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Section 1 - Introduction

1.1 - What is the ACM-3SA?

The ACM-3SA plug-in for Windows or Linux PCs and compatible audio workstation applications comprises a low and high-cut filter emulation based on the vintage Pultec HLF-3C units. It models the 'constant K' passive filter circuitry found in such devices using innovative analogue filter modelling technology.

1.2 - Main Features

- VST, VST3 and CLAP plug-in for 64Bit Windows or Linux PCs and compatible host applications.
- 'Passive' constant K filters model the behaviour of a vintage HLF-3C style low and high-cut filter.
- 12dB / octave high-pass (low cut) filter.
- 12dB / octave low-pass (high-cut) filter.
- Physical Control Weighting replicates the feel of high quality rotary controls.

1.3 System Requirements



Windows:

A PC running 64Bit Windows 7 or newer and a VST, VST3 or CLAP compatible host application.



Linux:

An X11 compatible Linux distribution and a Linux VST, VST3 or CLAP compatible host application.

1.4 - About the Manual

This manual covers the installation and use of the ACM-3SA equalizer. Features and operation may vary depending upon your operating system configuration and host application. Where appropriate, examples are also illustrated with screenshots of the features being discussed.

1.5 - Conventions Used

Access to menu items are shown as follows:

Menu -> Item -> Item

A Mono-spaced font is used to illustrate commands as they are typed on the command line.

Section 2 - Installation

2.1 Download Contents

Within the folder that contained this manual you will find Windows and Linux folders containing the plug-in built for **64Bit Windows or Linux systems**. Please refer to section 1.3 for system requirements.

2.2a Installing the Plug-In for Windows

Installing the Plug-In for Windows:

Within the Windows folder you will find installers for the VST, VST3 and CLAP plug-ins. The installers will guide you through the steps required to install the plug-ins.

NOTE: VST3 and CLAP define specific locations for compatible plug-ins. For Windows this is normally:

Program Files\Common Files\VST3\[CompanyName]

and

Program Files\Common Files\CLAP\[CompanyName]

The installer will permit other locations however you should use only the installer recommended location for the VST3 or CLAP plug-ins. unless you are confident of a specific reason for selecting an alternative.

The installer will only install the files necessary for the plug-in to function. It will not install anything else on your computer.

Uninstalling the plug-in:

To uninstall the plug-in It is recommended to use

Control Panel -> Add or Remove Programs

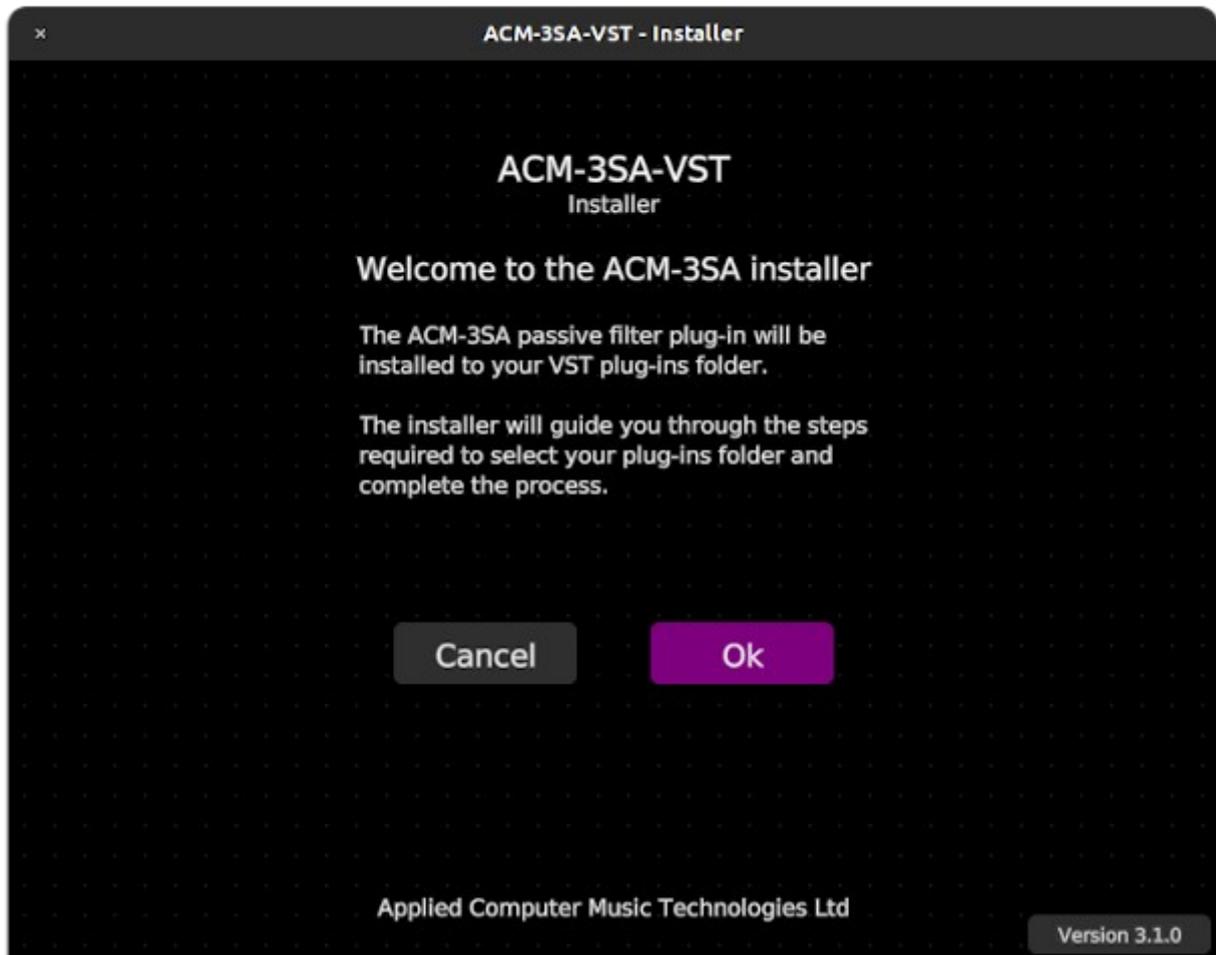
and select **Remove** for the ACM-2SA.

