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Quick-Start Software Manual

VME, PMC, PCI, cPCI, PC104, ISA and VXI Platforms

**The
Quick-Start Software Manual
Applies to
North Atlantic Industries
Board Level Products**

TABLE OF CONTENTS

The Quick Start Software Manual Applies to North Atlantic Industries Board Level Products	1
Table of Contents	2
Software Support Kit Contents	3
VME, PMC 64xxx and 74xxx	3
PCI, cPCI 76xxx, 75xxx and 78xxx	3
PC104, ISA 73xxx and 77xxx	4
VXI 65xxx	5
Quick Start Instructions	6
VME, PMC 64xxx and 74xxx	6
PCI, cPCI 76xxx, 75xxx and 78xxx	6
PC104, ISA 73xxx and 77xxx	6
VXI 65xxx	7
Graphical User Interface	8
VME, PMC 64xxx and 74xxx	8
Menu Program	8
PCI, cPCI 76xxx, 75xxx and 78xxx PC104, ISA 73xxx and 77xxx	11
Visual Basic Demo	11
LabVIEW Sample vi	14
Trouble Shooting	15

SOFTWARE SUPPORT KIT CONTENTS

A Software Support Kit (SSK) is supplied with all board level products. The SSK contents are operating system (O/S) dependent and thus platform dependant. A library, help file and examples are provided therein. To facilitate end user card function implementation, source code to libraries and examples is also provided. By platform, the SSK is as follows:

VME, PMC **64xxx and 74xxx**

The VxWorks Software Support Kit (SSK) is supplied with all VME and PMC platform based board level products. This platform's SSK contents include html format help documentation which defines board specific library functions and their respective parameter requirements. A board specific library and its source code is provided (module level c and header files) to facilitate function implementation independent of user operating system (O/S). Portability files are provided to identify Board Support Package (BSP) dependent functions and help port code to other common VME BSPs. With the use of the provided help documentation, these libraries are easily ported to any 32-bit O/S such as PSOS or Linux.

SSK Details:

Type	Embedded O/S, VxWorks Software Support Kit
Help Documentation	html format
Library	Board and module level c and header files
*.h	function prototypes
*.c	function definitions
Portability Files	Facilitates code porting to other common VME Board Support Packages
ApexPort.*	BSP dependent functions
	Easily portable to any 32-bit O/S such as PSOS or Linux

PCI, cPCI **76xxx, 75xxx and 78xxx**

The Windows 9x+ Software Support Kit (SSK) is supplied with all PCI and cPCI platform based board level products. This platform's SSK contents include html format help documentation which defines board specific library functions and their respective parameter requirements. An operating system specific driver is used to enable basic card input and output. A board specific library (DLL) is provided to facilitate function implementation in high level software applications/development systems including Microsoft Visual Studio (C++, Visual Basic, etc), LabVIEW, LabWindows, MathLab, and more. A Visual Basic Demo, or "soft panel" is provided for simple instrumentation, card test and debug. A sample LabVIEW VI is provided to help users integrate card functions in LabVIEW. In addition, a C++ example and its source code is provided to serve as an example card function implementation.

SSK Details:

Type	Windows 95 / 98 / NT4.0 / 2000 / XP Software Support Kit
Help Documentation	html format
Driver	O/S dependent driver Napx.* is installed by provided setup program.
Napx.sys	Windows NT4.0 / 2000 / XP driver
Napx.vxd	Windows 95 / 98 driver
	If using Windows 2000 / XP, Napx.sys is a Windows NT driver, not a plug-n-play Windows 2000 / XP driver. Windows 2000 / XP will issue a "New Hardware Found" message following each system boot. You may disable the device in the PC Hardware profile and the message "New Hardware Found" will no longer be posted. Our driver Napx.sys will still be resident on the PC hard-drive and all related applications and libraries will continue to operate properly. See Troubleshoot Section in the back of this manual for directions to disable the device in the hardware profile
Library	Dynamic Link Library (DLL)
*.dll	dynamic link library
*.h	header file for function prototypes
*.lib	static library, used for linking
*.bas	basic module used to link function calls to Visual Basic (VB)
	Provides function calls for high level software applications/development systems including Microsoft Visual Studio, LabVIEW, LabWindows, MathLab, and more.

