Future Impact I.

Bass Guitar Synthesizer and

Analog Modeling MIDI Synthesizer Expander

from Panda-Audio Ltd.

User Guide Version 1.22

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Panda-Audio Ltd.
www.panda-audio.com
Product web site: www.pandamidi.com

EU Directives on the Protection of the Environment

RoHS This product is compliant with the EU Directive 2002/95/EG for the Restriction of the use of Certain Hazardous Substances in Electrical and Electronic Equipment. No lead (Pb) cadmium (Cd), mercury (Hg), hexavalent chromium (Cr + 6), PBB or PBDE is intentionally added to this device. Any traces of impurities of these substances contained in the parts are below the RoHS specified threshold levels.

REACh This product is compliant with the European Union Directive EC1907/206 and contains none or less than 0.1% of the chemicals listed as hazardous chemicals in the REACh regulation.

WEEE As with the disposal of all old electrical and electronic equipment, this product is not to be treated as regular household waste. Instead it shall be handed over to the applicable collection point for recycling of electrical and electronic equipment.

CE This product complies with the European Union Council Directives and Standards relating to electromagnetic compatibility EMC Directive (2006/95/EC) and the Low Voltage Directive (2004/108/EC). EMC compliance test report: EMC – 130930/1

Operation is subject to the following two conditions:

(1)   This device may not cause harmful interference, and;
(2)   This device must accept any interference received, including interference that may cause undesired operation.

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Parts of the package:

1.   A Future Impact I pedal
2.   Quick Start Guide.

Part that you will need, but not contained in this delivery:

1.   A 9V stabilized, 100mA, Roland-Boss type supply with minus pole in the middle.
2.   Additionally, if you use it with a computer: PC or MAC with a MIDI interface and two MIDI cables. Minimum screen resolution of the computer: X>=1280, Y>=900. OS on PC: XP or Windows 7. OS on MAC: Intel-based Macintosh Computer with Mac OS X 10.5+.

Warranty

If your Future Impact I system defects or malfunctions as a result of any defected electronic parts or our design fault we provide you two years warranty of repairing or replacing it.

WARNING: NEVER press the Bank button by foot. It must be controlled by hand only. Damage of the Bank switch will not be covered by warranty.

Introduction

The Future Impact I. (FI) is a synthesizer effect for bass guitar players. Additionally it can be used through the MIDI input as a monophonic synthesizer expander using it with a keyboard, a wind controller, a computer or any MIDI source. You find in the FI_quickstart-V122.pdf document how to use it on stage, with a bass guitar. This information will not be repeated here, so read FI_quickstart-V122.pdf first.

Using the editor

Copy the software package into any directory on your computer, connect your MIDI interface to the computer and start FIEditor.exe. The FI is a very complex device with more than 100 parameters for a sound. In order to get an overview it is worth to investigate first the block diagrams of the FI algorithms in the Appendix. On the first page you find the whole device, except the effects. However, the oscillators appear here just as a rough outline, the detailed picture of the oscillators is on the second page. The third page shows how the effect block is inserted into the structure of FI.

FI has two basic sound sources: The harmonizer/bass guitar sound block and the synthesizer block. The synthesizer is driven by the information derived from the bass guitar sound. The bass guitar must be played with clean, monophonic riffs. The whole range of 6 string bass guitars is supported. Slapping, tapping or chord playing does not provide appropriate information about the pitch of the vibration, this can result in false notes of the synthesizer. The sounds of FI can be created from the synthesizer sound, the harmonizer/bass guitar sound, or a mixture of the two.

In the **MIDI/Preferences** pull-down menu you have to select the MIDI IN and MIDI OUT ports that you want to use. If you want to write sound programs into your FI then you must have two MIDI connections between FI and the computer, one cable from the MIDI OUT of the interface to the MIDI IN of FI, and one from the MIDI OUT of FI into MIDI IN on the computer. If you just want to edit sounds and experiment with them, without writing them into FI, then it is enough to have one MIDI connection, from MIDI OUT of the computer into MIDI IN of FI. On this panel there is a second MIDI IN for a Keyboard Input Device. If you want to design a sound using a keyboard instead of the bass guitar you can connect the MIDI OUT of the keyboard into this MIDI IN of the computer, and the computer will perform a through function for the keyboard signals. It is important that you must not connect the FI MIDI OUT to the Keyboard Input Device, only to FI Input Device. From version 1.22 of the FI there is a MIDI through function implemented in the FI software. Since the Keyboard Input Device also implement a MIDI through, connecting the FI to this input would cause n infinite MIDI loop.

In the **FILE** pull-down menu you find six options, plus **Exit**. In **Select Directory** you have to select the directory where you keep the sound programs. With **Load Program** you can load a sound program into the FI, and with **Save Program** you can save a sound program that you edited. You can save and load a sound program with any name, but if you want to write it into the FI then the name determines the location where it will be written to.

The first two characters must be a number between 01...99 in order to address a memory location in FI.

Write Program from File to FI will select one sound program, and write it into FI. You have to select a sound program here that has the appropriate number at the beginning of the name. If it does not, then **Load** it and **Save** it with an appropriate name. While this option will work even if you have just one cable from the PC to FI, the computer program will not get a confirmation of the writing action and an error message will appear, so it is recommended to use both cables. **Write All Programs from Files to FI** will copy all sound programs from your selected directory into FI in a single run. When you use this option then you must have a connection with two cables between FI and the computer, otherwise after writing the first file the action will break down with an error message. If the directory contains several files that have the same leading number then the program will show an error message and it will not perform this option until you remove all duplicates. If the directory contains holes, some of the locations 01...99 are not filled, then the program will ask you how to proceed. You can select between two options, holes will be skipped or filled with the default which is the sound program with the smallest number. These four options can be found directly on the program top surface as **LOAD**, **SAVE**, **WRITE ONE** and **WRITE ALL**. Instead of **LOAD**ing a program you can quickly step through those programs that are properly named with a name that starts with a two digit number if you use the + and − signs.

