Model CP266

Single-width, 6U CompactPCI

User's Manual

CP266

Single-width, 6U CompactPCI module

The CP266 is a single-width, 6U, CompactPCI module with 32 or 64, 16-bit analog output channels.

These independent analog channels provide ±10 V full-scale outputs. The channel update rate is 2ms, and each output is accurate to ±1mV.
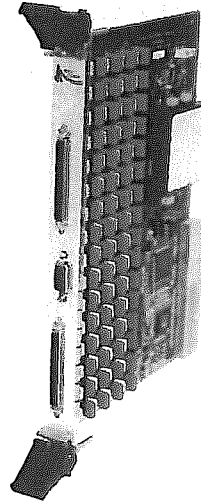
KineticSystems' CP266 is a single-width, 6U, CompactPCI module with 32 or 64, 16-bit analog output channels

TYPICAL APPLICATIONS

Automotive test cells

Industrial control

Automatic Test Equipment (ATE)

FEATURES

- 32 or 64 independent analog output channels
- 16-bit resolution
- ±10 V full-scale output
- Low drift
- Single gain and offset adjustments
- 2-pole, Bessel output filter on each channel
- Power-on reset to zero volts

GENERAL DESCRIPTION

The CP266 is a single-width, 6U, CompactPCI module with 32 or 64, 16-bit analog output channels. These independent analog channels provide ±10 V full-scale outputs. The channel update rate is 2ms, and each output is accurate to ±1mV. The power-up state of the analog outputs can be set to indepedent user-defined values. Paired output signals are provided to eliminate ground offset effects. The analog outputs are available at a single 68-pin SCSI II shielded connector (32-channel option) or a pair of 68-pin SCSI II shielded connectors (64-channel option).

BASIC CIRCUIT OPERATION

Data values for each channel are written to a 16-bit wide, dual-port memory. This memory is sequentially scanned, and the values are applied to a single 16-bit digital-to-analog converter. The DAC output is then multiplexed to separate high precision sample-and-hold circuits (one for each channel), and the outputs of these circuits pass through active, 2-pole, low-pass Bessel filters before being brought to the front panel connector(s). Bessel filters are provided because of their optimum step response. The nominal cutoff frequency of each filter is set at 500Hz. Since the voltage outputs of all circuits are accurate to within 1mV of each other, only one offset and one gain potentiometer are needed to adjust the DAC. Data can be written to or read from the CP266 in either offset binary or two's complement format. During power-on, the module initiates a sequence to restore the memory contents to user-defined values or to the zero default.

SOFTWARE

The CP266 comes with a Plug and Play driver for configuring and using the device and application examples to illustrate its basic functionality.

This and other tools, including their source code, are provided.

CP266 Block Diagram
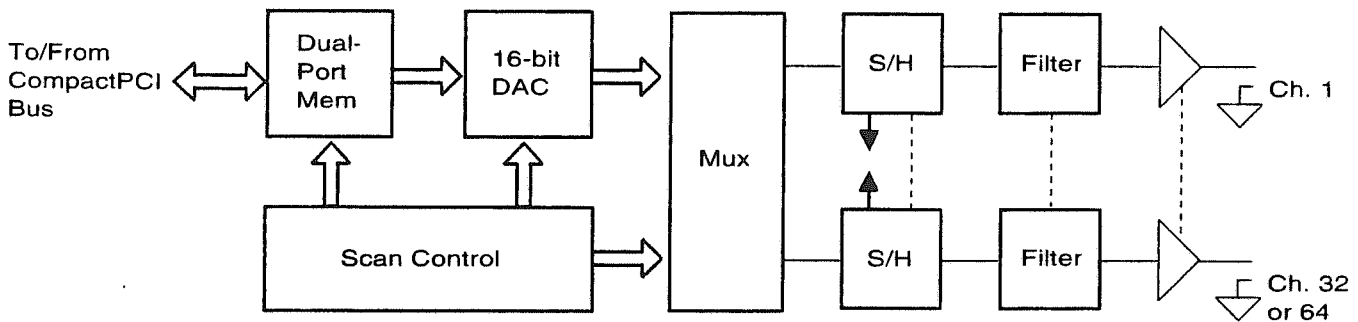
Item	Specifications
Number of Channels	32 or 64 (depending on option)
Output Signal Range	±10 V, 5mA maximum per channel
Resolution	16-bits
Monotonicity	16 bits
Absolute Accuracy	±1 mV max
Channel Tracking	±1 mV max
Output Impedance	0.5 W typ
Capacitive Load Drive	1,000 pF
Output Protection	Short-circuit to ground
Output Filter	2-pole Bessel, 500Hz cutoff
Channel Update Rate (latency)	2.176 ms (34ms x 64 channels)
Settling time to ±1mV accuracy (20V step)	TBD
Power-up State	Independent, user-defined values
On-board Memory	32 or 64 16-bit words (depending on option)
Output Connector Type	68S High Density
Power Requirements	
+5 V	2.4 A (64 channels with maximum 5mA load)
+3.3V	35 mA
+12 V	1 A maximum - auxiliary power connector
-12 V	1 A maximum - auxiliary power connector
Environmental and Mechanical	
Temperature range	
Operational	0°C to +50°C
Storage	-25°C to +75°C
Relative humidity	0 to 85%, non-condensing to 40°C
Cooling requirements	10 CFM
Dimensions	233.35 mm x 160 mm (6U CompactPCI module)
Front-panel potential	Chassis ground

Technical specifications contained within this publication are subject to change without notice.