2.2b Installing the Plug-In for Linux

Installing the Plug-In for Linux:

Within the x86-64 folder you will find the installer executable.

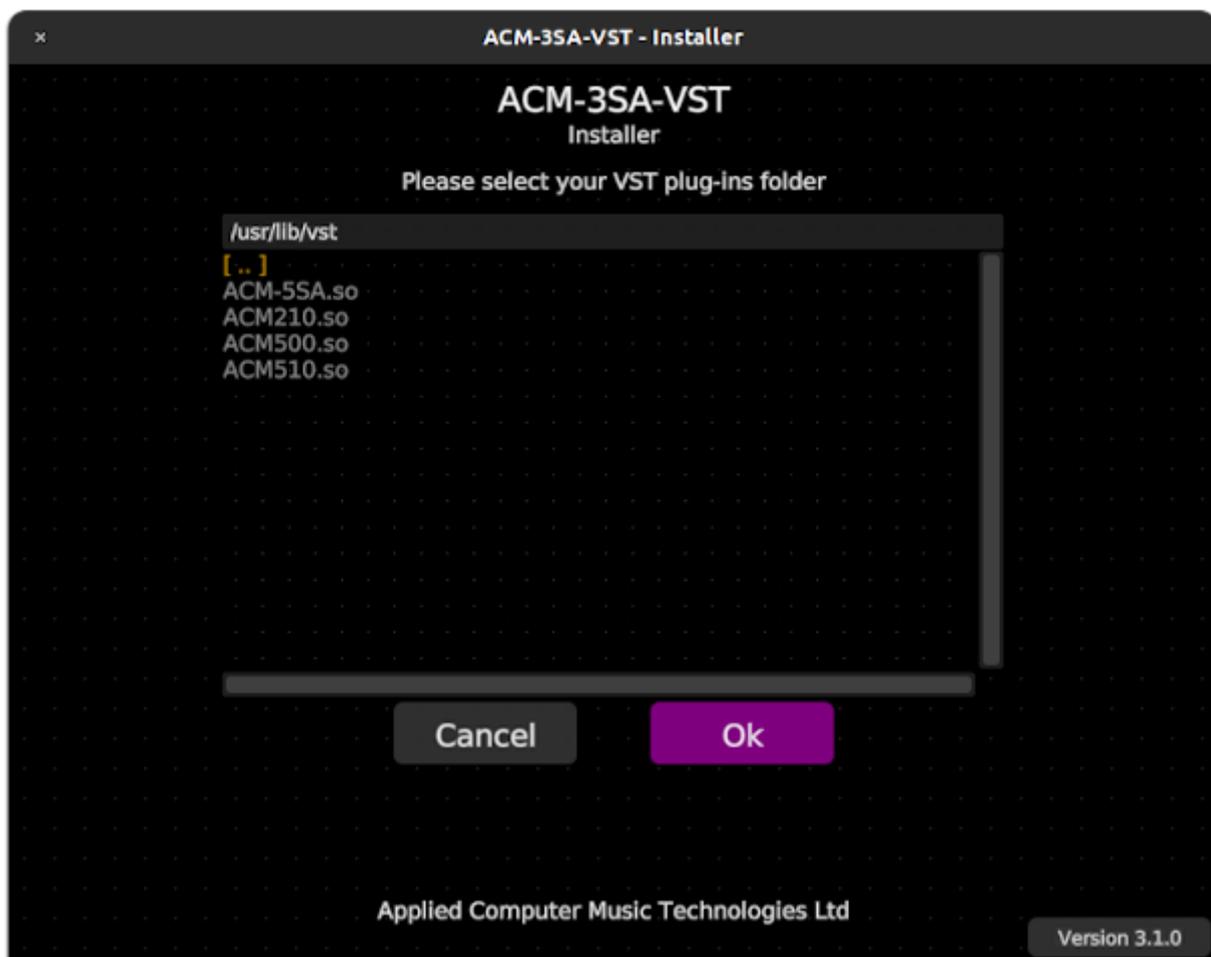
Run the installer executable by (double) clicking it in a file browser, or launching it from the command line. The installer will guide you through the installation process.