The last option in the **FILE** menu is **Firmware Update.** If a new software version of the FI appears, you should load it into your device.

1. Connect a MIDI interface to the PC (see remarks about MIDI interfaces at the end of this description). Connect the Future Impact bidirectionally to the interface, with two MIDI cables:
   FI/MIDI OUT -> MIDI Interface/MIDI IN (assigned to FI Input Device)

   MIDI Interface/MIDI OUT (assigned to Output Device) -> FI/MIDI IN

2. Power up Future Impact with both footswitches kept pressed while turning on power. The ON LED will start slowly blinking, all other LEDs and displays stay dark.
3. Click **Firmware Update** and select the update file. The file has a name format of FIxxx.ldr, where xxx is a three digit version number.
4. The program will first check if the FI is present. If not, then the update process will be ignored and the message "Future Impact not present" will appear. Otherwise, update will go on. The program will write "Loading Update...", the LED changes to blink quickly. At the end of the process the program will write "Update successful!", and the LED returns to blink slowly. Otherwise the program will write "Error!" and updating is stopped. The LED can be either on, or off, or quickly blinking.

After a successful update you have to power FI again. Check if the version number appearing on the display is identical with the version number of the update file. You can disconnect the MIDI cables, and start to use FI.

Even if for some reason the update was not successful (e.g. bad data transmission due to faulty driver software of the MIDI interface) you can use FI further just as before, with the old software. Even if power is interrupted during update do not worry, the FI software update process is foolproof. Although the device may look dead in this case, you can repeat the updating process in spite of the error until it will be successful.

While most MIDI interfaces are well implemented and can transfer large sysex packages like the one that the FI software upgrade, some manufacturers do not test their devices carefully enough, and data loss happens in a large package. While such a MIDI interface can be useable for the FI Editor or for other purposes, it cannot be used for the software upgrading. Do not worry, even if updating will make errors it will not damage your FI in any way; after an updating error the FI will remain useable just as it was before.

In the lower middle part of the screen you find a **keyboard**. If you do not have a bass guitar handy (and the bass sound is not part of the sound that you design) then you can use this keyboard to trigger notes in order to test the sound. The keyboard is even "velocity sensitive", it will produce different key velocity values depending on where you press the key.

Parameters

We will discuss separately the parameter blocks of FI.

VCO Block

FI contains four identical Voltage Controlled Oscillators (VCOs). The VCOs have the following parameters:

PITCH COARSE (-12..48): Determines the pitch of the oscillator in semitones. 0 will generate the same pitch as the input bass signal.

PITCH FINE (-63..63): You can detune the oscillator with a small musical interval. E.g. you can use this option to correct the imperfect harmonies of the well-tempered scale to perfectly clean intervals.

PITCH BEAT (-63..63): This serves also for detuning, but instead of a fixed musical interval it detunes with a fix number of Hz. The most important function of this parameter can be explained with the example when you use two oscillators in unison, and detune them in order to have a beating between them. If you adjust a pleasant beating in the deep range of the sound with FINE, and then you play it in the high range, the beating will become painfully "out of tune", since detuning will scale with the pitch. If you use BEAT instead, then the beating between the two oscillators will remain independent of the pitch.

AMPLITUDE SAW/SQR/TRI (0..127): The FI oscillators have three waveforms, saw, triangle and square. Here you can mix these in arbitrary proportion.

AMPLITUDE VOLUME (0..127): This is the master volume of the oscillator. This will have an especially important role by the foldover distortion.

PULSE WIDTH OFFSET (0..127): The pulse width of the square waveform can be adjusted between symmetric (0) and very thin pulse (127).

PULSE WIDTH LFO FRQ (1..127): Every oscillator has its own LFO (low frequency oscillator) for modulating the pulse width of the square signal. Here you can adjust the LFO frequency.

PULSE WIDTH LFO DEPTH (0..127): This controls the amount of LFO modulation. It is the programmer's responsibility to make sure that a combination of OFFSET and LFO DEPTH will not get out of the useable range of modulation.

SAW VCA DECAY TIME (0..127): As a special function, the amplitude of the saw waveform can have an individual decay envelope which is triggered every time when you pick the bass. This parameter adjusts the decay time.

SAW VCA SAW DECAY (-63..63): This parameter determines the amplitude of the decaying portion of the saw waveform. A combination of SAW AMPLITUDE and SAW DECAY allows you to have a wide range of possibilities. E.g. see the following examples:

SAW AMPLITUDE=64, SAW DECAY=0; a steady saw waveform.

SAW AMPLITUDE=0, SAW DECAY=63; a decaying waveform that fades out.

SAW AMPLITUDE=32, SAW DECAY=63; a decaying waveform, that becomes steady after the decay.

SAW AMPLITUDE=64, SAW DECAY=-63; the saw waveform will fade in.

Foldover Distortion: A very unique feature of FI is the foldover distortion. Depending on the implemented algorithm, when a signal processor is overloaded it will either clip the peak of the signal, or it will fold over. While clipping is often used to generate a moderate amount of overtones, foldover is practically never used since it generates such a high overtone content that will make the sound unusable due to out of tune aliasing products. However, the huge processing power used in FI allows to generate the oscillators with a 512 kHz oversampling rate, guaranteeing that the aliasing portion in the sound remains negligible. Foldover Distortion will happen either in one oscillator alone, or as a combination of separate oscillators.

