

Technical Note

Enabling the Qualcomm® Fluence™ Pro Noise Cancellation Technology on the Inforce 6540™ SBC Platform

Leveraging Advanced Noise Cancellation Technologies in Snapdragon Processors

We usually *hear* that *seeing is believing*, but for many, *hearing is believing*. Audio quality is critical to modern embedded applications that strive to deliver an immersive multimedia experience.

Conventional noise cancelation and reduction technologies segment audio signals sourced from a microphone in time and frequency planes. These techniques also suppress background noise by applying various gains to different signal segments. The gains are estimated based on the Signal-to-Noise-Ratio (SNR) measurements in each segment, for example, the gain is set close to unity if SNR is high, or set to low otherwise. As single-microphone solutions estimate SNR using stationary noise calculations, they generally do well with noises emanating from stationary sources. The performance degrades with non-stationary background noise and these traditional technologies are not able to adequately handle noises, such as background music, competing speech, burst noise, etc. Furthermore, aggressive noise reduction in single-microphone solutions often results in speech quality degradation.

Fluence Pro, Qualcomm's advanced dual-microphone noise cancelation technology, is capable of removing background noise by discriminating the desired signal in both spatial and temporal domains. It can handle stationary noise, quasi-stationary noise, and non-stationary noise. Fluence requires two microphones to be installed on the embedded device. During voice communication, each of the two microphones captures a mixture of desired speech and background noise. As the two microphones are placed at different locations, the audio signals are slightly different. This difference provides spatial information about the speech and noise. With Qualcomm's state-of-the-art array processing algorithm, Fluence is able to exploit such spatial information and provide accurate analysis of speech and noise characteristics. As a result, it is capable of filtering the noise signal out of the mixtures of speech and background

noise to achieve noise cancelation without speech quality degradation. Fluence Pro voice input technology can be used for command/control functionality, as well as two-way VoIP calling. Key features include:

- Echo Cancellation and Noise Suppression using multiple microphones
- Sound position tracking to determine user location relative to the device
- Sound focus to capture voice from specific areas
- Position Tracking

Note that microphone placement is extremely important and usage of QACT (Qualcomm's Audio Calibration Tool) is a required skill.

For embedded applications that require noise cancelation, the Qualcomm Fluence technology can be enabled in several Snapdragon processor powered Inforce compute platforms. Here we use the [Inforce 6540 SBC](#), powered by the Snapdragon 805 processor (APQ8084 SoC) as the test vehicle. The required commands are:

```
$> adb pull /system/build.prop
```

Change the Value of the properties in build.prop:

```
ro.qc.sdk.audio.fluencetype=fluence
```

Add these lines:

```
persist.audio.fluence.audiorec=true  
persist.audio.fluence.mode=broadside
```

```
$> adb remount  
$> adb push build.prop /system/  
$> adb shell chmod 644 /system/  
build.prop  
$> adb shell sync  
$> adb reboot
```



References

- [1] [Qualcomm Immersive Audio: superior surround sound on your smartphone—without headphones](#)
- [2] [Snapdragon Multimedia](#)

Additional Information

To learn more about the processing power, performance, and connectivity options provided by Inforce products, please visit www.inforcecomputing.com

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Global Sales & Support Inforce Computing Inc., 48820 Kato Road Ste 600B, Fremont, CA 94538 USA
Phone: (510) 683-9999 | sales@inforcecomputing.com

<http://www.inforcecomputing.com>