RELATED PRODUCTS

V765-ZA11	Rack Mount Termination Panel
5868-Axyz	Cable- 68P High Density SCSI to Unterminated
5868-Cxyz	Cable- 68P High Density SCSI to 68P High Density SCSI (for use with V765)
5868-Dxyz	Cable- 68S High Density SCSI to 68P High Density SCSI

ORDERING INFORMATION

CP266-ZA11	32-channel, 16-bit DAC, ±10 V output
CP266-ZA21	64-channel, 16-bit DAC, ±10 V output

Specifications contained within this data sheet are subject to change without notice

Updated May 11th, 2005

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www.kscorp.com

Revision History

2/16/05	KG	Initial Draft of CP266 User Manual.
2/16/07	NR	Update as necessary.

Table Of Contents

Chapter 1: Introduction

Description

The CP266 is a single-width, 6U, CompactPCI module with 32 or 64, 16-bit analog output channels. These independent analog channels provide ±10 V full-scale outputs. The channel update rate is 2ms, and each output is accurate to ±1mV. The power-up state of the analog outputs can be set to independent, user-defined values. Paired output signals are provided to eliminate ground offset effects. The analog outputs are available at a single 68-pin SCSI II shielded connector (32-channel option) or a pair of 68-pin SCSI II shielded connectors (64-channel option).

CP266 Specifications

Item	Specifications
Number of Channels	32 or 64 (depending on option)
Output Signal Range	±10 V, 5mA maximum per channel
Resolution	16-bits
Monotonicity	Monotonic to 15 bits
Absolute Accuracy	1 mV max
Channel Tracking	1 mV max
Output Impedance	0.5 Ω typ
Capacitive Load Drive	1,000pF
Output Protection	Can withstand an indefinite short to ground
Output Filter	2-pole Bessel, 500Hz cutoff
Channel Update Rate (latency)	2.176 ms (34μs x 64 channels)
Settling time to ±1mV accuracy (20V step)	3.5 ms (includes latency)
Power-up State	Independent, user-defined values
On-board Memory	32 or 64 16-bit words (depending on option)
Output Connector Type	68S SCSI High Density

Power Requirements
    +5 V
    +3.3V
    +12 V
    -12 V
	
	2.4 A (64channels with maximum 5mA load)
	33mA
	1 A maximum – auxiliary power connector
	1 A maximum – auxiliary power connector

Environmental and Mechanical
    Temperature range
        Operational
        Storage
    Relative humidity
    Cooling requirements
    Dimensions
    Front-panel potential
	
	0°C to +50°C
	-25°C to +75°C
	0 to 85%, non-condensing to 40°C
	10 CFM
	233.35 mm x 160 mm (6U CompactPCI module)
	Chassis ground

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Table 1. Specifications

1

Front Panel

Analog Output Connector(s)

The analog outputs are available at a single 68 position high density SCSI connector (32-channel option) or a pair of connectors (64-channel option). Auxiliary power is available via a 9 pin D-sub connector.

Figure 1. CP266 Connectors J3 and J4

Front Panel Connector Pinout - Channels 1-32

Pin Number	Signal Description	Pin Number	Signal Description
1	Channel 1 + Output	35	Channel 1 - Output
2	Channel 2 + Output	36	Channel 2 - Output
3	Channel 3 + Output	37	Channel 3 - Output
4	Channel 4 + Output	38	Channel 4 - Output
5	Channel 5 + Output	39	Channel 5 - Output
6	Channel 6 + Output	40	Channel 6 - Output
7	Channel 7 + Output	41	Channel 7 - Output
8	Channel 8 + Output	42	Channel 8 - Output
9	Channel 9 + Output	43	Channel 9 - Output
10	Channel 10 + Output	44	Channel 10 - Output
11	Channel 11 + Output	45	Channel 11 - Output
12	Channel 12 + Output	46	Channel 12 - Output
13	Channel 13 + Output	47	Channel 13 - Output
14	Channel 14 + Output	48	Channel 14 - Output
15	Channel 15 + Output	49	Channel 15 - Output
16	Channel 16 + Output	50	Channel 16 + Output
17	Channel 17 + Output	51	Channel 17 - Output
18	Channel 18 + Output	52	Channel 18 - Output
19	Channel 19 + Output	53	Channel 19 - Output
20	Channel 20 + Output	54	Channel 20 - Output
21	Channel 21 + Output	55	Channel 21 - Output
22	Channel 22 + Output	56	Channel 22 - Output
23	Channel 23 + Output	57	Channel 23 - Output
24	Channel 24 + Output	58	Channel 24 - Output
25	Channel 25 + Output	59	Channel 25 - Output
26	Channel 26 + Output	60	Channel 26 - Output
27	Channel 27 + Output	61	Channel 27 - Output
28	Channel 28 + Output	62	Channel 28 - Output
29	Channel 29 + Output	63	Channel 29 - Output
30	Channel 30 + Output	64	Channel 30 - Output
31	Channel 31 + Output	65	Channel 31 - Output
32	Channel 32 - Output	66	Channel 32 - Output
33	Ground	67	Ground
34	Reserved	68	Reserved

