SOFTUBE
FET COMPRESSOR
USER'S GUIDE
TDM/RTAS/VST/AU/VENUE

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Support

On the Softube website (www.softube.com) you will find answers to common questions (FAQ) and other topics that might interest you.

Support questions can be posted at http://www.softube.com, where we will help you as fast as we can!

Installation and Authorization

IF YOU BOUGHT THE PRODUCT IN A BOX you will have to register it in order to transfer the license to your iLok account:

1. Go to http://www.softube.com/register to transfer the license to your iLok account. You will need the **License Code** found in the box, your **iLok.com User ID**, and your **iLok USB dongle**. Follow the instructions on the web page.

IF YOU BOUGHT THE PRODUCT ONLINE and have got the confirmation e-mail, the license will already be deposited in your iLok account:

2. Make sure that you have the latest iLok drivers installed. They can be found at http://www.ilok.com.

3. Log on to http://www.ilok.com and transfer the newly received license to your physical iLok dongle.

4. Install the software from the CD, or download the latest version from http://www.softube.com/installers.

Sometimes the CD contains installers for all Softube products, but you will only be able to run those that you have acquired licenses for. In some cases, extra demo licenses are included when you buy a Softube product.

Introduction

THE FET COMPRESSOR IS BASED ON *the* most famous hardware FET compressor, and very much effort has been spent modeling the real hardware to make sure that this one sounds exactly the same. If you only use the big knobs and the six fixed ratios you'll get exactly the same analog sound and functionality as the real deal. But that's just the beginning. With the help of digital technology we have added some useful features that still have that analogue sound – but features that would've been hard or even impossible to implement with analog electronics. That way you will be able to get the best of two worlds. (Not even mentioning how ridiculously many FET Compressors you will be able to fit into your project without running low on CPU.)

Not convinced yet? Set the **Input** on MAX, **Ratio** on ALL. Listen.

Figure 1: The user interface of the FET Compressor – an analog sounding compressor with digital features.

Design Philosophy

THERE ARE THREE MAIN IDEAS BEHIND THIS DESIGN: First of all, we wanted to make an analog sounding digital compressor. Nothing must stand in the way of the sound. Every single part of the simulation contributes to making this piece unique. The extremely fast attack, all the subtle (and sometimes not so subtle) distortion that comes from the different parts of the compressor and the extremely careful way the signal is handled and conditioned through out the signal chain.

Second, we added features to make this product even more versatile and unique. The enhanced ratio, parallel compression, detector filtering and lookahead are such features. Third, these features must not stand in the way of the usability. The fewer knobs the better, and the faster the user gets the sound they want, the better.

This boils down to a single main objective: Every user should be able to get a good sound within seconds, and no user should be afraid to mess up the sound. An amateur should be able to make this sound just as good as a pro. And yeah, it has to look good.

In order to achieve these objectives we had to put special effort into the modeling. The original hardware has some quite quirky circuits, and a lot of its sound comes from far from ideal components and design. A lot of new ideas were developed during the modeling, and with the help of our expert listener and “golden ears” Dan Lumbye, we managed to put together a piece of software that should please even the most critical ears.

Patents

This product is protected by patent SE525332 and patents/patent applications US2004-0258250, EP1492081 and JP2004-183976.

User Interface

THE CONTROLS OF the FET Compressor are divided into two sections.

First of all we have the big knobs (**Input**, **Ratio**, **Attack**, **Release** and **Output**), which are the knobs that you will use every time you use the compressor (top row in the illustration on the right). These knobs are pretty standard and you probably already know what they do.

Then we have the small guys (middle row), which don't have to be tweaked every time you use the compressor. You don't even have to feel bad if you never touch them. People have managed to make hit records for 40 years without them. Nevertheless, they are extremely useful, and soon you'll have a hard time understanding how you ever could've managed without them.

Figure 2: Top: Knobs and meters used under "normal" operation. Middle: Extra functionality added in the software version. Bottom: Extra meters added to the software version.

