

# SM5 Signal Mixer

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Hardware Reference



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# SM5 Signal Mixer

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## SM5 Overview

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The SM5 is a three-channel signal mixer. The relative contribution of the three inputs to the final output can be adjusted using a variable gain for two of the inputs. In addition, the signal on the two adjustable channels can be inverted before addition. The input signal range is  $\pm 10$  V for each channel, with the additional caveat that the amplified signal for each channel may not exceed  $\pm 10$  V without clipping. The range for the summed output is  $\pm 10$  V.

## Power

The SM5 Signal Mixer is powered via the System 3 zBus ([ZB1PS](#)). No PC interface is required.

## SM5 Features

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The SM5 Signal Mixer is a three-channel weighted summer with variable input weighting and channel inverting.

## Inputs

Three signals input channels (A, B, and C), with a range up to  $\pm 10$  V peak, are accessed through front panel BNC connectors. Input channels A and B are multiplied by a weighted, signed constant,  $K$ , before being added to the final output. The weighting range for these two channels is adjustable from -20 dB to +20 dB (i.e.  $|K| = 0.1$  to 10) using a GAIN knob on the front panel. The sign of  $K$  for channels A and B can also be selected using front panel toggle switches, labeled INV-A and INV-B.

If an input is not being used, it should be grounded by attaching a shorted BNC cable. This will prevent unwanted noise from being added to the output.

## Clipping

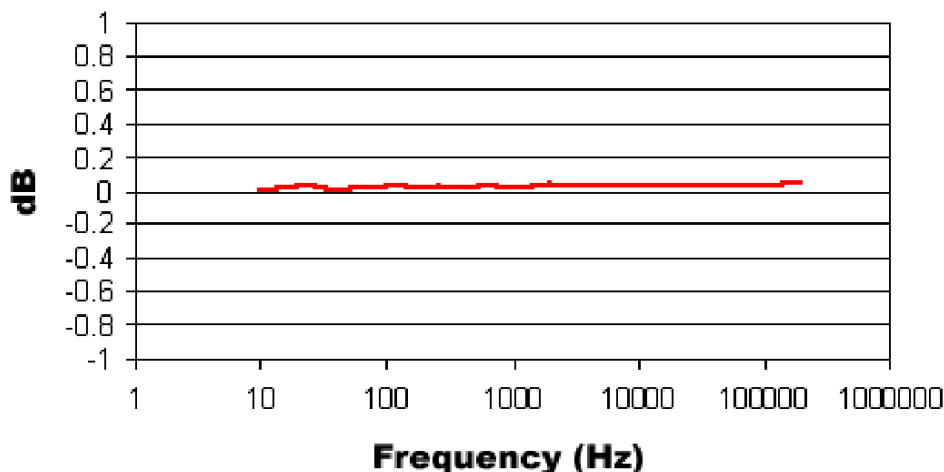
The variable weighting provides a great deal of flexibility in input and output signals. However, care should be taken to avoid clipping any signal component. The SM5 output signal =  $(K_a \cdot A) + (K_b \cdot B) + C$  is limited to  $\pm 10$  V peak. In addition, the raw inputs, A, B, and C, as well as the weighted inputs,  $K_a \cdot A$ , and  $K_b \cdot B$ , are limited to  $\pm 10$  V peak.

## SM5 Technical Specifications

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Input Signal Range	$\pm 10$ V peak
Weighting Range	-20.0 to +20.0 dB
Max Output	$\pm 10$ V
Spectral Variation	<0.1 dB from 10 Hz to 200 kHz
S/N (typical)	111 dB (20 Hz to 80 kHz)
THD	<0.002% (1 kHz tone $\pm 7$ V peak)
Noise Floor	19 $\mu$ Vrms
Output Impedance	20 Ohm
Input Impedance	10 kOhm
Inversion	Channels A & B

## SM5 Frequency Response



## SM5 Total Harmonic Distortion