Table 2. Front Panel Connector Pinout –Channels 1-32

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Front Panel Connector Pinout – Channels 33-64

Pin Number	Signal Description	Pin Number	Signal Description
1	Channel 33 + Output	35	Channel 33 - Output
2	Channel 34 + Output	36	Channel 34 - Output
3	Channel 35 + Output	37	Channel 35 - Output
4	Channel 36 + Output	38	Channel 36 - Output
5	Channel 37 + Output	39	Channel 37 - Output
6	Channel 38 + Output	40	Channel 38 - Output
7	Channel 39 + Output	41	Channel 39 - Output
8	Channel 40 + Output	42	Channel 40 - Output
9	Channel 41 + Output	43	Channel 41 - Output
10	Channel 42 + Output	44	Channel 42 - Output
11	Channel 43 + Output	45	Channel 43 - Output
12	Channel 44 + Output	46	Channel 44 - Output
13	Channel 45 + Output	47	Channel 45 - Output
14	Channel 46 + Output	48	Channel 46 - Output
15	Channel 47 + Output	49	Channel 47 - Output
16	Channel 48 + Output	50	Channel 48 + Output
17	Channel 49 + Output	51	Channel 49 - Output
18	Channel 50 + Output	52	Channel 50 - Output
19	Channel 51 + Output	53	Channel 51 - Output
20	Channel 52 + Output	54	Channel 52 - Output
21	Channel 53 + Output	55	Channel 53 - Output
22	Channel 54 + Output	56	Channel 54 - Output
23	Channel 55 + Output	57	Channel 55 - Output
24	Channel 56 + Output	58	Channel 56 - Output
25	Channel 57 + Output	59	Channel 57 - Output
26	Channel 58 + Output	60	Channel 58 - Output
27	Channel 59 + Output	61	Channel 59 - Output
28	Channel 60 + Output	62	Channel 60 - Output
29	Channel 61 + Output	63	Channel 61 - Output
30	Channel 62 + Output	64	Channel 62 - Output
31	Channel 63 + Output	65	Channel 63 - Output
32	Channel 64 - Output	66	Channel 64 - Output
33	Ground	67	Ground
34	Reserved	68	Reserved

Table 3. Front Panel Connector Pinout – Channels 33-64

Front Panel Connector Pinout – Auxiliary Power

Pin Number	Signal Description
1	+15 Volts
2	-15 Volts
3	Ground
4	+12 Volts
5	-12 Volts
6	Ground
7	+5 Volts
8	No Connect
9	No Connect

Table 3. Auxiliary Connector Pinout

Product Ordering Information

Model CP266-ZA11   32-channel, 16-bit DAC, ±10 V output
Model CP266-ZA21   64-channel, 16-bit DAC, ±10 V output

Related Products

Model V765-ZA11   Rack Mount Termination Panel
Model 5868-Axyz   Cable- 68P High Density SCSI to Unterminated
Model 5868-Cxyz   Cable- 68P High Density SCSI to 68P High Density SCSI
                      (for use with V765 Rack Mount Termination Panel)
Model 5868-Dxyz   Cable- 68S High Density SCSI to 68P High Density SCSI

                      KineticSystems VISA layer Software
                      KineticSystems CPCI VISA Plug-in Software
                      KineticSystems 266 VXI/PXI Interworking Library Software

Chapter 2: Installation

⚠ Do not install hardware before installing accompanying software. Installing the software before the hardware ensures that the information in the module description file is available to the operating system when it needs to identify the hardware. A brief overview of the installation steps are as follows:

1. Install software
2. Run the *Resource Manager* to register the module type with VISA
3. Power the system down
4. Install the module.
5. Power the system up. The operating system will automatically identify the new hardware and install kernel mode drivers.

Software Installation

The CP266 Plug and Play driver depends on an installed VISA layer. This procedure assumes that VISA has already been installed.

1. Insert the accompanying CD into your system and run setup.exe. This will install the Plug and Play driver code and libraries, as well as the module.ini file.
2. Run the VISA *Resource Manager* tool. The *Resource Manager* will identify the newly installed module.ini file and register the module type with VISA and build appropriate kernel mode driver files for the operating system.