Visual Basic Demo	Sample application or “soft panel” used for simple instrumentation, card test and debug
Msvbvm60.dll	VB applications support file used with sample application
Oleaut32.dll	OLE DLL used with sample application
Tabctl32.ocx	OCX file used with sample application
LabVIEW VI	Sample LabVIEW VI, uses “standard calls to DLL”
*.vi	Sample file
C++ Example	Command prompt run, menu driven, sample application

PC104, ISA 73xxx and 77xxx

The Windows 9x+ Software Support Kit (SSK) is supplied with all PC104 and ISA platform based board level products. This platform’s SSK contents include html format help documentation which defines board specific library functions and their respective parameter requirements. An operating system specific driver is used to enable basic card input and output. A board specific library (DLL) is provided to facilitate function implementation in high level software applications/development systems including Microsoft Visual Studio (C++, Visual Basic, etc), LabVIEW, LabWindows, MathLab, and more. A Visual Basic Demo, or “soft panel” is provided for simple instrumentation, card test and debug. A sample LabVIEW vi is provided to help users integrate card functions in LabVIEW. In addition, a C++ example and its source code is provided to serve as an example card function implementation. In some cases, a DOS sample application is included which may also be used for simple instrumentation, card test and debug.

SSK Details:

Type	Windows 95 / 98 / NT4.0 / 2000 / XP Software Support Kit
Help Documentation	html format
Driver	O/S dependent driver Napx.* is installed by provided setup program.
Napx.sys,	Windows NT4.0 / 2000 / XP driver
Napx.vxd	Windows 95 / 98 driver
	If using Windows 2000 / XP, NAPX.SYS is a Windows NT driver, not a plug-n-play Windows 2000 / XP driver. Windows 2000 / XP will issue a "New Hardware Found" message following each system boot. You may disable the device in the PC Hardware profile and the message "New Hardware Found" will no longer be posted. Our driver NAPX.SYS will still be resident on the PC hard-drive and all related applications and libraries will continue to operate properly. See Troubleshoot Section for directions to disable the device in the hardware profile
Library	Dynamic Link Library (DLL)
*.dll	dynamic link library
*.h	header file for function prototypes
*.lib	static library, used for linking
*.bas	basic module used to link function calls to Visual Basic (VB)
	Provides function calls for high level software applications/development systems including Microsoft Visual Studio, LabVIEW, LabWindows, MathLab, and more.
Visual Basic Demo	Sample application or “soft panel” used for simple instrumentation, card test and debug
Msvbvm60.dll	VB applications support file used with sample application
Oleaut32.dll	OLE DLL used with sample application
Tabctl32.ocx	OCX file used with sample application
LabVIEW VI	Sample LabVIEW VI, uses “standard calls to DLL”
*.vi	Sample file
C++ Example	Command prompt run, menu driven, sample application
DOS Sample	In some cases, DOS sample application is also included. DOS sample may also be used for simple instrumentation, card test and debug.

VXI**65xxx**

The VXI Software Support Kit (SSK) is supplied with all VXI platform based board level products. This platform's SSK contents include help documentation which defines card SCPI command set. A VISA plug and play driver is provided for card function implementation. A sample LabWindows application is provided for simple instrumentation, card test and debug.

SSK Details:

Type	GPIB, VXIBus Instrument Control, Software Support Kit
Help Documentation	MS Word document format
Library	SCPI Command Set
Driver	VISA, Plug and Play
LabWindows CVI	GUI application, or "soft panel" for simple instrumentation, card test and debug

QUICK START INSTRUCTIONS

All board level products are register based. Function implementation and data retrieval requires no more than simple data read or writes from card memory. The software for function calling must be installed, card addressing determined and implemented, and the card must actually be installed into the host or target computer chassis. The latest version of a board specific SSK can be downloaded from our website www.naii.com. Select the software *downloads* section. In addition, a board specific SSK is provided on floppy or CD with each shipment.

VME, PMC **64xxx and 74xxx**

1. Download / install board specific SSK.
2. Reference provided Help Documentation and specific card specification as required.
3. Determine desired card addressing scheme.
See specific card specification and/or address sheet (64xxx_VME_Board_Addressing.pdf) for details.
For standard card addressing, position card DIP switches accordingly.
For geographical addressing, remove geographical address disable jumper and implement in software.
4. Port VxWorks Library to required 32-bit O/S. Edit ApexPort.* using user specific BSP.
5. Install card in card cage and develop user specific application.

PCI, cPCI **76xxx, 75xxx and 78xxx**

1. Download / install board specific SSK.
2. Reference provided Help Documentation and specific card specification as required.
3. Install card into user computer chassis while computer is not powered on.
4. Power on user computer.
If using Windows 2000 / XP, O/S may issue a "New Hardware Found" message following each system boot. You may disable the device in the PC Hardware profile and the message "New Hardware Found" will no longer be posted. See Troubleshoot Section in the back of this manual for directions to disable the device in the hardware profile
5. Confirm driver installation using Napx View (Start / Programs / Apex Signal / Napx view) and edit port address if required.
6. Test card for communication using provided VB Sample or "Soft Panel" application (Start / Programs / Apex Signal / "PCI 76xxx" / VB app) Click on Device Info tab and check for valid serial number and/or date code.
7. Develop user specific application. Link to provided DLL if required. Open LabVIEW sample if required.

