D2K-VEE

HP-VEE® Interfaces for DAQ-2000/2200/2500 Series

Windows 98/NT/2000/XP

User's Guide

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How to Use This Manual

This manual is designed to help you use the D2K-VEE, the HP-VEE driver for DAQ-2000/2200 series data acquisition cards. For the installation and driver handling information, please refer to *ADLINK PCI/CompactPCI DAQ Cards Software Installation Guide*. For the detail description of D2K-VEE User Objects, please refer to D2K-VEE PDF file format Function Reference. This manual is organized as follows:

- Chapter 1, "Introduction to D2K-VEE" describes how to program your application by using D2K-VEE.
- Chapter 2, "D2K-VEE Overview" briefly describes each User Object and provides the programming guide.

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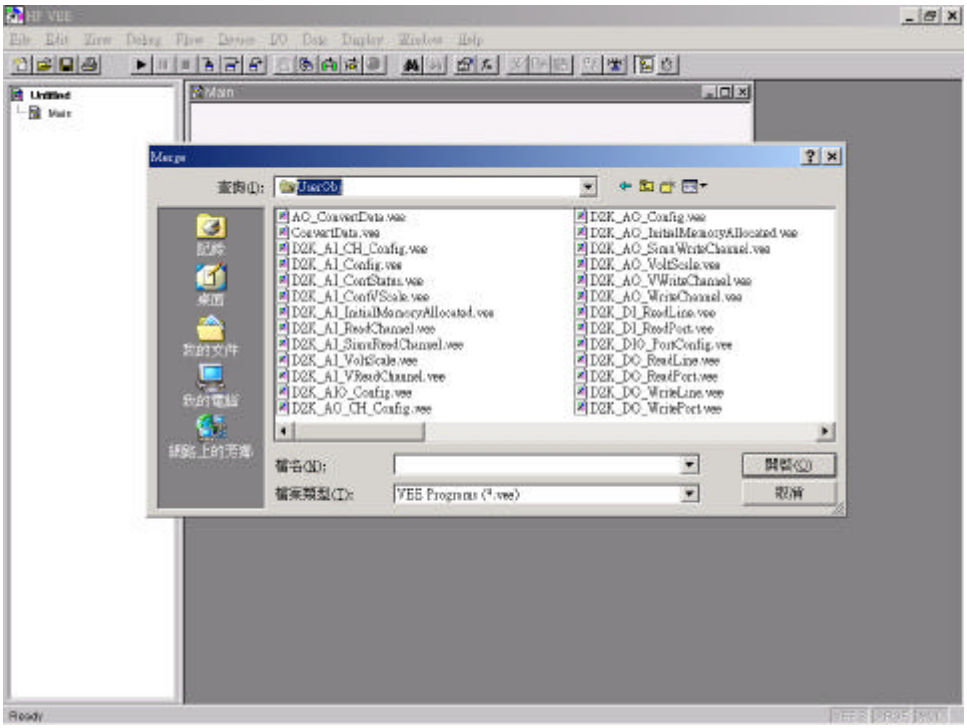
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1

Introduction to D2K-VEE

1.1 Using D2K-VEE User Objects in VEE

To use D2K-VEE User Objects, you may select File => Merge select the User Objects from where you install D2K-VEE.



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D2K-VEE Overview

2.1 D2K-VEE User Object Overview

This section briefly describes each User Object in D2K-VEE. All applications developed with D2K-VEE are compatible across Windows 98, Windows NT, and Windows 2000. D2K-VEE User Objects are grouped to the following classes:

- **General Configuration Function Group**
- **Analog Input Function Group**
  - Analog Input Configuration functions
  - One-Shot Analog Input functions
  - Continuous Analog Input functions
- **Analog Output Function Group**
  - Analog Output Configuration functions
  - One-Shot Analog Output functions
  - Continuous Analog Output functions
- **Digital Input Function Group**
  - Digital Input Configuration functions
  - One-Shot Digital Input functions
- **Digital Output Function Group**
  - Digital Output Configuration functions
  - One-Shot Digital Output functions
- **General Timer/Counter Function Group**
- **DIO Function Group**
  - Digital Input/Output Configuration function
- **SSI Function Group**
- **Special Convert Function Group**

2.1.1 General Configuration Function Group

Use these functions to initialize and configure data acquisition cards.

D2K_Register_Card Initializes the hardware and software states of a DAQ-2000 series data acquisition card. Initial User Objects must be called before any other D2K-VEE User Objects can be called for that card.

D2K_Release_Card Tells D2K-DASK driver that this card is not used currently and can be released. This would make room for new card to initialize.

2.1.2 Analog Input Function Group

Analog Input Configuration User Objects

D2K_AI_CH_Config Informs D2K-DASK library of the AI range selected for the specified analog input channel of DAQ-2000 device. You must call this function before calling function to perform analog input operation.

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D2K_AI_Config Informs D2K-DASK library of trigger source, trigger mode, input mode and trigger properties for the analog input operation of DAQ-2000 device. You must call this function before calling function to perform continuous analog input operation of DAQ-2000 device.