Directory Structure

Software installation will place files as described below. <VXIPNP> denotes where VISA is installed (e.g., by default C:\vxipnp\winnt on a Windows based machine).
- <VXIPNP>\include: ks266.h (API header file)
- <VXIPNP>\bin: ksp266.dll (API library)
- <VXIPNP>\lib\<*format*>: (API lib file ksp266.lib, in various formats)
- <VXIPNP\cp266: ksp266.c (API source code)

In addition, the module_cp266.ini file will be installed in the directory specified by registry setting HKEY_LOCAL_MACHINE\SOFTWARE\PXISA\CURRENT_VERSION, value ModuleDescriptionFilePath, or simply <VXIPNP> if the registry value is not set or does not exist.

Manual Registration with VISA

In the event that your VISA *Resource Manager* does not or cannot automatically register the CP266 with VISA via the module.ini file, you will probably need to manually register it with VISA. This will probably be accomplished by running a tool or wizard distributed with your VISA; consult your VISA documentation for details.

To manually register the CP266 with VISA, you will need the following information:

- Module Name: "CP266"
- Module Vendor: "KineticSystems Company, LLC"
- Model Code: 0x266
- Manufacturer Code: 0x11f4
- Interrupt Detect and Quiesce: *CP266 does not generate interrupts*

Unpacking the CP266

The CP266 comes in an anti-static bag to avoid electrostatic damage to the module. Please take the following precautions when unpacking the module:

- Ground yourself with a grounding strap or by touching a grounded object.
- Touch the anti-static package to a metal part of your CompactPCI chassis before removing the module from the package.
- Remove the module from the package and inspect the module for damage.
- Do not install the module into the CompactPCI chassis until you are satisfied that the module exhibits no obvious mechanical damage and is configured to conform to the desiring operating environment.

Chapter 3: Device Operation

Overview

The CP266 is a single width, 6U, CompactPCI module with 32 or 64, analog output channels. The CP266 architecture consists of a 16-bit wide, dual-port memory, a single 16-bit digital-to-analog converter (DAC) and 32 or 64 separate high precision sample-and-hold circuits (one for each channel). Data values for each channel are written to the dual-port memory. This memory is sequentially scanned and the values are applied to the single 16-bit DAC. The DAC output is then multiplexed to each of the sample-and-hold circuits, and the outputs of these circuits are fed through active, 2-pole, low-pass Bessel filters before being brought to the front panel connector(s).

The following diagram shows the internal architecture of the CP266.
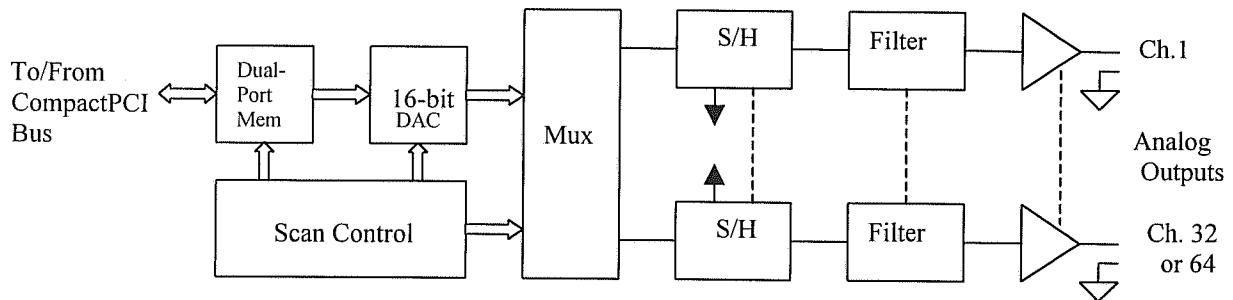
Figure 2. CP266 Block Diagram

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Chapter 4: Programming

The following functions are provided with the CP266 *Plug and Play* instrument driver.

Required Instrument Driver Functions	
Initialize	ks266_init
Reset	ks266_reset
Self Test	ks266_self_test
Error Query	ks266_error_query
Error Message	ks266_error_message
Revision Query	ks266_revision_query
Close	ks266_close

Optional Instrument Driver Functions	
Auto Connect To First	ks266_autoConnectToFirst
Auto Connect To All	ks266_autoConnectToAll

Configuration Driver Functions	
Set Powerup Auto Restore	ks266_autoRst
Extended reset	ks266_resetEx
Get number of Channels	ks266_getNumChannels
Determine if current output available	ks266_isCurrentEn
Get range of voltage outputs	ks266_getVoltageRange
Get range of current loop outputs	ks266_getCurrentRange

Data Driver Functions	
Set single channel voltage output	ks266_set_single_chan_voltage
Set single channel current output	ks266_set_single_chan_current
Set multiple channel voltage output	ks266_set_array_chan_voltage
Set multiple channel current output	ks266_set_array_chan_current
Get single channel voltage output	ks266_get_single_chan_voltage
Get single channel current output	ks266_get_single_chan_current
Get multiple channel voltage output	ks266_get_array_chan_voltage
Get multiple channel current output	ks266_get_array_chan_current

Initialization Functions

ks266_init

Syntax

C:

```
ViStatus ks266_init(ViChar rsrcName[],
                    ViBoolean bId_query,
                    ViBoolean bReset,
                    ViPSession vi);
```

Purpose

Establish communication with an instrument.

