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DBS 8750

High Precision Arbitrary Waveform Synthesizer

in a "C" Size VXI Module

Introduction

The DBS 8750 is a high speed (400 kHz), 16-bit, precision, dual channel Arbitrary Waveform Synthesizer. Fully compatible with VXI specification Rev. 1.3, the DBS 8750 occupies a single "C" size slot in a VXI chassis. Highly accurate standard and arbitrary waveforms are generated for use in a variety of demanding applications such as acoustical signatures, vibration analysis, complex signal generation, automatic test equipment, linear device testing, digital communications, and biomedical signal simulation.

Combining the superior performance of a dual digital-to-analog converter (DAC), with a 100 dB dynamic range, and the speed and processing capability of the TMS320C30 digital signal processor (DSP), the DBS 8750 provides precise, direct digital synthesis (DDS) of analog signals at an economically attractive price.

For maximum flexibility, three sources of digital data are supported for arbitrary waveform generation and signal processing: downloaded data from VXI-resident memories, calculated data from the resident DSP, and local bus transferred data via connector P2 from other adjacent cards such as the Analogic DBS 87xx family of VXI digitizer modules.

This multiple sourcing of waveform data, complemented by versatile triggering and cross-synchronization capabilities, allows easy integration of precision analog signal synthesis within sophisticated VXI instrumentation applications.

Software integration effort is reduced to an absolute minimum with the DBS 8750. Message-based device architecture allows serial word communication protocols with any Slot 0 Controller using Standard Commands for Programmable Instruments (SCPI). A selection of available software drivers is offered for use with the unit.

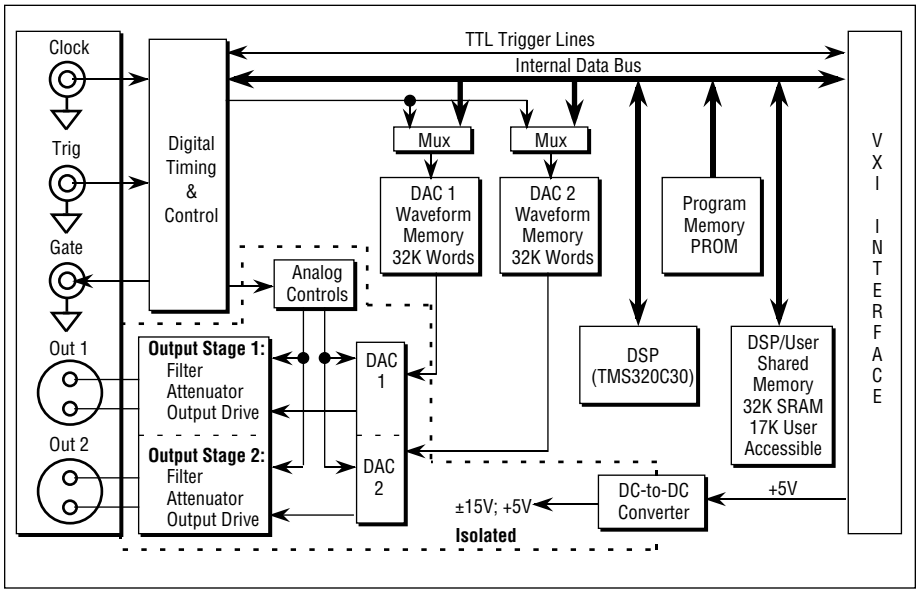
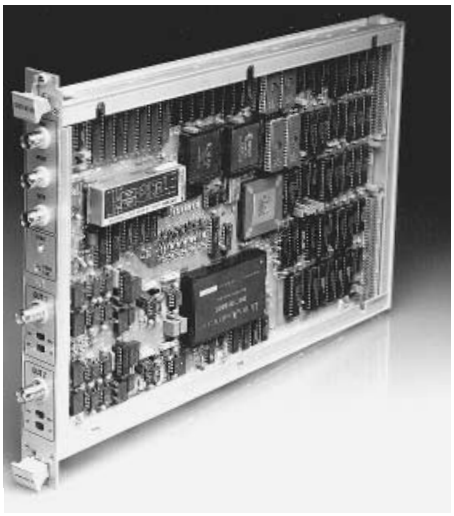


Figure 1. The DBS 8750 Block Diagram.



