"Intelligent" Multifunction Card Family

Air-Cooled

North Atlantic Industries presents its family of ***Intelligent*** Multifunction Cards for Rugged 6U VME (Model 64C1), cPCI (Model 78C1), and PCI (Model 76C1) Platforms.

Intelligence has been designed-in from the start, from our extensive user programmability features to our comprehensive test and diagnostics capabilities. Users can mix a wide range of I/O functions on a single card, significantly reducing card count.

Conduction-Cooled Wedge-Lock

Mix and Match Modules for High Functional Density

Users can *tune card functionality to their exact needs* by filling up to 6 slots with a choice of 16+ function modules that include A/D, D/A, 4-20 mA, Discrete I/O, Digital I/O, RTD, Multimode Transceivers, Function Generators, AC Reference, Synchro/Resolver measurement, and LVDT/RVDT measurement. By integrating more functions onto a card, users *reduce the number of cards required per system, thereby reducing system size, weight, power, heat and overall cost.*

Extensive User Programmability

Users can *customize individual function modules* through extensive programmability features that provide flexibility at the channel level. Programmable features vary by module, and include configuration as input or output, input range and gain, input scaling, debounce time, filtering, and input threshold levels. *Flexibility is maximized and card count minimized through user programmability.*

Comprehensive Test and Diagnostics

All ***Intelligent*** Multifunction cards are equipped with an *On-Line Background Built-In-Test (BIT)* routine that *continually checks the functional operation* of the card and its modules while running, with *no effect* on the operation of the card. The BIT routine sequentially tests each channel and immediately reports faults when found at the card level *(identifying card, module, and channel of the fault)*, and at the signal interface level (identifying faults such as signal loss, open line, and undefined range for signals coming into or out of the board). There is *no need* to shut the system down to identify these faults.

In addition to the On-Line Background BIT Test, the card offers two Off-Line Test routines depending upon modules used. The *Self-Test* routine sequentially tests each channel for proper operation, and can be initiated at start-up or at the user's discretion.

The *Diagnostics Test* provides the user with extensive card-level diagnostic test and troubleshooting capability. For measurement applications, this test allows the user to measure any specific datum entered (an input angle for S/D module). For stimulus applications, a channel wrap-around register is provided which measures signal outputs at all times.

Environmental: Multifunction cards are available in air-cooled (0° to +70°C or -40° to +85°C operating temperatures) or conduction-cooled/wedge-lock (-40° to +85°C operating temperature) versions.

Free Software Support Kits to facilitate function implementation independent of user operating system (O/S) are downloadable from the web (www.naii.com). These kits provide board specific libraries of "C" Function Calls and source code (module level "C" and header files), help files, and examples.

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FUNCTION MODULE LIBRARY

Function	Module	# Channels	Description
A/D	C1	10	A/D (1.25 VDC to 10.0 VDC FS) Uni or Bipolar
A/D	C2	10	A/D (40 VDC) Uni or Bipolar
A/D Current Input	C3	10	4 - 20 ma Current Measurement
A/D	C4	10	A/D (50 VDC) Uni or Bipolar
Function Generator	E1	4	Programmable Function Generators (Sine, Triangular, or Square Wave.)
D/A	J3	10	D/A Isolated Outputs +/- 1.25 VDC
D/A	J5	10	D/A Isolated Outputs +/- 2.5 VDC
D/A	F1	10	D/A Isolated Outputs +/- 10 VDC
D/A	J7	4	D/A Isolated Outputs +/- 20 to +/- 80 VDC
I/O TTL	D1	16	TTL (0 - 5V), Programmable as Input or Output
I/O Transceiver	D2	11	Differential Multi-Mode Transceivers (supports RS422/485)
I/O Discrete	K2	16	Discrete (0 - 40V), Isolated, Programmable as Input or Output
I/O Discrete	K4	16	Discrete (0 - 40V), Non-Isolated, Programmable as Input or Output
RTD	G1	6	Four-wire Platinum RTD
S/D	S1	4	400Hz Synchro/Resolver Measurement
S/D	S2	4	60 - 400Hz Synchro Measurement

The above function modules are also available on the following platforms: cPCI (3U & 6U), PXI, PCI, VXI

PROGRAMMABILITY FEATURES

A/D Modules	Uni/Bipolar inputs, Voltage ranges, Input filtering
D/A Modules	Output range (+/- 1.25V, +/- 2.5V, +/-10V), Output stage smoothing filter
I/O Discrete Modules	Channels programmable as input or output; Four programmable input thresholds (0 to 40 V - configure input thresholds for signal characterization such as Vcc short or short to ground and hysteresis implementation); Output programmable as source, sink, or push-pull; Programmable current sources for inputs and outputs (eliminates need for pull-up/pull-down resistors); Programmable de-bounce; Interrupt generation on any signal transition (positive, negative, input signal loss).
I/O TTL Digital Module	Channels programmable as input or output; Output programmable as source, sink, or push-pull; Programmable de-bounce; Interrupt generation on any signal transition (positive, negative, input signal loss).
I/O Transceiver Module	Second order anti-aliasing filter and post filter; Digitally programmable break point.

TEST AND DIAGNOSTIC CAPABILITIES

A/D, RTD Modules	Background BIT and Self-Test: On a continuously rotating basis, each channel checked to a test accuracy of 0.2% FS. All channels monitored for open input (except Current Measurement Module C3). Diagnostics (A/D only): User may test any channel using internal D/A for proper conversion.
D/A Modules	Background BIT and Self-Test: On a continuously rotating basis, each channel checked to a test accuracy of 0.2% FS. All channels monitored for shorted output.
I/O Discrete, I/O TTL Digital, and Transceiver Modules	Background BIT: Continuously test and validate channel processing (data read or write logic). All channels monitored for circuit over-current conditions as well as threshold signal transitioning status.
Function Generator Module	Background BIT and Self-Test: On a continuously rotating basis, each channel checked to a test accuracy of 0.2% FS. Test intended for use with steady state signals.
S/D Modules	Background BIT and Self-Test: On a continuously rotating basis, checks 72 angles per channel, for all channels to a test accuracy of .05 degrees. All channels monitored for open reference and signal input loss. Diagnostics: User may test any channel using internal D/S for proper conversion.