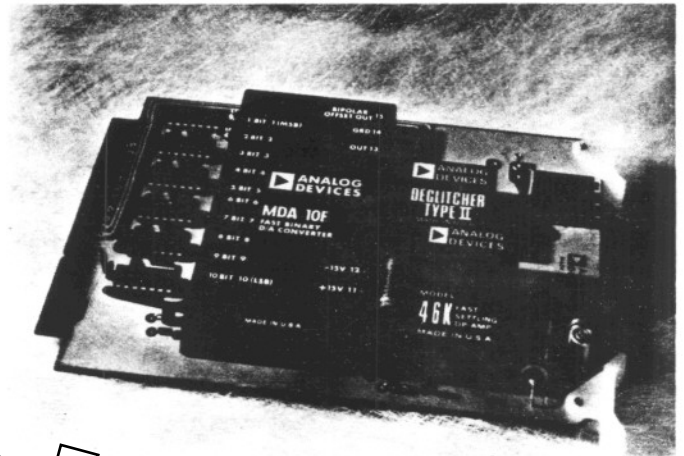


FEATURES

- Deglitcher
- 10-Bit Resolution & Accuracy
- Monotonic
- High Speed Settling to $\pm\frac{1}{2}$ LSB
 - 40ns – 1LSB Step
 - 200ns – Full Scale Step
- Linearity $\pm\frac{1}{2}$ LSB
- Coaxial Cable Connector Output
- Schottky TTL Register Included

APPLICATIONS

- Graphic Displays
- Deflection Systems
- Character Generators
- High Speed D/A Systems



DESCRIPTION

The DAC-10DF is a 10-bit D/A converter that has a very fast settling, virtually glitch free, voltage output. These features make it a particularly good choice for use in CRT display systems. It is also well suited for other applications requiring high speed, glitchless operation, such as character generators, high speed test equipment, and very high speed A/D converters. A coaxial cable output is used to ensure that the DAC-10DF's high speed output signal is received exactly as transmitted. With a model 50 output amplifier, the output will settle to within $\pm\frac{1}{2}$ LSB in 40ns for 1LSB input change. Monotonicity is assured from $+5^{\circ}\text{C}$ to $+45^{\circ}\text{C}$. Schottky TTL is used for the input register to increase speed and decrease time skew. Decreased register skew and a new deglitching circuit combine to practically eliminate the undesirable glitches which would otherwise occur at the major carry and other major transitions of the converter.

OUTPUT OPTIONS

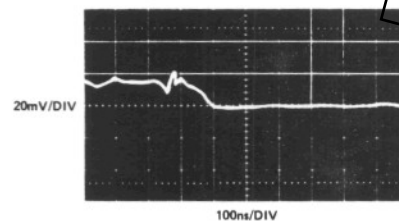
The DAC-10DF is available with either a model 48K or a model 50K output amplifier. Both offer the same selection of output ranges, $\pm 2.5\text{V}$, $\pm 5.0\text{V}$, or $\pm 10.0\text{V}$. In either case, the amplifier's output is wired to a board mounted Microdot RF connector. The fast, high current output of the model 50 makes it suitable for driving a terminated 50 to 100Ω coaxial cable. Its 100mA output capability permits the high slew rates needed for good pulse transmission over a coaxial cable. The model 48K is a lower power amplifier, offering lower power supply current requirements. It may be used for driving higher impedance cables that don't require a high current source.

TIMING

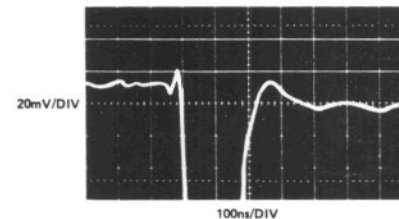
The strobe pulse must have rise and fall times $\leq 12\text{ns}$, and a

width of at least 50ns. The data inputs must remain constant from 10ns prior to until 10ns after the strobe pulse's leading edge. The digital input data is transferred from the input register to the D/A conversion circuitry approximately 20ns after the strobe pulse's leading edge.

GLITCH SUPPRESSION – DAC-10DF



WITH DEGLITCHER



WITHOUT DEGLITCHER

The two views above show the DAC-10DF during a major carry transition. Note that without the deglitcher, not only does the large glitch fly down way offscale, but also that the settling time is much longer.

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use; nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices.

