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Interfacing DVSI's AMBE-2000™ and AMBE-2020™ Vocoder Chips with the Texas Instruments PCM3500 Codec

The Texas Instruments PCM3500 codec chip presents a simple low cost solution for use with DVSI's AMBE-2000™ or AMBE-2020™ vocoder chips. This application note provides information on alternative methods of interfacing these components.

PCM3500

The block diagram in Figure 1 shows a sample interface between the PCM3500 codec and DVSI's AMBE-2000™ vocoder chip. The AMBE-2000™ or AMBE-2020™ CODEC_SEL bits (see AMBE-2000™ or AMBE-2020™ users manual) must be set for use with a generic 16 bit linear codec (CODEC_SEL1,0 – 00).

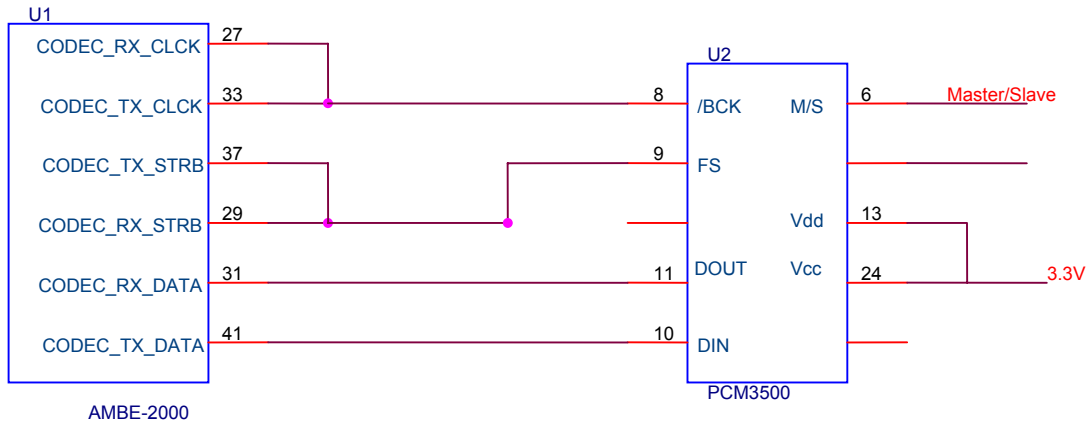
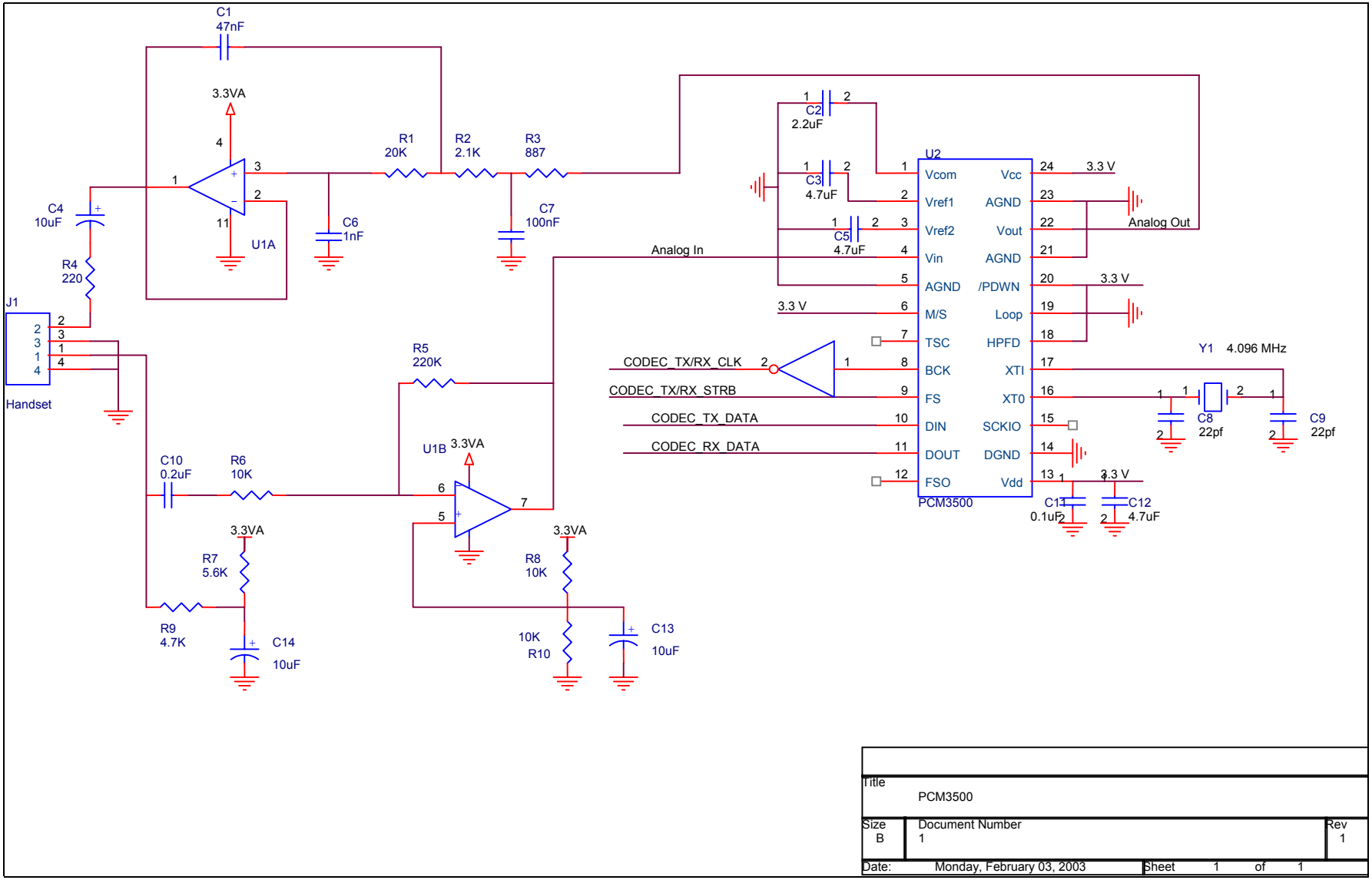


