signal level. This indicator shows three input level conditions as follows:

- OFF - No signal or very low signal level
- BRIGHT GREEN - Normal line level signal present - **Ideal working level**
- RED - Overloaded signal - Level too high

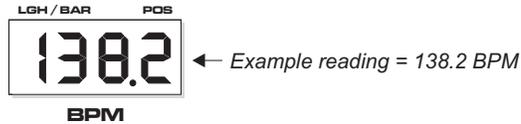
With the FEDERATION connected to your DJ system as detailed on page 5, play a suitable upbeat track on any connected sound source and ensure the mixing desk's gain/level controls are set correctly (0dB).

If you have connected the FEDERATION to the master outputs of the mixer, move the mixing desk master output fader to its normal working position (around 0dB indication on output level meters) and observe the FEDERATION's input level indicator. The indicator should be illuminated GREEN, occasionally flashing RED. If the level indication is incorrect, adjust the FEDERATION's input gain accordingly. See UTILITY MODE 1 on page 29.

*NOTE: if the input signal level is set incorrectly, the performance of the BPM engine and/or audio quality may be affected.*

## BPM DISPLAY

Start the playback of a suitable audio track (containing definable beat information). The BPM display should now show the tempo of the track in beats per minute as in the following example:



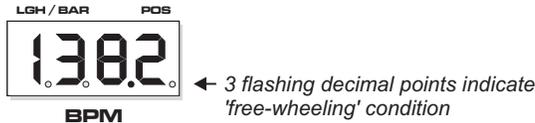
The indicator in the MASTER ON/OFF button (and any selected ACTIVATE buttons) will now flash at the detected BPM rate to indicate 'PAUSE' mode.

*NOTE: If the BPM engine has picked up on the off-beat information in the track (LEDs flashing on the off-beats) from a prominent Hi-Hat etc., you can use the NUDGE control's Pull/Push feature to adjust the synchronisation to the on-beat position - for further information see page 18.*

During tempo analysis of the audio track, the right-hand digit in the display may fluctuate slightly as the BPM reading is constantly updated in real-time. Any major shift in tempo (changing the playback speed using a CD/vinyl deck's pitch control) will be tracked and displayed by the FEDERATION.

*IMPORTANT NOTE: the FEDERATION's BPM engine will continue triggering the effects indefinitely at the last detected BPM rate if the strong regular beats in the audio track become unavailable. This feature allows the effects to continue operating through quite passages in the audio track.*

If the strong regular beats in the audio track become unavailable, the 3 remaining decimal point indicators in the BPM display will flash continuously, as shown in the following example:



This will occur approximately 5 seconds after the last valid BPM reading was taken to warn you the FEDERATION is now 'free-wheeling' and the BPM display is no longer being updated from the audio track. When the beats in the audio track return, the FEDERATION will automatically detect the BPM information and make any necessary adjustments, at which time the flashing decimal point indicators will go out to indicate a 'locked-in' condition.

## SYNCHRONISATION INDICATOR

This 3-way indicator shows the synchronisation status between the audio and effect beat position. The BPM engine constantly analyses the accuracy of the relative downbeat positions and will either 'PULL' or 'PUSH' the effect triggering to maintain the synchronisation.

When the audio and effects are *synchronised* the green 'OK' indicator will light, as follows:



If the effects are *ahead* of the audio, the red 'PULL' indicator will light, as follows:



If the effects are *behind* the audio, the red 'PUSH' indicator will light, as follows:



**ACTIVATING THE EFFECTS**

Each effect can be turned on and off independently using the 'ACTIVATE' buttons in conjunction with the MASTER ON/OFF button.

To cue the effect(s), press the ACTIVATE button(s) once in 'PAUSE' mode (BPM detected, MASTER ON/OFF indicator flashing at BPM rate). The indicator(s) in the ACTIVATE button(s) will now also flash at the BPM rate. Use the MONITOR feature to listen to the cued effects before committing them to the master output (see page 32).

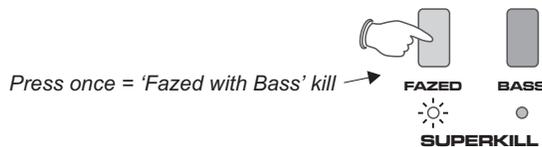
Press the MASTER ON/OFF button once (LED on) to output the activated effects. The indicators in the ACTIVATE buttons will stay on when the MASTER button is set to 'ON' and flash when set to 'PAUSE'.

To instantly switch the effects ON, press the MASTER ON/OFF button (LED on) and then press the desired ACTIVATE button(s). You can select /de-select the effects at random using the MASTER ON/OFF and ACTIVATE buttons.

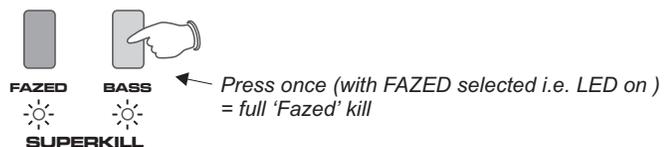
**SUPERKILL**

The SuperKill section allows you to radically alter audio with or without the main effects in operation (totally independent of the BPM engine). By phase inverting the stereo signal, the vocal/instrument levels in the audio are dramatically remixed, often revealing previously unheard elements within the music. You can choose between full FAZED kill, BASS kill or even FAZED WITH BASS kill which adds the rhythmical bass frequencies back into the FAZED mix to keep the groove going.

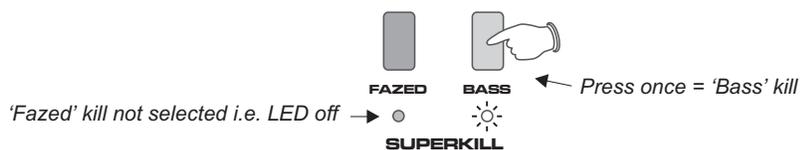
For Fazed with Bass kill, select 'FAZED' button:



For full Fazed kill, now select 'BASS' button:



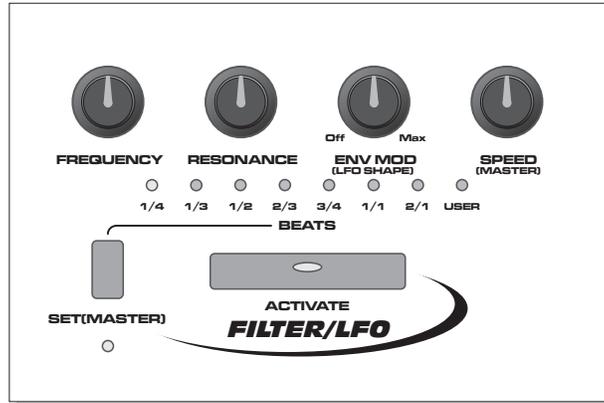
For Bass kill only, select 'BASS' button:



To de-select the Super-Kill function, simply press the relevant button again (LED off). The Super-Kill settings can be stored with each program.

**NOTE:** The SuperKill function requires a STEREO input signal for satisfactory operation.

## THE FILTER /LFO



This effect recreates the most essential part (for many dance music producers and remixers) of a classic analogue synthesizer, the filter, and puts it under the direct control of the tempo of the source music via the synchronised Low Frequency Oscillator (LFO).

The Filter allows you to remove or accentuate frequencies in the source signal. If the Frequency knob is used on its own, then it will just make the signal duller the more it is turned anti-clockwise. However, more interesting results are produced if it is used in conjunction with the Resonance and Envelope Mod controls. Resonance allows you to boost the frequencies around the current cut-off Frequency, accentuating the action of the Filter, especially under the control of the LFO. This can be set to subtly emphasise the movement or exaggerate it into a squealing monster. Envelope Mod controls the amount of change to the cut-off frequency when under LFO control. The greater the Envelope Mod amount, the more the filter is quickly opened from and closed back to the Frequency knob setting at each trigger from the BPM analyser. If the Frequency knob is set closed (fully anti-clockwise) and the Env Mod to max (fully clockwise) this will produce the most marked effect, especially if Resonance is set fairly high as well.

### FREQUENCY

This control sets the basic cut-off frequency of the filter. At the fully clockwise position, the filter is completely open allowing all the frequencies of the audio signal to pass through. As the control is moved anti-clockwise it gradually closes the filter, cutting out harmonics, starting with the highest and then progressively the lower ones until all the frequencies have been removed.

### RESONANCE

This control sets the boost level of the frequencies around the cut-off point as set by the FREQUENCY control. At the fully anti-clockwise position there is no boost. As the control is moved in a clockwise direction the frequencies will be gradually boosted. At the fully clockwise position, the resonance will reach self-oscillation producing a new pitched element similar to acoustic feedback.

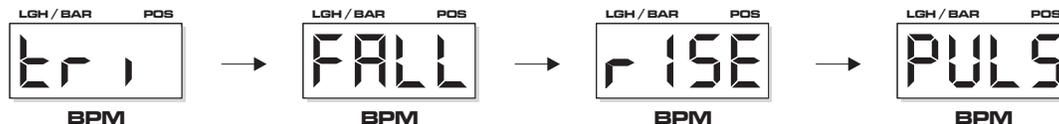
### ENVELOPE MOD (LFO SHAPE)

This control has two functions determined by the Filter's SET(MASTER) button.

Under normal operating conditions (when the SET(EDIT) button is *NOT* pressed down) this control sets the amount of change (depth) of the cut-off frequency as set by the FREQUENCY control. At the fully anti-clockwise 'Off' position there will be no change to the filter cut-off frequency which is useful for making 'manual' sweeps with the filter's FREQUENCY and RESONANCE controls. As the control is moved in a clockwise direction the filter will be increasingly opened by the audio modulation.

When the SET(EDIT) button is pressed and held down (LED flashing) this control sets the LFO wave shape. There are four types to choose from, each having their own individual characteristics and subsequent affect on the music.

Between the fully anti-clockwise and 10 o'clock positions, the TRIANGLE shape will be selected. Between the 10 o'clock and 12 o'clock positions, the FALLING SAWTOOTH shape will be selected. Between the 12 o'clock and 2 o'clock positions, the RISING SAWTOOTH shape will be selected. Between the 2 o'clock and fully clockwise positions, the PULSE shape will be selected. The main BPM display will indicate the settings as follows:



**SPEED (MASTER)**

This control has two functions determined by the Filter's SET(EDIT) button.

Under normal operating conditions (when the SET(EDIT) button is *NOT* pressed down) this control can be used to manually set the trigger rate of the LFO. To override any of the preset BEATS settings, simply turn the SPEED control to make the necessary adjustment. The BEATS indicators will light in sequence as this control is moved past each preset value, with two LEDs on indicating a speed setting between any two values.