In addition to this, we also added some metering so that you can monitor your signal all the time (bottom row). An input VU meter (which is fun to drive into the reds all the time) and a stereo output peak meter make sure that you always know what is going on with your signal.

Input

The **Input** knob on this compressor works both as a gain control and a threshold control. If you increase the **Input** volume you will also increase the gain reduction, which makes it work sort of like a combination of a gain knob and a reversed threshold knob. You can drive the INPUT VU far into the reds without any unwanted digital clipping. Just make sure that the OUTPUT PEAK meter doesn't indicate any clipping. (If it does, just lower the **Output** volume a bit.)

> *The **Input** knob also works as a threshold control. More input gain will give you more gain reduction.*

If you drive the input volume so that the VU start hitting the reds you will also add more distortion to the signal. If you want lots of distortion we really recommend you to also set the **Ratio** knob on ALL.

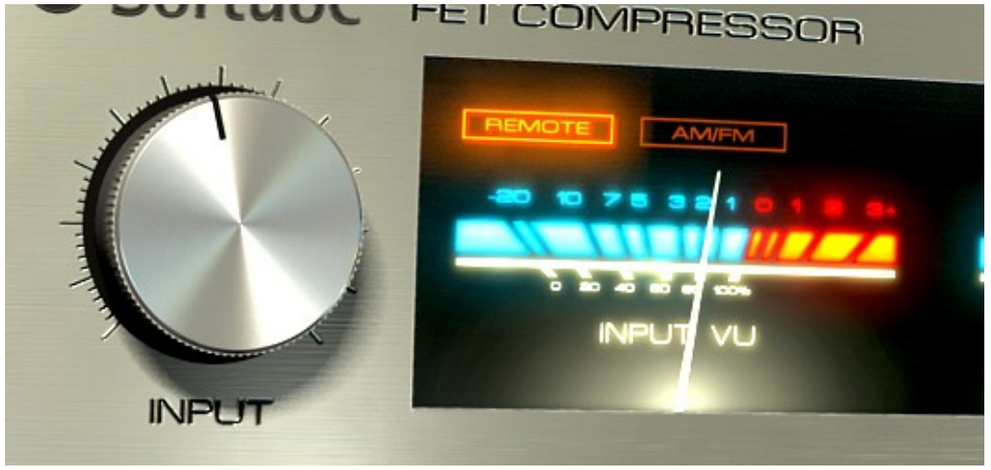

*Figure 3: The **Input** knob and corresponding input VU meter.*

> *More input gain also means more distortion (in a good way).*

Ratio

Figure 4: The Ratio knob.

At a first glance, the **Ratio** knob on the FET Compressor seems to work a little bit different than its hardware counterpart. The biggest difference is that the **Ratio** knob is continuous, meaning that it's possible to select settings between different fixed ratios, for instance between 12:1 and 20:1. Furthermore, it's also possible to select settings between 20:1 and the famous “All buttons in” setting.

If you would rather use the “pre-defined” settings that are identical to those on the original hardware: 1:1, 4:1, 8:1, 12:1, 20:1 and ALL, just click on the labels to jump directly to those settings (see Figure 5).

Figure 5: Click on the labels to immediately go to a “factory” setting.

“All Buttons In” Mode

The ALL mode is a peculiarity found on this type of compressor. Originally the different ratios were selected with push buttons, which made some mix engineers try out what happens if you press all buttons at once. From a technical perspective, pushing all buttons at the same time makes all bias levels go berserk. From a sound perspective, this means that you will get a very pumping compression with lots of distortion. This mode is often called the “British mode”. By setting the **Ratio** somewhere between 20:1 and ALL you'll get a sound that's definitely unique for this product.