Selecting the Install Location:

The installer will prompt for your plug-ins folder location. Normally this will be `/home/your-user-name/.vst` or `.vst3` It is recommended to have a single VST or VST3 plug-ins folder, but you can install the plug-in to as many different locations as you require (just run the installer again and select a new location).

Depending upon system configuration, you may also be prompted for your user or root password if you attempt to install to a system folder, or one to which you do not have write permissions. The installer uses a standard system authentication process (`pkexec`) and does not directly gain elevated permissions.



Troubleshooting:

The installer is designed to be self-contained and compatible with most Linux distributions, if you need to backup the installer, the single executable file should be all you need. However, due to the varied and customizable nature of Linux distributions, it is possible that the installer may not be compatible with your system configuration. If this happens, follow these steps to isolate the problem or to install the plug-ins manually.

1. Do not try to run the installer as the root / admin user. If you do, there will be a warning message on the console and the installer will exit. The installer is designed to be run as a normal user and will prompt for a password if required.
2. The installer uses the `pkexec` authentication method if attempting to install to a system folder, or one to which the current user does not have write access. (the installer itself never gains root or elevated permissions on your system). If this is not a standard component of your Linux distribution, you will need to correctly install and configure it for your system, or select a different install location with appropriate user access permissions.
3. In some circumstances you may need to mark the installer as 'executable' in order for it to be launched. You can normally do this by right-clicking the installer and selecting:

Properties -> Permissions -> Allow executing file as program

Manually Installing the Plug-In:

If your system configuration is not compatible with the installer, you can install the plug-in manually by copying the required files onto your system. You will need to be familiar with command line operations in order to do this.

The plug-in binary files are contained in the `plug-in_binaries.tar.gz` file within the x86 or x86-64 folders. Extract the archive, and you will find it contains VST and VST3 folders.

The VST and VST3 folders contain the plug-in in Linux VST and VST3 format.

There is also a README file which details how to copy the required files onto your system.

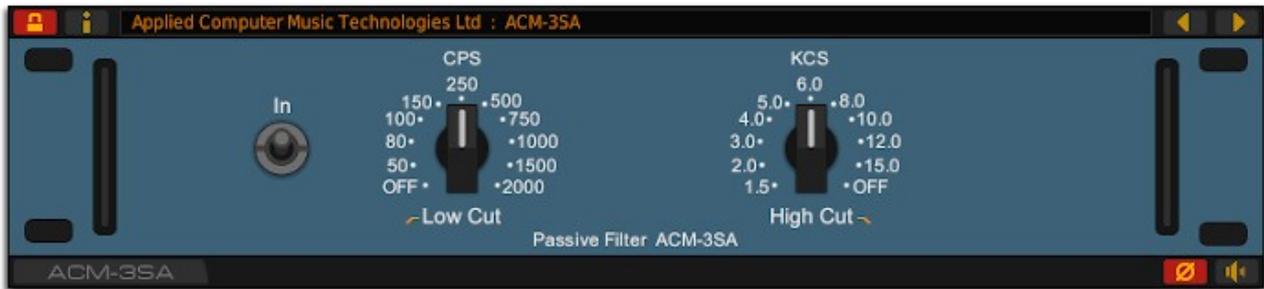
2.3 Product Support

If you are unsure how to install the plug-in, or encounter problems during the installation, please contact:

support@acmt.co.uk

Section 3 - Operation

3.1 - The Graphical User Interface



This is the ACM-3SA front panel. You can control it by clicking and dragging on the knobs or switches. Some controls may have indents – these manifest themselves as areas in the control rotation where the reluctance to move is increased such that you have to drag a bit 'harder'. They are intended to behave like real controls which may have a 'click stop' at 0dB for example.

You can also move the controls by placing the mouse pointer over them and using the scroll wheel. In this case the centre indent has no effect. The way in which the rotary controls respond to mouse movement may also be affected by host application configuration, as described in the next section.

3.2 Control Modes

The control mode determines the way in which the rotary controls respond to mouse movement. This can normally be configured via the host application preferences. Please refer to your host application documentation for details.

1. Circular

This is the default mode unless changed by host application settings. Clicking on a control will move it immediately to the mouse pointer's angular position. To adjust the control, drag the mouse pointer in a circle or arc.

2. Relative Circular (Default)

Similar to circular mode, however moving the mouse will adjust the control relative to its current setting.

3. Linear

The control responds to vertical movement. Drag up to increase the value, turning the control clockwise, or down to decrease the value, turning the control anticlockwise.

In all modes, double clicking in the centre of a control will return it to its default position.

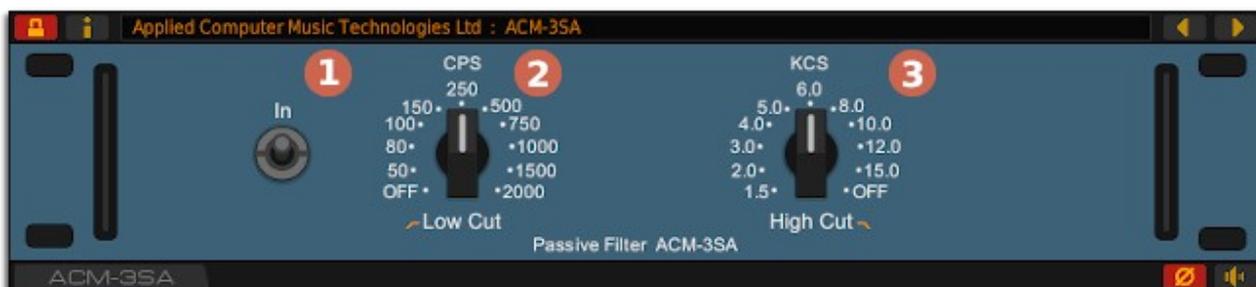
3.3 - Physically Weighted Controls

To improve the feel of the controls, and make them behave more as hardware equivalents do, the control knobs have been given a small amount of physical 'inertia'. This weighting does not affect the 'law' of the control, only the way it responds to mouse movement. When you begin to drag on a control, or change direction, its 'gearing' will be at a higher resolution (which also helps to locate more precise settings). As you continue to drag the control, it will become more closely geared to the mouse movement, meaning that you can still make significant control changes without large and awkward movements of the mouse.

As the controls are operated their value will be displayed in the status bar above the front panel. If at any time you need to know a control's setting, just click on its centre and the value will appear in the status bar.

3.4 – Control Functions

The ACM-3SA comprises 12dB / octave high-pass (low-cut) and low-pass (high-cut) filters. Each filter has a switch selectable cut-off frequency and / or independent bypass. The control functions are described in detail as follows:



1. In

This is the filter bypass switch. With the switch on, the filters will be in the signal path and affecting the output. With the switch off, the filters will be out of the signal path, providing a completely clean bypass.

2. Low Cut Frequency - CPS

The low cut switch selects the cut-off frequency at which the low-cut filter operates. The switch has ten frequency positions together with an 'off' position which bypasses the low-cut filter completely. In keeping with similar vintage hardware, the control settings are indicated in cycles per second [CPS] - equivalent to Hz.

3. High Cut Frequency - KCS

The high cut switch selects the cut-off frequency at which the high-cut filter operates. The switch has ten frequency positions together with an 'off' position which bypasses the high-cut filter completely. In keeping with similar vintage hardware, the control settings are indicated in kilocycles per second [KCS] - equivalent to kHz.