The Speed control can be used to set the LFO to much slower, synchronised rates than the maximum preset BEATS trigger of every other beat (2/1). When the 2/1 setting is passed, all indicators in the BEATS display will be off and the special 'slow sync'd' feature will be introduced. The knob movement is thereafter divided into preset 'zones', each related to musical bars derived from the current BPM value. The settings will be shown briefly on the main display as follows:



RANGE = 01, 02, 03, 04, 08, 12, 16 BARS. The LFO can be re-started from the beginning of the wave shape each time the MASTER or filter ACTIVATE button is pressed.

When the SET(EDIT) button is pressed and held down (LED flashing) this control becomes the 'master' speed control for any activated effects. This feature can be used to change the trigger rate of up to four effects at once in real-time producing dramatic speeding up / slowing down effects. The speed of the 'slaved' effects will 'jump' to the value of this control as soon as it is moved.

Also, when the SET(EDIT) button is pressed and held down (LED flashing), you can set the BEATS on all four effects simultaneously. See "Setting the BEATS" on page 16 for more information.

**BEATS**

These indicators show the automatic BEATS setting (if selected) for the FILTER /LFO effect. See "Setting the BEATS" on page 16.

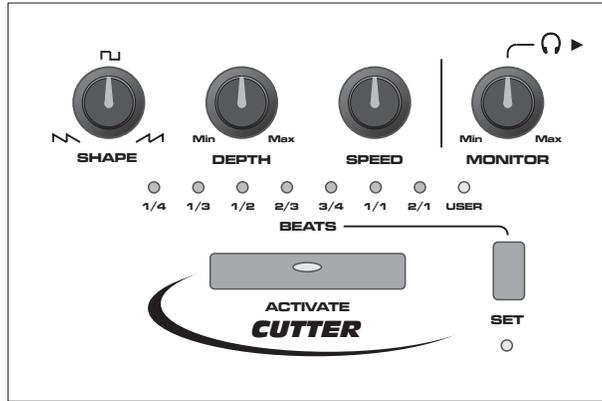
**SET (MASTER)**

This button selects the automatic BEATS setting mode for the FILTER /LFO effect. Also, when the SET(MASTER) button is pressed and held down (LED flashing), you can set the BEATS on all four effects simultaneously. See "Setting the BEATS" on page 16 for more information.

**ACTIVATE**

This button switches the FILTER/LFO effect on and off (or to 'cue' if MASTER ON/OFF is set to OFF). See "Activating the effects" on page 9.

## THE CUTTER



This effect operates in a similar fashion to the filter but on the overall volume of the signal. The Cutter can be set to operate either as a conventional 'gate' which, each time it is triggered opens instantly to allow signal through but then after a short period closes completely to cut off the signal, or as a fade-in/fade-out control with a relatively short period of operation.

When the Shape control is set to the left of centre, the volume will rise instantly to full on each triggered beat, giving a very fast attack (with the release becoming increasingly sudden as the centre position is reached). This is ideal for making the beat of the music even more marked. To the right of centre, the rise of the volume is progressively slowed down (and the release being instantaneous). This slowing of the attack of the sound can make the beat sound 'lazy' or even 'backwards' and will give more esoteric results. The Depth control allows you to adjust from subtle to extreme as you turn from left to right.

### SHAPE

This control selects the shape of the cutter effect. At the fully anti-clockwise position (∩) the overall volume of the audio will rise quickly and fall slowly. As the control is moved in a clockwise direction the change in volume will become more severe, quickly rising and falling to form a 'gated' effect, reaching it's maximum at the 12 o'clock position (⌐). As the control is moved towards the fully clockwise position (∪) the effect will become more subtle, the volume rising slowly and falling away quickly for a 'backwards' effect.

*NOTE: When the USER BEATS feature is selected, the fall/rise times of the sawtooth shape settings can be set to fixed or dynamic duration - for further information see UTILITY section on page 31.*

### DEPTH

This control has two functions depending on the position of the SHAPE control.

When the SHAPE control is set to the square position (⌐), this control sets the length of the 'open' or on period of the gate, the period in which the audio signal can be heard.

At the fully anti-clockwise position (Min), the gate is open for its maximum duration allowing most of the audio signal to pass. As the control is moved in a clockwise direction the open period becomes increasingly shorter, allowing less and less of the audio signal to pass until, at the fully clockwise position (Max), the duration of the open period is extremely short, allowing through just a brief section of the audio signal.

When the SHAPE control is set towards the falling or rising sawtooth positions, (∩ ∪) this control sets the volume level of the sawtooth's low point in relation to it's fixed maximum peak (0dB). At the fully anti-clockwise position (Min), the volume of the low point will be just below that of the peak, giving a soft, subtle tremolo effect. As the control is moved in a clockwise direction the volume of the low point will become increasingly quieter, the difference between the two points becoming more and more pronounced until, at the fully clockwise position (Max), the low point volume will be at infinity or 'off'.

**SPEED**

This control can be used to manually set the trigger rate of the CUTTER. To override any of the preset BEATS settings, simply turn the SPEED control to make the necessary adjustment. The BEATS indicators will light in sequence as this control is moved past each preset value, with two LEDs on indicating a speed setting between any two values. On this effect, the SPEED control range is locked to the BEATS setting range - i.e. 1/4 to 2/1.

**BEATS**

These indicators show the automatic BEATS setting (if selected) for the CUTTER effect. See "Setting the BEATS" on page 16.

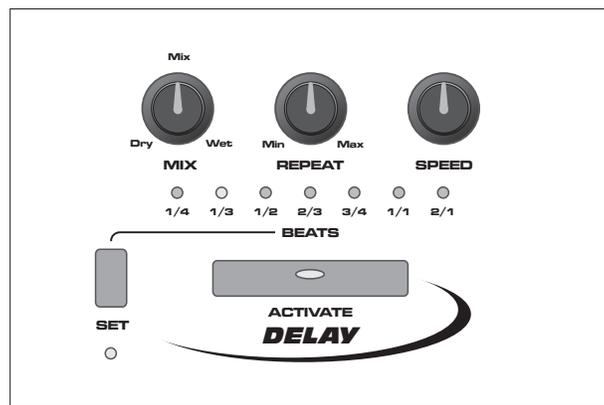
**SET**

This button selects the automatic BEATS setting mode for the CUTTER effect. See "Setting the BEATS" on page 16.

**ACTIVATE**

This button switches the CUTTER effect on and off (or to 'cue' if MASTER ON/OFF is set to OFF). See "Activating the effects" on page 9

*MONITOR SECTION: Please see page 32 for details.*

**THE DELAY**

This effect makes a copy of the source signal and then adds it back into the signal after a period of time as set by the BPM analyser. The level and number of repeats can be set to determine how much this affects the original signal. The delayed signal will be a perfect copy of the original, thanks to the high quality of digital technology in the FEDERATION. The number of repeats can be varied from one to increasingly numerous repeats which, although decaying in volume, will still threaten to drown out the source signal (which may be exactly what you want). Use the Max Repeat position with caution!

**LEVEL**

This control sets the volume level of the delayed signal. At the fully anti-clockwise position the delayed signal level will be at its quietest. As the control is moved in a clockwise direction the volume will gradually increase until, at the fully clockwise position, it will be at its maximum.

**REPEAT**

This control sets the number of times the delayed signal is repeated. At the fully anti-clockwise position (Min), there will just be a single repeat or echo of the signal (no feedback). As the control is moved in a clockwise direction the delayed signal will be increasingly fed back into the delay to create more and more repeats, the multiple repeats slowly decaying in volume over a period of time. At the fully clockwise position (Max), the number of repeats feeding back into the delay will be sufficient to maintain a 'looping' phrase indefinitely.

## SPEED

This control can be used to manually set the trigger rate of the DELAY. It's operation models the classic tape echo machines of the past, smoothly changing the speed up and down (without a digital glitch) as would the motor driven machines of the 60's and 70's. The inherent speed control time lag of these older tape echo units has also been included, just try moving the speed control quickly from minimum to maximum (with REPEAT control set to multiple repeats) to hear the delay repeats catch up in a lazy manner.

**IMPORTANT NOTE - PLEASE READ:** The relationship between the Delay's SPEED control and BEATS setting differs to that of other effects. Using the analogy of the classic tape machine, the BEATS setting determines the 'tape length' whilst the SPEED control sets the 'tape speed', this having a 4 to 1 range centred about the current BEATS setting. When a new BEATS setting is selected a new 'tape length' is calculated for the current 'tape speed' setting. This means that the SPEED control is always in the correct position and never jumps to a new BEATS setting, which would result in sudden 'out of tune' echos. Therefore, the BEATS indicators will not always light in full sequence as do the other effects.

To override any of the preset BEATS settings, simply turn the SPEED control to make the necessary adjustment. The BEATS indicators will light in sequence as the control is moved past each preset value, with two LEDs indicating a speed setting between any two values. The range of selectable settings, when using the SPEED control, will always be governed by the current BEATS setting (i.e. a 4/1 range about a mid-point BEATS value).

## BEATS

These indicators show the automatic BEATS setting for the DELAY effect. See "Setting the BEATS" on page 16.

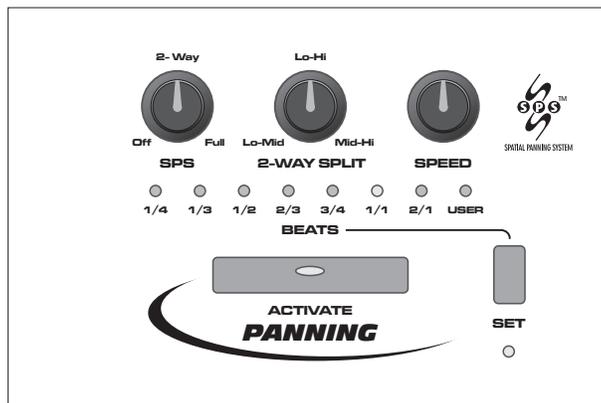
## SET

This button selects the automatic BEATS setting mode for the DELAY effect. See "Setting the BEATS" on page 16. The *USER BEATS setting is not available on the Delay effect.*

## ACTIVATE

This button switches the DELAY effect on and off (or to 'cue' if MASTER ON/OFF is set to OFF). See "Activating the effects" on page 9.