Description

ks266_init establishes communication with a CP266 and optionally resets and queries the module. Once these operations are complete, an instrument handle is returned for subsequent communication with the module. For each instrument handle returned via ks266_init, a corresponding ks266_close should be executed prior to termination of the application program.

Parameters

Parameter Name	Direction	Description
rsrcName	Input	Instrument description.
bId_query	Input	If (VI_TRUE) perform in-system verification If (VI_FALSE) do not perform in-system verification.
bReset	Input	If (VI_TRUE) perform reset operation; the reset will be a 'soft reset' (see ks266_resetEx) If (VI_FALSE) do not perform reset operation
vi	Output	Instrument handle

rsrcName specifies the name of the resource to be initialized. The format of the resource string is as follows:

Description	Grammar
Bus/Device/Function string	PXI[*interface*]::*bus-device*[*.function*][::INSTR]
Chassis/Slot string	PXI[*interface*]::CHASSIS*chassis*::SLOT*slot*[::FUNC*func*][::INSTR]
Bus/Device/Function legacy string	PXI[*bus*]::*device*[*.function*][::INSTR]

Return Values

In addition to the return values returned directly from `viOpen`, the following status values are returned:

VI_SUCCESS	Initialization successful
VI_WARN_NSUP_RESET	Reset not supported
VI_ERROR_FAIL_ID_QUERY	Instrument identification failed

ks266_reset

Syntax

C:

ViStatus ks266_reset(ViSession vi);

Purpose

Place the instrument in its default state.

Description

ks266_reset performs a *reset* operation on the instrument, returning it to its power-up state. The reset will be a *soft* reset, as described under ks266_resetEx; see the description for ks266_resetEx for details on the distinction between *soft* and *hard* resets.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle

Return Values

VI_SUCCESS	Initialization successful
VI_WARN_UNKNOWN_STATUS	Reset was attempted but portions of the operation may not have completed

ks266_self_test

Syntax

C:

```
ViStatus ks266_self_test(ViSession vi,
                         ViPInt16 test_result,
                         ViString test_message);
```

Purpose

Perform self-test and return results.

Description

`ks266_self_test` run the module self-test and returns result.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
test_result	Output	Numeric result from self-test operation 0 = no error (test passed)
test_message	Output	Self-test status message

Return Values

VI_SUCCESS	Initialization successful
VI_WARN_NSUP_SELF_TEST	Self-test not supported

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ks266_error_query

Syntax

C:

```
ViStatus ks266_error_query(ViSession vi,
                           ViPInt16 error_code,
                           ViString error_message);
```

Purpose

Queries the instrument and returns instrument-specific error information.

Description

ks266_error_query is not supported on the CP266.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
error_code	Output	Instrument error code
error_message	Output	Error message; must be at least 256 characters

Return Values

VI_WARN_NSUP_ERROR_QUERY	Unknown status code

ks266_error_message

Syntax

C:

```
ViStatus ks266_error_message(ViSession vi,
                             ViInt16 status_code,
                             ViString message);
```

Purpose

Translate a status code into a text message.

Description

ks266_error_message takes an error code returned from some other CP266
Instrument Driver API function and translates it to a readable text message.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
status_code	Input	Instrument error code returned from another API function
message	Output	Error message; must be at least 256 characters

Return Values

VI_SUCCESS	Initialization successful
VI_WARN_UNKNOWN_STATUS	Unknown status code

ks266_revision_query

Syntax

C:

```
ViStatus ks266_revision_query(ViSession vi,
                              ViString driver_rev,
                              ViString instr_rev);
```

Purpose

Returns the revision of the instrument driver and the firmware revision of the instrument.

Description

ks266_revision_query returns the revision of the instrument driver and the firmware revision of the instrument.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
driver_rev	Output	Instrument driver revision; must be at least 256 characters
instr_rev	Output	Instrument firmware revision; must be at least 256 characters

Return Values

VI_SUCCESS	Initialization successful
VI_WARN_NSUP_REV_QUERY	Instrument revision query not supported

ks266_close

Syntax

C:

ViStatus ks266_close(ViSession vi);

Purpose

Close a session and release all resources.

Description

ks266_close terminates the software connection to the instrument and deallocates system resources associated with that instrument.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle

Return Values

VI_SUCCESS	Initialization successful

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Optional Instrument Driver Functions

ks266_autoConnectToFirst

Syntax

C:

ViStatus ks266_autoConnectToFirst(ViPSession vi);

Purpose

> Open a session to an instrument.