Figure 1: The AMBE-2000™ Vocoder with the PCM3500 CODEC

There are two advantages to using the PCM3500 codec. The first is the single supply design. The PCM3500 supports a single power supply design from +2.7 v to +3.6 v. The second advantage lies in its simplicity. There are no complicated configuration schemes associated with the codec. For configuration information, please see the PCM3500 data sheet and the reference circuit in Figure 2.


C1
47nF
3.3VA
R1
20K
R2
2.1K
R3
887
C2
2.2uF
C3
4.7uF
C5
4.7uF
U2
Vcom
Vref1
Vref2
Vin
AGND
M/S
TSC
BCK
FS
DIN
DOUT
FSO
Vcc
AGND
/PDWN
Loop
HPFD
XTI
XT0
SCKIO
DGND
Vdd
PCM3500
3.3 V
Analog Out
Analog In
C4
10uF
C6
1nF
C7
100nF
U1A
R4
220
J1
Handset
R5
220K
CODEC_TX/RX_CLK
CODEC_TX/RX_STRB
CODEC_TX_DATA
CODEC_RX_DATA
Y1
4.096 MHz
C8
22pf
C9
22pf
C10
0.2uF
R6
10K
U1B
R7
5.6K
R8
10K
R9
4.7K
C14
10uF
10K
R10
C13
10uF
C11
0.1uF
C12
4.7uF
Title
PCM3500
Size
B
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Monday, February 03, 2003
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1

Figure 2

Notes On Analog Circuit Design

The example circuit assumes that a telephone handset is going to be used in the circuit. Typically, handset microphones have a very small gain and the output is at moderately low levels (on the order of 50 millivolts peak to peak). The PCM3500 Voice Codec is designed for an analog input voltage of 2 volts peak to peak. The analog input in the reference design is amplified (Gain = 22) in order to bring the handset voltage to the level expected by the ADC.

The output section is designed using a low pass filter design with a gain of 1. The filter is designed to allow the maximum amount of the voice signal to pass unimpeded. The output of the PCM3500 should be filtered for maximum voice quality.

Capacitors C13 and C14 are for creating a very low noise DC bias signal. If a low noise DC bias is available elsewhere in the circuit, they are not needed.

For optimum performance, the analog circuit should be adjusted for whatever input (and output) device is used. Please reference the PCM3500 data sheet for the analog requirements.

Application Information

It is strongly recommended that the user review the Application Information provided in the Texas Instruments PCM3500 data sheet before finalizing any design.

Additional Reference Material

AMBE-2000™ or AMBE-2020™ vocoder chip Users Manual
http://www.dvsinc.com/literature.htm

Application Report – Understanding Data Converters:
http://www-s.ti.com/sc/psheets/slaa013/slaa013.pdf

PCM3500 Data Sheet
http://www-s.ti.com/sc/ds/pcm3500.pdf

PCM3500 Evaluation Board
http://www-s.ti.com/sc/psheets/sbau028/sbau028.pdf