## THE PANNER

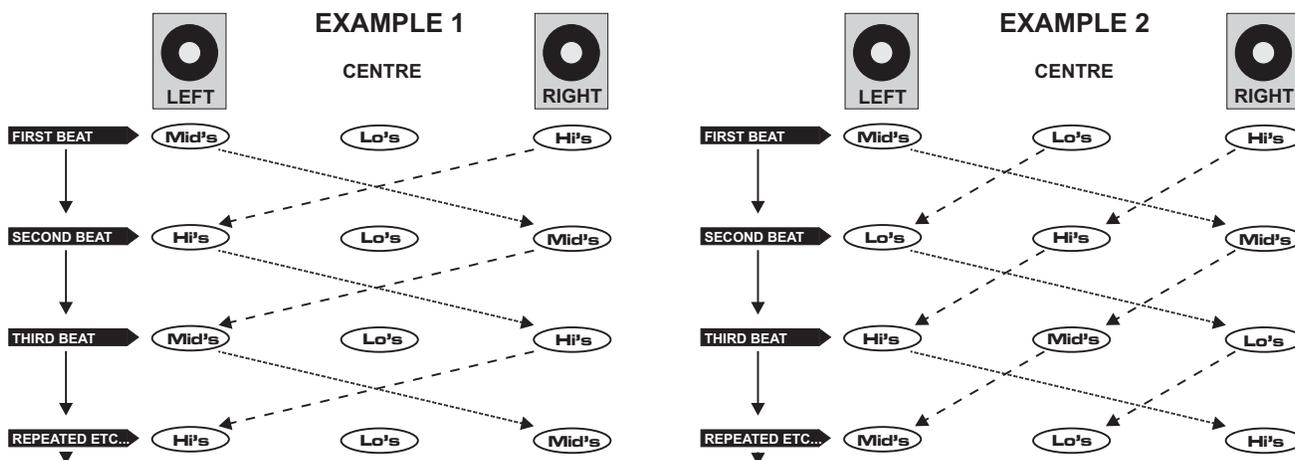


This part of the FEDERATION is quite revolutionary. There have of course been auto-panning devices before, which could use an LFO to move a signal around the stereo field, but none which could trigger this LFO from a BPM analyser and certainly none which could move different frequency bands to different pan positions at the same time. The unique Spatial Panning System (SPS), featured for the first time ever on the FEDERATION BPM FX, can actually split the incoming signal into three bands (low, mid and hi - as normally used by DJs) and then move these bands' pan positions independently. With SPS off, the Panner works in a more conventional fashion on the entire signal, moving it around the stereo position at the determined speed, giving you a standard auto-pan

controlled by the BPM engine. As you increase the SPS amount, it will start to move two bands around in the stereo field whilst holding the third user-definable band stationary and as SPS reaches full, all three bands will be constantly cycled to different places in the stereo field.

**SPS**

This control sets the amount of Spatial Panning and how the split frequencies are moved about the stereo field. At the fully anti-clockwise position (Off), all the audio frequencies are locked together and are panned as one. As the control is moved in a clockwise direction the audio signal will become increasingly split into high, mid and low frequency elements until, at the 12 o'clock position (2-Way), the separation will be at its maximum. The '2-Way' setting of SPS shifts two frequency bands from left to right whilst holding the third in a central position. As the control is moved further clockwise the movement of the split frequency bands increasingly changes, the three bands now starting to 'chase' each other in a left, right, centre, left, right, centre... pattern on each triggered pulse until, at the fully clockwise position (Full), the Spatial Panning effect will be at it's maximum.



**Example 1:** Frequency band movement when SPS control = '2-Way' (2-Way Split control set to 'Mid-Hi' position)

**Example 2:** Frequency band movement when SPS control = 'Full' (2-Way Split control has no function when SPS set to full)

**2-WAY SPLIT**

This control sets the configuration of 2-Way Spatial Panning. At the fully anti-clockwise position (Lo-Mid), the HIGH frequency band will be held in a central position with the low and mid frequencies panning from left to right in opposing directions. At the 12 o'clock position (Lo-Hi), the MID frequency band will be held in a central position with the low and high frequencies panning from left to right in opposing directions. At the fully clockwise position (Mid-Hi), the LOW frequency band will be held in a central position with the mid and high frequencies panning from left to right in opposing directions. See example 1 above.

**SPEED**

This control sets the trigger rate of the PANNER. To override any of the preset BEATS settings, simply turn the SPEED control to make the necessary adjustment. The BEATS indicators will light in sequence as this control is moved past each preset value, with two LEDs on indicating a speed setting between any two values. The Speed control can be used to set the Panning to much slower, synchronised rates than the maximum preset BEATS trigger of every other beat (2/1). When the 2/1 setting is passed, all indicators in the BEATS display will be off and the special 'slow sync'd' feature will be introduced. The knob movement is thereafter divided into preset 'zones', each related to musical bars derived from the current BPM value. The settings will be shown briefly on the main display as follows:



RANGE = 01, 02, 03, 04, 08, 12, 16 BARS.

## BEATS

These indicators show the automatic BEATS setting (if selected) for the PANNING effect. See “Setting the BEATS” on page 16.

## SET

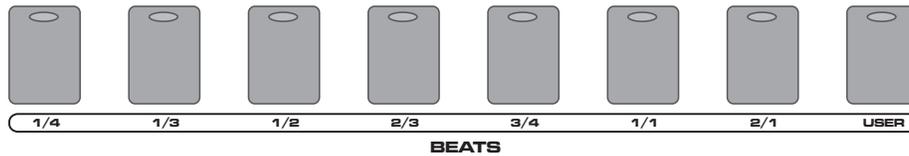
This button selects the automatic BEATS setting mode for the PANNING effect. See “Setting the BEATS” on page 16.

## ACTIVATE

This button switches the PANNING effect on (or to ‘cue’ if MASTER ON/OFF is set to OFF.) and off. See “Activating the effects” on page 9.

## SETTING THE BEATS

This is where you set the preset trigger rates for each effect. The eight master ‘BEATS’ buttons at the front edge of the FEDERATION are used to instantly call up the musically correct trigger timings derived from the current audio input.

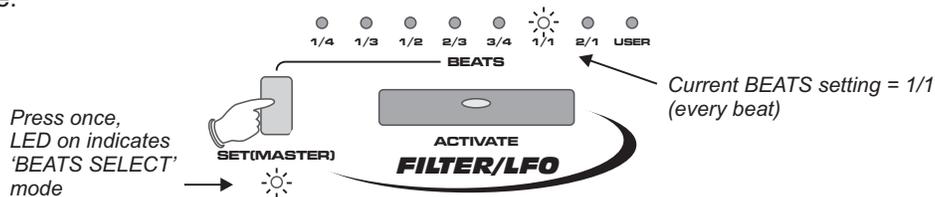


The labelling under each button designates the divisions or multiples of triggers per musical beat as follows:

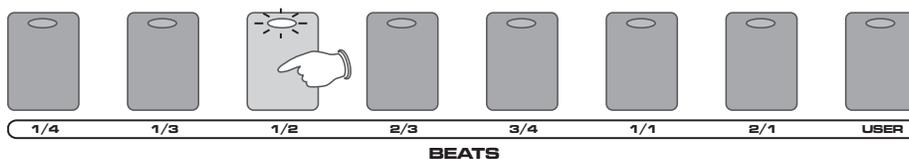
- 1/4 = Four times every beat
- 1/3 = Every third of a beat
- 1/2 = Twice every beat
- 2/3 = Every two thirds of a beat
- 3/4 = Every three quarters of a beat
- 1/1 = Every beat
- 2/1 = Every other beat
- USER (please see the USER BEATS section on page 23)

Each effect module features a ‘SET’ button. These buttons allow trigger settings implemented with the master BEATS buttons to be routed to the effects independently or collectively. A row of status indicators labelled ‘BEATS’ give visual confirmation of the current trigger setting for each effect.

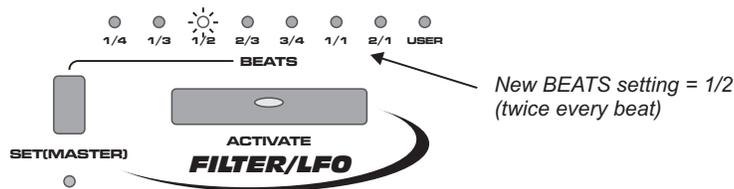
To change a BEATS setting, press the effect SET button once and check that the indicator comes on, as in the following example:



Ensure the FEDERATION is in main ‘SELECT’ mode i.e. ‘PROGRAM’ or user beats ‘PATTERN RECORD’ modes are inactive. Now, press one of the master BEATS buttons, as in the following example:



The trigger timing of the effect will instantly change and the BEATS indicator will confirm the new setting, as in the following example:



You can use the BEATS buttons to change the trigger settings on any combination of effects simultaneously. Simply press the SET button (LED on) for each effect you wish to change - e.g. If all effects SET buttons are set to 'ON', pressing one of the master BEATS button will change the trigger timing of all four effects.

Alternatively, you can use the FILTER/LFO 'SET(MASTER)' button to change all four effects at once. Simply press and *hold down* this SET button, then press one of the main BEATS buttons.

## TAP (CLEAR BPM) Button

This multi-function button allows you to manually enter a tempo by hand or 'clear' the current BPM reading. The TAP feature can be used to set the BPM rate when there is no audio signal present or when the beat information becomes unavailable during a quiet passage of the audio track (intro, middle eight etc). The CLEAR feature can be used to cancel the current BPM reading, which automatically de-activates the effects.

**TAP - Tempo Edit:** To enter a BPM rate from an 'IDLE' condition (no audio beat detected) use a finger to tap in a tempo (within the FEDERATION's current BPM range) on the TAP button. After 3-4 taps the tempo will be shown on the main BPM display. The 'MASTER ON/OFF' and any selected 'ACTIVATE' indicators will flash at the BPM rate to indicate 'PAUSE' mode.

The TAP feature can also be used to override the BPM engine whilst it is detecting a BPM or 'free-wheeling'. Use a finger to tap in the tempo. After 3-4 taps the new tempo will be shown on the main BPM display and the effect triggering will immediately change to the new BPM rate.

*NOTE: Subsequent 'valid' beat information detected by the BPM engine may override manual changes made with the TAP function.*

The TAP function can also be used to assist the BPM engine as it analyses more complex rhythm tracks. Tapping along with the tempo of the track can help the software to recognise patterns within the music and so lock-in and adjust the BPM and/or synchronisation itself.

**CLEAR - Reset the BPM Engine:** To clear a BPM reading and reset the FEDERATION to 'IDLE' mode, press and *hold down* this button for approximately 1 second. Four centre bars will replace the BPM reading in the main display and any activated effects will be de-activated.

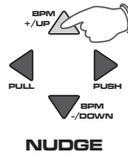
*NOTE: The TAP and CLEAR functions detailed above WILL NOT OPERATE when USER BEATS are set to 'LIVE' mode - see page 23.*

## NUDGE Control

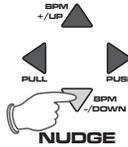
The 4-button NUDGE control lets you make fine adjustments to the BPM rate and audio/effect synchronisation.

**BPM adjustments using BPM+/UP and BPM-/DOWN buttons:** During normal operation the BPM engine will automatically detect and adjust itself to the correct BPM value. However, if the BPM engine is 'free-wheeling' or you wish to adjust a 'tapped in' tempo, you can use the North/South positions of the NUDGE control to increase or decrease the BPM value in 0.1 BPM steps.

To increase the BPM reading by 0.1 BPM, press the top button once (BPM +/UP).



To decrease the BPM reading by 0.1 BPM, press the lower button once (BPM-/DOWN).