Description

> ks266_autoConnectToFirst searches the system for a CP266 module, opens communication with the module, and returns a session handle. The module selected is arbitrary – see ks266_autoConnectToAll to obtain sessions to more than 1 instrument.

Parameters

Parameter Name	Direction	Description
vi	Output	Instrument handle

Return Values

> In addition to the return values returned directly from viOpen, the following status values are returned:

VI_SUCCESS	Initialization successful
VI_MORE_INST_PRESENT	Valid session returned; however, there are additional instruments not accessed by this function.

ks266_autoConnectToAll

Syntax

C:

```
ViStatus ks266_autoConnectToAll(ViSession[] vi,
                                ViInt16 arrayLength,
                                ViPInt16 numConnected);
```

Purpose

Open sessions to multiple instruments.

Description

ks266_autoConnectToAll attempts to find up to arrayLength CP266 module(s) modules in the system and returns open sessions to them.

Parameters

Parameter Name	Direction	Description
vi	Output	Array of session handles to be populated; must have at least arrayLength elements
arrayLength	Input	Number of elements to populate in vi array
numConnected	Output	Number of instruments handled populated in vi array

Return Values

In addition to the return values returned directly from viOpen, the following status values are returned:

VI_SUCCESS	Initialization successful
VI_MORE_INST_PRESENT	Valid session(s) returned; however, there are additional instruments not accessed by this function.

Configuration Functions

ks266_autoRst

Syntax

C:

ViStatus ks266_autoRst(ViSession vi, ViBoolean rstEna);

Purpose

Set the power-up state of the instrument.

Description

ks266_autoRst specifies the power-up state of the instrument. By default, the instrument powers up with all outputs set to 0 volts. This function allows the user to save the current output settings such that these exact settings will by automatically applied on the next power cycle (or reset—see ks266_resetEx).

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
rstEna	Input	If set to VI_FALSE, any currently saved power-up settings are discarded, and all channels will be set to 0 volts on next power-up/reset. Current settings are *not* affected. If set to VI_TRUE, all current output settings are saved, and will automatically be reapplied on the next power-cycle/reset operation

Return Values

VI_SUCCESS	Configuration successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_TMO	Instrument EEProm could not be updated
VI_ERROR_NSUP_OPER	Instrument not capable of auto restore

ks266_resetEx

Syntax

C:

ViStatus ks266_resetEx(ViSession vi, enum KS266RESETTYPE resetType);

Purpose

Extended reset of the instrument.

Description

ks266_resetEx sets the power-up mode of the instrument and then performs a reset.

The CP266 has 2 different types of reset: *soft* and *hard*.

Soft reset returns the outputs of all channels to the configuration saved in EEPROM if there is one (see ks266_autoRst for details) or to 0 volts otherwise.

Hard reset removes any stored configuration and then does the reset procedure; all channels are configured to 0 volts. This represents the state of the instrument when shipped from the factory.

The standard ks266_reset function does the equivalent of a *soft* reset.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
resetType	Input	If set to KS266RESETTYPESOFT, all outputs will be set to the saved configuration (if any). See ks266_autoRst If set to KS266RESETTYPEHARD, any saved configuration will be removed before the reset is applied; outputs will be set to 0 volts.

Return Values

VI_SUCCESS	Reset successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_NSUP_OPER	Instrument not capable of 'soft' reset, only 'hard' is supported

ks266_getNumChannels

Syntax

C:

ViStatus ks266_getNumChannels(ViSession vi, ViPUInt16 pNumChannels);

Purpose

Returns the number of channels the instrument is equipped with.

Description

ks266_getNumChannels returns the number of channels the instrument was equipped with at the factory. See the 'Product Ordering Information' section for information on various ordering options.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
pNumChannels	Output	Reference to a variable to be populated with the number of channels available

Return Values

VI_SUCCESS	Configuration successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266

ks266_isCurrentEn

Syntax

C:

ViStatus ks266_isCurrentEn(ViSession vi, ViPBoolean pCurrentEn);

Purpose

Queries if the current loop output option is available.

Description

ks266_isCurrentEn queries the instrument to determine if current loop output is available. See the 'Product Ordering Information' section for information on various ordering options.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
pIsCurrentEn	Output	Reference to a variable to be populated with the current output availability

Return Values

VI_SUCCESS	Configuration successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266

ks266_getVoltageRange

Syntax

C:

```
ViStatus ks266_getVoltageRange(ViSession vi,
                               ViPReal64 pMinVoltage,
                               ViPReal64 pMaxVoltage);
```

Purpose

Get the range of output voltages supported.