Section 4 – System Toolbars

4.1 - Preset Selectors



In addition to the preset selector options provided by the host application, the plug-in has a pair of preset selector buttons to the right of the status display. Pressing the right or left arrows will step up or down through the factory presets and the four user preset memories.

4.2 - Info Button



Clicking on the Info button will open a pop-up showing the current version, together with a product ID code if the plug-in has been activated with a valid key.

4.3 – Demo Indicator



The red lock icon indicates the plug-in has not been activated with a valid key. To unlock the plug-in and remove the demo limitations, click the button to open the demo / activation key pop-up and enter your key (see section 4.2). Once the key is accepted, the lock will change to an open symbol. **You will need to restart the host application to complete the activation process.**

4.4 – Phase / Polarity



The phase / polarity switch causes the signal at the output to be inverted. When switching between inverted and normal settings, or when bypassing the plug-in with the phase invert enabled, there may be a slight interruption to the audio.

4.5 – Output Trim



The level trim adjusts the output by up to +/- 6dB. Click on the control and drag upwards to increase the level or down to decrease. The mouse scroll-wheel can also be used to adjust the level in +/- 3dB steps. Double clicking on the control will return it to its default 0.0dB setting.

Section 5 - Presets

5.1 - Preset Configurations

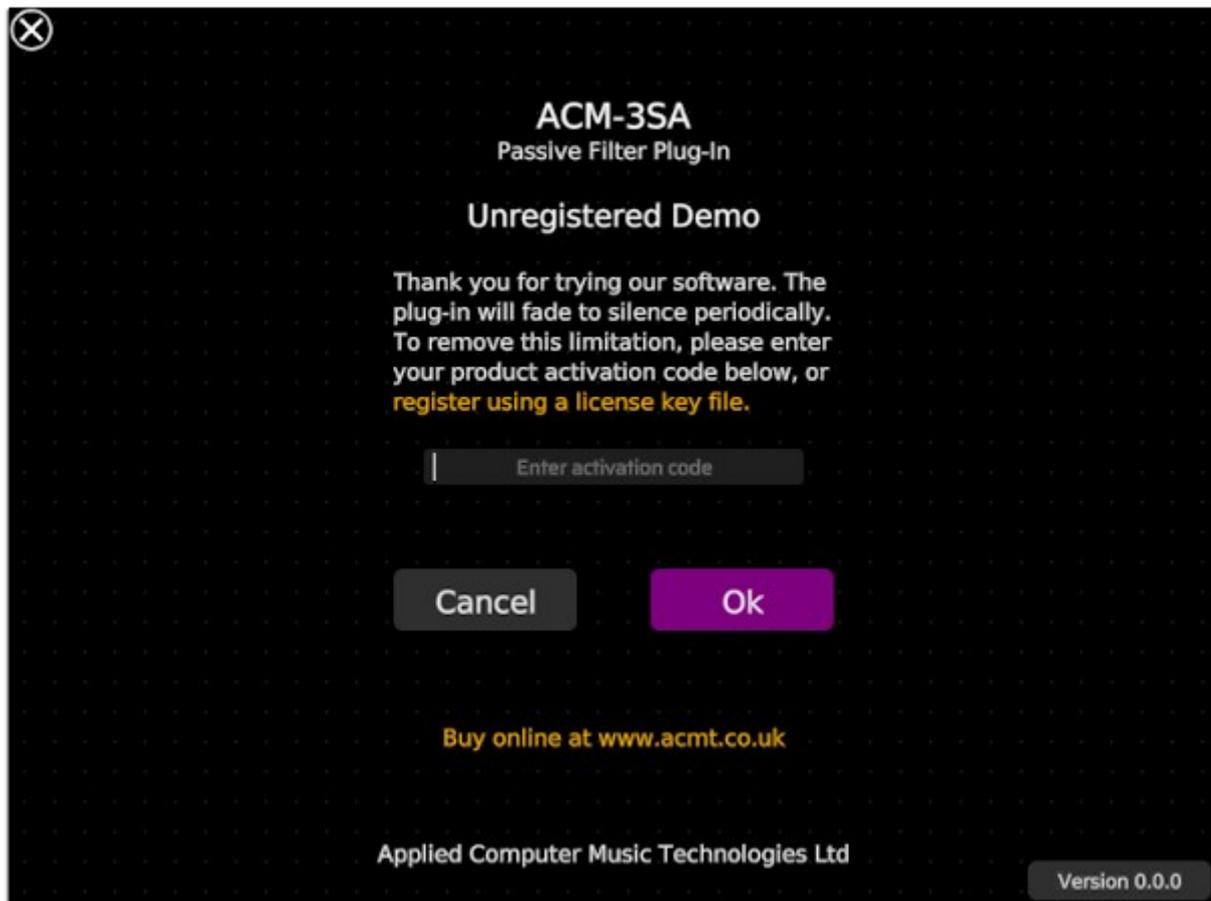
The ACM-3SA has four factory presets, designed to provide a guide to some of the more common combinations of control settings.