D2K_AI_InitialMemoryAllocated

Gets the actual size of analog input memory that is available in the device driver

D2K_AI_MuxScanSetup Stores *numChans*, *chans*, and *gain_refGnd* in the Channel-Gain Queue for a scanned data acquisition operation

One-Shot Analog Input User Objects

D2K_AI_ReadChannel Performs a software triggered A/D conversion (analog input) on an analog input channel and returns the value converted (unscaled)

D2K_AI_ReadMuxScan Returns readings for all analog input channels selected by *D2K_AI_MuxScanSetup*. This function is only available for Multiplexed AD card (e.q. DAQ-2205)

D2K_AI_ScanReadChannels Performs software triggered A/D conversions (analog input) on analog input channels and returns the values converted (unscaled). This function is only available for Multiplexed AD card (e.q. DAQ-2205)

D2K_AI_SimuReadChannel Performs a software triggered A/D conversion (analog input) on analog input channels and returns the values converted (unscaled). This function is only available for Simultaneous AD card (e.q. DAQ-2010)

D2K_AI_VReadChannel Performs a software triggered A/D conversion (analog input) on an analog input channel and returns the value scaled to a voltage in units of volts

D2K_AI_VoltScale Converts the result from a *D2K_AI_ReadChannel* call to the actual input voltage

Continuous Analog Input User Objects

D2K_AI_ContReadChannel

Performs continuous A/D conversions on the specified analog input channel at a rate as close to the rate you specified

D2K_AI_ContScanChannels

Performs continuous A/D conversions on the specified *continuous* analog input channels at a rate as close to the rate you specified. This function is only available for those cards that support auto-scan functionality

D2K_AI_ContReadMultipleChannels

Performs continuous A/D conversions on the specified analog input channels at a rate as close to the rate you specified. This function is only available for those cards that support auto-scan functionality.

D2K_AI_ContReadChannelToFile

Performs continuous A/D conversions on the specified analog input channel at a rate as close to the rate you specified and saves the acquired data in a disk file

D2K_AI_ContScanChannelsToFile

Performs continuous A/D conversions on the specified *continuous* analog input channels at a rate as close to the rate you specified and saves the acquired data in a disk file. This function is only available for those cards that support auto-scan functionality.

D2K_AI_ContReadMultipleChannelsToFile

Performs continuous A/D conversions on the specified analog input channels at a rate as close to the rate you specified and saves the acquired data in a disk file. This function is only available for those cards that support auto-scan functionality.

D2K_AI_ContMuxScan This function initializes the Channel-Gain Queue to point to the start of the scan sequence as specified by *D2K_AI_MuxScanSetup* and starts a multiple-channel scanned data acquisition operation. This function is only available for ***Multiplexed AD card*** (e.g. DAQ-2205).

D2K_AI_ContMuxScanToFile

Initializes the Channel-Gain Queue to point to the start of the scan sequence as specified by *D2K_AI_MuxScanSetup*, starts a multiple-channel scanned data acquisition operation and saves the acquired data in a disk file.

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D2K_AI_ContVScale	Converts the values of an array of acquired data from a continuous A/D conversion call to the actual input voltages
D2K_AI_ContStatus	Checks the current status of the continuous analog input operation
D2K_AI_ContBufferSetup	Set up the buffer for continuous analog input
D2K_AI_ContBufferReset	Reset all the buffers set by function *D2K_AI_ContBufferSetup*

2.1.3 Analog Output Function Group

Analog output Configuration User Objects

D2K_AO_CH_Config	Informs D2K-DASK library of the reference voltage value selected for an analog output channel of DAQ-2000 Device. You must call this function before calling function to perform voltage output operation.
D2K_AO_Config	Informs D2K-DASK library of trigger source, trigger mode, output mode and trigger properties for the analog output operation of DAQ-2000 device. You must call this function before calling function to perform continuous analog output operation of DAQ-2000 device.
D2K_AO_InitialMemoryAllocated	Gets the actual size of analog output DMA memory that is available in the device driver
D2K_AO_GroupSetup	Assigns one or more analog output channels to a waveform generation group
D2K_AO_WFM_StopConfig	Informs D2K-DASK library of stop source and stop mode for the asynchronous analog output operation of a specified group

One-Shot Analog Output Functions

D2K_AO_WriteChannel	Writes a binary value to the specified analog output channel
D2K_AO_SimuWriteChannel	Writes binary values to the specified analog output channels simultaneously. This function is only available for Simultaneous DA card
D2K_AO_VWriteChannel	Accepts a voltage value, scales it to the proper binary value and writes a binary value to the specified analog output channel
D2K_AO_VoltScale	Scales a voltage to a binary value
D2K_AO_Group_Update	Writes binary values to the specified group of analog output channels simultaneously
D2K_AO_Group_VUpdate	Accepts voltage values, scales them to the proper binary values and writes binary values to the specified group of analog output channels simultaneously