PC104, ISA **73xxx and 77xxx**

1. Download / install board specific SSK.
2. Reference provided Help Documentation and specific card specification as required.
3. Address card using card DIP switches accordingly. See specific card specification for details.
4. Install card into user computer chassis while computer is not powered on.
5. Power on user computer.
If using Windows 2000 / XP, O/S may issue a "New Hardware Found" message following each system boot. You may disable the device in the PC Hardware profile and the message "New Hardware Found" will no longer be posted. See Troubleshoot Section for directions to disable the device in the hardware profile
6. Confirm driver installation using Napx View (Start / Programs / Apex Signal / Napx view) and edit port address if required.
7. Test card for communication using provided VB Sample or "Soft Panel" application (Start / Programs / Apex Signal / "PCI 76xxx" / VB app) Click on Device Info tab and check for valid serial number and/or date code.
8. Develop user specific application. Link to provided DLL if required. Open LabVIEW sample if required.

VXI**65xxx**

1. Download / install board specific SSK.
2. Reference provided Help Documentation and specific card specification as required.
3. Install card into user computer chassis while computer is not powered on.
4. Power on user computer.
5. Develop user specific application. Open LabWindows CVI GUI if required.

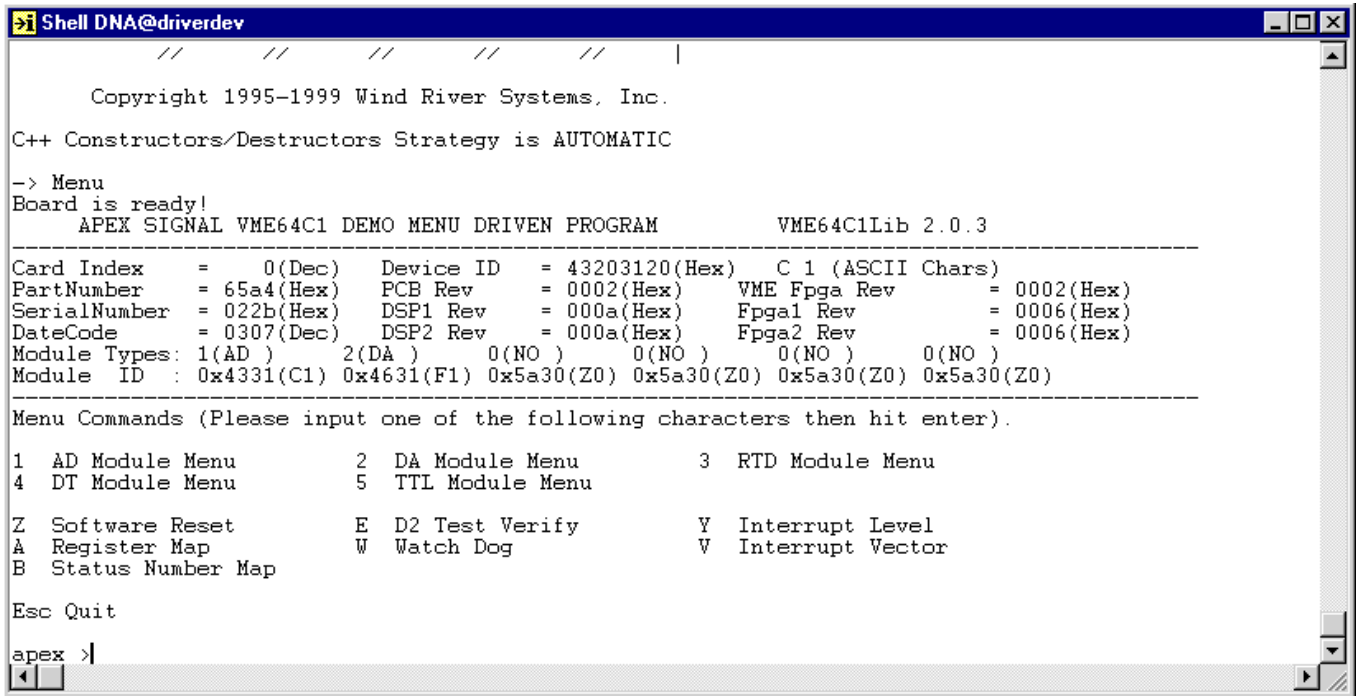
GRAPHICAL USER INTERFACE

Details to our provided sample, example and/or graphical user interface (GUI) are provided below. These GUIs are provided to help facilitate user application development.