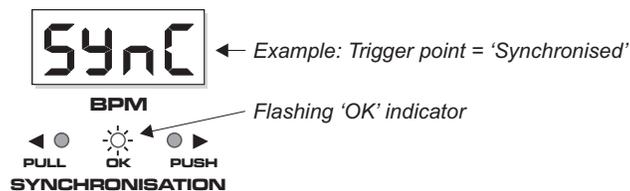


Press and hold down either button to scroll through the BPM values. Further valid beat information detected by the BPM engine will override any manual changes made with these buttons.

**Setting the default BPM value:** The BPM+/UP and BPM-/DOWN buttons can also be used to quickly enter a default BPM value. When the BPM engine is in IDLE mode (no audio signal present - BPM display showing four centre bars), simply press either button once to enter the default setting of 120 BPM. The FEDERATION is now in PAUSE mode and ready to run the effects at 120 BPM. You can adjust this setting with the TAP or NUDGE (BPM+/UP or BPM-/DOWN) buttons.

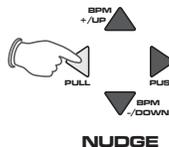
**SYNC Adjustments (using PULL and PUSH buttons):** Under normal circumstances the BPM engine will automatically detect and adjust the audio/effect trigger point to either the on-beat or off-beat position depending on whichever is more prominent in the audio track. You can use the PUSH/PULL feature to make fine adjustments to the synchronisation (if the effects sound slightly ahead or behind the beat of the audio) or complete 1/2 beat steps (if the BPM engine has locked to the off-beat when you require synchronisation to be on the beat or vic-versa).

To check the trigger synchronisation setting, press either the 'PULL' or 'PUSH' button once. The main BPM display and SYNCHRONISATION indicators will now show the current setting, as in the following example:

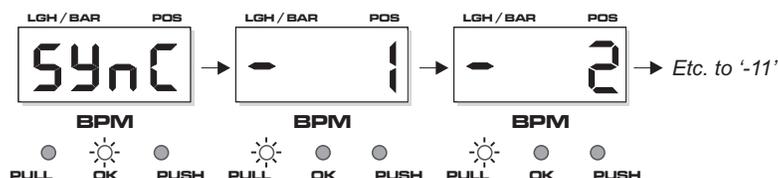


After 4 seconds the BPM display/SYNC indicators will revert to their normal operation. To *adjust* the trigger synchronisation setting, again press one of the buttons marked 'PULL' or 'PUSH' and then, during the 4 second display period, press either button again to change the setting. Each half beat measure has 12 interim settings which allow very fine adjustments to be made to the synchronisation.

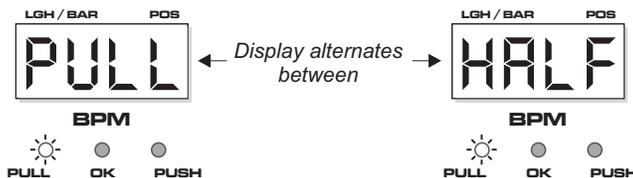
**PULL:** To 'Pull' the MIDI clock backwards, press the left button (PULL) during the 4 second display period.



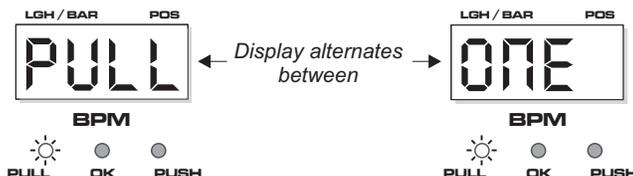
The display reading will change for each single press as follows:



After the '-11' setting, the synchronisation will be pulled back exactly ½ beat, as indicated by the following display:

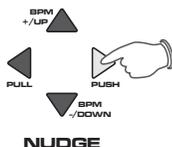


Further adjustments can be made beyond the 'PULL ½ beat' point (display reads from '-13' down to '-23') until the synchronisation is pulled back by one complete beat (maximum PULL adjustment). For this setting the display will show the following:

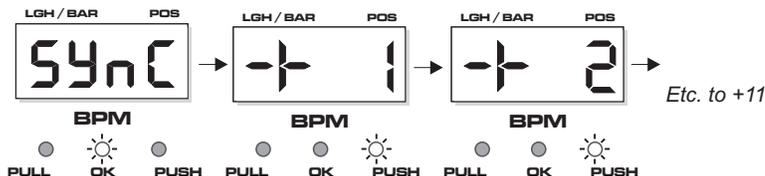


**½ BEAT ADJUSTMENTS:** You can adjust the PULL setting in ½ beat steps by pressing and *holding down* the PULL button for 1 second.

**PUSH:** To 'Push' the MIDI clock forwards, press the right button (PUSH) during the 4 second display period.



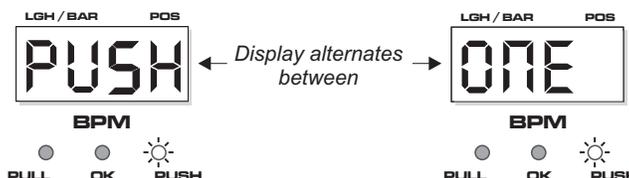
The display reading will change for each press as follows:



After the '+11' setting, the synchronisation will be pushed forwards exactly ½ beat, as indicated by the following display:



Further fine adjustments can be made beyond the 'PUSH ½ beat' point (display reads from '+13' up to '+23') until the synchronisation is pushed forwards by one complete beat (maximum PUSH adjustment). For this setting the display will show the following:

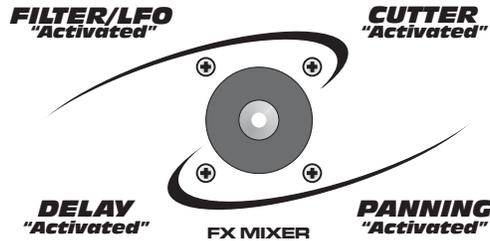


**½ BEAT ADJUSTMENTS:** You can adjust the PULL setting in ½ beat steps by pressing and *holding down* the PULL button for 1 second.

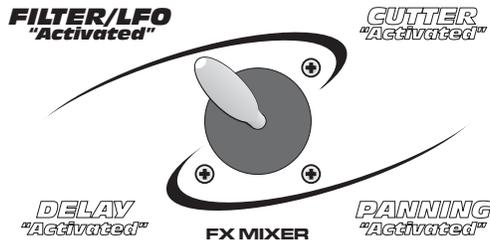
## FX MIXER Joystick Control

The FX MIXER joystick control can be used to adjust the balance between the activated effects in real-time. At the central 'upright' position, all the effect levels will be equal. As the joystick is moved in the 'direction' of an effect (see following diagrams) the audio level of the remaining effects will become increasingly quieter until, with the knob pointing at the effect and hard-up against the edge of the joystick aperture, the other effects will be at their lowest level.

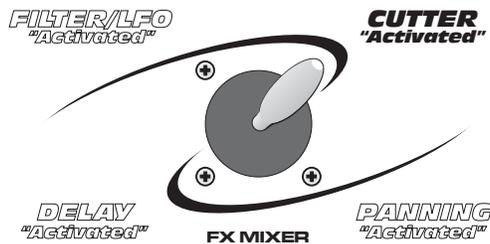
To hear all activated effects equally, always ensure the joystick is in the upright position, as in the following example:



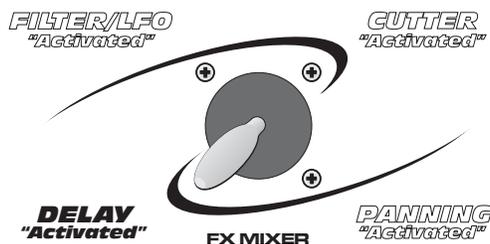
To mainly hear the FILTER/LFO effect, move the joystick to the North/West position, as in the following example:



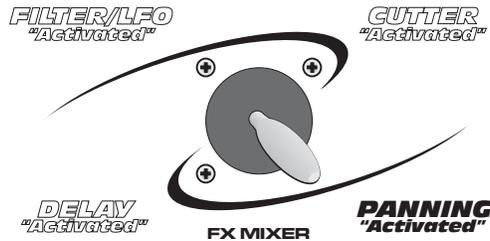
To mainly hear the CUTTER effect, move the joystick to the North/East position, as in the following example:



To mainly hear the DELAY effect, move the joystick to the South/West position, as in the following example:

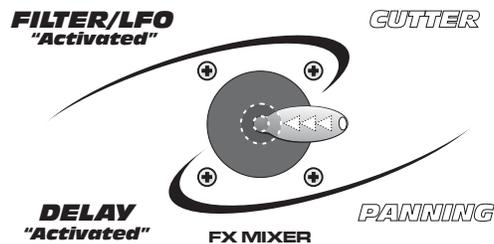


To mainly hear the PANNING effect, move the joystick to the South/East position, as in the following example:

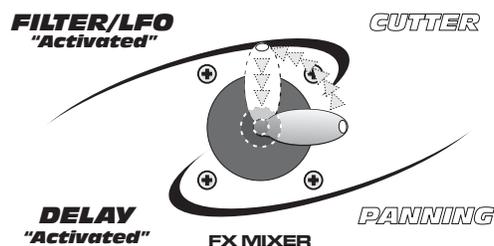


When the joystick is placed in a position other than those detailed above the result will be a unique blend of the activated effects. With all four effects activated, try moving the joystick around to get a feel of the variations possible. You can also use the FX MIXER to fade-in or fade-out one, two or three effects, as detailed in the following example:

**Fade-In/Out the FILTER/LFO and DELAY effects:** Position the joystick over to the right, in between the CUTTER and PANNING positions as shown below and ensure all effects are de-activated. Activate the FILTER/LFO and DELAY effects and then select the MASTER to ON. The audio track will be un-effected until the joystick is moved away from the mid CUTTER/PANNING position. To fade-in both effects simultaneously, move the joystick in a straight line towards the centre position.



To fade-in one effect before the other, move the joystick around the edge of the aperture towards the preferred effect and then inwards to bring in the second effect.



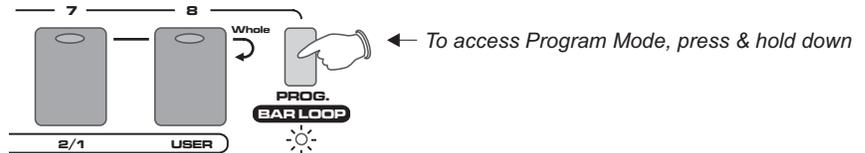
At the central upright position, the level of both effects will be at their maximum i.e. moving the joystick past the upright position towards the FILTER/LFO or DELAY positions will have no further effect.

To fade-out the effects simply return the joystick to the mid CUTTER/PANNING position.

