



## SCS70 Pro Subwoofer F.A.Q.

with Richard Newman, Head of Engineering

### I. Cabinet

- a. Infinite (Sealed) Design – Why was this design picked? How does it lead to better performance over other designs?

When designing the SCS70 we considered all options, narrowed them down to either sealed or ported and then built both for comparison. While the ported design, employed in the same way you find in our SCM50/100/150 will give exceptional performance at low frequencies, it has a major drawback when the content is very low frequency focused – loss of control below the port tuning frequency. In this product the port would need to be tuned to ~23Hz and while most music has very little to no content below that, some cinematic content does. So, if a ported design was used, we would have had to employ some high pass filtering in the amplifier, cutting the energy below the port tuning frequency and protecting the driver. Sadly, doing so introduces significant group delay and has a negative impact on integration with the main monitors.

So, the sealed design results in less processing in the amplifier and therefore better integration with main monitors.

- b. Heavy and Inert Cabinet – What does this mean? Is the cabinet made from a special material or is there substantial bracing?

The internal air pressure in a subwoofer can get very high so it's important that the cabinet is resonance free and has a good balance of stiffness and damping. We've used 25mm MR MDF throughout and also included bracing to further support the internal cabinet faces.

### 2. Driver – NEW 12"

- a. Increased magnetic gap – Does this mean it has greater excursion than other ATC drivers?

Yes. The new driver (SS75-314SC) has been designed from the ground up, taking the short coil/long gap configuration that we employ throughout our range to the extreme. The magnetic gap is 50% longer than you'll find in our SL motors which means the driver is free from any magnetic "BL (force factor)" non-linearities over a 20mm p/p excursion and in fact-an influence of BL non-linearity remains very low even at 30mm p/p. An added benefit of the short coil/long gap topology is efficient heatsinking from the coil (since it's always in the gap), reducing power compression. The suspension on this new subwoofer driver is also all new and developed with much greater excursion capability in order to compliment the increased 'magnetic Xmax'.

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b. Magnet material – Neodymium? Ferrite?

Until now, we've only used Neo in our tweeters, so this is our first large neodymium driver. The N48M (high grade and high temp) neodymium ring magnet is 130mm in diameter and 9mm thick... which is huge for a Neo magnet. The only way we could achieve a linear magnetic field over a 30mm gap was by using such a large Neo ring combined with a highly optimized assembly.

Another feature seen in the bass driver and facilitated by the efficiency of the Neo ring is a high degree of ventilation. The 32mm diameter flared hole in the pole piece greatly reduces air noise at high excursions and aids cooling.

c. What makes it superior over other drivers you make and why not use an OEM driver?

The motor assembly and suspension components in the SS75-314SC are all optimized purely for sub-bass reproduction. The advantage to using an ATC in-house designed and built driver is that we were able to optimize it for our exact requirements, so building it ourselves means we can achieve the highest levels of performance while offering better value for the customer.

3. Amplifier

a. 300 watts – why not more?

What needs to be considered is how the system works as a whole. The driver and cabinet configuration/size has been designed to be efficient over the operating band and in this system 300W offers plenty of headroom. If we had opted for a smaller enclosure, we would then have been led to design a driver which required high levels of LF EQ and therefore more amplifier power to displace the same amount of air (remember +3dB SPL requires 2x the amplifier power). Also bear in mind what I said about LF EQ and the negative affect it has on group delay and phase response.

One problem with making subs with very high amplifier powers is that the driver needs to be able to handle all that power (~99% which will be converted to heat) and much of the design is therefore going to be focused on making sure it has huge degrees of power handling and heatsinking capacity. I believe we've taken a more balanced approach which is better fitting to our product range.

b. Any EQ/DSP as found in existing 15" ATC Sub?

No. I was very keen to avoid this so there is absolutely no LF EQ/boost in the system. The high pass response of the amplifier is <2Hz and it is flat up until the LP filters (set on the panel) attenuate the output. I believe I've given the reasons why we took this approach above. Ultimately the goal of the sub was to create a product that sounded like the bottom end of a large ATC (SCM150) and that cannot be achieved through processing.

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- c. New amp design – is it similar to existing designs? P2? Or SCM0.1-15 amp?

The amplifier is a Grounded Source MOSFET design like you find throughout our range of Professional monitors. The amplifier circuit has origins in our P2 (sharing the same number of devices and power transformer) and is partnered with a newly developed pre-amplifier/filter board and mains control board.

4. Performance
  - a. Minimal Distortion – Could you elaborate?

Distortion can exist in many forms, such as THD, IMD and Power Compression, all of which are a function of both frequency and level. There is also the Frequency Response Linearity and Transient Response to consider. The SCS70 Pro has design features aimed squarely at addressing all the types of distortion we can measure, making it capable of delivering low distortion even at higher SPL's.

I believe one great strength of our product is the driver focused approach and lack of processing. This approach results in less group delay, less phase distortion and outstanding transient response, all of which ultimately improve the integration for the end user and greatly reduces the need to 'chase' the ideal level setting.

5. Connections
  - a. The 15" sub sometimes required the user to use both inputs, via a Y-cable, to have enough output to level match some ATC speakers. Does this unit also require using both inputs to increase output?

This won't be required in the SCS70 because we have a +6dB switch on the panel. The input sensitivity is also a better match to the speakers the sub will pair with and +4dBu pink noise will produce 88dB at 1m (single channel driven, gain +6dB, attenuator at 0dB, 80Hz LP), close to exactly where you want to be for surround and immersive setups. There is also the +10dB gain option, should the sub be used for LFE application only and the client lacks this feature elsewhere in the chain.

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