VME, PMC 64xxx and 74xxx

Menu Program

A line prompt MENU program is provided for the Multi-Function Card 64C1 and is detailed below. This MENU program applies to the 64C1, 64CA3 and 64DT1 cards.



```
Shell DNA@driverdev
// // // // //
Copyright 1995-1999 Wind River Systems, Inc.
C++ Constructors/Destructors Strategy is AUTOMATIC
-> Menu
Board is ready!
APEX SIGNAL VME64C1 DEMO MENU DRIVEN PROGRAM          VME64C1Lib 2.0.3
-----
Card Index      = 0(Dec)   Device ID   = 43203120(Hex)   C 1 (ASCII Chars)
PartNumber     = 65a4(Hex) PCB Rev    = 0002(Hex)   VME Fpga Rev  = 0002(Hex)
SerialNumber   = 022b(Hex) DSP1 Rev  = 000a(Hex)   Fpga1 Rev    = 0006(Hex)
DateCode      = 0307(Dec) DSP2 Rev  = 000a(Hex)   Fpga2 Rev    = 0006(Hex)
Module Types:  1(AD )   2(DA )   0(NO )   0(NO )   0(NO )   0(NO )
Module ID : 0x4331(C1) 0x4631(F1) 0x5a30(Z0) 0x5a30(Z0) 0x5a30(Z0) 0x5a30(Z0)
-----
Menu Commands (Please input one of the following characters then hit enter).

1 AD Module Menu      2 DA Module Menu      3 RTD Module Menu
4 DT Module Menu      5 TTL Module Menu

Z Software Reset      E D2 Test Verify      Y Interrupt Level
A Register Map        W Watch Dog           V Interrupt Vector
B Status Number Map

Esc Quit
apex >
```

Above is a snapshot to the Apex Signal VME64C1 Demo Menu Driven Program. This program runs in any VxWorks development environment, but source code is provided so it can be easily ported to any other c code supported development system. The main menu details card information such as part number, serial number and date code. Card configuration is described by module ID and its associated slot.

```

Shell DNA@driverdev
Module Types: 1(AD )    2(DA )    0(NO )    0(NO )    0(NO )    0(NO )
Module ID   : 0x4331(C1) 0x4631(F1) 0x5a30(Z0) 0x5a30(Z0) 0x5a30(Z0) 0x5a30(Z0)
-----
Menu Commands (Please input one of the following characters then hit enter).

1  AD Module Menu          2  DA Module Menu          3  RTD Module Menu
4  DT Module Menu         5  TTL Module Menu

Z  Software Reset         E  D2 Test Verify          Y  Interrupt Level
A  Register Map           W  Watch Dog              V  Interrupt Vector
B  Status Number Map

Esc Quit

apex >
1
      AD  Menu

Commands
J  AD Voltage
K  AD Range-Polarity
Q  AD Filter Break Freq
L  AD Interrupt Enable
N  AD Status

Esc Go back to Main Menu

apex >

```

Menu commands are provided for each module type

```

Shell DNA@driverdev
Esc Go back to Main Menu

apex >
J
      AD Voltage Menu

      AD      Voltage(Volt)

Module      1      2      3      4      5      6
-----
channel 1    0.0000    "02"    "02"    "02"    "02"    "02"
channel 2    0.0000    "02"    "02"    "02"    "02"    "02"
channel 3    0.0005    "02"    "02"    "02"    "02"    "02"
channel 4    0.0000    "02"    "02"    "02"    "02"    "02"
channel 5    0.0002    "02"    "02"    "02"    "02"    "02"
channel 6    0.0000    "02"    "02"    "02"    "02"    "02"
channel 7    0.0002    "02"    "02"    "02"    "02"    "02"
channel 8    0.0029    "02"    "02"    "02"    "02"    "02"
channel 9    0.0000    "02"    "02"    "02"    "02"    "02"
channel 10   0.0000    "02"    "02"    "02"    "02"    "02"

      "number" - Returned Error Number in decimal format.
                (please look up at Status Number Map Menu for meaning.)

Commands
Esc Go back to AD Menu

apex >Jj