Every oscillator waveform will drive the summation to maximum amplitude alone, if it is set to 127. Foldover Distortion will happen if the sum of all waveform amplitudes becomes more than 127 (or, at least it can happen, depending on the phase of the components). Since every oscillator can have two dynamically changing portions of the sound, the pulse width modulation and the SAW VCA, these can be used to generate a sound with dynamically changing spectrum, even without a filter.

Another step of foldover distortion can happen between separate oscillators. When the four oscillators are summed, the sum will fold over if the sum of the amplitudes is higher than 127. Therefore, in clean default sounds the oscillator master volumes are set to 32, so foldover cannot happen. The effect of foldover distortion between oscillators that are tuned to different frequencies or just beating is rather unpredictable, it leaves a lot of freedom for experimenting.

There is a **COPY** option in the lower left part of the screen to copy all parameters of an oscillator to another one. You have to select a source VCO at the left side and a destination VCO at the right side, then press **COPY**.

Harmonizer Block

The Harmonizer Block consists of the harmonizer with three transposed voices, and the Distortion. The input to the Distortion is a mixture of four voices, the original bass and the three harmonized voices.

MIXER BASS/VOICE1/VOICE2/VOICE3 (0..127): You can set an arbitrary proportion between these four sound sources. VOICE1 is fixed at +1 octave transposition, the other two are variable in steps of 5TH, octave, octave+5TH, two octaves.

HARMONIZER TRANSPOSE VOICE2/VOICE3 (0..3): For two voices the transposition is variable. Identical settings of the two voices are scaled so, that they are not exactly equal, they will have a slight beating between them.

DISTORTION GRADE (0..31): The degree of distortion can be adjusted here. Even at zero the distortion is not turned off.

DISTORTION TONE (0..127): The tone of the harmonizer/distortion part can be set here. The filter is an equalizer set to 2100 Hz and Q=0.8. The controller can adjust a cut or boost at this frequency. 0-> -11dB; 64-> 0dB; 127->+11dB.

Envelope Generator Block

VCA ATTACK/RELEASE, VCF ATTACK/DECAY, NOISE ATTACK/DECAY (1..127): FI has three envelope generators that control the Voltage Controlled Amplifier (VCA), the Voltage Controlled Filter (VCF) and the Noise Generator. All three of them are triggered with every picking of the bass, but there is an important difference between them: the envelope generator of the VCA is an Attack-Release envelope, while the other two are Attack-Decay envelopes. This means, the VCA envelope will start with an attack from zero, and when it reaches the maximum level this will be kept until the end of the sound; then it will fade out with a release time.

The other two envelopes will start from zero with an attack, and when they reach the maximum they immediately turn back and decay to zero. As a further twist, the VCA envelope works this way as described here only when it is driven from a keyboard or a computer; when it is driven from a bass, then the sound decays either with the release time of the envelope, or with the natural release of the bass sound as the sound is stopped, whichever is shorter. This allows much more natural sounds from the bass guitar.

Please note that while the synthesizer sound is gated with the VCA envelope, the noise source is not; therefore, if you play short notes and the NOISE DECAY is long it can be sustained longer than the note itself.

Voltage Controlled Filter Block

The Voltage Controlled Filter (VCF) Block consists of three parts, an audio mixer, the filter cutoff modulation part, and the filter parameters.

AUDIO BASS / DIST / AR.DIST / SYNTH / NOISE (0..127): This is a four channel mixer at the input of the VCF. The first channel is the direct bass guitar sound itself. The output of the Harmonizer / Distortion Block is connected to the second input channel. The fourth channel is the synthesizer sound, and the fifth is the noise generator. The third channel has a very special function, which is coupled with the function of the fourth channel, the synthesizer sound.

As we discussed earlier, the synthesizer sound is passing through the VCA. This means, if you adjust a significant attack time, then the note will start with a delay after picking. The AR.DIST channel consists of the distorted sound (like the second channel) but processed through another VCA which is controlled by the inverse envelope of the synthesizer VCA. This way, if you adjust roughly same loudness levels for AR.DIST and SYNTH, and adjust a significant attack time then you will get a sound which starts as a sound with Harmonizer/ Distortion, and fades through to a synthesizer sound. Although relatively few of the demo sounds use this feature, this can be used to cover perfectly an eventual tracking error/delay of the synthesizer sound.

MODULATION FRQ VINTAGE (OFF,1..80) / FRQ NEW (36..122): These are two controllers for the same function, the basic frequency of the VCF. While the Deep Impact had an inaccurate approximation of the necessary exponential filter control characteristic, The Future Impact has a perfect implementation. However, in order to emulate the Deep Impact sounds it was necessary to emulate the imperfection of the filter. Therefore, in the Deep Impact emulation sounds (the first 9 of the default set) FRQ VINTAGE is used to set the filter frequency, and the setting of FRQ NEW is irrelevant. If FRQ VINTAGE is set to -1, then FRQ NEW becomes active. The scaling of these parameters is roughly 10 units/octave for FRQ VINTAGE, and the number on the slider of FRQ NEW is exactly the MIDI number of the filter frequency.

MODULATION ENVELOPE FOLLOWER (0..127) / AD(0..127) / PITCH FOLLOW (0..1): The frequency of the filter can be modulated dynamically from different sources. The Envelope Follower signal is following exactly the loudness envelope of the bass guitar, so a portion of the control from this source can give a very dynamic modulation to the sound. The AD modulation is the VCF Envelope Generator signal, with adjustable attack and decay times. Pitch Follow can be set to either 0 or 1. If it is set to 0, the filter frequency is steady, independent from the bass guitar signal. If it is 1, the filter frequency is accurately tracking the bass guitar signal. This can be used for many purposes, among others to generate whistling sounds with very sharp filter adjustment.

