



## QUICK REFERENCE

# NI-DMM™ Instrument Driver

## Initialize and Close

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS <sup>1</sup>
	<b>niDMM Initialize<sup>2</sup></b> (niDMM_init)		
			Creates a new session to the instrument.
	ViRsrc	resourceName	For Traditional NI-DAQ devices, use DAQ: : #, where # is the device number. For NI-DAQmx devices, the device name is assigned by Measurement & Automation Explorer (MAX). Optionally, for all devices you can use an IVI logical name.
	ViBoolean	IDQuery	NIDMM_VAL_TRUE NIDMM_VAL_FALSE
	ViBoolean	resetDevice	NIDMM_VAL_TRUE NIDMM_VAL_FALSE
	ViSession*	vi	Reference to new session handle

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	<b>niDMM Initialize with Options</b> (niDMM_InitWithOptions)		
			Creates a new session to the instrument and optionally sets the initial state of session properties.
	ViRsrc	resourceName	For Traditional NI-DAQ devices, use DAQ: : #, where # is the device number. For NI-DAQmx devices, the device name is assigned by Measurement & Automation Explorer (MAX). Optionally, for all devices you can use an IVI logical name.
	ViBoolean	IDQuery	NIDMM_VAL_TRUE NIDMM_VAL_FALSE
	ViBoolean	resetDevice	NIDMM_VAL_TRUE NIDMM_VAL_FALSE
	ViString	Option String	Simulate = 0, RangeCheck = 1 QueryInstrStatus = 1, Cache = 1
	ViSession*	vi	Reference to new session handle

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<sup>1</sup> In LabWindows™/CVI™, C, and C++, constant names such as NIDMM\_VAL\_TRUE and NIDMM\_VAL\_AUTO\_ZERO\_ON refer to the use of #defines in your program. In LabVIEW, these constants refer to Boolean or ring controls with corresponding entries. For example, NIDMM\_VAL\_AUTO\_ZERO\_ON corresponds to the LabVIEW ring control entry Auto Zero On. Refer to LabVIEW Help (Show Help) for more details.


<sup>2</sup> Function name for LabWindows/CVI, C, C++, and Visual Basic.


## Initialize and Close (continued)

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Close</b> (niDMM_close)		
			Closes the current session to the instrument.
	ViSession	vi	Session handle


## Configure

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Configure Measurement Digits</b> (niDMM_ConfigureMeasurementDigits)		
			Configures the common properties of the measurement.
	ViSession	vi	Session handle
	ViInt32	Function	DC volts, AC volts, and so on
	ViReal64	Range	
	ViReal64	Resolution in Digits	








	<b>niDMM Configure Multi Point</b> (niDMM_ConfigureMultiPoint)		
			Configures the properties for multipoint measurements.
	ViSession	vi	Session handle
	ViInt32	Trigger Count	Default = 1
	ViInt32	Sample Count	Default = 1
	ViInt32	Sample Trigger	Immediate, External, TTL0, and so on
	ViReal64	Sample Interval	Default = Auto

	<b>niDMM Configure Waveform Acquisition</b> (niDMM_ConfigureWaveformAcquisition)		
			Configures the NI 4070/4071/4072 for waveform acquisitions.
	ViSession	vi	Session handle
	ViInt32	Function	Voltage Waveform, Current Waveform
	ViReal64	Range	
	ViReal64	Rate	
	ViInt32	WaveformPoints	






## Measurement Options

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Configure Powerline Frequency</b> (niDMM_ConfigurePowerLineFrequency)		
			Specifies the powerline frequency.
	ViSession	vi	Session handle
	ViReal64	Powerline Frequency	Default = 60 Hz







