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## Nimble-8

### Benefits and Features

- Versatile design consists of separate digital motherboard and A/D daughter card.
- Daughter cards exist for a variety of A/D ICs which allow NIMBLE to conform to specific performance needs.
- All digital signals driving the analog daughter card are optocoupled for total isolation (for  $F_s < 30$  MHz).
- Analog daughter card receives its power from separate linear supply for clean operation and digital isolation.
- Daughter cards range from 10 - 16 bits with sampling rates beyond 41 MSPS.
- Digital sampling control including Frame Start and Sample Gate (See Description for details).
- 6U x 160 mm VME single slot form factor.
- VME slave interface (A16/A24, D32)
- Optional VSB master allows NIMBLE to download data to off-the-shelf memory boards and general purpose machines.
- High speed front panel parallel port (directly compatible with CRI DSP boards)
- On-board FIFO (up to 64K samples deep for one channel; 32K samples deep for dual channel configurations).
- Front panel SMA inputs for analog input channels, Convert Clock, Frame Start, and Sample Gate.
- Supports either external source or on-board crystal for convert clock.
- Various input impedance and voltage ranges available.
- Power for digital motherboard: 2.6A @ +5V
- Power for an analog daughter card varies with the model, but +12V @ 0.7A and -12V @ 0.3A is typical (based upon NIM8 daughter card).

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### Description

The NIMBLE product line is an extremely flexible design in a 6U x 160 mm VME format. A daughter card contains the entire A/D section; all signals that drive the daughter card are optocoupled (for  $F_s < 30$  MHz). In addition, the daughter card receives its own source of linear power from a front panel connector. This linear power source is regulated down to the required voltages. Thus, the NIMBLE design isolates the digital motherboard from the A/D section.

CRI has designed an entire family of A/D daughter cards around various A/D ICs. Based upon various manufacturers' A/D technology, the NIMBLE daughter cards provide anywhere from 16 bits @ 2 MSPS to 12 bits @ 41+ MSPS.

The digital motherboard has functions specifically designed for radar and image processing applications. The functions control the sampling digitally instead of gating the sampling clock; this arrangement keeps the A/Ds very stable for improved performance.

Sample Gate is a front panel SMA input which the operator can use to turn sampling on or off. Frame Start is a front panel SMA trigger input which signals NIMBLE to collect "n" samples. "n" is completely programmable over the VMEbus through CRI's Application Program Interface (API) software. The NIMBLE motherboard also provides a Delay Counter. This feature, used in

conjunction with Frame Start, allows the user to delay sampling by a programmable number of convert clocks.

An optional VSB interface is available on NIMBLE to facilitate data transfers to off-the-shelf mass memory boards or to general purpose processing machines.

The digital motherboard contains four synchronous FIFOs. At present, each FIFO can be up to 16K samples deep. In a dual channel configuration, each channel uses a pair of FIFOs. This configuration results in a maximum depth of 32K per channel. Single channel operation permits a maximum depth of 64K samples.

CRI designed the NIMBLE board to seamlessly interface with CRI's other off-the-shelf DSP products. The 40-pin front panel output port is a high speed parallel port (two 16-bit data channels).

Each channel of A/D data is in 2's complement format and sign-extended to fit within the channel's 16-bit field.

## Analog Specifications

12 bits / 41+ MSPS (dual channel)

Analog Devices AD9042 Monolithic A/D Converter

Convert Clock Options: on-board crystal or front panel TTL

DC Coupled (op-amp); Analog Bandwidth <10 MHz

Input Voltage Options:            1.00 V peak to peak (gain = 1)  
   0.50 V peak to peak (gain = 2)  
   0.25 V peak to peak (gain = 4)

$F_{in} = 1.0$  MHz;  $F_s = 40.96$  MSPS    SNR = 66.7 dB; SFDR = 77.5 dB; ENOB = 10.8 bits

$F_{in} = 4.8$  MHz;  $F_s = 40.96$  MSPS    SNR = 66.2 dB; SFDR = 75.0 dB; ENOB = 10.6 bits

$F_{in} = 9.8$  MHz;  $F_s = 40.96$  MSPS    SNR = 63.5 dB; SFDR = 70.0 dB; ENOB = 10.2 bits



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