MODULATION FRQ 2ND (0..24): FI has not only one VCF, but two of them. They are connected in parallel. The second one has a single adjustable parameter, FRQ 2ND. The resonance (Q) parameter is the same as the first one, the filter is always in Bandpass mode. The cutoff control signal is the same as for the first one, except that FRQ 2ND is an adjustable offset corresponding to a fixed harmonic interval between them. Using two resonances provides an excellent way to generate sounds with vowel-like formants, resembling human voice. The offset is defined in semitone steps. If you set it to zero, then the second filter is turned off.

FILTER TYPE: The filter type can be selected here. It can be LOWPASS, HIGHPASS, BANDPASS, NOTCH or OFF. OFF means that the filter is bypassed.

FILTER RESONANCE (Q) (7..127): The resonance sharpness of the filter can be adjusted on the scale of Q=0.7...12.7).

24 dB / 12 dB: The filter mode can be set as 24 dB/octave or 12 dB/octave.

LFO Block

A dedicated LFO can be used to modulate the VCF and the VCO.

LFO FREQ (1..127): Sets the frequency of the LFO.

LFO DELAY (0..127): An envelope is started at every picking of the bass that fades in the LFO amplitude with a variable delay. If it is set to zero then the LFO amplitude is set immediately.

LFO VCF DEPTH / VCO DEPTH (0..127): The LFO amplitude can be set for both destinations.

MIDI + Portamento + Keyboard Block

The parameters in this block are relevant only if FI is used through MIDI IN. Actually FI has internally separate modes for using it with bass or using it through MIDI IN, but it does not require a "switch". Switching between these modes happens automatically. Whenever a proper audio signal appears at the bass input, it switches to Bass Mode, and whenever a NOTE ON appears at

the MIDI IN it switches to MIDI Mode. So, if you want to use it through the MIDI input then take care that no audio signal appears on the bass input. While in Bass Mode the filter cutoff can be controlled by the envelope of the bass signal, in Keyboard Mode this control will adjust the effect of key velocity on the VCF cutoff.

PBD RANGE (0..12): Pitch Bend Range in number of semitones. Determines how FI will react on modification of the pitch with the pitch bend wheel.

TRANSP OCTAVE (-2..1): The incoming MIDI information can be transposed by -2, -1, 0 or +1 octaves in order to match the external source to the sounds of FI.

PORTAMENTO TIME (0..127): If this is set to non-zero value, the pitch will glide from one note to the other with an adjustable time.

PORTAMENTO MODE: FIX TIME means that the portamento time will always be the same, no matter how large is the pitch step. FIX RATE means that the portamento rate will always be the same, so the time to reach the target note will depend on the distance between the starting note and the target.

TRIG/GATE: In GATE MODE a new attack of the sound will be started only if you release all keys before starting a new one. In TRIGGER MODE a new attack will be started every time when a key is pressed.

PRIORITY: This parameter will determine what happens if you play more than one note at a time. LOWER: Whichever note is the lowest it will be played. UPPER: Whichever note is the highest it will be played. FIRST: Whichever not was pressed first it will be played. LAST: Whichever note was pressed last it will be played.

Main Output Mixer Block

This is a simple two channel mixer, before the final output to the effect section.

BASS / VCF (0..127): Setting these will determine the loudness ratio between the direct bass sound and the sound coming from the synthesizer / harmonizer through the VCF.

Effect Block

The effect block contains three effects at the time of the product release, and it will be enhanced further later.

TYPE (0..3): The effect type can be selected here. The choices are: BYPASS (0), CHORUS / FLANGER / SLAPBACK / REVERB (1), OVERDRIVE (2), EQUALIZER (3). The parameters of the different effects will be discussed separately.

BASS/VCF (0..127) or (0..1): With these controls you can determine which of the two main signals (BASS and VCF) will be routed through the effect section.

This is slightly different for effect type 1 and 2 or 3. For the time modulation effect you can determine on a 0..127 continuous scale the blend ratio between the dry and the effected signal. In case of Overdrive or Equalizer such a blend control makes no sense, so the controller is either 0 for dry only or 1 for effect only.

Effect 1 : Chorus/Flanger/Slapback/Reverb

This effect has a very flexible set of blocks and control parameters, which enable it to be configured as a Chorus, a Flanger, a Slapback Echo or a simple Reverb by just setting the parameters differently.

This effect consists of two delay lines that can be modulated, and two LFOs that can be used as modulator. However, the two LFOs are not assigned to the two delay lines in a fixed configuration, each can modulate either delay line.

LFO A FRQ, LFO B FRQ (0..127): The frequency of the two LFOs can be adjusted here.

LEVEL1, LEVEL2 (-64..63): The output level of the two delay lines. The amplitude can be negative, which is important for flanger sounds if the delay value is very small, or if the two delay values are very close to each other.

DELAY1, DELAY2 (0..127): The delay time can be adjusted here. The maximum value is about 160 msec. It is the sound designer's responsibility that (delay +- modulation) remains within the range that makes sense.

MOD1A, MOD1B, MOD2A, MOD2B (0..127): The modulation amplitudes of the LFOs A and B to the delay lines 1 and 2.

FBCK LEVEL (0..127): Feedback level. It is the sound designer's responsibility to set the feedback level moderately so that no oscillation happens. Oscillation can completely block the sound.

