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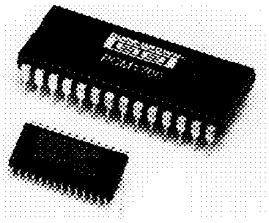


PCM1700U
PCM1700P

Dual 18-Bit Monolithic Audio DIGITAL-TO-ANALOG CONVERTER

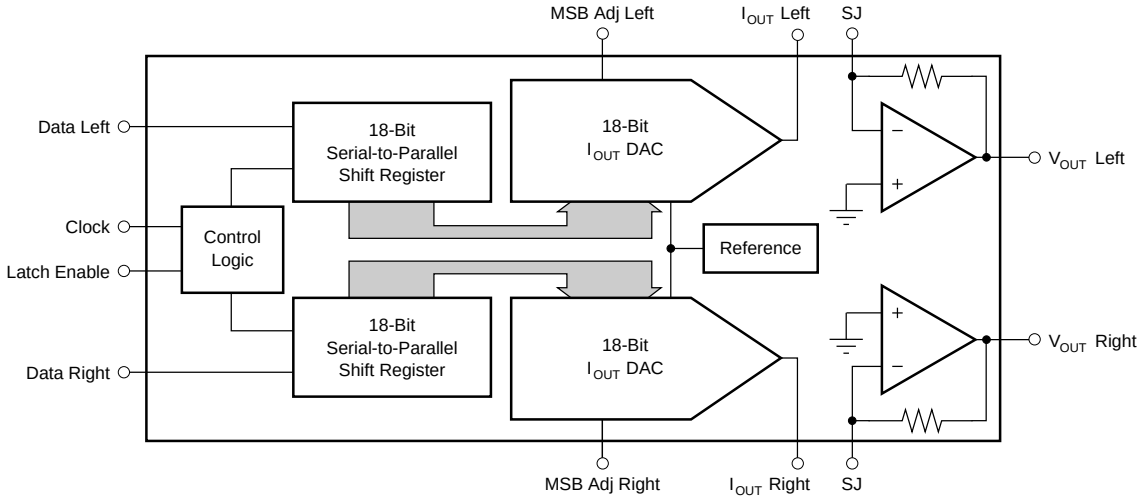
FEATURES

- DUAL 18-BIT LOW-POWER MONOLITHIC AUDIO D/A CONVERTER
- VERY LOW MAX THD+N: –92dB Without External Adjust
- CO-PHASE, LOW-GLITCH ±3V OR ±670µA AUDIO OUTPUTS
- CAPABLE OF 16X PER CHANNEL OVERSAMPLING RATE
- COMPLETE WITH INTERNAL REFERENCE
- SERIAL INPUT FORMAT 100% COMPATIBLE WITH INDUSTRY STD PCM56P
- RUNS ON ±5V SUPPLIES AND DISSIPATES 300mW MAX
- COMPACT 28-PIN PLASTIC DIP OR SOIC

DESCRIPTION

The PCM1700 is a low cost, high-performance, dual 18-bit digital-to-analog converter. The PCM1700 features low glitch, co-phase current and voltage outputs and only requires ±5V supplies. The PCM1700 comes complete with an internal reference and optional MSB adjustability for even greater THD performance. Total power dissipation is less than 400mW max. Low maximum Total Harmonic Distortion + Noise (–92dB max; PCM1700P-K) is 100% tested. The very fast PCM1700 is also capable of 16X oversampling rates on both channels simultaneously, providing freedom in output filter selection.

The PCM1700 comes in space-saving 28-pin plastic DIP and SOIC packages. PCM1700 accepts a serial data input format that is compatible with other Burr-Brown PCM products such as the industry standard PCM56P.



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PDS-1035D
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SPECIFICATIONS

ELECTRICAL

At 25°C, and $\pm V_{CC}$ = ±5.00V unless otherwise noted. Where relevant, specifications apply to both left and right input/output channels.