Route 1 Industrial Park; P.O. Box 280; Norwood, Mass. 02062
 Tel: 617/329-4700 TWX: 710/394-6577
 West Coast Mid-West Texas
 213/595-1783 312/894-3300 214/231-5094

SPECIFICATIONS (typical @ +25°C and nominal supply voltages, unless otherwise noted)

MODEL	DAC-10DF (With 48K Output Amplifier)	DAC-10DF (With 50K Output Amplifier)
RESOLUTION	10 Bits	*
Differential Linearity	±½LSB max	*
Monotonic Linearity ¹	+5°C to +45°C Guaranteed	*
Linearity ¹	±½LSB max	*
LOGIC LEVELS	0 ≤ "0" ≤ +0.8V @ -2mA max +2.0 ≤ "1" ≤ +5.0V @ 80µA max	*
DIGITAL INPUTS	1 Schottky TTL Load/Bit	*
STROBE INPUT	Positive Pulse, 50 to 500ns, 1 Schottky TTL Load	*
CODING OPTIONS ²	Offset Binary, Two's Complement	*
REFERENCE	Internal High Stability Reference Included	*
OPERATING TEMP. RANGE	0 to +70°C	*
OUTPUT OPTIONS	±2.5V, ±5.0V, ±10.0V @ 15mA max	±2.5V, ±5.0V, ±10.0V @ 100mA max
SETTLING TIME ³ For FS Step	500ns max	200ns max
For 1LSB Step	100ns max	40ns max
GLITCH	5mV Peak (max) 50ns Width (typ)	20mV Peak (max) 50ns Width (typ)
GAIN TEMPERATURE COEFFICIENT	±50ppm/°C of Reading (max)	*
ZERO TEMPERATURE COEFFICIENT	±20ppm/°C of FS (max)	±30ppm/°C of FS (max)
POWER REQUIREMENTS	+15V dc ±3% @ 80mA max -15V dc ±3% @ 80mA max +5V dc ±5% @ 400mA max*	+15V dc ±3% @ 200mA max -15V dc ±3% @ 200mA max
SIZE & CONSTRUCTION	4.5" x 6.0" x 0.67" (114.3 x 152.4 x 17.02mm) PC Plug-In Card	*
MATING EDGE CONNECTOR	Cinch #250-22-30-170 (supplied)	*
MATING COAXIAL CONNECTOR	Microdot #132-0300-0003 (supplied)	*
ADJUSTMENTS	Gain Dynamic Zero (Glitch Suppression) Offset	* * *
GAIN ADJ. RANGE	±5% of Range	*
PRICE (1-9)	\$663	*

*Specifications same as for DAC-10DF with 48K amplifier.

¹ Deviation measured from the straight line through +Full Scale and -Full Scale.

² The unit is shipped connected for Offset Binary. The coding is determined by a jumper associated with 3 adjacent terminals on the PC board, lettered A, C, and B. B is jumpered to C for Offset Binary coding. A is jumpered to C for Two's Complement Coding.

³ As measured with ±2.5 volt output, from trailing edge of clock pulse to point where output is within ±½LSB of final value.

Specifications subject to change without notice.

PIN DESIGNATIONS

PIN	FUNCTION	PIN	FUNCTION
A	BIT 1 (MSB)	N	} INTERLOCK CONNECTIONS +5V dc
B	BIT 2	P	
C	BIT 3	R	
D	BIT 4	S	} DIGITAL GROUND
E	BIT 5	T	
F	BIT 6	U	
H	BIT 7	V	} ANALOG GROUND
J	BIT 8	W	
K	BIT 9	X	
L	BIT 10 (LSB)	Y	+15V dc
M	STROBE	Z	-15V dc
			ANALOG GROUND

CIRCUIT CONNECTIONS

The DAC-10DF's output is connected to a coaxial cable via a Microdot RF connector. A 93Ω RG 195 cable or its equivalent is recommended. For optimum received signal shape, the receiving end of the cable must be terminated into a purely resistive load that has a resistance equal to the characteristic impedance of the cable. Because of this requirement, the ±10V output option cannot be used with a cable that has a characteristic impedance of <93Ω. In such an instance, the current required would exceed that available from the DAC-10DF. In order to prevent the possibility of a ground loop through the coaxial cable's shield, the DAC-10DF and the circuitry it drives should be powered by separate power supplies having no common connection. It is recommended that the ±15V dc power supply feeding the DAC-10DF have no other loads connected to it. The power supply should have an ac output impedance at 10kHz of <1Ω.

Normally, the digital and analog grounds of a D/A converter would be brought out separately, run to a common point, and then joined together. However, because of the DAC-10DF's exceptionally high speed, the inductance of the ground leads is likely to cause noise in the converter's output. Therefore, the digital and analog grounds are tied together on the DAC-10DF's PC board. The IR drop along common digital and analog ground leads that may cause problems with higher resolution (e.g., 14 or 16 bit) DACs is not likely to be troublesome to a 10 bit DAC.

Because of the very high speed of the Schottky TTL input registers, it is possible that the digital input signals could be reflected back and forth between the DAC-10DF's inputs and their driving sources. This might result in a wavefront that builds up sufficient voltage to damage some of the logic. Driving the logic inputs with transmission lines, and terminating each cable at the DAC-10DF's socket with a resistor (equal to the characteristic impedance of the cable) in series with a 220pF capacitor between each input and ground will prevent these reflections.

ORDERING INFORMATION

		DAC-10DF/XX/XX	
Output Range	}	±2.5 Volts:	2.5
		±5.0 Volts:	5.0
		±10.0 Volts:	10
Output Amplifier	}	Model 48K:	48
		Model 50K:	50

POTENTIOMETER ADJUSTMENTS