FBCK DMP (0..127): Feedback Damp. A lowpass filter applied to the feedback path. It can emulate the natural damping of walls in a room.

Effect 2: Overdrive

DRIVE (0..127): This will adjust the amount of distortion.

LEVEL (-6..+6): Output level adjustment in dB steps. Adjusting DRIVE will also change the level of the signal in a somewhat unpredictable manner, therefore an output level adjustment is necessary here.

Effect 3: Equalizer

The Equalizer consists of a bass shelf tone control, two parametric band equalizer stages, and a treble shelf tone control.

BASS FRQ (0..127): This control will adjust the frequency of the bass shelf filter in the range of 50...270 Hz.

BASS SLOPE (0..127): the steepness of the bass filter can be adjusted here in a range of 3...10dB/octave.

BASS BOOST (-20..+20): The bass can be boosted or cut by up to 20dB.

MID1 FRQ, MID2 FRQ (0..127): The center frequency of the equalizer stages can be adjusted in the range of 170...7000Hz.

MID1 Q, MID2 Q (10..100): The resonance (Q) of the equalizer stages can be adjusted in a range of 1...10.

MID1 BOOST, MID2 BOOST (-20..+20): Boost and Cut of the equalizers can be adjusted in the range of -20dB to +20dB.

TREBLE FRQ (0..127): This control will adjust the frequency of the treble shelf filter in the range of 2000...7000 Hz.

TREBLE SLOPE (0..127): the steepness of the treble filter can be adjusted here in a range of 3...10dB/octave.

TREBLE BOOST (-15..+15): The treble can be boosted or cut by up to 15dB.

Using Parameter (Effect) on the FI to adjust EQUALIZER: The default Equalizer setting that was adjusted in the editor will be active by setting 5 of the data wheel. Increasing up to 9 will increase treble boost/cut in steps of 2 dB, while reducing bass boost/cut also in steps of 2dB, and leaving the mid controls unchanged. So, effectively turning the control to higher value will make the sound sharper, while decreasing to 1 will damp the sound.

The Equalizer section has an optional graphical editor too. On top of the Equalizer section you find two small icons. The left one selects the editor with sliders as described before, the right one selects the graphical editor. If you use the graphical editor you can adjust with the mouse the frequency of a filter stage (left-right), and the boost-cut (up-down). If you use the right mouse button, you can edit the steepness of the low and high shelving filters in dB/octave, or the Q value of the mid filters.

Block Adjust Mode

There are three options to adjust a complete block (or even all of them) in one single step. In the lower right corner you can select one or more of the 8 processing blocks that were discussed here. You can even **Select All** or **Clear All** of them. Once selected, you can press:

Default: It will set the block to useful default parameters.

Reset: It will inhibit the block.

Random: This option will generate random values for all parameters in the selected block(s).

MIDI Implementation details

The MIDI input of the FI will receive the following information:

NOTE ON with velocity

NOTE OFF

PITCH BEND

PROGRAM CHANGE (1...99 for programs 1...99)

MODULATION (Control 1; default value: 127)

BREATH CONTROL (Control 2; default value: 127)

MIDI VOLUME (Control 7; default value: 127)

SOSTENUTO (Control 66; Effect On/Off). If <64 then switch the relay to bypass, if >=64 then to effect.
SOFT PEDAL (Control 67; Program decrement switch). If >=64 then first it makes one step down, then it starts to scroll, just like the Program Up does. Stops if <64.
FILTER CUTOFF (Control 74; default value: 64)

Remark1: Modulation (Control 1) is routed to both VCF and VCO LFO Modulation. This means, that whatever depth is set in the program, this depth value will be reached if Control 1 is at maximum, 127. Practically, the modulation value(s) in the program will be multiplied with the MIDI controller value / 127. Beware, if you use FI with a keyboard and use the Mod Wheel, when you release it, it will reset the controller to zero. If you disconnect now the keyboard and play the FI further with a bass, you will find that there is no modulation in the programs where you expect it, because the default of 127 has been reset to zero. *You have to turn FI off and on again.*

Remark2: MIDI Volume (Control 7) is implemented at the final output of FI. It is independent of all program parameters. Beware, if you use a keyboard or a MIDI pedal to adjust the volume of FI and you disconnect it, the volume will return to the default maximum value only if you turn FI off and on again.

Remark3: The breath controller (2) adjusts the VCF volume of the Output Mixer in the same way as the LFO modulations work: when the MIDI breath controller is at maximum (127) then this corresponds to the preset value in the program. This differs from Volume Control (7) in two aspects:

1.) It adjusts only the synth voice volume, does not change the bass;

2.) It is before the effects, so delay effects will not be muted out when this controller is pulled down.

Remark4: NOTE ON, NOTE OFF and PITCH BEND are active in MIDI Mode only (it is actually NOTE ON what switches the FI to MIDI Mode), the other controllers can be used in either MIDI Mode or Bass Mode.

MIDI Through: The MIDI OUT of the FI will mirror back all information coming through MIDI IN, except Control 6 (Data Edit), NRPN controllers and sysex.

Program Change Out: Whenever a program change happens on the FI, it sends out the appropriate Program Change command on the MIDI OUT on the effective MIDI Channel, if it was caused by pressing the Program pedal, or a Program Decrement command on the MIDI IN, but not by a Program Change on MIDI IN (this will appear on MIDI OUT anyway, due to THRU).