PARAMETER	CONDITIONS	PCM1700U/U-J/U-K, PCM1700P/P-J/P-K MIN	TYP	MAX	UNITS
RESOLUTION		18			Bits
DYNAMIC RANGE			+108		dB
INPUT					
DIGITAL INPUT					
Logic Family			TTL Compatible		
Logic Level: V_{IH}		+2		$+V_{DD}$	V
V_{IL}		0		+0.8	V
I_{IH}	V_{IH} = +2.7V			+1	µA
I_{IL}	V_{IL} = +0.4V			–50	µA
Data Format			Serial BTC(1)		
Input Clock Frequency		11.288	20		MHz
DYNAMIC CHARACTERISTICS					
TOTAL HARMONIC DISTORTION + N(6)					
PCM1700_:					
f = 991kHz (0dB)	f_S = 352.8kHz(4)		–88	–82	dB
f = 991kHz (–20dB)	f_S = 352.8kHz		–74	–68	dB
f_{IN} = 991kHz (–60dB)	f_S = 352.8kHz		–34	–28	dB
PCM1700_-J:					
f = 991kHz (0dB)	f_S = 352.8kHz		–94	–88	dB
f = 991kHz (–20dB)	f_S = 352.8kHz		–76	–74	dB
f = 991kHz (–60dB)	f_S = 352.8kHz		–36	–34	dB
PCM1700_-K:					
f = 991kHz (0dB)	f_S = 352.8kHz		–98	–92	dB
f = 991kHz (–20dB)	f_S = 352.8kHz		–80	–74	dB
f = 991kHz (–60dB)	f_S = 352.8kHz		–40	–34	dB
CHANNEL SEPARATION		+96	+108		dB
SIGNAL-TO-NOISE RATIO(5)	20Hz to 20kHz at BPZ(6)		+108		dB
TRANSFER CHARACTERISTICS					
ACCURACY					
Gain Error			±1	±3	%
Gain Mismatch	Channel to Channel		±1	±3	%
Bipolar Zero Error			10		mV
BPZ Error Mismatch	Channel to Channel		5		mV
BPZ Differential Linearity Error(7)			±1		LSB
Gain Drift			100		ppm/°C
Bipolar Zero Drift			20		ppm of FSR/°C
Warm-up Time		1			minute
POWER SUPPLY REJECTION	$\pm V_{CC}$ to V_{OUT}		+86		dB
ANALOG OUTPUT					
Voltage: Output Range			±3		V
Output Impedance			0.1		Ω
Current Output			±2		mA
Capacitive Load Drive	R_{LOAD} = 1.5kΩ		TBD		pF
Short Circuit Duration			Indefinite		
Settling Time			Sufficient to Meet THD+N Specs		
Glitch Energ			Meets All THD+N Specs Without External Output Deglitching		
Current: Output Range	(±2%)		±670		µA
Output Impedance	(±2%)		1.67		kΩ
POWER SUPPLY REQUIREMENTS					
$\pm V_{CC}$ Supply Voltage		+4.75	+5.00	+5.25	V
Supply Current: $+I_{CC}$	$+V_{CC}$ = +5.0V		+18	+30	mA
$-I_{CC}$	$-V_{CC}$ = –5.0V		–42	–65	mA
Power Dissipation	$\pm V_{CC}$ = ±5.0V		280	475	mW
TEMPERATURE RANGE					
Specification		0		+70	°C
Operating		–30		+70	°C
Storage		–60		+100	°C

NOTES: (1) Binary Two's Complement coding. (6) Ratio of ($Distortion_{RMS}$ + $Noise_{RMS}$) / $Signal_{RMS}$. (3) D/A converter input frequency/signal level on both left and right channels. (4) D/A converter sample frequency (8 X 44.1kHz; 8X oversampling per channel). (5) Ratio of $Noise_{RMS}$ / $Signal_{RMS}$. Measured using an A-weighted filter. (6) Bipolar zero. (7) Differential non-linearity at bipolar major carry input code. Measured in 16-bit LSBs. Adjustable to zero error.

PIN ASSIGNMENTS (Plastic PKG)