```

Module specific functions can be accessed and programmed once the user has selected the module type menu. Channels to non-related modules are indicated by "02".

```
Shell DNA@driverdev
Q AD Filter Break Freq
L AD Interrupt Enable
N AD Status

Esc Go back to Main Menu

apex >
N
    Display Status Values Menu

AD Interrupt Status

Module      1      2      3      4      5      6
-----
BIT status  0x0000  "0002"  "0002"  "0002"  "0002"  "0002"
Open status 0x03ff  "0002"  "0002"  "0002"  "0002"  "0002"
(Note 40V or 50V full scale AD module do not have open status or interrupt.)

Each bit represent one channel:
    0 - passing status
    1 - failing status
"number" - Returned Error Number in decimal format.
          (please look up at Status Number Map Menu for meaning.)

Commands
Esc Go back to AD Menu

apex >
```

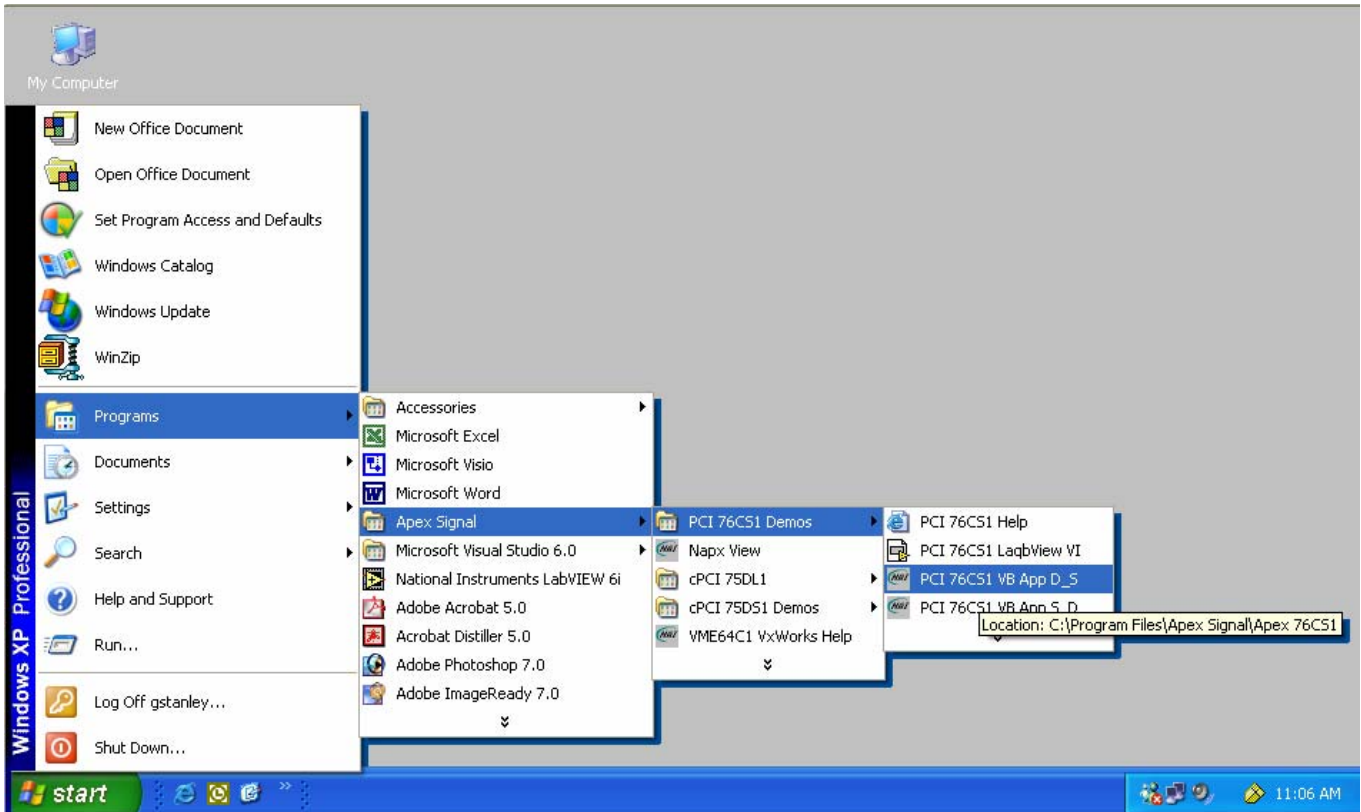
A status value menu is also available. Here module status such as A/D BIT and Open status can be observed. Status is indicated in hex.