Editing the Configuration Parameters

The FI has 99 sets of Program Parameters, that can be edited with the computer editor, as described before; it also has 99 sets of modifier parameters, that can be edited on the FI with the Edit dial, as described in the Quickstart manual; if has two Global Parameters, NOTE OFF LEVEL and NOTE ON LEVEL, these can also be edited with the Edit Dial; and it also has a few Configuration Parameters, that are common for all Programs. These can be edited on the FI in a special startup mode. Two of these were already discussed in the Quickstart Manual, Reset All and Program Mode, but for completeness they are repeated here as well.

Press the left footswitch while you power on. Turn the Parameter dial to the leftmost position, Note Off Level to see the name of a parameter, and turn it to right to any other position to see the value of the parameter. The value can be changed with the edit dial. Step through the parameters with pressing the left footswitch again. When ready with editing turn FI off and on again.

RESET ALL: Name: "rS", meaning RESET. Value: 0. If it is changed to 1 all sound parameters will be reset to default (5). The default sound at power on will be reset to (1).

DEFAULT Mode or DIRECT Mode: Name: "PrG", meaning PROGRAM. Value: Either "0" (DEFAULT) or "1" (DIRECT). DEFAULT Mode is as described in "Operating FI". In DIRECT Mode you get a program change immediately when you hit the PROGRAM button. Single step will increase program, double-step will decrease it. If you keep PROGRAM pressed, the number starts to scroll up, first slowly, then faster. If you keep it down after a double-step, it will scroll down. In DIRECT Mode increment-decrement will step over bank borders, you can access any of the 99 programs.

MIDI Channel: Name: "GLb", meaning Global MIDI Channel**.** Value: All,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16. All means global OMNI mode. 1…16 means global receive channel set to any of these. If OMNI mode is selected then the MIDI output channel for Program Change that is sent out will be channel 1.

VCF Control: Name: "vCF", meaning VCF control range adjust. Value: 1:+-1 octave; 2:+-2 octaves; 4: +-4 octaves

Specifications

Technical specifications:

- Size: 155 x 125 x 65 mm, 6.1 x 4.9 x 2.6 inch
- Weight: 600g
- Power: 9V stabilized, 100mA, Roland-Boss type supply with minus pole in the middle. Supply not included.
- True bypass (relay switching)
- Super high performance DSP
- All algorithms calculated with 32 bit accuracy
- 24 bit AD/DA converters
- Oscillators generated at 512 kHz oversampling
- Distortion calculated at 128 kHz oversampling

Connectors:

- Audio in jack
- Audio out jack
- 5 pin DIN MIDI in
- 5 pin DIN MIDI out
- 5.5/2.1 mm DC socket for 9V stabilized supply, minus in the middle

Controls:

- Input Level potentiometer
- Output Level potentiometer
- Parameter Selector potentiometer
- Edit Wheel for parameter editing
- Bank Up pushbutton (in the Edit Wheel)
- Program Footswitch
- On/Off Footswitch

Displays:

- 3 VU meter LEDs, green: -18dB, yellow: -11dB, red: -5dB
- On/Off indicator LED
- 3 digits 7 segment display: Bank Number, Program Number, Edit Data

Features:

- Covers the full range of 4, 5 and 6 string bass guitars
- 99 Programs, 9 Programs in Bank 0, 10 Programs in Banks 1…9 each
- First 9 programs Deep Impact compatible
- Sounds can be designed and archived with a PC Editor software
- Major sound parameters can be changed easily on the device itself

- ◾ Free sound libraries will be published
- ◾ Software can be updated through MIDI
- ◾ Software update is free

MIDI Expander Features:

- ◾ Portamento can be either fixed time, or fixed rate
- ◾ MIDI channel, pitch bend range, octave transposition settings
- ◾ Trigger / Gate mode
- ◾ Key priority: Lower, Upper, First, Last

Signal Processing Building Blocks:

- ◾ 4 VCOs with saw, square and triangle waveform each
- ◾ Every VCO has separate LFO for PWM
- ◾ Every VCO has separate decay envelope for saw amplitude
- ◾ Every VCO can generate complex dynamically changing waveforms by foldover distortion
- ◾ Harmonizer with 3 voices, variable transposition
- ◾ High quality guitar distortion for the harmonizer voices
- ◾ EQ control and noise gate for the harmonizer voices
- ◾ Attack-Decay envelope for VCF and Attack-Release envelope for VCA
- ◾ Smooth crossfade between harmonizer and synthesizer voices
- ◾ VCF with Lowpass, Highpass, Bandpass and Notch mode
- ◾ VCF has 12dB/oct or 24dB/oct mode
- ◾ LFO with delay acting on VCO or VCF

Effects:

- ◾ Bass guitar sound or synthesizer sounds can be routed separately to effect
- ◾ Chorus, Flanger, Slapback, Reverb, Overdrive and 4 band parametric Equalizer effects

Requirement for using FI:

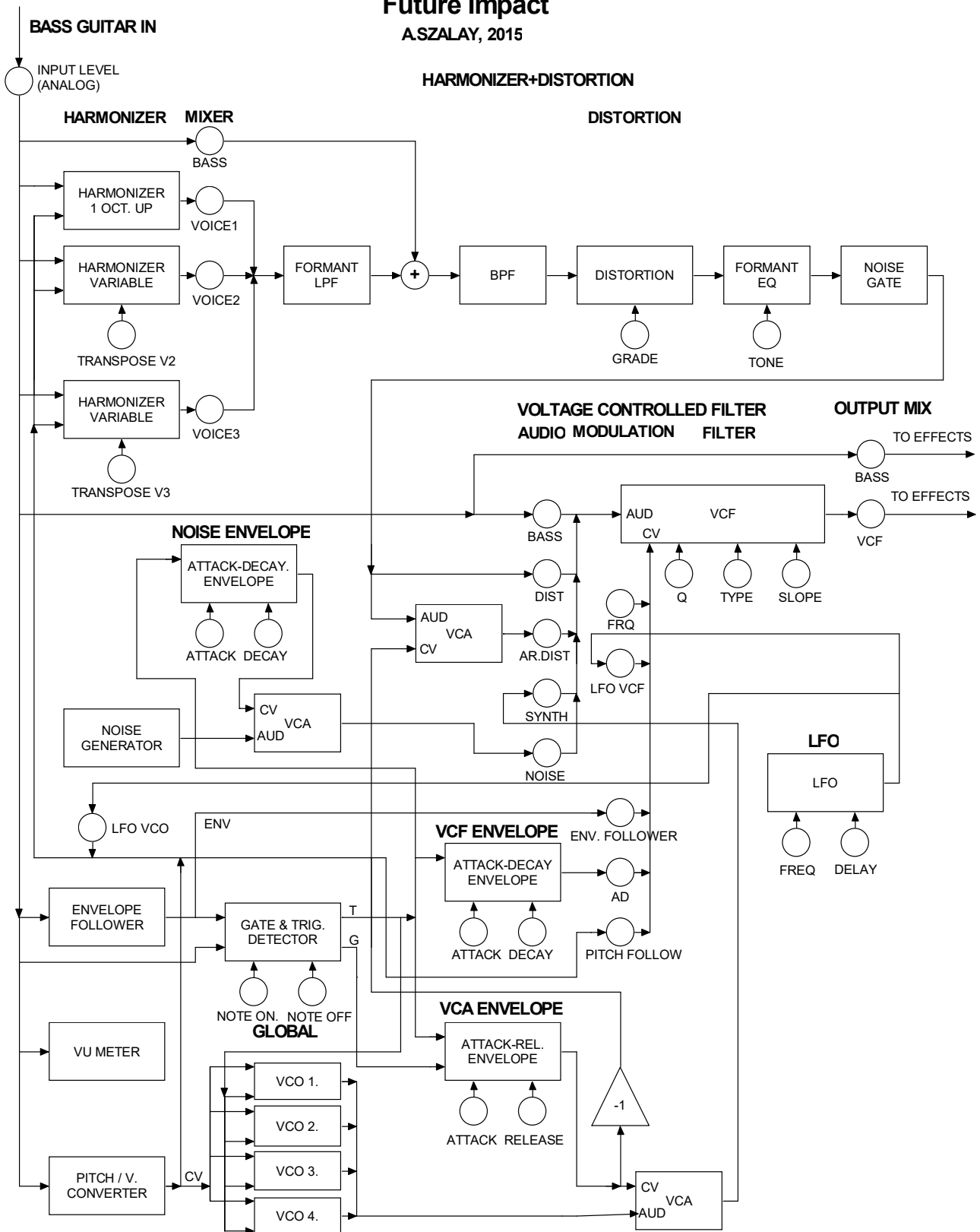- ◾ 9V stabilized, 100mA, Roland-Boss type supply with minus pole in the middle.

Additional requirement for sound editing:

- ◾ PC or MAC with a MIDI interface and two MIDI cables. Minimum screen resolution of the computer: X>=1280, Y>=900. OS on PC: XP or Windows 7. OS on MAC: Intel-based Macintosh Computer with Mac OS X 10.5+.
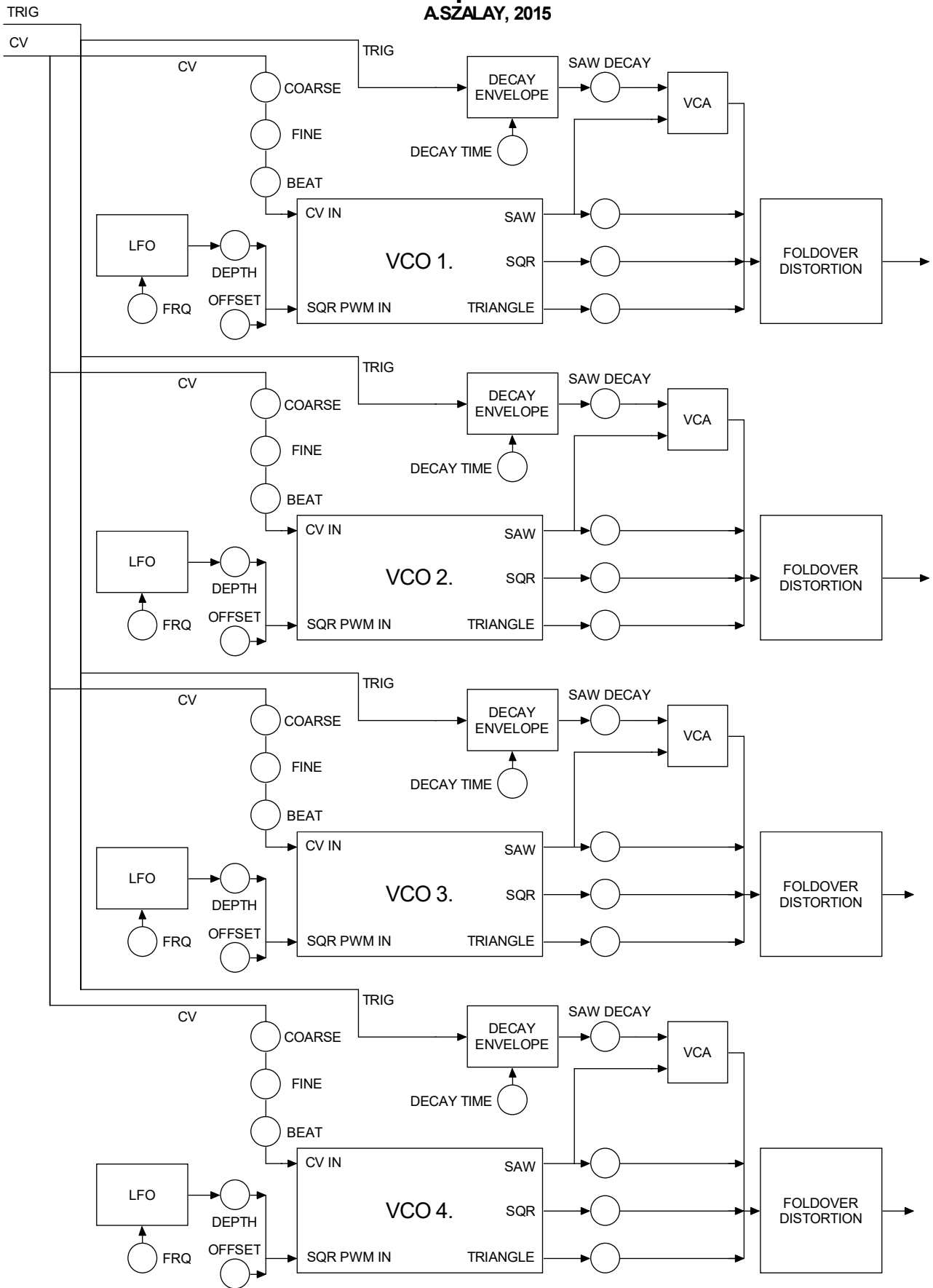
Algorithm Block Diagrams