PIN	DESCRIPTION	MNEMONIC
1	–5V Analog Supply	$-V_{CC}$
2	Left Channel Servo-Amp Decoupling Point	CAP
3	Left Channel MSB Adjustment	MSB ADJ (L)
4	No Connect	NC
5	Left Channel Bipolar Offset Decoupling Point	CAP
6	Left Channel Current Output	IOUT (L)
7	Left Channel Analog Common	ACOM
8	Left Channel Summing Junction	SJ (L)
9	Left Channel Voltage Output	VOUT (L)
10	No Connect	NC
11	+5V Digital Supply	$+V_{DD}$
12	Left Channel Data Input	DATA
13	Clock Input	CLOCK
14	–5V Logic Supply	$-V_{DD}$
15	Latch Enable Input	LE
16	Right Channel Data Input	DATA (R)
17	Digital Common	DCOM
18	No Connect	NC
19	Right Channel Voltage Output	VOUT (R)
20	Right Channel Summing Junction	SJ (R)
21	Right Channel Analog Common	ACOM
22	Right Channel Current Output	IOUT (R)
23	Right Channel Bipolar Offset Decoupling Point	CAP
24	Right Channel MSB Adjustment	MSB ADJ (R)
25	Right Channel Servo-Amp Decoupling Point	CAP
26	MSB Adjustment Potentiometer Voltage Output	VPOT
27	+5V Analog Supply	$+V_{CC}$
28	Digital Common	DCOM

ORDERING INFORMATION

PCM1700 ( ) ( )

Basic Model Number
P: Plastic U: SOIC
Performance Grade Code

ABSOLUTE MAXIMUM RATINGS

DC Supply Voltages	±7.5VDC
Input Logic Voltage	–1V to $+V_{CC}$
Power Dissipation	500mW
Operating Temperature	–25°C to +70°C
Storage Temperature	–60°C to +100°C
Lead Temperature (soldering, 10s)	+300°C

PIN ASSIGNMENTS (SOIC PKG)

PIN	DESCRIPTION	MNEMONIC
9	–5V Analog Supply	$-V_{CC}$
10	Left Channel Servo-Amp Decoupling Point	CAP
11	Left Channel MSB Adjustment	MSB ADJ (L)
19	No Connect	NC
12	Left Channel Bipolar Offset Decoupling Point	CAP
13	Left Channel Current Output	I_{OUT} (L)
14	Left Channel Analog Common	ACOM
15	Left Channel Summing Junction	SJ (L)
16	Left Channel Voltage Output	V_{OUT} (L)
17	No Connect	NC
18	+5V Digital Supply	$+V_{DD}$
20	Left Channel Data Input	DATA
21	Clock Input	CLOCK
22	–5V Logic Supply	$-V_{DD}$
23	Latch Enable Input	LE
24	Right Channel Data Input	DATA (R)
25	Digital Common	DCOM
26	No Connect	NC
27	Right Channel Voltage Output	V_{OUT} (R)
28	Right Channel Summing Junction	SJ (R)
1	Right Channel Analog Common	ACOM
2	Right Channel Current Output	I_{OUT} (R)
3	Right Channel Bipolar Offset Decoupling Point	CAP
4	Right Channel MSB Adjustment	MSB ADJ (R)
5	Right Channel Servo-Amp Decoupling Point	CAP
6	MSB Adjustment Potentiometer Voltage Output	V_{POT}
7	+5V Analog Supply	$+V_{DD}$
8	Digital Common	DCOM

NOTE: In the SOIC (PCM1700U) package, the die is rotated 90°. Therefore, the pin assignments are different from the DIP. See pin assignments on page 4 for details.

PACKAGE INFORMATION

MODEL	PACKAGE	PACKAGE DRAWING NUMBER(1)
PCM1700U	28-Pin SOIC	217
PCM1700U-J	28-Pin SOIC	217
PCM1700U-K	28-Pin SOIC	217
PCM1700P	28-Pin Plastic DIP	126
PCM1700P-J	28-Pin Plastic DIP	126
PCM1700P-K	28-Pin Plastic DIP	126

NOTE: (1) For detailed drawing and dimension table, please see end of data sheet, or Appendix D of Burr-Brown IC Data Book.

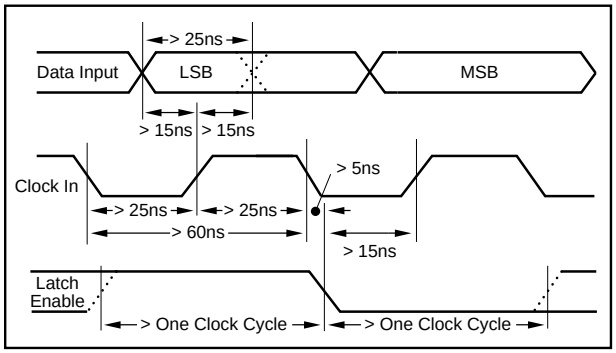

FIGURE 1. PCM1700P Setup and Hold Timing Diagram.