Factory Preset 1 - Rumble 50 Hz	Using the low-cut filter as a 'rumble filter' to remove unwanted low frequency noise below 50Hz.
Factory Preset 2 - Rumble 80 Hz	Using the low-cut filter as a 'rumble filter' to remove unwanted low frequency noise below 80Hz.
Factory Preset 3 - Hold Music	Using the high and low-cut filters to simulate bandwidth limited telephone 'hold music.'
Factory Preset 4 - Distant Radio	Using the high and low-cut filters to simulate the sound of a radio playing in the distance.

Section 6 – Demo Limitations

6.1 - Demo Screen

When the plug-in is first added to a channel / buss, the following screen will appear if it has not been activated by a valid key. This indicates the plug-in is in demo mode and will run with some limitations. To remove these limitations you will need to obtain a valid activation key from the Applied Computer Music Technologies website at: <https://www.acmt.co.uk>



To activate the plug-in, enter your activation code into the text box (you can also paste it from the clipboard by right-clicking and selecting the 'Paste' context pop-up). You will need to restart your host application to complete the process. If you do not have a valid key, you can cancel the pop-up and activate it at another time by clicking the lock button in the plug-in's graphical user-interface.

Section 7 – About The Processing

7.1 ACM-3SA Functional Blocks

1. Passive Filters

Audio entering the ACM-3SA passes through two 'constant K' 12dB / octave passive filter emulations, which provide both the low and the high frequency cut, adjusted via the front panel controls. Each filter can be independently bypassed.

2. Low Latency Analogue Modelled Filters

The ACM-3SA uses innovative processing to ensure that the correct equivalent analogue frequency response is modelled, even at lower sample rates. This enables an accurate representation of the original filter behaviour, without the need for CPU intensive oversampling, reducing both latency and processing demand.

3. Interpolated Controls

As the front panel controls are adjusted, the filter smoothly interpolates between settings, ensuring glitch free ('click-less') switching between frequency settings just as in the original vintage hardware.

Section 8 - Using the ACM-3SA

The ACM-3SA emulates a Pultec HLF-3C style vintage passive filter. Historically this has often been overlooked when compared to the more familiar EQP-1A. The passive filter provides two filter sections, a 12dB / octave low-cut (high-pass) and a 12dB / octave high-cut (low-pass).

8.1 Low Cut Filter

The low frequency cut filter provides ten switch selectable cut-off frequencies, with a fixed attenuation of 12dB / octave below the cut-off frequency, or a clean bypass in the 'OFF' position. In the original hardware, the filter is an entirely passive 'constant-k' design, containing no active components.

The filter can be used as a 'rumble filter' to tame unwanted low frequency noise (for example acoustic vibration or pickup from a microphone input) or to restrict the frequency range for deliberate effect, for example 'telephone voice'.

8.2 High Cut Filter

Similar to the low-cut filter, the high frequency cut filter provides ten switch selectable cut-off frequencies, with a fixed attenuation of 12dB / octave above the cut-off frequency, or a clean bypass in the 'OFF' position. In the original hardware, the filter is an entirely passive 'constant-k' design, containing no active components.

The filter can be used to tame unwanted high-frequency content (for example vocal sibilance) or to restrict the frequency range for deliberate effect, for example a bandwidth limited 'telephone voice.'