Continuous Analog Output Functions

D2K_AO_ContWriteChannel	Performs continuous analog output on the specified analog output port at a rate as close to the rate you specified
D2K_ AO_ContWriteMultipleChannels	Performs continuous D/A conversions on the specified analog output channels at a rate as close to the rate you specified
D2K_AO_ContStatus	Checks the current status of the continuous analog output operation
D2K_AO_ContBufferSetup	This function set up the buffer for continuous analog output
D2K_AO_ContReset	This function reset all the buffers set by function *D2K_AO_ContBufferSetup* for continuous analog output
D2K_AO_Group_FIFOLoad	Loads a waveform buffer to on-board DA FIFOs.
D2K_AO_Group_WFM_Start	Performs continuous D/A conversions on the specified group of analog output channels at a rate as close to the rate you specified

2.1.4 Digital Input Function Group

One-Shot Digital Input User Objects

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D2K_DI_ReadLine Reads the digital logic state of the specified digital line in the specified port

D2K_DI_ReadPort Reads digital data from the specified digital input port

2.1.5 Digital Output Function Group

One-Shot Digital Output User Objects

D2K_DO_WriteLine Sets the specified digital output line in the specified digital output port to the specified state. This function is only available for those cards that support digital output read-back functionality.

D2K_DO_WritePort Writes digital data to the specified digital output port

D2K_DO_ReadLine Reads the specified digital output line in the specified digital output port

D2K_DO_ReadPort Reads digital data from the specified digital output port

2.1.6 General Timer/Counter Function Group

General-Purpose Timer/Counter User Objects

D2K_GCTR_Setup Controls the general-purpose counter to operate in the specified mode

D2K_GCTR_Read Reads the counter value of the general-purpose counter without disturbing the counting process

D2K_GCTR_Control Controls for the selected counter/timer by software

D2K_GCTR_Reset Halts the specified general-purpose timer/counter operation and reload the initial value of the timer/counter

D2K_GCTR_Status Reads the counter value of the general-purpose counter without disturbing the counting process

2.1.7 DIO Function Group

Digital Input/Output Configuration Functions

D2K_DIO_PortConfig This function is only used by the Digital I/O cards whose I/O port can be set as either input port or output port. This function informs D2K-DASK library of the port direction selected for the digital input/output operation. You must call this function before calling functions to perform digital input/output operation.

2.1.8 SSI Function Group

D2K_SSI_SourceConn Connects a device to the specified SSI bus trigger line

D2K_SSI_SourceDisconn Disconnects a device signal from the specified SSI bus trigger line

D2K_SSI_SourceClear Disconnects a device signal from the specified SSI bus trigger line

2.1.9 Calibration Function Group

D2K_DB_Auto_Calibration_ALL Calibrates your DAQ-2000 device

D2K_EEPROM_CAL_Constant_Update

Save new calibration constants to the specified *bank* of EEPROM

D2K_Load_CAL_Data Load calibration constants from the specified *bank* of EEPROM

DAQ2010_Acquire_AD_Error Acquires the offset and gain errors of the specified AI channel in the specified polarity mode

DAQ2010_Acquire_DA_Error Acquires the offset and gain errors of the specified DA channel in the specified polarity mode

DAQ2005_Acquire_AD_Error Acquires the offset and gain errors of the specified AI channel in the specified polarity mode

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DAQ2005_Acquire_DA_Error	Acquires the offset and gain errors of the specified DA channel in the specified polarity mode
DAQ2006_Acquire_AD_Error	Acquires the offset and gain errors of the specified AI channel in the specified polarity mode
DAQ2006_Acquire_DA_Error	Acquires the offset and gain errors of the specified DA channel in the specified polarity mode
DAQ2204_Acquire_AD_Error	Acquires the offset and gain errors of ADC
DAQ2204_Acquire_DA_Error	Acquires the offset and gain errors of the specified DA channel in the specified polarity mode
DAQ2205_Acquire_AD_Error	Acquires the offset and gain errors of ADC
DAQ2205_Acquire_DA_Error	Acquires the offset and gain errors of the specified DA channel in the specified polarity mode
DAQ2206_Acquire_AD_Error	Acquires the offset and gain errors of ADC
DAQ2206_Acquire_DA_Error	Acquires the offset and gain errors of the specified DA channel in the specified polarity mode
DAQ250X_Acquire_AD_Error	Acquires the offset and gain errors of ADC
DAQ250X_Acquire_DA_Error	Acquires the offset and gain errors of the specified DA channel in the specified polarity mode

2.1.10 Special Convert Function Group

AI_ConvertData	Converts the continuous AI data to the VEE acceptable array. The data_buf size must be twice of the raw_buf size.
AO_ConvertData	Converts the continuous AO data to the D2K-DASK acceptable array. The data_buf size must be larger than half of raw_buf size.

2.2 D2K-VEE Programming

The Chapter *D2K-DASK Application Hints* of *D2K-DASK User's Guide* provides the programming schemes showing the function flow of that D2K-DASK performs analog I/O and digital I/O. Please refer to it for the information of D2K-VEE programming.

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