## PROGRAMS

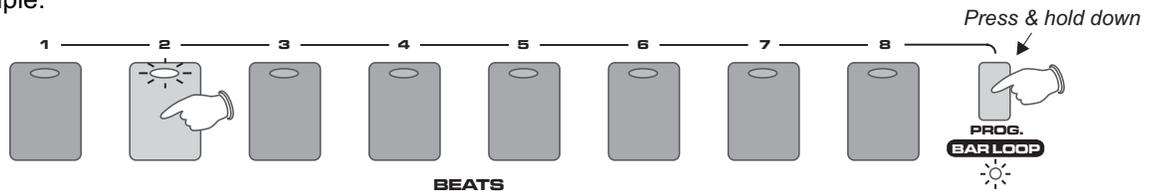
This feature allows you to store all the FEDERATION settings in memory for instant recall of your favourite effect 'scenes'. The position of every knob and switch, the trigger settings, the user beats patterns, utility mode parameters and even the joystick position can be memorised in eight user programmable locations.

The main BEATS buttons are used to recall, compare and store the programs. To enter 'PROGRAM' mode, press *and hold down* the 'PROG' button (LED on), as in the following example:



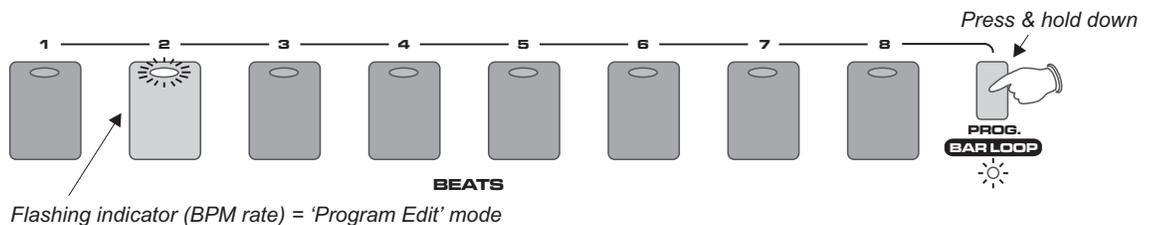
The functions within program mode can only be accessed whilst the 'PROG' button is held down. The labelling above each button designates the program number from 1 to 8.

**RECALL:** To recall a program, press any of the main BEATS buttons whilst holding down the 'PROG' button, as in the following example:



The FEDERATION is shipped with 8 factory presets. Try recalling all eight programs to hear how the effects can be setup.

**EDIT:** To edit the selected program simply adjust the controls. When the first control or switch is moved, the indicator within the selected PROGRAM button will start to flash to indicate 'EDIT' mode, as in the following example:



If you *don't* want to keep the parameter changes made during editing simply select another program number or exit program mode (release PROG button).

**COMPARE:** To hear the original settings of the selected program press and hold the PROG button, then press the flashing program button once. The indicator in the selected program button will now flash at twice the BPM rate to indicate 'Compare' mode, the effects setup reverting back temporarily to the pre-edit condition. You can switch from 'Edit' to 'Compare' modes as often as you like, simply press the button again to jump from one mode to the next.

**STORE IN SELECTED PROGRAM:** If you want to store the new settings, they can be saved into the selected program (any previous settings will be overwritten). To store the new settings, press and hold down the selected program button (whilst holding down the PROG button) for approximately 2 seconds. The indicator in the program button will flash rapidly and 'SAVE' will appear briefly in the main display when the store operation is complete.

**STORE IN ANOTHER PROGRAM:** If you want to keep the existing program *and* still save the edited setup, you can store it in any of the other program locations. Press and hold down the PROG button and select another program number, **KEEP THE PROG BUTTON HELD DOWN** and then press the new program button a second time. The previously edited setup will now be recalled into this program. If you are happy to overwrite the program,

press and hold down the selected program button (whilst still holding down the PROG button) for approximately 2 seconds. The indicator in the program button will flash rapidly and 'SAVE' will appear briefly in the main display when the store operation is complete. You can try any amount of program locations before saving the new setup by repeating this procedure. To exit PROGRAM mode at any time simply release the 'PROG' button(LED off).

The eight factory presets can be re-loaded into memory at any time either individually or simultaneously.

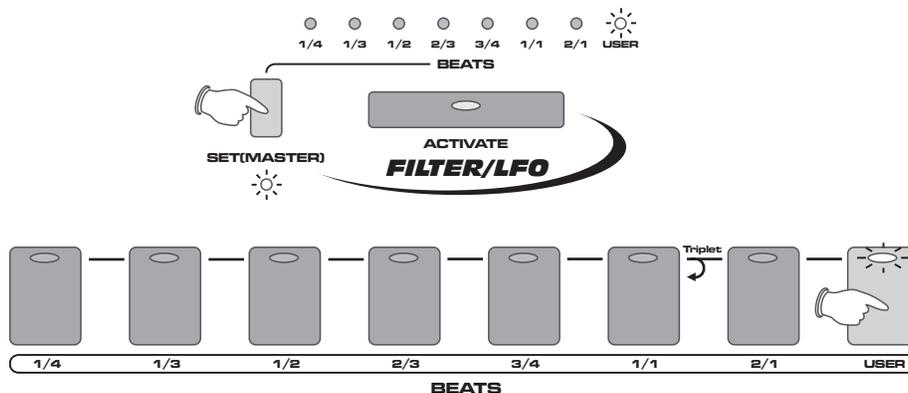
**RE-LOAD ALL 8 FACTORY PRESETS:** With the FEDERATION's power switched off, simply press and hold down the 'PROG' button and turn the power back on. The display will show 'SURE' to prompt confirmation of the load. Press the NUDGE button marked 'BPM+/up' to confirm this operation ('LOAD' appears briefly in display).

**RE-LOAD SINGLE FACTORY PRESETS:** With the FEDERATION's power switched off, simply press and hold down one program button (1 to 8) and turn the power back on. The display will show 'SURE' to prompt confirmation of the load. Press the NUDGE button marked 'BPM+/up' to confirm this operation ('LOAD' appears briefly in display). Only single programs can be loaded in this manner. Example: To re-load three of the factory presets this operation must be repeated three times, a different program button pressed for each power on procedure.

**USER BEATS**

This section allows you to create your own customised trigger patterns for linking the effects to more complex rhythmical patterns within the music. The two USER BEATS memories in each program store patterns of up to 8 bars in length whilst the 'LIVE' feature allows you to trigger the effects 'on the fly' using the TAP button. The USER BEATS feature can be selected on the FILTER/LFO, CUTTER and PANNING effects only.

To select the USER BEATS function, press the effect 'SET' button and then select the button marked 'USER', as in the following example:



To select the 'LIVE' setting, press the 'LIVE(REC)' button in the USER BEATS section, as in the following example:



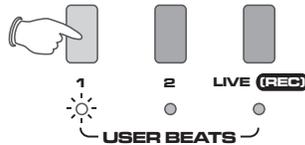
Activate the FILTER/LFO effect, check the MASTER is set to ON and that the FX MIXER joystick is pointing towards the effect or in the central upright position. Now, use the 'TAP' button to trigger the FILTER effect in time with a particular part within the music, perhaps the bass line.

Try adjusting the FILTER controls to change the sound in real-time as you tap along to the musical pattern. Each time the TAP button is pressed and released the FILTER will open and close back to the setting as set by the 'FREQUENCY' and 'ENV MOD' controls. To 'hold open' the FILTER, press and *hold down* the TAP button. To close the FILTER again simply release the button.

The CUTTER effect will operate as does the Filter, 'opening up' when the TAP button is pressed (or held down) to allow the music through and closing when released. The PANNING effect will operate in a similar manner, the SPS frequencies moving to new pan positions with each press, however, there will be no further panning movement when the TAP button is pressed and held down.

**NOTE:** The TAP (clear BPM) function for the main BPM engine WILL NOT OPERATE when the USER BEATS 'LIVE' function is selected.

To program your own trigger patterns, first select one of the USER BEATS memories from the buttons marked 1 and 2, as in the following example:



The FEDERATION is shipped with two factory USER BEAT patterns in each program for you to try out before proceeding with the recording process detailed in the next section. Listen to all 16 first to see if you want to keep them for future reference (before over-writing them).

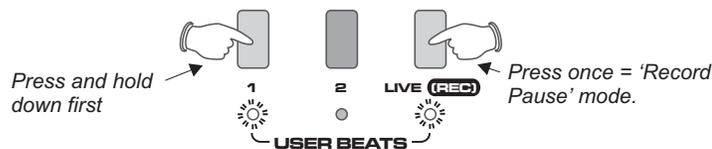
**ERASE:** To clear a USER BEATS memory before starting a totally new pattern, first press and *hold down* the selected button (1 or 2) and then press the TAP (CLEAR BPM) button for approximately 1 second. The indicator below the selected memory button will flash rapidly and 'ErAS' will appear briefly in the main display to confirm this function.



**RECORDING:** Before attempting to record your own pattern, try practising along with the music (using the 'LIVE' function) and count-out the number of bars needed, as in the following example:

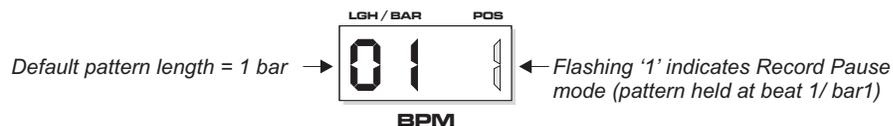


To setup the definable parameters of the pattern, first press and *hold down* the selected memory button and then press the 'LIVE(REC)' button, as in the following example:

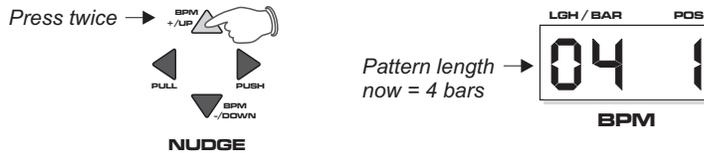


The indicators of the selected memory (1) and LIVE(REC) buttons will now flash at the current BPM rate to indicate 'Record Pause' mode.