Appendix

Appendix A - Technical Data

1. Technical Specifications

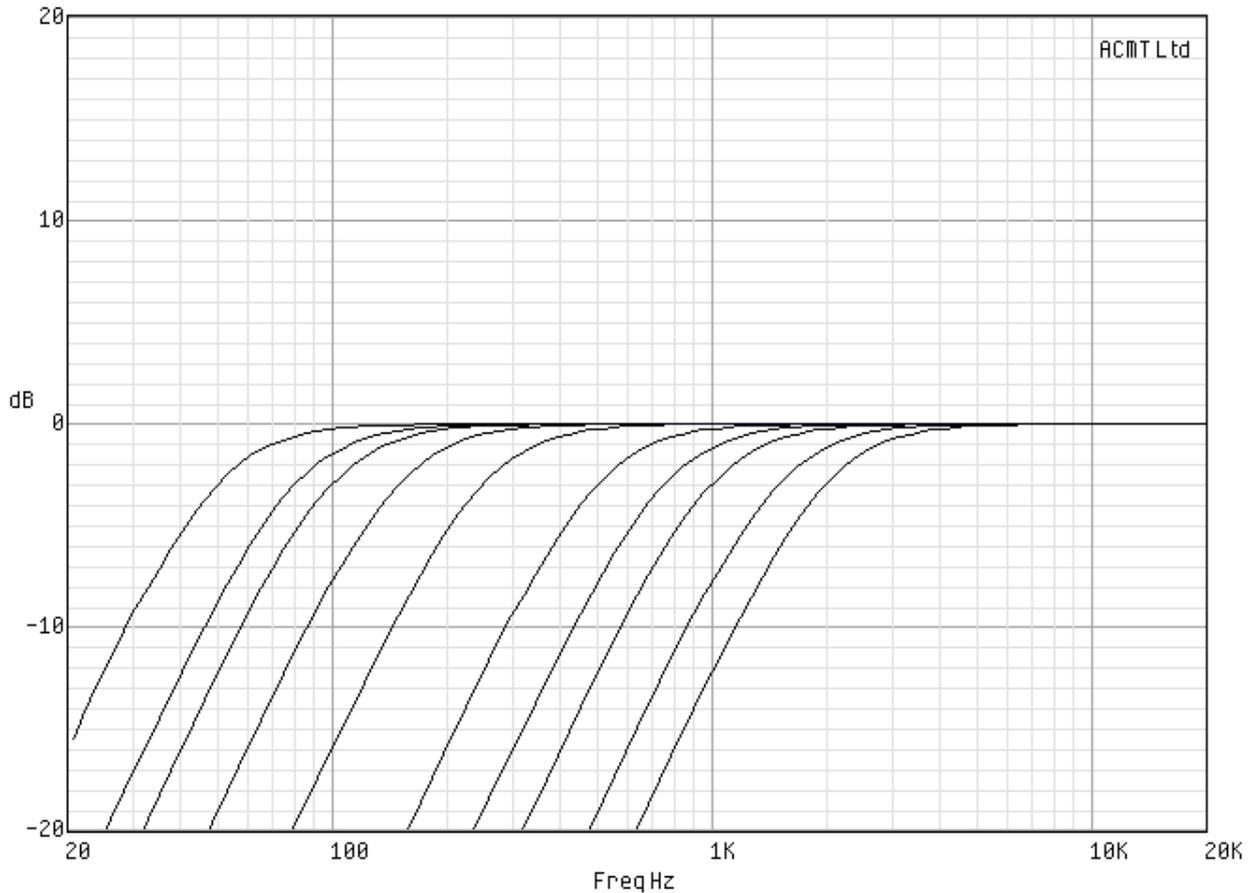
Frequency Response:	0Hz to $F_s/2$ (bypassed) - where F_s is the sample rate.
Internal Processing:	32bit floating point, 64Bit DSP coefficients and storage.
Reference Level:	0dBu = -18dBFS.
Dynamic Range:	Limited only by internal processing resolution (32bit floating point) and progressive limiting due to inductor saturation modelling.
Low Cut Frequency:	OFF, 50Hz, 80Hz, 100Hz, 150Hz, 250Hz, 500Hz, 750Hz, 1000Hz, 1500Hz, 2000Hz - Switch selectable.
Low Cut Slope:	12dB / octave.
High Cut Frequency:	1.5kHz, 2.0kHz, 3.0kHz, 4.0kHz, 5.0kHz, 6.0kHz, 8.0kHz, 10.0kHz, 12.0kHz, 15.0kHz, OFF - Switch selectable.
High Cut Slope:	12dB / octave.
Filter Types:	Analogue modelled low latency 12dB / octave 'constant-k' high-pass (low-cut) and low-pass (high-cut).

NOTE: VST is a trademark of Steinberg Media Technologies GmbH

Appendix B - Measured Performance

1 - Low Cut

Composite graph showing the measured response to a 20Hz - 20kHz swept sine.