Future Impact
A.SZALAY, 2015

HARMONIZER+DISTORTION

BASS GUITAR IN

INPUT LEVEL (ANALOG)

HARMONIZER **MIXER**

BASS

HARMONIZER 1 OCT. UP

VOICE1

HARMONIZER VARIABLE

VOICE2

TRANSPOSE V2

HARMONIZER VARIABLE

VOICE3

TRANSPOSE V3

FORMANT LPF

DISTORTION

BPF

DISTORTION

GRADE

FORMANT EQ

TONE

NOISE GATE

VOLTAGE CONTROLLED FILTER
AUDIO MODULATION   FILTER

OUTPUT MIX

TO EFFECTS
BASS

TO EFFECTS
VCF

AUD VCF
CV

Q   TYPE   SLOPE

BASS

DIST

FRQ

LFO VCF

NOISE ENVELOPE

ATTACK-DECAY. ENVELOPE

ATTACK DECAY

AUD VCA
CV

AR.DIST

SYNTH

LFO

LFO

FREQ DELAY

NOISE GENERATOR

CV VCA
AUD

NOISE

LFO VCO

ENV

VCF ENVELOPE

ENV. FOLLOWER

ATTACK-DECAY ENVELOPE

AD

ATTACK DECAY

PITCH FOLLOW

ENVELOPE FOLLOWER

GATE & TRIG. DETECTOR

T

G

NOTE ON. NOTE OFF

GLOBAL

VU METER

VCA ENVELOPE

ATTACK-REL. ENVELOPE

ATTACK RELEASE

-1

VCO 1.

VCO 2.

VCO 3.

VCO 4.

PITCH / V. CONVERTER

CV

CV VCA
AUD

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Future Impact Oscillators
A.SZALAY, 2015

Future Impact Effect Routing
A.SZALAY, 2015

FROM BASS → ( ) BLEND → (+) → **EFFECTS** → (+) → ( ) **AUDIO OUT**

FROM VCF → ( ) BLEND → (+)

OUTPUT LEVEL
(ANALOG)
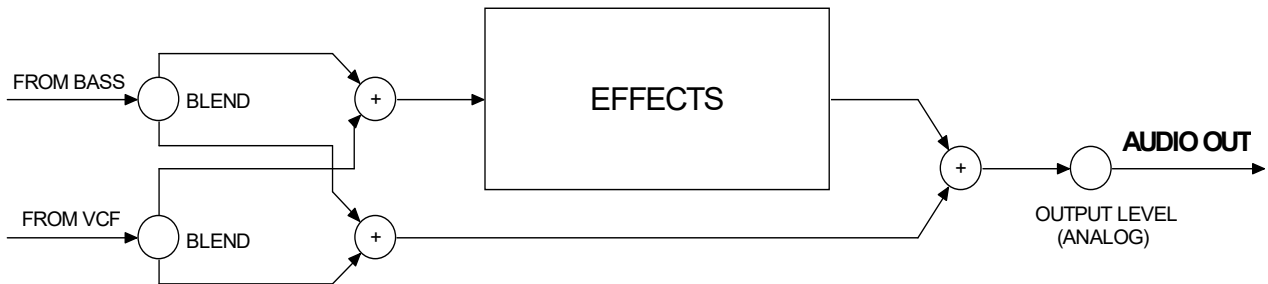
Warranty and Return Policy

The customer must never send back a device without consulting the manufacturer by e-mail first. A device should be returned to the manufacturer only after consultation, if the manufacturer explicitly requests to do so. The customer must pay for the cost of shipping the device back to the manufacturer. It is up to the customer what shipping service will be used for the return, but it is the customer's responsibility to ensure that the manufacturer receives the device. The cost of repairing the device and sending back the repaired device to the customer will be covered by the manufacturer during the warranty period of two years. After the warranty period the cost of repairing and postage has to be paid by the customer. It is the manufacturer's responsibility to ensure that it is received by the customer.