Attack and Release

Use the **Attack** and **Release** controls to change how fast the compressor starts to compress (**Attack**) and how fast it should recover from the gain reduction (**Release**). The attack time on this unit is very fast, ranging from about 20 µs at the fastest setting to about 800 µs on its slowest setting. Other kinds of compressors often have much slower attack times. In comparison to the attack time the release times are much slower – ranging between 50 ms and 1.1 s. Please note that these numbers only give a general idea of the attack and release times. In practice (and just like in the modeled hardware), the attack and release times will be program dependent, ie. depend on the characteristics of the input signal.

*Figure 6: The **Attack** and **Release** knobs.*

Since a fast attack and release time leads to a fast gain reduction, sometimes those settings will cause unwanted "clipping effects". To remove this unwanted side effect, you can either slow down the release time or add some look ahead to the detector circuit. (See "Lookahead").

Input and Gain Reduction VU meters

Figure 7: The Input and Gain Reduction VU meters are also modeled using physical modeling so they will also react just like the real thing.

The **Input VU** meter is used to monitor the input signal. If a stereo signal is present, the meter will display the maximum energy of both signals. This may seem like a drawback, but since the gain reduction circuit (a.k.a. “detector” or ”side chain”) works in mono, the VU will actually display the same thing the detector sees. (Unless you start fiddling with the small knobs, but we're not there yet.)

The **Gain Reduction** meter is used to monitor the amount of gain reduction in the compressor. The FET Compressor has only one detector, so if a stereo signal is present the gain reduction will be the same for both channels. This prevents unwanted distortion of the stereo image.

If the **Ratio** knob is set at ALL, the **Gain Reduction** meter won't show the same results as the original hardware. Instead it will display the actual gain reduction (which the original unit doesn't). You will also notice that the Gain Reduction sometimes display positive values when the **Ratio** is set at ALL, which is correct. The ALL mode does indeed have negative gain reduction (=positive gain) for some settings.

Output

In comparison to the **Input** knob, the **Output** knob doesn't do much more than just adjusting the output volume. Keep a close look on the OUTPUT PEAK meter while adjusting the output volume to avoid unwanted digital clipping. It is good practice to keep the levels below 0 dB, even if you are using a (native) host that allows level above 0 dB. On TDM, the plug-in will digitally clip all signals above 0 dB on the output.

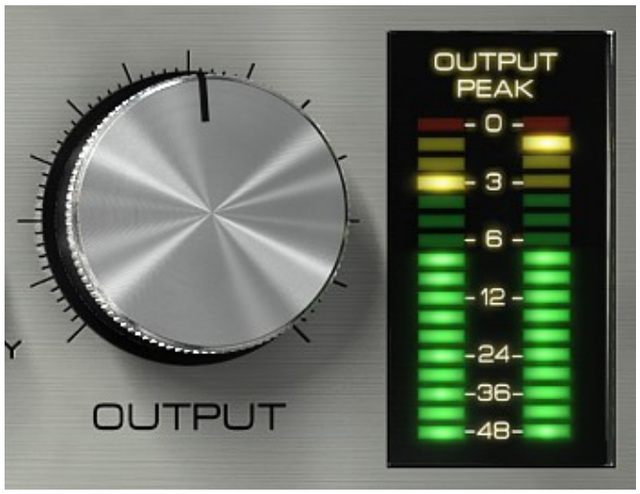

Figure 8: Output knob and output meter.

Output Peak Meter

The output peak meter is a fast peak meter with hold values. Single peak values up in the reds (at 0 dB) are okay, but don't push it. This meter will display the left and right channel on the left and right meter if you use the plug-in in STEREO mode, otherwise it'll just show the same MONO signal on both meters.

Keep the output levels below 0 dB!

Detector Controls

The most important part of any compressor is the detector. It is the detector that decides how the compressor should compress. All controls except the **Output** (and **Parallel Inject**) control the detector, but in this plug-in we have chosen to bundle the four advanced knobs together and call them “detector controls”.

Common to all these controls is that they can be turned off by setting them in the OFF position. Their status LED will light up when ever they are active.

Figure 9: The four advanced detector knobs.