In this mode the main BPM display shows information relating to the recording process. The two left-hand digits show the length of the pattern in musical bars. The right-hand digit shows the current beat position within each bar. After erasing a USER BEAT memory as detailed in the ERASE section above, the default settings will be automatically set, as in the following example:



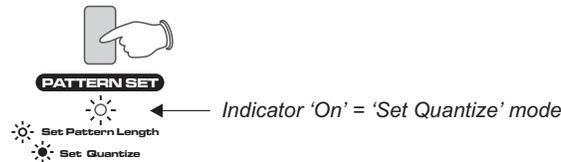
**PATTERN LENGTH:** Set the length to coincide with the number of bars you require for your pattern. When you have decided on the length of the pattern, ensure the 'PATTERN SET' indicator is flashing, then use the 'BPM+/Up' and 'BPM-/Down' buttons on the NUDGE control to change the value, as in the following example:



**QUANTIZE:** The 'Quantize' feature automatically corrects the timing of the 'tapped-in' trigger events to the nearest beat (see page 27) and also sets the scale of the pattern. The 'recording input area' (see page 26) is therefore determined by the quantize value. You should set the quantize resolution to the shortest beat value that will occur in the pattern you wish to record. The available quantize settings are:

- 16 - sixteenth note / Record input area = buttons 1 to 8 <sup>Whole</sup> ↷
- 16 t - sixteenth note triplet / Record input area = buttons 1 to 6 <sup>Triplet</sup> ↷
- 8 - eighth note / Record input area = buttons 1 to 8 <sup>Whole</sup> ↷
- 8 t - eighth note triplet / Record input area = buttons 1 to 6 <sup>Triplet</sup> ↷

To change the quantize value, press the 'PATTERN SET' button and ensure the indicator is constantly 'on' (not flashing), as in the following example:



The PATTERN SET button toggles between 'set pattern length' and 'set quantize value' when 'Record Pause' mode is active. The default quantize setting will now be shown on the main display, as in the following example:



To change the quantize value, use the 'BPM+/Up' and 'BPM-/Down' buttons on the NUDGE control.

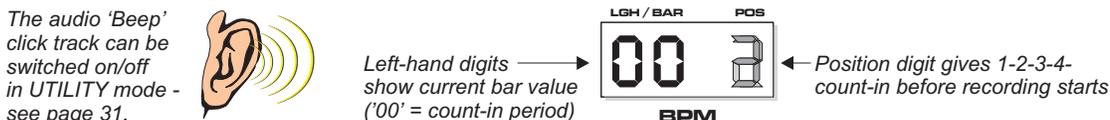
Having set the pattern length and quantize value, you are now ready to record your own trigger pattern into the FEDERATION (If you want to exit 'Record Pause' mode at any time, simply press the selected memory button).

You can monitor the effect your new trigger pattern has on the music as you record it by playing the audio track and ensuring the desired effect(s) are activated prior to starting the recording process. Once you get familiar with recording trigger patterns you may choose to input them without the music playing.

In 'Record Pause' mode, press the 'LIVE(REC)' button once (in time with the music) to start the recording process, as in the following example:



In 'Record' mode, the selected Memory / LIVE(REC) indicators will change to 'on'. The FEDERATION gives you a 4 beat count-in (with audible 'beep' if required) before recording starts. The 'POS' (beat position) digit in the main BPM display will stop flashing '1' and change to show the count-in, as in the following example:



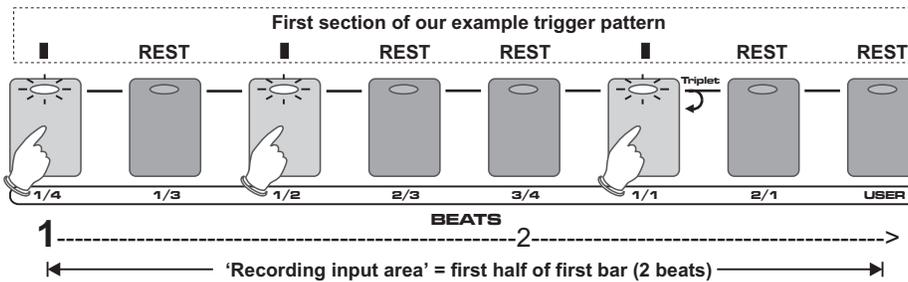
The two left-hand digits will show the bar position of the pattern as it loops around it's set length. The 'bar' and 'beat count' displays will be updated throughout the recording process for confirmation of the exact bar/beat position within the pattern.

Before entering any trigger events, watch the main BPM display and the indicators within the main BEATS buttons to familiarise yourself with the recording environment. Notice the pattern 'loops' around it's preset length (view 'LGH/BAR' digits and left-to-right 'chasing' indicators across the BEATS buttons), repeating the number of bars indefinitely with a constant beat position indication (view 'POS' digit). With the pattern repeating in this manner you should find it easy to enter and monitor trigger events and quickly create the desired pattern.

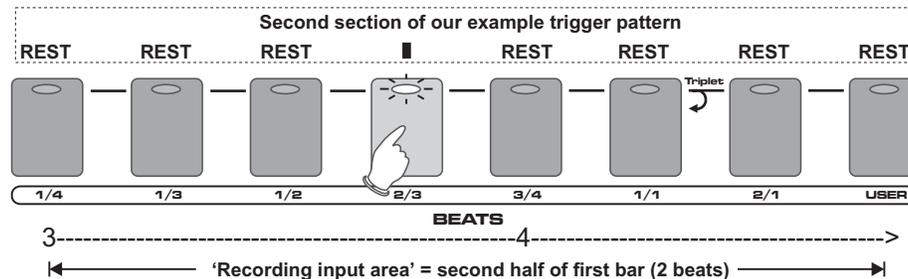
The FEDERATION has two main recording methods. The first uses the eight main BEATS buttons to record/delete events and is based on a classic 'step-time' system found in many MIDI sequencer products whilst the second method is a popular manual 'tap-in' method for entering events in real-time.

**STEP-TIME RECORDING:** The eight main BEATS buttons/indicators represent the 'recording input area' for the current bar section, as shown by the 'LGH/BAR' and 'POS' digits. As the pattern plays through it's set number of bars, so the 'recording input area' moves on, always displaying the events of the current bar within the pattern.

To input trigger events, press the button(s) that coincide with your particular pattern. The indicator(s) will come on and a trigger event will occur at that point in the pattern, as shown in the following examples:

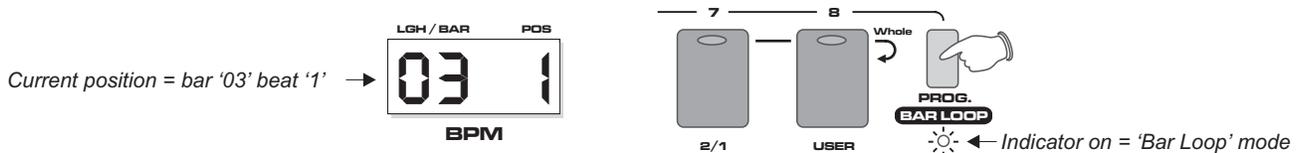


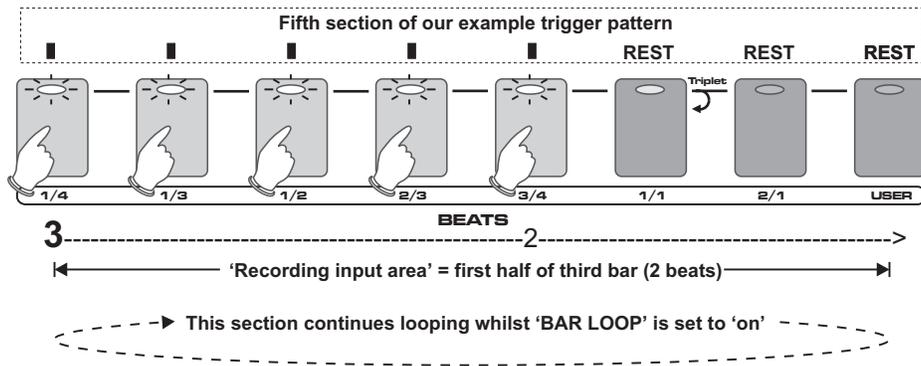
To remove an event, simply press the highlighted button(s) again and the indicator will go out. After showing the first 2 beats of the first bar, the BEATS buttons will show the second 2 beats of the bar, as in the following example:



Once again, press the buttons to match your trigger pattern.

**BAR LOOP:** If you find the event display is moving from one section to the next too rapidly (medium to high BPM rates will make the available 'window' for entering/ deleting events change very fast), you can use the 'BAR LOOP' feature to isolate any section and edit the events at leisure. Press the 'BAR LOOP' button when the section you want to edit is visible within the 'recording input area', as shown in the following example:

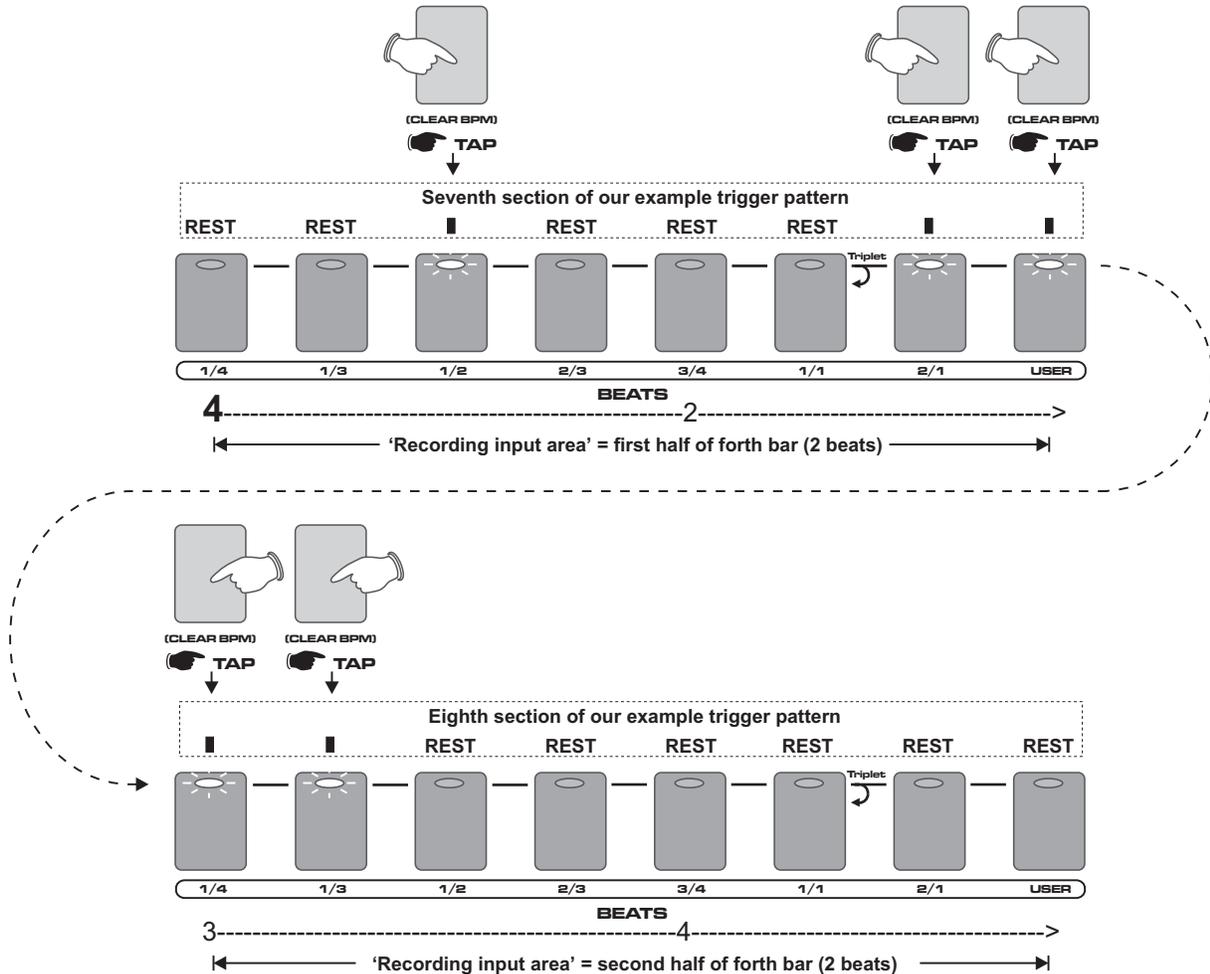




To exit 'BAR LOOP' mode simply press the 'BAR LOOP' button again (LED off). The pattern will now continue to play onwards from the end of the current loop section.