PCI, cPCI
PC104, ISA

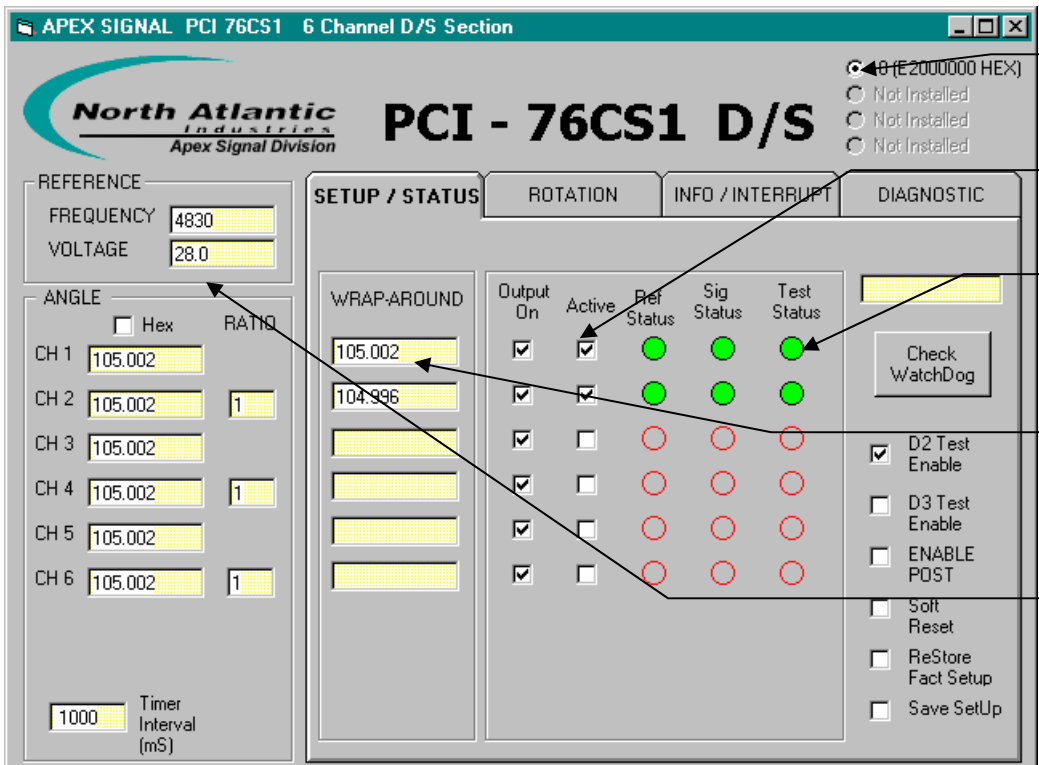
76xxx, 75xxx and 78xxx
73xxx and 77xxx

Visual Basic Demo

All VB Demos across windows platforms are similar. As an example, several views to the 76CS1 VB Demo, DS function, are detailed below.



To launch the VB Demo application, Click “Start / Programs / Apex Signal / PCI 76CS1 Demos / PCI 76CS1 VB.”