> *Don't be afraid to keep these controls in the OFF position. Use these controls if there is something particular that you'd like to achieve or something that needs to be fixed. (If it ain't broken, don't fix it!)*

External Side Chain

In some plug-in formats, such as RTAS, TDM and AU, it is possible to use an external signal as input to the detector.[1] This is very common if you for instance want to compress a bass line using the bass drum as the trigger to the compressor. In that case, the bass line will be compressed when ever the bass drum is hit.

*Even if an external side chain signal is present, you will have to activate the external side chain by increasing the **External Side Chain** knob until the LED lights up. If the **External Side Chain** knob is in its OFF position, the detector will always use the regular input.*

Figure 10: The side chain knob.

Use the **External Side Chain** knob to set the input volume of the external signal (for instance the bass drum track). A higher input volume will lead to more gain reduction, just like the **Input** knob works without an external side chain.

*Monitor the **Gain Reduction VU Meter** when you set the level of the external side chain. Just increase the **External Side Chain** until you get enough gain reduction.*

1) External side chaining *might* also work in some VST hosts. It depends very much on which VST host and version you are using. The plug-in will add two extra inputs (inputs 3 and 4) and regards these as the external side chain input. If your host accepts these four inputs, the external side chain indicator (Figure 15) will light up.

Low Cut and High Cut

Figure 11: The Low and High Cut knobs.

The **Low** and **High Cut** can be used to filter the signal before it reaches the detector. A good practice can be to remove some of the (unwanted) low frequencies so that they don't affect the gain reduction. Another trick is to apply filtering so that only certain frequencies cause the detector to compress the signal. If you for example compress a drum kit, you might want to keep the boominess of the bass drum, but compress the cymbals and snare. Set the **Low Cut** to 200-300 Hz so that the bass drum will get filtered out before it reaches the detector.

Please keep in mind that **Low Cut** and **High Cut** don't alter the direct signal, just the signal that enters the detector.

*Please note that the 200 and 1000 Hz settings on the **Low** and **High Cut** knobs corresponds to the knob being set at 12 o'clock (where the little indicator lines are located). The easiest way to get to that setting is to click on the 200 or 1000 label on the panel.*

Lookahead

The **Lookahead** can be used if the fastest attack time isn't fast enough, for instance if you want to apply some heavy limiting to a signal. The **Lookahead** will delay the signal path outside of the detector by up to 1 ms, leaving the detector signal unaffected. This has two effects:

Figure 12: The Lookahead knob.

1. The output signal will be delayed by up to 1 millisecond.

2. The detector will “see” the undelayed signal, but reduce the gain on the delayed signal. This means that the detector will be able to compress the signal before the actual transient comes (since the actual transient has been delayed).

> *The **Lookahead** time corresponds to the total latency of the plug-in. The plug-in will not report this latency to the host, since almost no hosts support compensating for a delay that depends on a parameter.*

Some very fast **Attack**/**Release** settings will cause a “crackling” sound on transients, often sounding like some sort of digital clipping or saturation somewhere in the signal chain. This is very typical for this kind of compressor, but is usually an unwanted effect. The normal way to get rid of this “side effect” is to slow down the attack and release times but now you have another tool to use. By adding a little lookahead to the detector, many of these side effects can be avoided.

Parallel Inject

Parallel Compression is a technique where you blend the compressed signal with the original signal. Say that you have a heavily compressed drum track where all the transients have been lost (compressed). By adding a little bit of parallel compression you can blend in the original signal (with the original transients) with the high-energy compressed signal (without transients) and thus get the best of both worlds.

Figure 13: Parallel compression is fun.

This is a technique that is very easy to achieve with a send-bus, but this baby does a little bit more than that. First of all, you won't get any problem with the **Lookahead** since the dry signal is delayed with the same delay time as the compressed signal. Then the dry signal will be affected by the same analogue modeling mojo as the compressed one, which means that some of the distortion and coloring of the compressor will also have a an effect on the dry signal. And at last, the **Output Peak** meter will of course show the sum of these signals, so that you can set a proper output level.