**TAP RECORDING:** You can also enter events with the TAP button. This allows you to play along with the music in real-time, tapping in the events to match the music.

To enter the trigger events, press the TAP button at the desired point in the pattern during 'Record' mode, as in the following example:



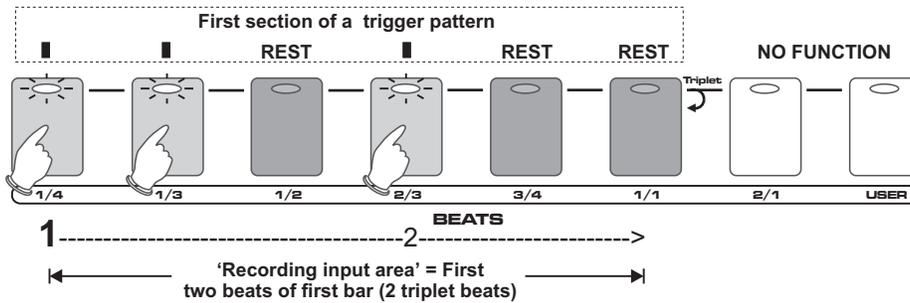
The quantize setting will automatically correct the timing of any trigger events you tap-in to the nearest set beat.

**NOTE:** if you find some tapped-in trigger events are rejected, always select the sixteenth note QUANTIZE value for the finest resolution.

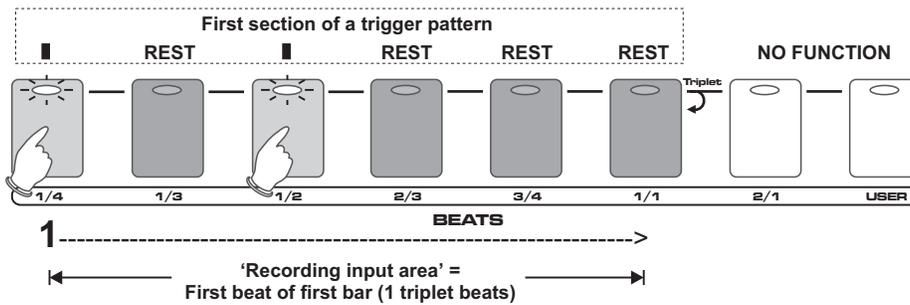
If you want to delete any tapped-in events, simply press the highlighted BEATS button(s) corresponding to the trigger position within the 'recording input area'. The indicator will go out and the event will be removed. When you are satisfied with your recording, press the 'LIVE(REC)' button to exit record mode. You can go back and edit the pattern at any time by entering 'Record Pause' then 'Record' mode directly without carrying out the erase function.

**RECORDING TRIPLET PATTERNS:** The 'recording input area' changes length when the 'triplet' quantize settings are selected, as shown in the following examples:

Quantize setting = '8 t' (8th note triplet):

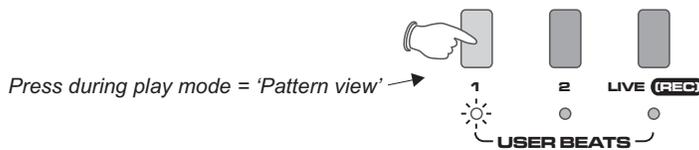


The scale is set to cover 2 bars allowing 8th note values to be input. Here is the same trigger pattern when quantize setting = '16 t' (16th note triplet):

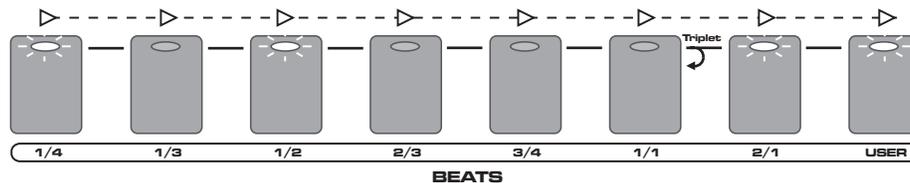


The scale is now set to 1 bar allowing the inclusion of 16th note values.

You can monitor the USER BEATS trigger patterns (1 or 2) during normal play mode to check the pattern activity and the current position. To view the pattern, press and *hold down* the active memory button during normal 'Play' mode (BPM detected), as in the following example:



The BEATS buttons will show the left to right 'chasing' indicator pattern and any trigger events as they appear over the preset number of bars, as shown in the following example:



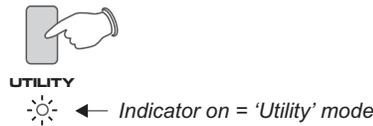
The main BPM display will also show the bar / beat position, as in record mode. To exit 'pattern view' mode simply release the memory button.

**UTILITY MODE**

The Utility section contains various system parameters that need to be altered less frequently than those on the main panel. Some changes will be stored when the power is turned off. The parameters available in this mode are:

1. Set input channel gain
2. Set effects configuration
3. Set BPM range
4. Set Cutter sawtooth slope
5. USER BEATS click track on/off

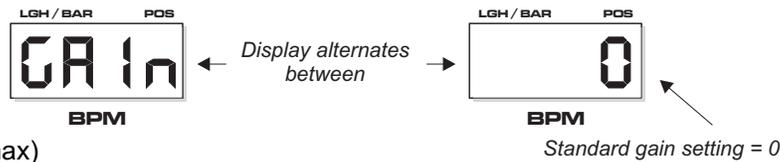
To enter utility mode, press the 'UTILITY' button once, as in the following example:



The indicator will come on and the main display will show the setting of the first utility parameter (or last visited parameter thereafter). Each subsequent press will call up the next parameter, the selection returning to '1' after the last item on the list. To exit UTILITY mode, press the 'TAP (CLEAR BPM)' button once.

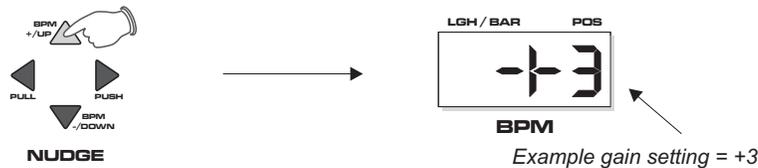
**UTILITY 1: INPUT GAIN**

This is where you adjust the input gain to match the FX send or master output level from your mixing desk. With utility mode '1' selected, the display will alternate between:



SETTING RANGE = 0 to +5(max)

To match the level from the master output, first set the gain/level faders on your mixing desk to the normal operating positions (0dB on indicators) and, with a suitably loud audio track playing, observe the FEDERATION's input indicator. Use the NUDGE control 'BPM +/UP' and 'BPM -/DOWN' buttons to adjust the gain setting.



The standard gain setting ('0') of the FEDERATION has been set to match the very high outputs of many DJ mixing desks/sound sources on the market. If your mixing desk/sound source has a lower output level (this will be shown by low level indications on the bi-colour input LED when the mixing desk output is at full), use the gain setting to boost the input signal until the input LED lights GREEN, occasionally flashing RED.

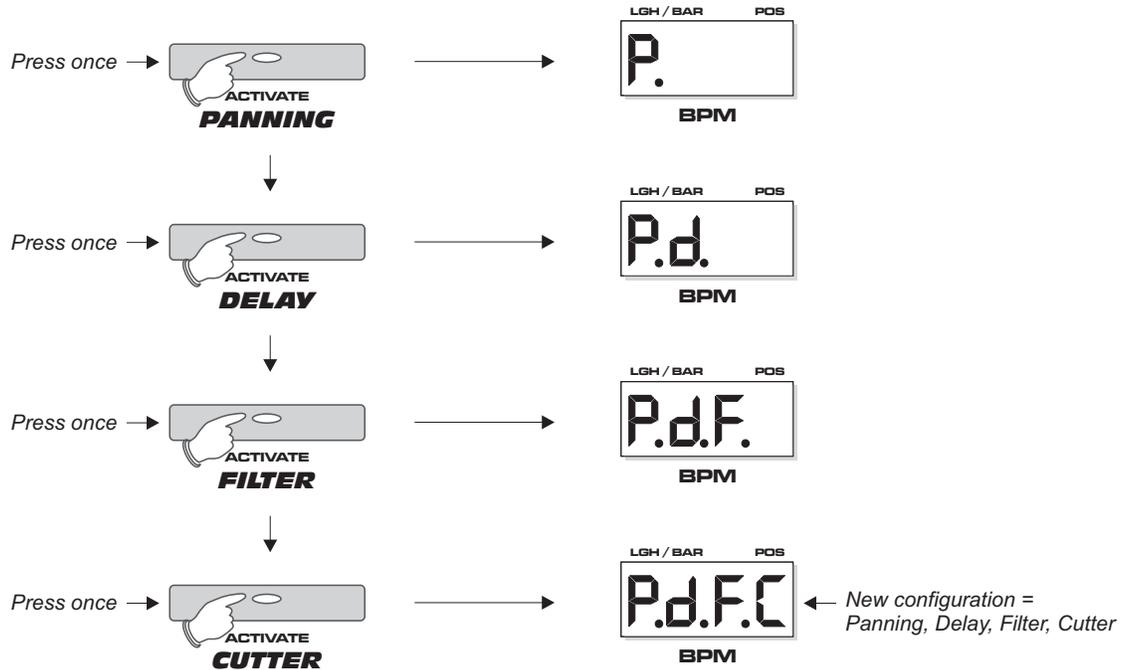
**UTILITY 2: EFFECTS CONFIGURATION**

This is where you select the order of the effects. With utility mode '2' selected, the display will alternate between:



The effects can be arranged one after the other in any order you wish. Try various combinations to hear the way the interaction between the effects changes. To change the configuration, use the effect 'ACTIVATE' buttons to select the effects in the order you want to place them.