Card # 0

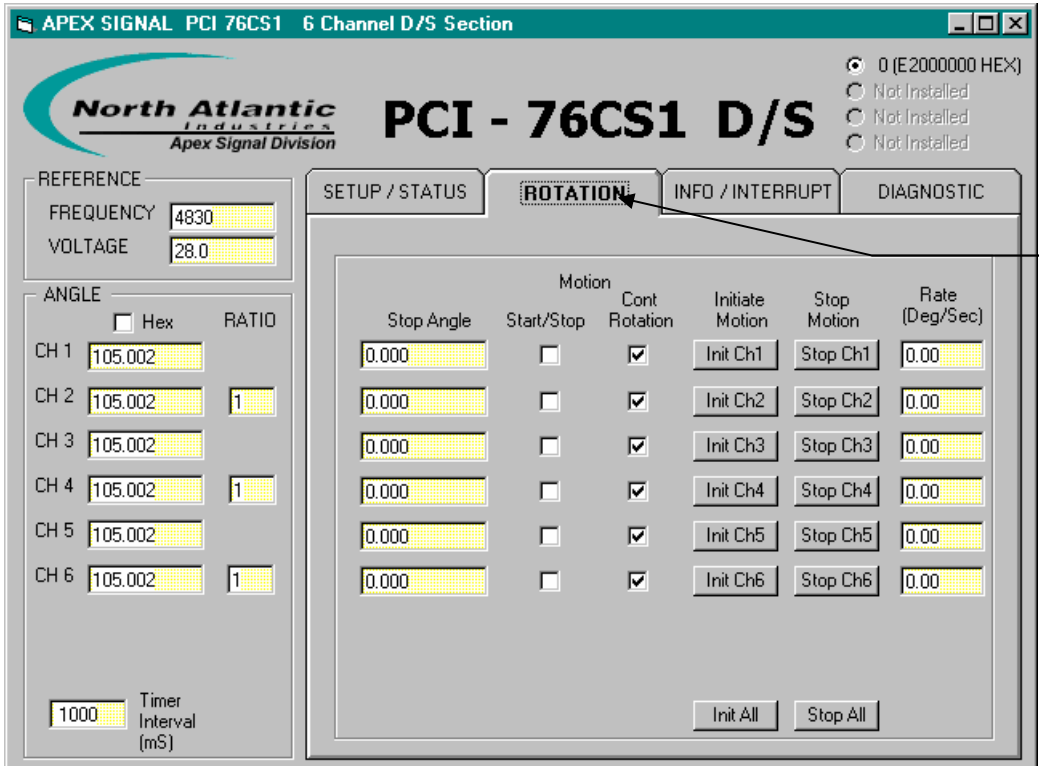
Channel Active Outputs ON

Status Passing (Green)

Wrap angle is the same as the programmed angle.

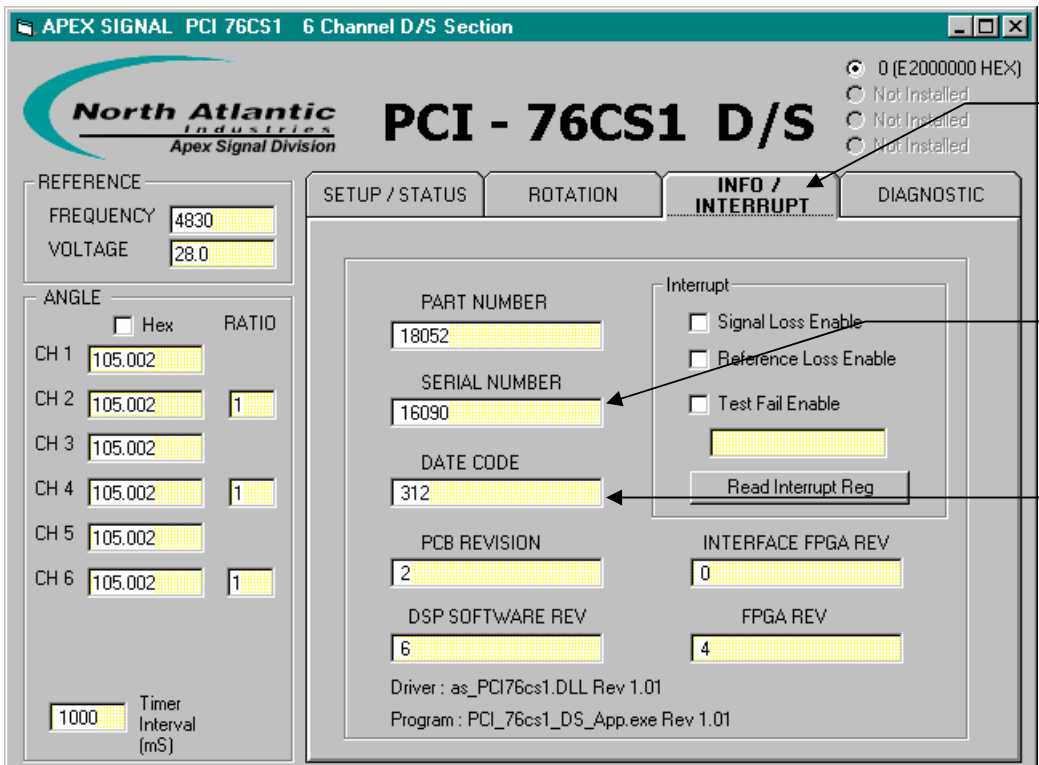
Program Reference Voltage (28 Vrms)

Use Setup / Status tab to program channel and view status. This view provides for simple instrumentation.



Select Rotation tab to program Start/Stop Rotation features

Click Rotation tab to program Start/Stop Rotation features.