> *Whenever you change the gain reduction (for example by changing the **Input** volume) you will need to change the **Parallel Inject** since the volume of the compressed signal has changed. But be careful - sometimes the dry signal is much louder than the compressed signal!*

Status Indicators

The FET Compressor comes with a couple of handy status labels, located in the VU meter section.

Remote *(Pro Tools only)*

Whenever automation is used, or if an external control surface is connected, the **Remote** status indicator will light up. The knobs that are being controlled will also get a thin frame around them.

Figure 14: Remote is lit up on automation or external control surfaces.

External

This indicator displays when an external side chain is present. Whenever an external side chain is present, it is possible to use the **External Side Chain** knob to set the amount of gain of the external signal to the detector.

In TDM/RTAS it will light up whenever you have connected a side chain bus to the plug-in. This indicator will always be lit in hosts that use the Audio Unit (AU) format. In VST, it will light up if the host accepts side chain inputs, but this doesn't work for all VST hosts... So it goes.

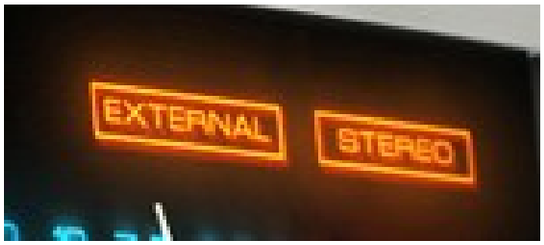

Figure 15: External is only used in Pro Tools and Stereo is pretty self explanatory.

Stereo

The **Stereo** indicator lights up if the compressor was instantiated in stereo mode.

Controls Summary

The knobs are controlled by either dragging Left-Right or Up-Down, or by using the mouse-wheel.

Figure 16: Top: Click-and-drag cursor. Bottom: Label-click cursor.

Mouse

- **Up/Down**: Increase/Decrease the setting of a knob/switch
- **Left/Right**: Increase/Decrease the setting of a knob/switch
- **Mouse wheel** *(Mac OS X only)*: Increase/Decrease the setting of a knob/switch

Pointing over a label will make the cursor change to a “pointing hand” cursor. Clicking the label will make the knob to immediately move to the corresponding position.

Keyboard Commands

Use these key commands while changing a parameter.

- **Fine Adjust**: Command (Mac) or Ctrl (Windows)
- **Reset to Default**: Alt
- **Automation Control Window** *(Pro Tools only)*: Ctrl+Command+Alt+click (Mac) or Ctrl+Windows+Alt+click (Windows)
- **Show Automation Track** *(Pro Tools only)*: Ctrl+Command+click (Mac) or Ctrl+Windows+click (Windows)

Tweaking Tips

We didn't want to include too much of the standard “this is how a compressor work” theory, but rather focus on the parts that make this plug-in special. Here are our favorite tweaks.

I want distortion!

There are two types of distortion in a compressor like this, first we have the input and output stage distortion and second the (frequency dependent) distortion caused by the compressing. To get the first type of distortion, just increase the **Input** until you get enough distortion. You can even have **Ratio** set to 1:1 (= no compression). The other type of distortion is usually caused by a fast attack and release time. If you set **Ratio** on ALL and **Release** on FAST, you'll get the fastest release time possible. *Try the “Distortion” presets.*

The compressor isn't fast enough

If you find that the **Attack** time isn't fast enough (doesn't squash all the transients), increase the **Lookahead** until you're satisfied.

The compressor is too fast

The **Attack** times get slower if **Ratio** is set on ALL, so in order to get a late attack set **Ratio** on ALL. If you want to increase the transients but compress the rest of the signal, use the “all buttons in” mode. *Try the “Transient” presets.*

It makes crackling sounds on the transients

This is because of the extremely fast attack time. First you can slow down the **Attack** times so that the gain reduction becomes not as abrupt as it was. To compensate for the slower **Attack** time, increase the **Lookahead**.