Description

ks266_getVoltageRange queries the instrument to determine the minimum and maximum output voltage supported. See the 'Product Ordering Information' section for information on various ordering options.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
pMinVoltage	Output	Reference to a variable to be populated with the minimum output voltage supported
pMaxVoltage	Output	Reference to a variable to be populated with the maximum output voltage supported

Return Values

VI_SUCCESS	Configuration successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266

ks266_getCurrentRange

Syntax

C:

```
ViStatus ks266_getCurrentRange(ViSession vi,
                               ViPReal64 pMinCurrent,
                               ViPReal64 pMaxCurrent);
```

Purpose

Get the range of output current loops supported.

Description

ks266_getCurrentRange queries the instrument to determine the minimum and maximum current loop outputs supported. See the 'Product Ordering Information' section for information on various ordering options.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
pMinCurrent	Output	Reference to a variable to be populated with the minimum output current loop supported
pMaxCurrent	Output	Reference to a variable to be populated with the maximum output current loop supported

Return Values

VI_SUCCESS	Configuration successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_NSUP_OPER	Current loop output not supported on this instrument

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Data Functions

ks266_set_single_chan_voltage

Syntax

C:

```
ViStatus ks266_set_single_chan_voltage(ViSession vi,
                                       ViUInt16 channel,
                                       ViReal64 voltage);
```

Purpose

Set the output of a given channel to a voltage.

Description

`ks266_set_single_chan_voltage` sets the output of a single channel to a given voltage.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
channel	Input	Channel to have output set to
voltage	Input	Voltage value to set channel to

Return Values

VI_SUCCESS	Operation successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_INV_PARAMETER	Specified channel or voltage out of range

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ks266_set_single_chan_current

Syntax

C:

```
ViStatus ks266_set_single_chan_current(ViSession vi,
                                       ViUInt16 channel,
                                       ViReal64 mA);
```

Purpose

Set the output of a given channel to a current.

Description

ks266_set_single_chan_current sets the output of a single channel to a given current. This option only applies to instruments that are equipped with the optional current source output option (see ks266_isCurrentEn).

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
channel	Input	Channel to have output set to
mA	Input	Current (mA) value to set channel to

Return Values

VI_SUCCESS	Operation successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_INV_PARAMETER	Specified channel or voltage out of range
VI_ERROR_NSUP_OPER	Current loop output not supported on this instrument

ks266_set_array_chan_voltage

Syntax

C:

```
ViStatus ks266_set_array_chan_voltage(ViSession vi,
                                      ViUInt16 beginChannel,
                                      ViUInt16 endChannel,
                                      ViReal64 voltage[]);
```

Purpose

Set the output of a range of channels to a voltage.

Description

ks266_set_array_chan_voltage sets the output of a range of channels to a given voltage.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
beginChannel	Input	1st channel to have output set to
endChannel	Input	last channel to have output set to
voltage	Input	Array of voltages value to set channels to

Return Values

VI_SUCCESS	Operation successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_INV_PARAMETER	Specified channel or voltage out of range

ks266_set_array_chan_current

Syntax

C:

```
ViStatus ks266_set_array_chan_current(ViSession vi,
                                      ViUInt16 beginChannel,
                                      ViUInt16 endChannel,
                                      ViReal64 current[]);
```

Purpose

Set the output of a range of channels to a current in mA.

Description

ks266_set_array_chan_current sets the output of a range of channels to a given current. This option only applies to instruments that are equipped with the optional current loop output option (see ks266_isCurrentEn).

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
beginChannel	Input	1st channel to have output set to
endChannel	Input	last channel to have output set to
current	Input	Array of currents value to set channels to

Return Values

VI_SUCCESS	Operation successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_INV_PARAMETER	Specified channel or voltage out of range
VI_ERROR_NSUP_OPER	Current loop output not supported on this instrument

ks266_get_single_chan_voltage

Syntax

C:

```
ViStatus ks266_get_single_chan_voltage(ViSession vi,
                                       ViUInt16 channel,
                                       ViPReal64 voltage);
```

Purpose

Get the output voltage of a given channel.

Description

ks266_get_single_chan_voltage gets the output voltage setting of a single channel.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
channel	Input	Channel to have output set to
voltage	Output	Voltage output setting

Return Values

VI_SUCCESS	Operation successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_INV_PARAMETER	Specified channel out of range

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ks266_get_single_chan_current

Syntax

C:

```
ViStatus ks266_get_single_chan_current(ViSession vi,
                                       ViUInt16 channel,
                                       ViPReal64 mA);
```

Purpose

Get the output current setting of a given channel.

Description

ks266_get_single_chan_current gets the current mA setting of a single channel. This option only applies to instruments that are equipped with the optional current source output option (see ks266_isCurrentEn).

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
channel	Input	Channel to have output set to
mA	Output	Current (mA) value of channel

Return Values

VI_SUCCESS	Operation successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_INV_PARAMETER	Specified channel or voltage out of range
VI_ERROR_NSUP_OPER	Current loop output not supported on this instrument

ks266_get_array_chan_voltage

Syntax

C:

```
ViStatus ks266_get_array_chan_voltage(ViSession vi,
                                      ViUInt16 beginChannel,
                                      ViUInt16 endChannel,
                                      ViReal64 voltage[]);
```

Purpose

Get the voltage output of a range of channels.