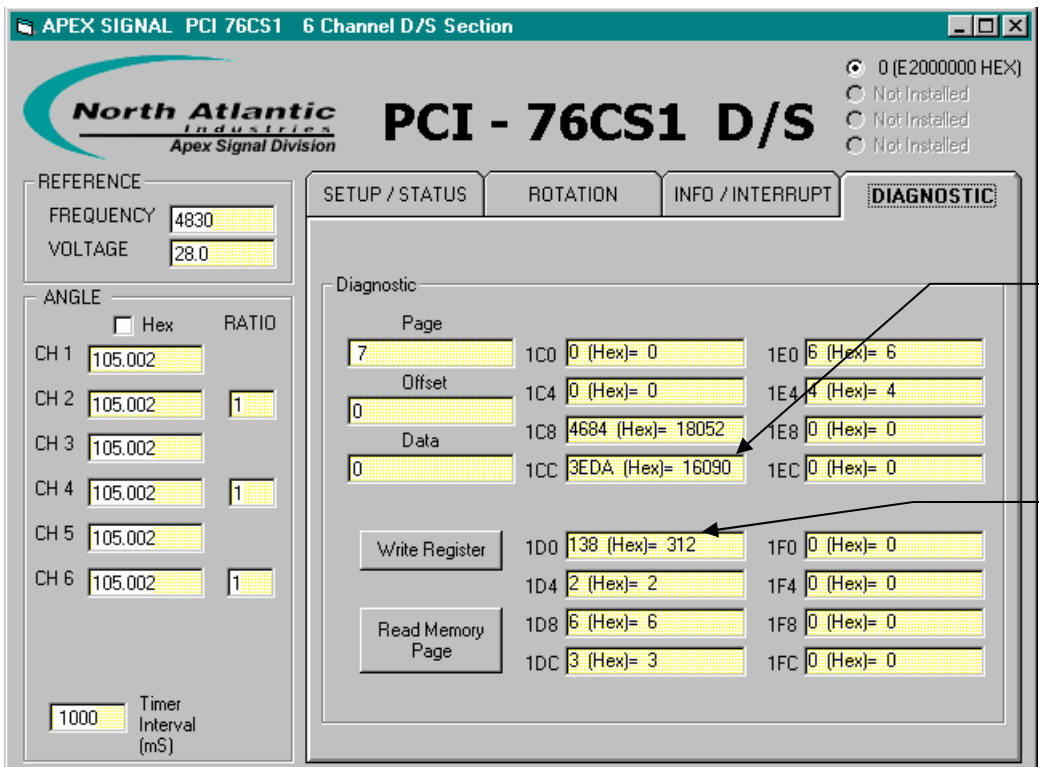


Select Info tab to view Serial Number, Date Code, etc.

Serial Number is 16090

Date Code is 0312 (12th week of 2003)

Select Info tab to view board specific information, such as part number, serial number or date code.



Memory map 0x1CC is Serial Number Value displayed is 3EDA in hex (16090 decimal)

Memory map 0x1D0 is Date Code Value displayed is 0312 in hex (12th week of 2003)

Select Diagnostic tab to directly read write card memory map. This is useful for test and debug.

LabVIEW Sample vi

All LabVIEW samples across these platforms are also similar. As an example, 4OR2Wire.vi using a 75DL1 implementing a getTwoWireModeAll function is detailed below.

The screenshot displays the LabVIEW environment with the following components:

- 4OR2Wire vi High Level GUI:** A control panel with fields for Card (0), Handle (47891112), SerialNumber (55), TwoWireEnable (0), and TwoWire (0).
- 75DL1_4OR2Wire.vi Diagram:** A block diagram showing the flow of data from the GUI through various data type conversion blocks (I32, I16, U16) to the Call Library Function block.
- Call Library Function Dialog:** A dialog box with the following settings:
 - Library Name or Path: C:\WINNT\system32\as_cPCI75dl1.dll
 - Function Name: as_75dl1_getTwoWireModeAll
 - Calling Conventions: stdcall (WINAPI)
 - Parameter: return type
 - Type: Numeric
 - Data Type: Signed 32-bit Integer
 - Function Prototype: long as_75dl1_getTwoWireModeAll(long Handle, long *TwoWire);
- HTML Help Documentation:** A window showing the documentation for the `as_75dl1_getTwoWireModeAll` function. It includes a description: "Reads the DLV's TwoWire Register for all channels with one word," and a C-style function signature:


```
int __stdcall as_75dl1_getTwoWireModeAll(
    HANDLE cardHandle,
    int *twoWire
);
```

When using LabVIEW, all function calls must use the standard c calling convention. It may be helpful to view the LabVIEW project and the html help documentation simultaneously as above. Help documentation describes all board specific functions and their specific parameter details. For successful function implementation, parameter details support call library function parameterization.

TROUBLE SHOOTING

To disable the device driver in the windows (NT4.0 / 2000 / XP) hardware profile, do the following:

1. Go to Start \ Settings \ Control Panel \ System
2. Select Hardware tab within System Properties Dialog.
3. Left Mouse Click Device Manager
4. Find "Other Devices", and Right Click "PCI Device"
5. Select "Disable" at the top of the Roll Down List Box.



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