All the energy and attack of each note disappears

It is a fast compressor and chances are that it will compress fast transients (yeah?). That's

why we added the **Parallel Inject**. By increasing the **Parallel Inject** you can blend in a little bit of the original signal (with the original transients). Try to balance it so that you get the transients from the dry path and the rest of the signal from the compressed path.

All the energy and attack of each note disappears (pt. II)

Another trick you could try, if you'd like to restore some of the transients is to narrow down the detectors frequency bands by adding some **Low Cut** and **High Cut** filtering. It doesn't work on all program material, but it's worth a try.

I want some cool drum bus tricks

Ok, here are our favorites:

1. **Fat Bass Drum**: Apply heavy compression on your drum bus. Increase the **Low Cut** knob until the bass drum doesn't trigger the compressor (at about 200-300 Hz). In most cases, this will make the bass drum sound fatter and louder compared to the rest of the kit.

2. **Pumping Drums**: Set **Ratio** on ALL, **Release** on SLOW and adjust the **Input** until you're satisfied. Blend in some dry signal with **Parallel Inject**.

3. **Sustained Drums with Transients**: Apply heavy 20:1 compression with fast release and attack times, blend in some transients with **Parallel Inject.**

Adding color

Finally you shouldn't be afraid of using this plug-in in the 1:1 mode. You won't get any compression, but it will color the sound. And the meters look nice too.

Multi-Channel Operation

FET Compressor supports the following multi-channel modes:

- MONO: The Output Peak meters will display the same values on both meters.
- STEREO: The Left and Right channels will be processed by the same detector, just as if you had the stereo interconnect thingy connected to the original hardware.

How the different modes are selected depends on your host software. In most hosts, inserting the FET Compressor on a mono-track will make it use the Mono-mode, and vice-versa with a stereo-track.

Block Diagram

This is a block diagram over the FET Compressor functionality. Please note that this illustration depicts the *functionality* of the plug-in – the inner workings ire quite different.[2]

