

## SA10 / SA20 digital filter selection

### Introduction

The SA10 and SA20 allow the listener to choose between a number of digital filters for use with the coaxial and optical SPDIF inputs. There are three options available on the SA10 and seven on the SA20. Digital filters are required to minimise unwanted antialiasing distortion in the audio band but no digital filter is perfect, all are a compromise between various parameters. These include:

**Frequency response** – Audio level with respect to frequency. Ideally this should not vary significantly between 20Hz and 20kHz.

**Phase** – The time delay introduced between reproducing different frequencies within the pass band of the filter. Ideally this would be as low as possible (linear phase).

**Pre ringing** – Additional audio artefacts that precede the original audio impulse. These are sometimes thought to be bad as this phenomenon does not exist in the natural world, so ideally this should be as low level and last for as short a time as possible.

**Post ringing** – Additional audio artefacts that follow the original audio impulse. Ideally these should be as low in level and last for as short a time as possible.

**Aliasing** – Additional audio artefacts introduced into the audio band from high frequency signals.

We have chosen our default filters through a combination of careful measurement and listening tests and we believe they are the best compromise to achieve the best listening experience. However, all of the filters sacrifice performance of one parameter to improve another. Therefore, dependant on your choice of listening material and personal preference, you may wish to choose one of the other options. Note that any audible differences are most likely to be heard with sample rates of 48kHz and below.

### Filters - SA10

**Minimum Phase Fast Roll Off (MinP Fast)** – No pre-ringing and the phase response varies at higher frequencies. There are significantly higher amounts of post ringing compared with the linear phase filter options.

**Linear Phase Slow Roll Off (LinP Slow)** – Low and equal levels of pre and post ringing. No phase shifts but can introduce high frequency aliasing at a higher level than linear phase fast roll off. Very high frequencies will be slightly attenuated.

**Linear Phase Fast Roll Off (LinP Fast) (SA10 default)** – Higher and equal levels of pre and post ringing compared with linear phase slow roll off. No phase shifts and with minimal high frequency aliasing compared with slow roll off.

### Filters - SA20

**Brick Wall (B Wall)** – No phase shift, but introduces both pre and post ringing artefacts.

**Corrected Minimum Phase Fast Roll Off (Corr MinP)** – Low pre-ringing and the phase response varies at higher frequencies. There is more post ringing compared with linear phase and apodizing filters.

**Apodizing (SA20 default)** – A compromise between phase, frequency response and ringing. Its main advantage is that it removes most of the ringing that has been introduced upstream in the recording process when the original material was recorded and mastered.

**Minimum Phase Slow Roll Off (MinP Slow)** - No pre-ringing artefacts but can introduce phase shifts at higher frequencies. It has less post ringing than the Minimum Phase Fast Roll Off, but this is still higher than the linear phase filter options. Very high frequencies in the last half octave of the filter pass band will be slightly attenuated.

**Minimum Phase Fast Roll Off (MinP Fast)** – No pre-ringing and the phase response varies at higher frequencies. There are significantly higher amounts of post ringing compared with the linear phase filter options.

**Linear Phase Slow Roll Off (LinP Slow)** – Low and equal levels of pre and post ringing. No phase shifts but can introduce high frequency aliasing at a higher level than linear phase fast roll off. Very high frequencies will be slightly attenuated.

**Linear Phase Fast Roll Off (LinP Fast) (SA10 default)** – Higher and equal levels of pre and post ringing compared with linear phase slow roll off. No phase shifts and with minimal high frequency aliasing compared with slow roll off.

### Selecting the filter

Enter the setup menu by pressing and holding the MUTE key on the front panel for 3 seconds.

Use the front panel keys to navigate as described in the “setup menu” section of the manual to get to the “Filter” option in system settings.

Use the volume control knob to select your required filter.

The \* character indicates the currently selected filter.