CURTIS ELECTROMUSIC SPECIALTIES

C E M 3 3 6 5

FAST DUAL DAC MULTIPLIER

Preliminary, November 1985

Description

The CEM 3365 is a dual high speed one quandrant multiplier intended to scale the output of fast bipolar DACs in digital audio applications. Each half of the 3365 contains a very fast op amp and a high speed current input / current output gain cell whose gain is controlled by the output of the op amp; a full scale multiplication with settling of the cell output to 12 bits can occur in 150 ns (200 ns max.). This response is in contrast to the many microseconds which would result from changing the reference input of even the fastest bipolar multiplying DACs.

As both inputs and output of the op amp are externally available, two modes of operation are possible. One is to configure the op amp as the current-to-voltage converter of a second bipolar control DAC, so the gain may be controlled directly by a data word. Effective resolution of the result is the sum of the resolutions of the two DACs (24 bits for two 12 bit DACs). The second mode is to configure the op amp simply as a voltage follower, allowing the gain to be controlled by a voltage (from a Sample and Hold, for instance).

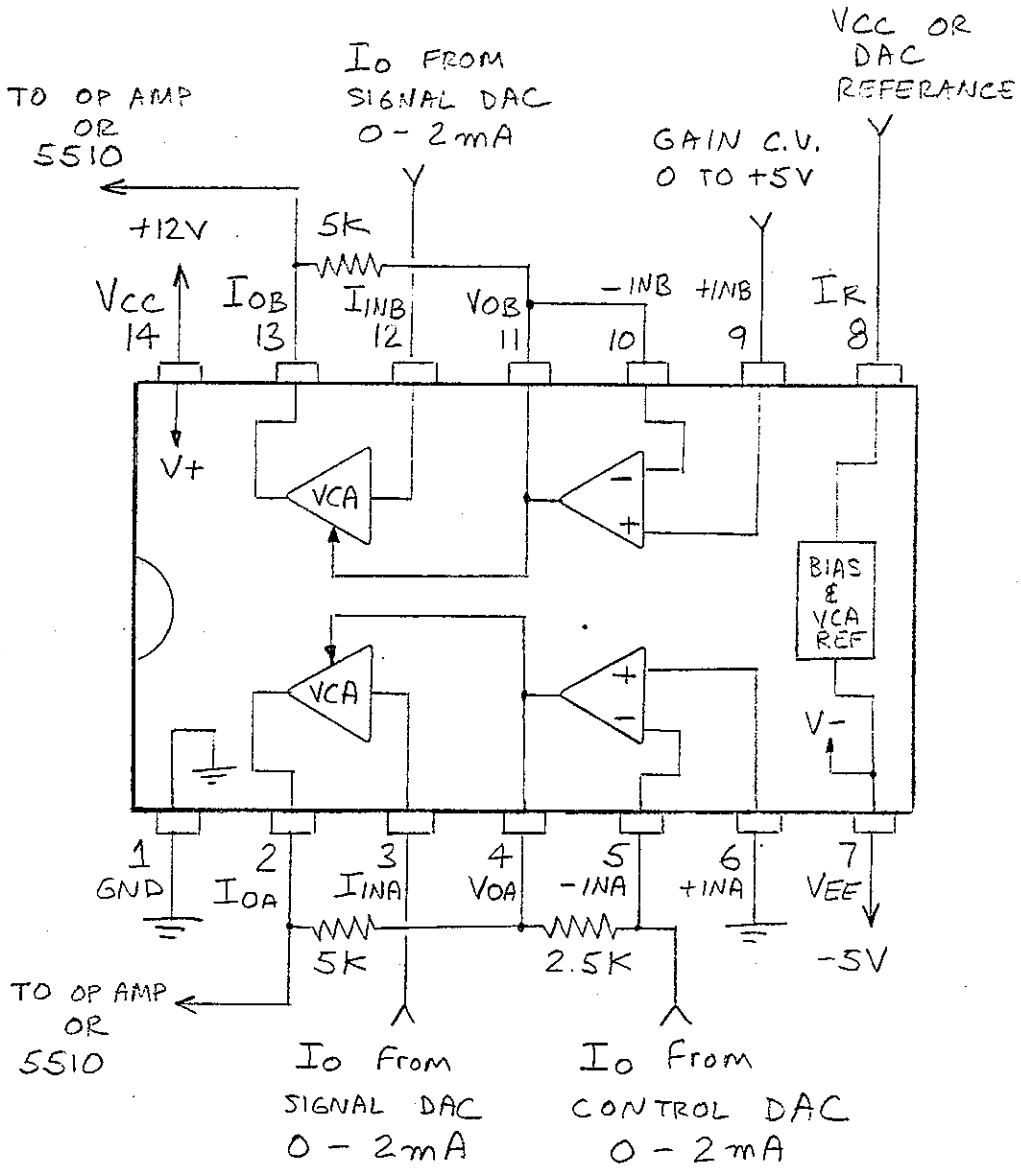
Although the input to the gain cell is limited to a unipolar current, the output may be made bipolar simply by connecting a properly valued resistor from the op amp output to the gain cell output. Additional versatility is provided by the reference voltage pin, which accurately sets the op amp output voltage required for maximum gain.