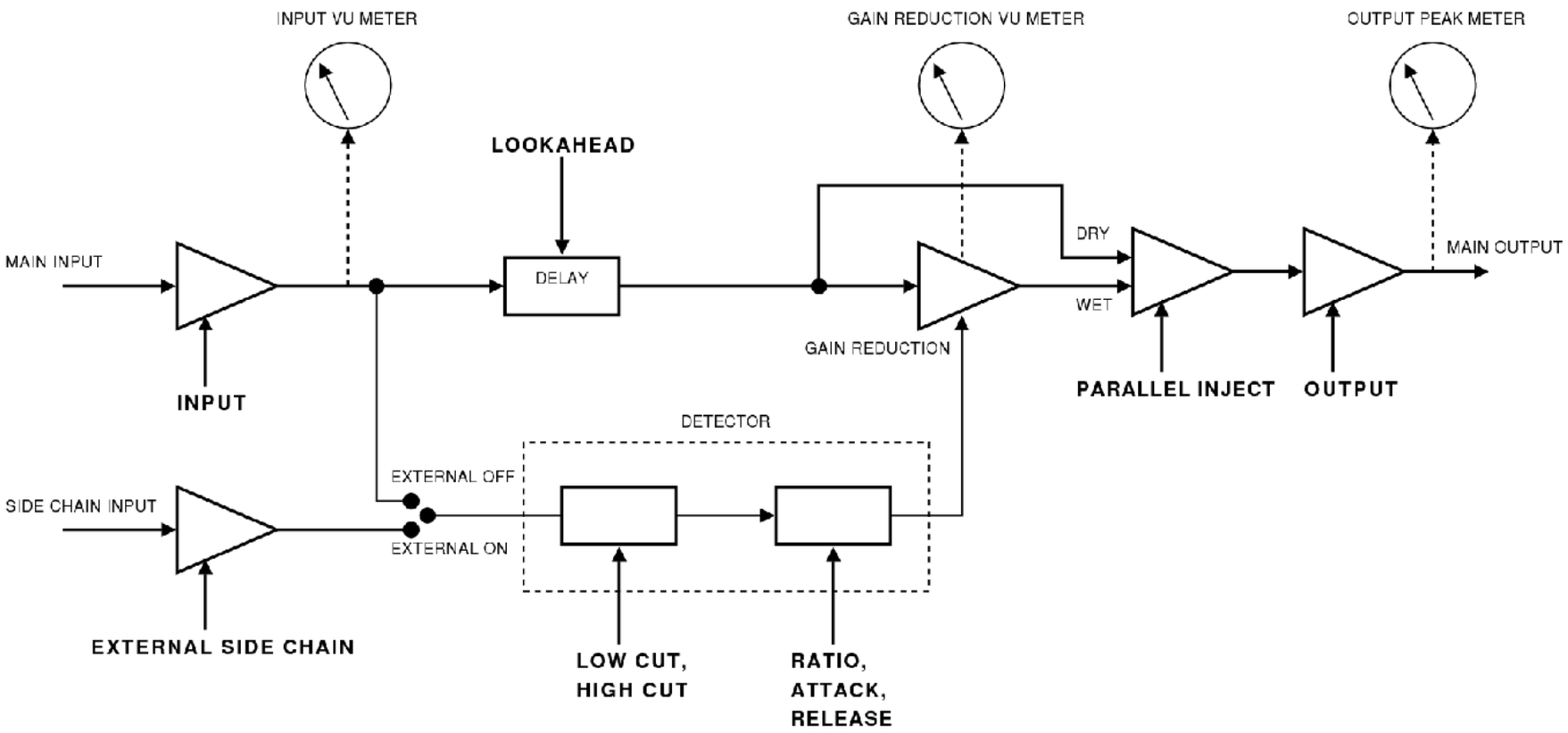

Figure 17: Block diagram of the FET Compressor. The SIDE CHAIN INPUT *is only active if the side chain has been activated by the* ***External Side Chain*** *knob, regardless of whether a side chain is present or not.*

2) The experienced reader will notice that some parts, like the feedback connection of the compressor, have been omitted in the illustration for the sake of clarity.

System Requirements

Please make sure that you have the latest Interlok drivers installed!

All Versions

- Mac OS 10.4 (or higher) on a G3 or Intel CPU (or better), or
  Windows XP (or higher) on a PIII CPU (or better)
- 44.1, 48, 88.2, 96, 176.4 and 192 kHz sample rates are supported
- Mono and Stereo modes are supported. See “Multi-Channel Operation” for more information
- **iLok USB key and the latest iLok drivers** (available from www.ilok.com)

Native Version (VST/AU/RTAS)

- Any VST, RTAS or AudioUnit compatible host application

Since external side chaining isn't officially supported by the VST plug-in format, there is no guarantee that external side chaining will work with your VST host.

Pro Tools|HD Version (TDM/VENUE)

In Pro Tools|HD, it is possible to use FET Compressor on either a Core or an Accel processor, although only 44.1 and 48 kHz sample rates are supported on Core. For more info on CPU consumption and availability, see the table below.

All sample rates are available in the RTAS and VENUE versions.

System Requirements

- Pro Tools|HD with Pro Tools 7.0 or higher or VENUE system.
- System must meet requirements for Pro Tools|HD from Digidesign

PT|HD CPU consumption	Core	Accel
44.1/48 kHz	< 77%	< 35%
88.2/96 kHz	—	< 58%
176.4/192 kHz	—	< 91%

FET Compressor was made by: Oscar Öberg – modeling and implementation. Torsten Gatu – framework programming. Niklas Odelholm – framework programming and graphic design. Arvid Rosén – framework programming. Ulf Ekelöf – 3D rendering and graphics. Dan Lumbye – sound design. Stefan Fandén – feature hunter. Thanks to Lars Nygaard and Anders Bech at Cyberfarm (DK) and Per Åkesson at Care Of Sound Studio for letting us use and abuse their equipment.