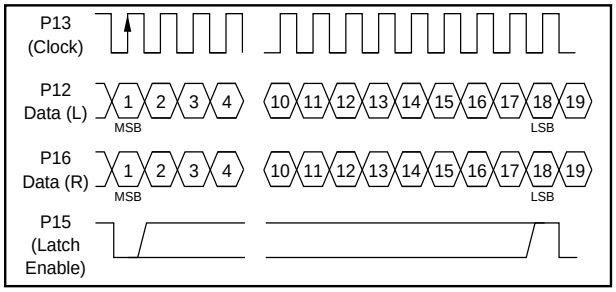

FIGURE 2. Timing Diagram.

DIGITAL INPUT	ANALOG OUTPUT		
Binary Two's Complement (BTC)	DAC Output	Voltage (V) V_{OUT} Mode	Current (mA) I_{OUT} Mode
1FFFF Hex	+ FS	+2.99997711	–0.66999489
00000 Hex	BPZ	0.00000000	0.00000000
3FFFF Hex	BPZ – 1LSB	–0.00002289	+0.00000511
20000 Hex	– FS	–3.00000000	+0.67000000

TABLE I. PCM1700 Input/Output Relationships.

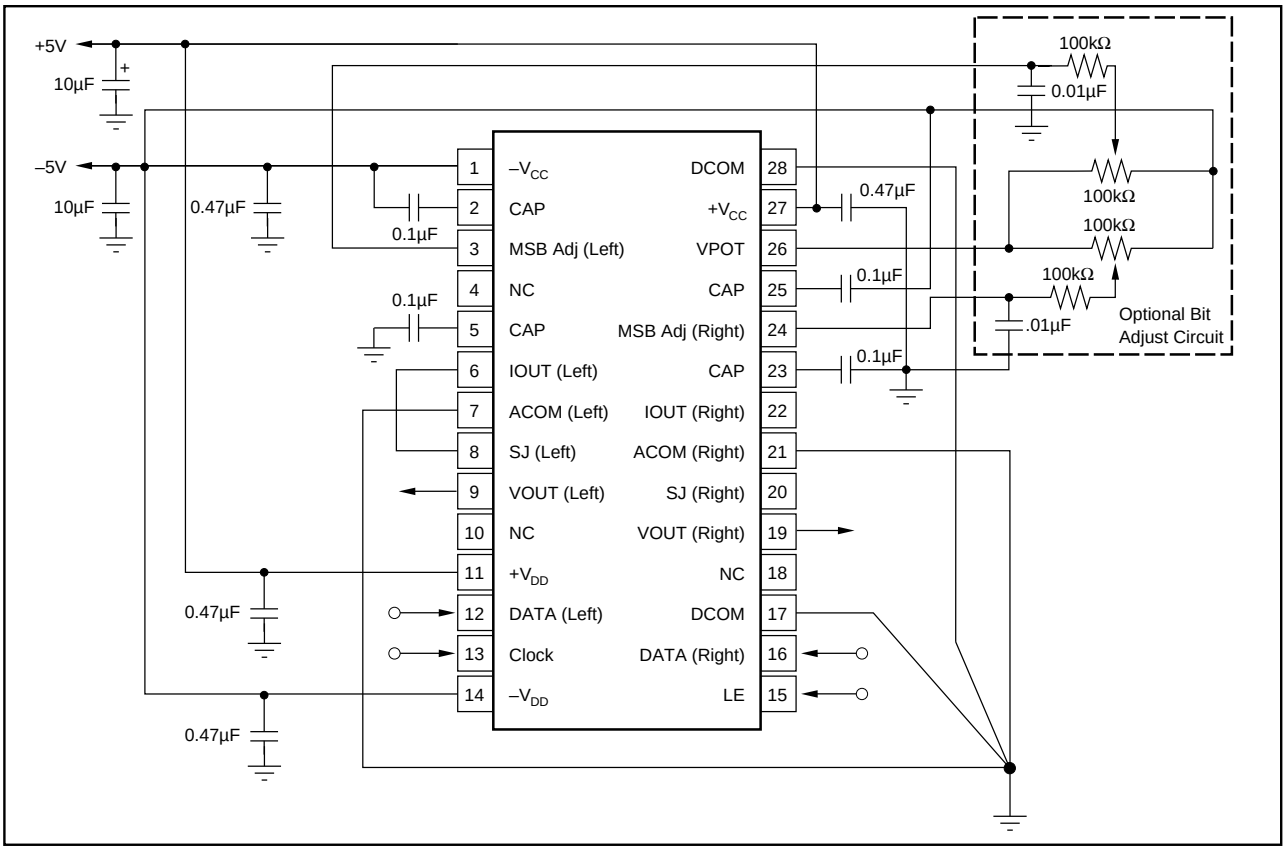

FIGURE 3. Voltage Output Connection Diagram (DIP Package Diagram.)