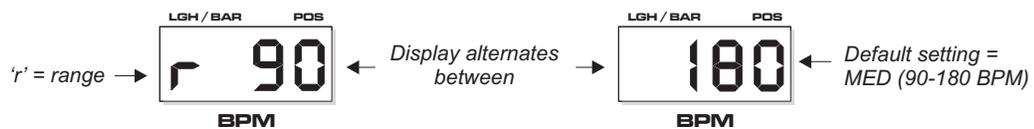
When the first activate button is pressed, the display will change to show the new 'first in line' effect and so on until all four effects have been entered, as in the following example:



Effects cannot be entered twice. After all four effects have been entered correctly, the operating system will automatically exit Utility mode.

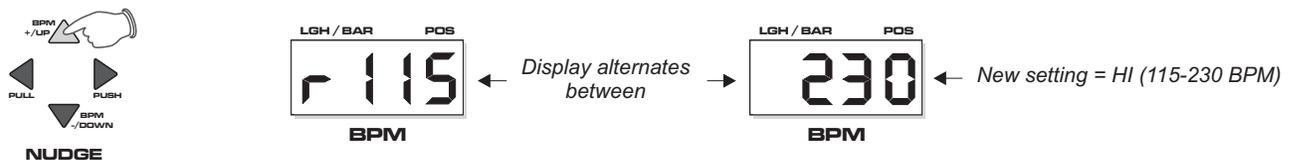
### UTILITY 3: BPM RANGE

This is where you set the working range of the FEDERATION's BPM engine. There are three operating bands, each specifically designed to complement different styles of music from the slowest R&B to the fastest 'Speed Garage'. With utility mode '3' selected, the display will alternate between:



- SETTING RANGE = LO (60 to 120BPM)
- MED (90 to 180BPM)
- HI (115 to 230BPM)

To change the BPM range, use the NUDGE control 'BPM +/-UP' or 'BPM +/-DOWN' buttons, as in the following example:



The BPM range setting is global i.e. it will affect all programs.

**NOTE:** BPM's outside of the selected range limit cannot be analysed. Always check the general tempo of the music you are playing falls well within the selected BPM range. For most applications we recommend the MID BPM range of 90-180BPM.

**UTILITY 4: CUTTER SAWTOOTH SLOPE**

This is where you set the duration of the cutter's sawtooth slope (rise/fall period between triggers). This setting can only be used when the triggering is set to USER BEATS. With utility mode '4' selected, the display will alternate between:

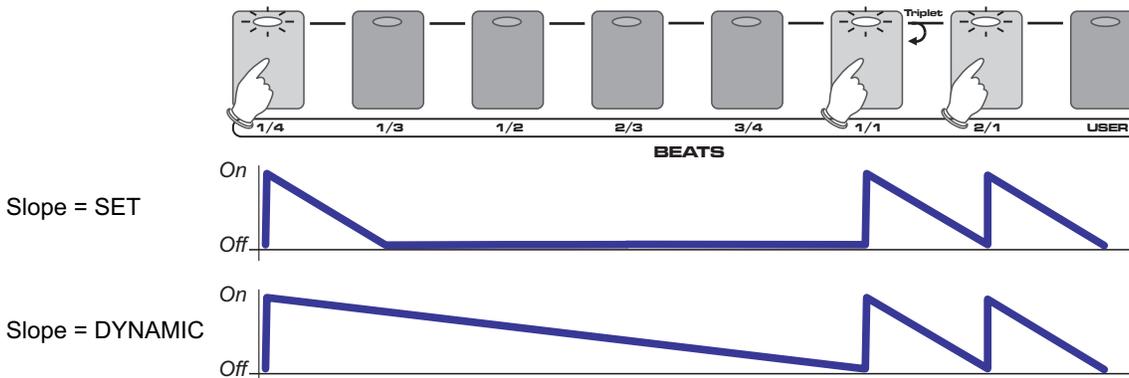


When the 'SET' slope is selected, the rise/fall time will always be equal to the quantize setting e.g. if the quantize is set to 16's, the slope duration will be fixed at 1/16 of the beat. This gives a very short, punchy feel to the trigger pattern.

When the 'dYn' (Dynamic) slope is selected, the rise/fall times will be determined by the next programmed trigger event in the pattern e.g. the audio level will rise/fall at different rates depending on the trigger pattern activity. This gives a more dynamic, 'envelope' feel to the trigger pattern, much the same as from a keyboard synthesizer. Use the NUDGE control 'BPM +/UP' and 'BPM -/DOWN' buttons to change the setting.

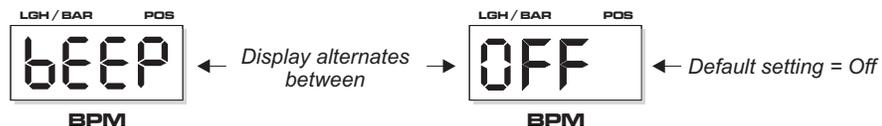


As an example, the following trigger pattern would be changed by the two settings as follows:

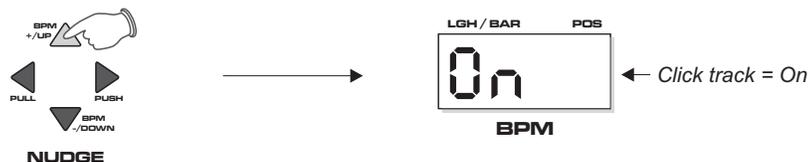


**UTILITY 5: USER BEATS CLICK TRACK**

This is where you switch the USER BEATS click track on and off. With utility mode '5' selected, the display will alternate between:



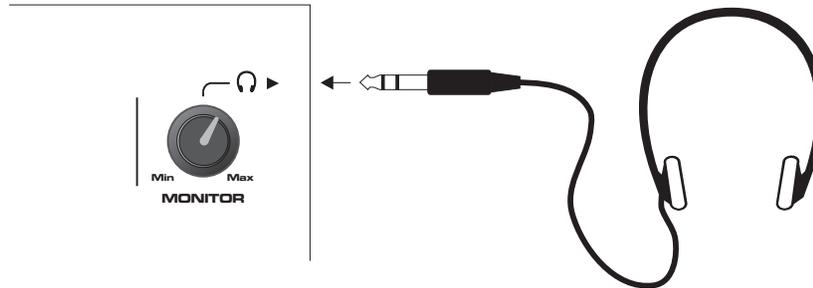
When set to 'On', the audible 'beep' will be heard over the connected audio system (and Headphone output), helping you to keep in time with the music when recording or editing trigger patterns. Use the NUDGE control 'BPM +/UP' and 'BPM -/DOWN' buttons to change the setting.



## HEADPHONE MONITORING

The MONITOR feature allows Djs to hear the activated effects setup before committing it to the Master output. The powerful headphone amplifier delivers all the pure power needed for successful DJ monitoring.

This section features a monitor level control and gold-plated ¼" jack output socket located on the right-hand side of the FEDERATION. Ensure the MONITOR control is set to 'Min', then connect a pair of suitable headphones to the output socket, as in the following example:



Slowly turn the MONITOR control clockwise until a comfortable level is reached. If no effects are activated, the unaffected audio signal alone will be heard.

With the MASTER ON/OFF set to off (indicator flashing) try activating one or more of the effects. You should now hear the effects in the headphones but not on the main amplifier system. Setup the effects as required and, when you're ready, select the MASTER to ON. The effects can now be introduced to the master audio signal in full confidence.

## HINTS & TIPS

### Synchronisation and Tempo Changes:

1. Use the NUDGE feature to manually adjust any synchronisation errors during quite passages (when beat information is unavailable).
2. Always make slow changes when adjusting the sound source pitch control. This will allow the effects to remain in synchronisation during tempo changes.
3. Never make tempo changes during quite passages (when beat information is unavailable) as the FEDERATION will lose synchronisation.

### Troubleshooting:

<b>Problem</b>	<b>Check</b>
BPM engine will not read track	Check/reset BPM range Check mixing desk output level and FEDERATION input gain setting
Unable to hear effect	Check position of FX Mixer joystick Is the Effect activated? Check level controls
Effects out of synchronisation	Check NUDGE setting Check mixing desk output level and FEDERATION input gain setting

---

## SPECIFICATION - FEDERATION BPM FX - DJ

### Audio

**Freq. Response:** 20Hz to 20kHz (+/-0.5dB)  
**S/N ratio:** >85dB  
**THD:** <0.015%  
**Sample rate:** 44.1 kHz 16 bit (CD Quality)  
**Input Levels:** 1 - 2.5 V

### BPM engine

**BPM Ranges:** Low (60 -120), Mid (90 -180), Hi (115 - 230)  
**Lock-in time:** Typically 1 - 4 sec's (from start of readable beats)  
**Accuracy:** +/- 0.1 BPM

### Filter/LFO

**Controls:** Frequency, Resonance, Envelope Mod, Speed(Master), Set Beats, Activate  
**Edit:** Master Speed  
**Speed range:** 20mS - 16Bars of music at calculated BPM

### Cutter

**Controls:** Shape, Depth, Speed, Set Beats, Activate  
**Shape:** Falling sawtooth, Square, Rising sawtooth

### Delay

**Controls:** Level, Repeat, Speed, Set Beats, Activate  
**Speed range:** 20mS - 1.5S

### SPS Panning

**Controls:** SPS, 2-Way Split, Speed, Set Beats, Activate  
**SPS:** Off, 2-Way, Full  
**2-Way Split:** Lo-Mid, Lo-Hi, Mid-Hi  
**Speed range:** 20mS - 16Bars of music at calculated BPM

### Main Features / Controls

**Super-Kill:** Fazed and Bass kill switches  
**FX Mixer:** 1 x Joystick control  
**Trigger Beats:** 8 x buttons (1/4-1/3-1/2-2/3-3/4-1/1- 2/1- USER)  
**User Beats:** 3 x buttons (2 memories per program + LIVE)  
**Programs:** 8 x Program memories  
**Nudge:** 4 x button keypad

### Connectors

**IN/OUT** (RCA phonos)  
Headphone monitor out (2 watts RMS)  
DC Power In

### Power Supply

External (9vDC 800mA)

### Dimensions / Weight

340x230x50mm (13.4x9x2 inches) 2.25kg

### Optional Accessories

**Rack-01:** 19" rack kit (with headphone monitor extension lead to R/H panel)

*Specification and /or appearance subject to change without prior notice due to product improvement - Patent Pending.*

---

## FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

For the USA

This equipment has been tested and found to comply with the limits listed for a Class B digital device, pursuant to Part 15 of 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 instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged 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.

Unauthorized changes or modifications to this system can void the users authority to operate this equipment. This equipment requires shielded interface cables in order to meet FCC class B limit.



This product complies with the requirements of European Directive 89/336/EEC

For Europe

## CLASS B

## NOTICE

For Canada

This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications.

## CLASSE B

## AVIS

Cet appareil numerique ne depasse pas les limites de la Classe B au niveau des emissions de bruits radioelectriques fixes dans le Reglement des signaux parasites par le ministere Canadien des Communications.

---