Single TAS3103 in 5.1 Channel Audio System

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ABSTRACT

The TAS3103 is a three channel digital audio processor. It is capable of audio functions such as volume and tone control, audio mixing, dynamic range compression/expansion (DRCE), parametric equalization, audio effects, spectrum analysis, and delay.
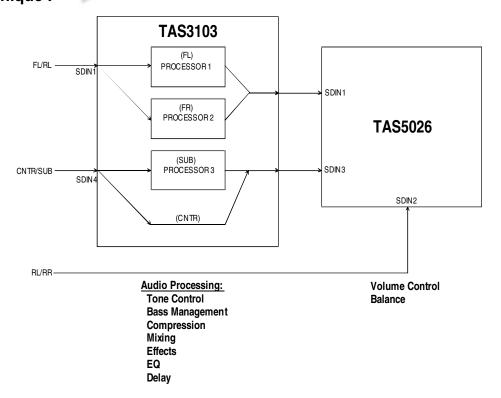
In common home theater systems, two TAS3103's are generally used to process the six audio channels. This report describes a method for using a single TAS3103 to process the front speakers and the subwoofer. Volume control and balance are implemented using the functions in a TAS5026 PWM Modulator.

System Block Diagram:

This report covers the addition of a digital audio processor to the amplifier system in a 5.1 Channel home theater system. In this type of system, there are normally three digital audio channels. One channel contains the information for the front speakers, the second contains the information for the Rear or Surround speaker, and the last channel contains the information for the Subwoofer and Center Channel.

In many applications, it is necessary to apply tone control to the front speakers and the subwoofer. Furthermore, bass management and compression are necessary for the subwoofer. Occasionally, it is desirable to delay the information to the front speakers to align their phase with the subwoofer. These functions are all possible with the TAS3103.

Technique :


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                        TAS3103
FL/RL ──── SDIN1            (FL)
                       PROCESSOR 1 ─┐
                                    ├──── SDIN1
                           (FR)     │              TAS5026
                       PROCESSOR 2 ─┘
CNTR/SUB ── SDIN4          (SUB)
                       PROCESSOR 3 ─┐──── SDIN3
                           (CNTR)   │
                                          SDIN2
RL/RR ─────────────────────────────────────┘

Audio Processing:            Volume Control
  Tone Control               Balance
  Bass Management
  Compression
  Mixing
  Effects
  EQ
  Delay
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Description:

The preceding diagram, two of the three digital audio channels are connected to the TAS3103. One of the channels, the Rear or Surround, is connected directly to the TAS5026 PWM Modulator, which provides the signals that drive the amplifier's output stages.

The two front channels are connected to two processing sections inside of the TAS3103 and the appropriate audio processing algorithms are applied to them.

The data channel for the center and subwoofer channels are also connected to the TAS3103. Through the use of the input switches, internal to the TAS3103, the subwoofer information is connected to the third processing section and the center channel is routed to the output switches. The two audio channels are reconstructed to digital audio data and routed to the output. In some cases, it may be desirable to process the center channel instead of the subwoofer. This can be accomplished, under program control, with the input and output switches in the TAS3103.

The two outputs of the TAS3103 and the remaining audio channel for the rear speakers are routed directly to the TAS5026. Since the TAS5026 has individual channel volume control, it performs the functions of volume control and balance. The rear channels will lead the other channels by two sample times, since there is a two sample time delay in the TAS3103. In a low cost application this small delay is generally acceptable.

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