Description

ks266_get_array_chan_voltage gets the voltage output of a range of channels. The caller must provide a voltage array sufficiently large to accommodate the number of channels specified.

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
beginChannel	Input	1st channel to have output set to
endChannel	Input	last channel to have output set to
voltage	Output	Array to be populated with voltage settings

Return Values

VI_SUCCESS	Operation successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_INV_PARAMETER	Specified channel or voltage out of range

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ks266_get_array_chan_current

Syntax

C:

```
ViStatus ks266_get_array_chan_current(ViSession vi,
                                      ViUInt16 beginChannel,
                                      ViUInt16 endChannel,
                                      ViReal64 current[]);
```

Purpose

Get the current (mA) output of a range of channels.

Description

ks266_get_array_chan_current gets the current (mA) output of a range of channels. This option only applies to instruments that are equipped with the optional current source output option (see ks266_isCurrentEn).

Parameters

Parameter Name	Direction	Description
vi	Input	Instrument handle
beginChannel	Input	1st channel to have output set to
endChannel	Input	last channel to have output set to
current	Output	Array to be populated with current settings

Return Values

VI_SUCCESS	Operation successful
VI_ERROR_FAIL_ID_QUERY	vi session not associated with a CP266
VI_ERROR_INV_PARAMETER	Specified channel or voltage out of range
VI_ERROR_NSUP_OPER	Current loop output not supported on this instrument

Appendix A

Technical Support and Warranty

KineticSystems warrants its standard hardware products to be free of defects in workmanship and materials for a period of one year from the date of shipment to the original end user. KineticSystems warrants its software products to conform to the software description applicable at the time of purchase for a period of ninety days from the date of shipment. Products purchased for resale by KineticSystems carry the original equipment manufacturer's warranty.

KineticSystems will, at its option, either repair or replace products that prove to be defective in materials or workmanship during the warranty period.

Transportation charges for shipping products to KineticSystems are prepaid by the purchaser, while charges for returning the repaired product to the purchaser, if located in the United States, are paid by KineticSystems. Return shipments are made by UPS, where available, unless the purchaser requests a premium method of shipment at his expense. The selected carrier is not the agent of KineticSystems, and KineticSystems assumes no liability relating to the services provided by the carrier.

The product warranty may vary outside the United States and does not include shipping, customs clearance or any other charges. Consult your local authorized representative for more information regarding specific warranty coverage and shipping details.

Product specifications and descriptions in this document subject to change without notice.
KineticSystems specifically makes no warranty of fitness for a particular purpose or any other warranty either expressed or implied, except as is expressly set forth herein. This warranty does not cover product failures created by unauthorized modifications, product misuse or improper installation.

Products are not accepted for credit or exchange without prior written approval. If it is necessary to return a product for repair replacement or exchange, a Return Authorization (RA) Number must first be obtained from the Repair Service Center before shipping the product to KineticSystems.

Please take the following steps if you are having a problem and feel you may need to return a product for service:

Contact KineticSystems and discuss the problem with a Technical Service Engineer.
Obtain a Return Authorization (RA) Number.
Initiate a purchase order for the estimated repair charge if the product is out of warranty.
Include with the product a description of the problem and the name of the technical contact person at your facility.
Ship the product prepaid with the RA Number marked on the outside of the package to:

KineticSystems Company, LLC
Repair Service Center
900 North State Street
Lockport, IL 60441

Telephone: (815) 838-0005
Fax: (815) 838-4424

Ways to contact us:

KineticSystems Company, LLC
900 N. State Street
Lockport, IL 60441-2200

Phone: (800) DATA NOW (1-800-328-2669)
        (815) 838-0005
 Fax: (815) 838-4424

E-mail:mkt-info@kscorp.com
        tech-serv@kscorp.com
        sales@kscorp.com
Web: http://www.kscorp.com

Feedback

The purpose of this manual is to provide you with the information you need to make the CP266 as easy as possible to understand and use. It is very important that the information is accurate, understandable and accessible. To help us continue to make this manual as "user friendly" as possible, we hope you will fill out this form and Fax it back to us at (815) 838 0095. Or mail a copy to KineticSystems Company, LLC 900 N. State, Lockport, IL 60441. Your input is very valuable.

Please rate each of the following.

The information in this manual is:

	Yes								No
Accurate	10	9	8	7	6	5	4	3	2 1
Readable	10	9	8	7	6	5	4	3	2 1
Easy to find	10	9	8	7	6	5	4	3	2 1
Well organized	10	9	8	7	6	5	4	3	2 1
Sufficient	10	9	8	7	6	5	4	3	2 1

We would appreciate receiving any thoughts you have about how we can improve this user's manual:

(Include additional sheets if needed)
Name   Phone
Company