Features

- 16-Bit Precision
- 400 kHz Update Rate
- Two Independent Outputs
- 500V Block Isolated Outputs
- 0.003% Differential Nonlinearity
- High Performance DSP
- Library of Standard Functions
- SCPI Command Compatibility
- Fully Compatible with the Analogic DBS Series Modules
- Software Drivers Available

Applications

- Acoustic Signature
- Automatic Test Equipment
- Vibration Stimulus
- Digital Communication
- Biomedical Signal Stimulus
- Linear Device Testing
- Precision Audio Component Testing

VXI bus

CE

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DBS 8750

Specifications[1]

ANALOG OUTPUTS

Number of Channels
2

Output Drive (programmable)
Single-ended or Differential

Output Voltage
±10V Single-ended or Differential (@ no load)

Maximum Load Current
40 mA

Crosstalk Ch. to Ch.
–96 dB

Resolution
16 bit

Offset (programmable)
+10V to –10V in 1 LSB Steps

Attenuation (programmable):
0 dB to –30 dB in 0.01 dB steps.

Gain (filter bypass)
1 ±0.5%

Differential Non-Linearity
±0.003% of FSR Max.

Output Impedance (switch selectable)
50Ω or 600Ω

Output Coupling (switch selectable)
DC or AC

Isolation
300 VDC

STANDARD WAVEFORM OUTPUTS

Sine Wave Frequency
12.5 Hz to 20 kHz

Peak Distortion[2]
–96 dB @ 1.0 kHz
–93 dB @ 20 kHz

Total Harmonic Distortion[3]
–94 dB @ 1.0 kHz
–90 dB @ 20 kHz

Square Wave, Triangle Wave Frequency
12.5 Hz to 30 kHz

Settling Time to 1 LSB after 10V Step
16 µs (output filter off)

Offset Voltage Typ.
±20 mV

FILTERS

Filter Type
6 pole Butterworth

Modes of Operation
ON or bypass (programmable)

Pass Band Frequency
25 kHz (3 dB point)

Flatness in Pass Band
±0.1 dB to 10 kHz Max.
±0.25 dB to 20 kHz Max.

Attenuation in Stop Band
–90 dB

Settling Time
250 µs to 16 bit accuracy for 20 volt step function

STABILITY (0°C TO +50°C)

Required Warm-up Time (for ultimate specifications)
15 minutes

Offset Tempco
±23 µV/°C Typ.
±75 µV/°C Max.

Gain Tempco
±20 ppm FSR/°C Typ.
±40 ppm FSR/°C Max.

Differential Nonlinearity Tempco
±5 ppm FSR/°C Max.

MEMORY

Waveform memory (each channel)
32K words @ 16 bits

Shared DSP/User Memory
17K words for data transfers to/from VXI memory or P2 local bus

TRIGGERING AND SYNCHRONIZATION

External Clock (input #1)
Front Panel BNC (TTL) active low, 400 kHz Max, 120 nS Min. pulse width

External Clock (input #2)
TTLTRIG line P2 connector

External Trigger/Start (input)
Front Panel BNC (TTL) active low or TTLTRG line

Gate (Delayed Gate) (output)
Front Panel BNC (TTL) or TTLTRG line. Active low during waveform generation. Programmable delay 20 µs to 41.94 sec. relative to Ext. Trigger/Start

Precision Clock (output)
TTLTRIG line P2 connector

Clock Accuracy
16 MHz ±0.005%

DSP PROCESSOR
TMS320C30 @ 33 MHz

FRONT PANEL INDICATOR

Self-Test Pass/Fail
Green/Red LED

POWER REQUIRED

+5V Supply
+4.75V Min., +5.25V Max.

Power Consumption
20W maximum

ENVIRONMENTAL AND MECHANICAL

Rated Performance
0°C to 50°C

Storage
–25°C to +75°C

Relative Humidity
0 to 85% noncondensing up to +40°C

Cooling
1.4 litre/sec. airflow for 10°C rise at 0.39 mm H_2O back pressure

Dimensions
"C" size VXI

Weight
3 lbs, 4 oz/1.47 kg

NOTES:

1. Unless otherwise noted, all specifications apply at 25°C.
2. Peak Distortion — peak distortion represents the ratio between the highest spurious frequency below the Nyquist rate and the signal.
3. Total Harmonic Distortion — total harmonic distortion represents the ratio between the RMS sum of all harmonics up to 20th harmonic and the RMS value of the signal.

Specifications subject to change without notice.

Ordering Guide

DBS 8750
Waveform Synthesizer

SCPI Programmable

Equation	Waveform	SCPI Expression
$(A \sin \omega_1 t)\ (B \sin \omega_2 t)$		CALculate:MATH FOR T A*SIN(ω_1t)* B*SIN(ω_2t)
$\int_0^a (A+be^{-t}\cos \omega t) + \int_a^b (-A+be^{-t}\cos \omega t)$		CALculate:MATH FOR T1 A+b*e^(–t)*COS(ωt) FOR T2 –A+b*e^(–t)*COS(ωt)
$A \sin (\omega (t - x)) / (\omega (t - x))$		CALculate:MATH FOR T1 A*SIN(ω*(t–x))/(ω*(t–x))

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Printed in U.S.A.

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Bulletin No. 16-100546 REV 1 3/97 2.5M

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