Test Signal

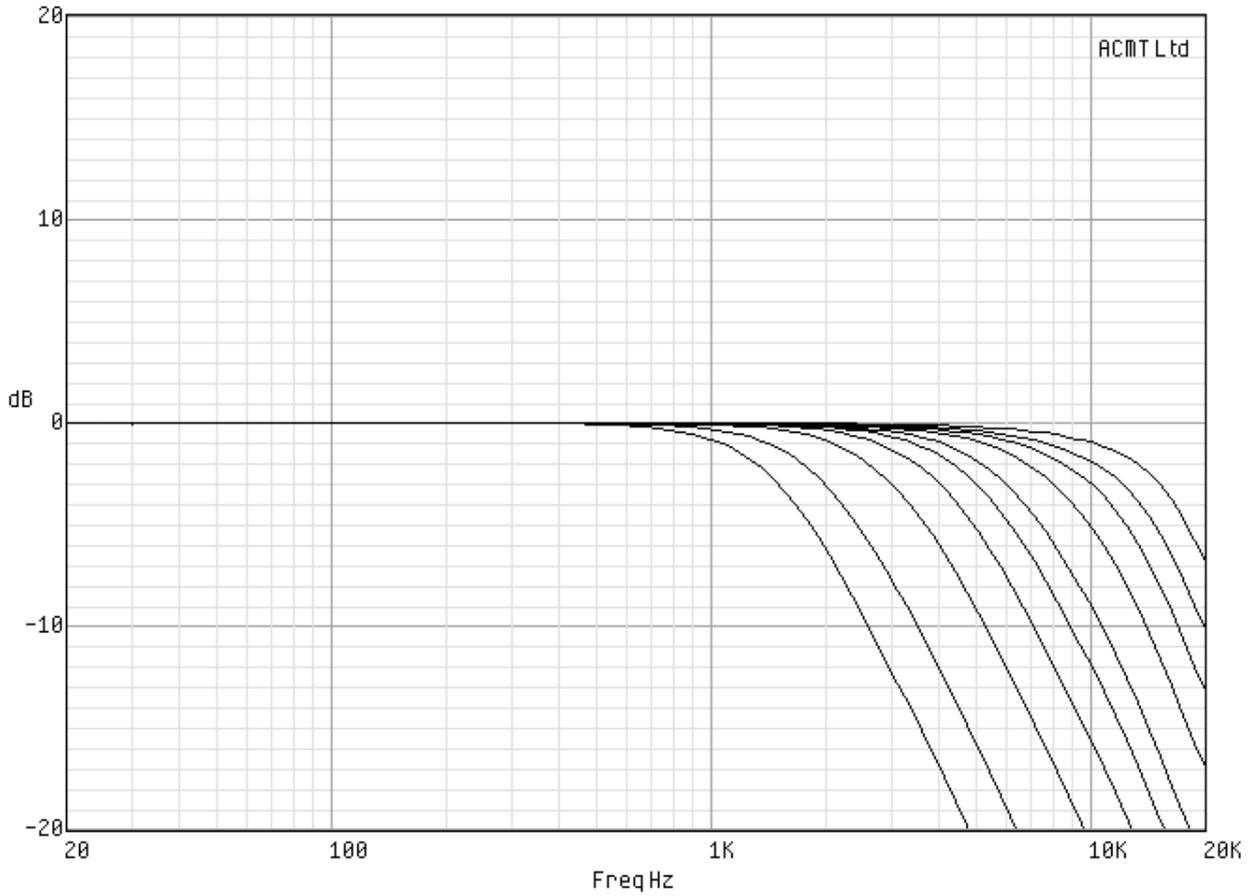
Input Signal 20Hz - 20kHz swept sine at 0dBFS
Sample Rate 48kHz

Control Settings

Low Cut Freq 50Hz - 2000Hz

2 - High Cut

Composite graph showing the measured response to a 20Hz - 20kHz swept sine.



<u>Test Signal</u>	
Input Signal	20Hz - 20kHz swept sine at 0dBFS
Sample Rate	48kHz
<u>Control Settings</u>	
Low Cut Freq	1.5kHz - 15kHz

Appendix C - Spare Parts and Service

With regular care and maintenance your new ACM-3SA filter plug-in is designed to give long and reliable service. Spare parts and service updates can be downloaded from:

<https://www.acmt.co.uk>

Always ensure it has adequate ventilation and is kept free from dust. **Always use genuine replacement parts.** For service and support information contact:

support@acmt.co.uk

Appendix D - Disclaimer

Disclaimer

All trademarks are the property of their respective owners and are used for information purposes only. References to other companies or their products or representation of those products does not imply any official endorsement of the software by those companies or any affiliation to those companies unless expressly stated otherwise.

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