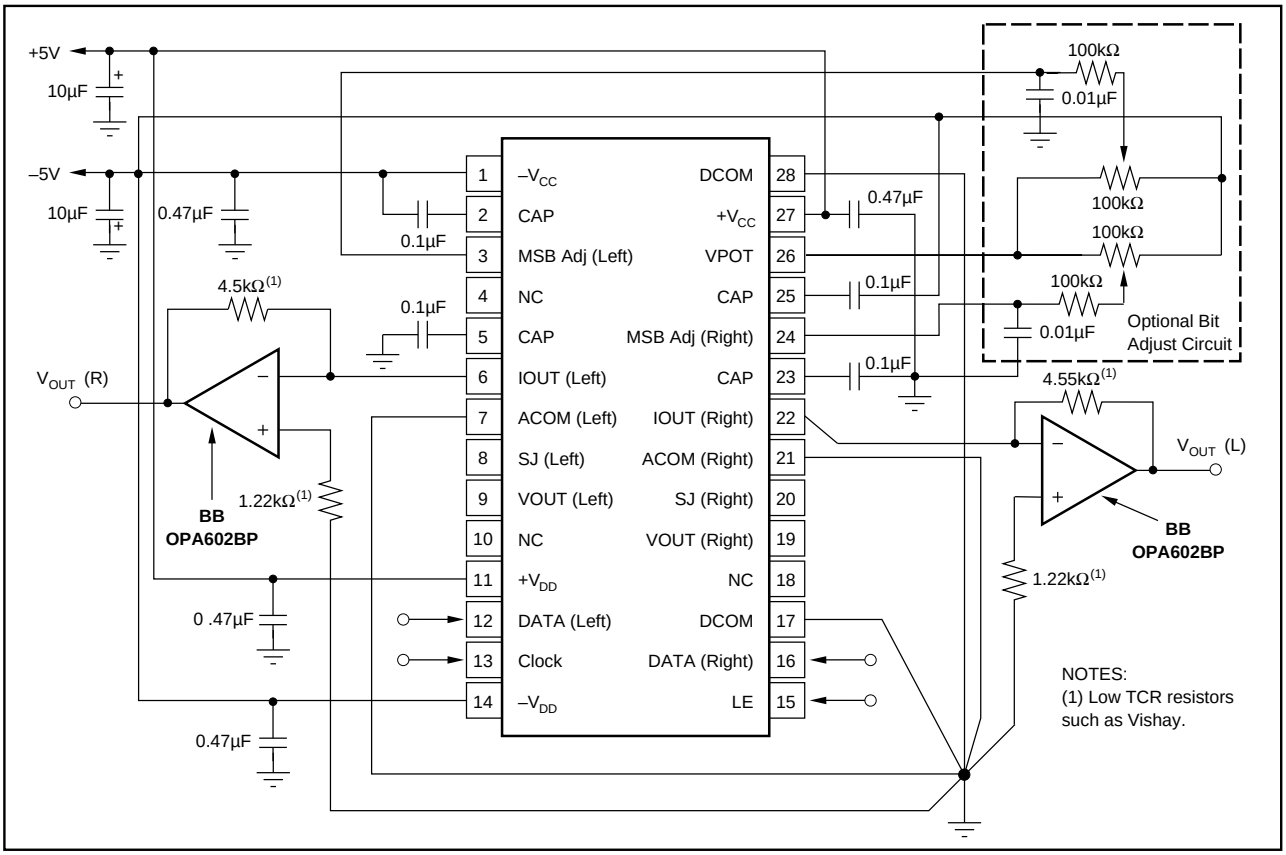

FIGURE 4. Current Output Connection Diagram (DIP Package Diagram.)