A typical application for the 3365 would be to control the amplitude of digitally generated audio signals in a multiplexed system. When used in conjunction with a CEM 5510 Fast Octal Sample and Hold, for instance, 8 channels of digital audio with individual amplitude control and 24 bits resolution can be produced in less than 2 uS (500 nS per channel).

Fast, flexible, and requiring few support components, the CEM 3365 offers an inexpensive alternative to the high speed hardware digital multipliers required in multiplexed digital audio systems.

Features:

- Fast multiplication of bipolar DAC outputs: setting to .Ø25% of input in < 2ØØ nS
- Gain controllable by another DAC or by a voltage
- Two independent multipliers in a single 14 pin DIP
- Adjustable voltage level required for maximum gain
- Unipolar or bipolar outputs



CEM3365 FAST DAC MULTIPLIER

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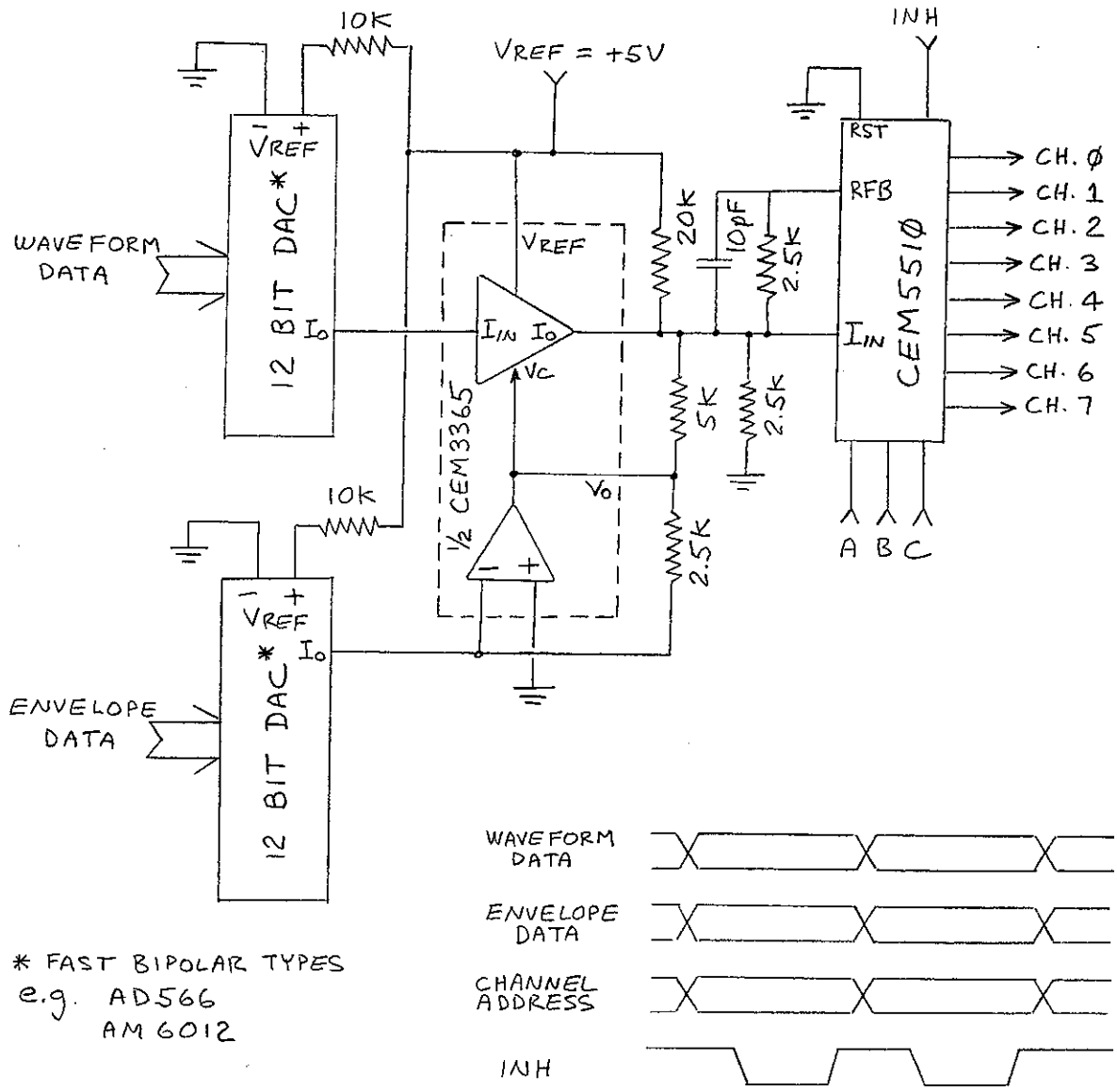
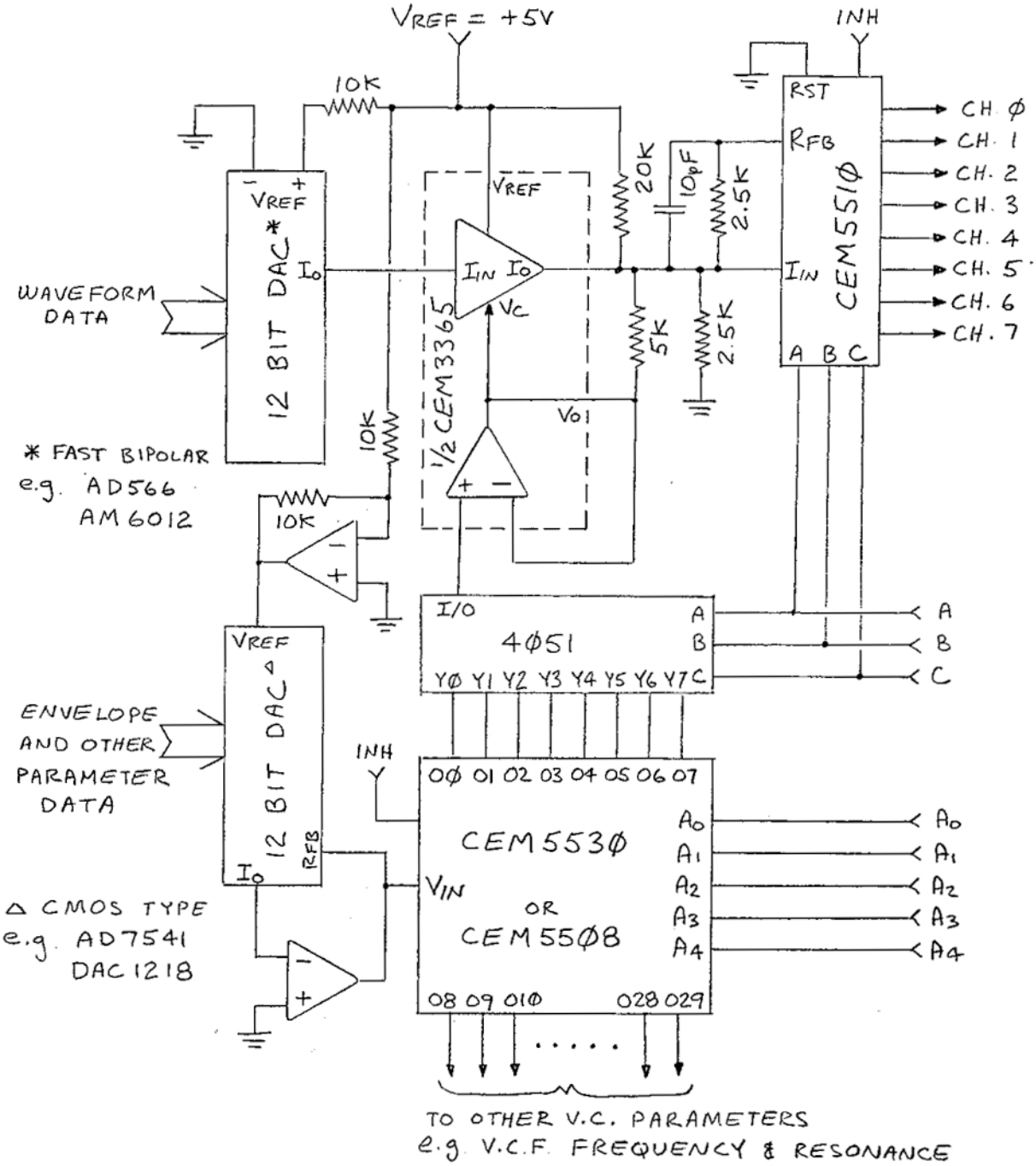
Generating 8 Channels of Digital Audio with Individual Envelope Control on Each Channel



* FAST BIPOLAR TYPES
e.g. AD566
AM 6012

This approach requires special hardware to update both DACs (simultaneously) every 500 ns (for maximum throughput)

Generating 8 Channels of Digital Audio with Individual Envelope Control on Each Channel



Advantage of this approach is envelope and parameter data needs updating only once every 1 - 10 mS.