## Measurement Options (continued)

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Configure Auto Zero</b> (niDMM_ConfigureAutoZeroMode)		Configures the DMM for Auto Zero.
	ViSession	vi	Session handle
	ViInt32	AutoZero	Default = Auto
	<b>niDMM Configure ADC Calibration</b> (niDMM_ConfigureADCCalibration)		Allows the NI 4070/4071/4072 to compensate for gain drift since the last external or self-calibration.
	ViSession	vi	Session handle
	ViInt32	ADC Calibration	Default = Auto
	<b>niDMM Configure Offset Comp Ohms</b> (niDMM_ConfigureOffsetCompOhms)		Allows the NI 4070/4071/4072 to compensate for voltage offsets in resistance measurements.
	ViSession	vi	Session handle
	ViInt32	Offset Compensated Ohms	Default = Off
	<b>niDMM Configure AC Bandwidth</b> (niDMM_ConfigureACBandwidth)		Configures the Min Frequency and Max Frequency properties that the DMM uses for AC measurements.
	ViSession	vi	Session handle
	ViReal64	Minimum Frequency	Hz
	ViReal64	Maximum Frequency	Hz
	<b>niDMM Configure Frequency Voltage Range</b> (niDMM_ConfigureFrequencyVoltageRange)		Specifies the expected maximum amplitude of the input signal for frequency and period measurements on the NI 4070/4071/4072.
	ViSession	vi	Session handle
	ViReal64	Frequency Voltage Range	Default = AutoRange
	<b>niDMM Configure Current Source</b> (niDMM_ConfigureCurrentSource)		Configures the current source for diode measurements on the NI 4070/4071/4072.
	ViSession	vi	Session handle
	ViReal64	Current Source	Default = 1.00 mA
	<b>niDMM Configure Waveform Coupling</b> (niDMM_ConfigureWaveformCoupling)		Configures instrument coupling for voltage waveforms on the NI 4070/4071/4072.
	ViSession	vi	Session handle
	ViInt32	Waveform Coupling	AC or DC




# Capacitance and Inductance

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Configure Cable Comp Type</b> (niDMM_ConfigureCableCompType)		
			Sets the Cable Compensation Type property for the current capacitance/inductance mode range on the NI 4072.
	ViSession	vi	Session handle
	ViInt32	Cable Comp Type	
	<b>niDMM Configure Open Cable Comp Values</b> (niDMM_OpenCableCompValues)		
			Configures the Open Cable Comp Conductance and Open Cable Comp Susceptance properties on the NI 4072.
	ViSession	vi	Session handle
	ViReal64	Conductance	
	ViReal64	Susceptance	
	<b>niDMM Configure Short Cable Comp Values</b> (niDMM_ConfigureShortCableCompValues)		
			Configures the Short Cable Comp Resistance and Short Cable Comp Reactance properties on the NI 4072.
	ViSession	vi	Session handle
	ViReal64	Resistance	
	ViReal64	Reactance	
	<b>niDMM Perform Open Cable Comp</b> (niDMM_PerformOpenCableComp)		
			Performs the open cable compensation measurements and returns open cable compensation conductance and susceptance values on the NI 4072.
	ViSession	vi	Session handle
	ViInt32	MaxTime	
	ViReal64	Conductance	
	ViReal64	Susceptance	
	<b>niDMM Perform Short Cable Comp</b> (niDMM_PerformShortCableComp)		
			Performs the short cable compensation measurements and returns short cable compensation resistance and reactance values on the NI 4072.
	ViSession	vi	Session handle
	ViInt32	MaxTime	
	ViReal64	Resistance	
	ViReal64	Reactance	



# Triggers

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Configure Trigger</b> (niDMM_ConfigureTrigger)		Configures the DMM trigger source and trigger delay.
	ViSession	vi	Session handle
	ViInt32	Trigger Source	Default = Immediate
	ViReal64	Trigger Delay	Default = Auto
	<b>niDMM Send Software Trigger</b> (niDMM_SendSoftwareTrigger)		Sends a command to trigger the DMM.
	ViSession	vi	Session handle
	<b>niDMM Configure Trigger Slope</b> (niDMM_ConfigureTriggerSlope)		Sets the Trigger Slope property to either rising edge or falling edge polarity.
	ViSession	vi	Session handle
	ViInt32	Trigger Slope	
	<b>niDMM Configure Sample Trigger Slope</b> (niDMM_ConfigureSampleTriggerSlope)		Sets the Sample Trigger Slope property to either rising edge or falling edge polarity.
	ViSession	vi	Session handle
	ViInt32	Slope	
	<b>niDMM Configure Meas Complete Dest</b> (niDMM_ConfigureMeasCompleteDest)		Specifies the destination of the Measurement Complete (MC) signal.
	ViSession	vi	Session handle
	ViInt32	Measurement Complete Destination	Default = None
	<b>niDMM Configure Meas Complete Slope</b> (niDMM_ConfigureMeasCompleteSlope)		Sets the MC signal to either rising edge or falling edge polarity.
	ViSession	vi	Session handle
	ViInt32	Slope	



# Actual Values

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Get Auto Range Value</b> (niDMM_GetAutoRangeValue)		Returns the actual range that the DMM is using, even when auto ranging is off.
	ViSession	vi	Session handle
	ViReal64*	autoRange Value	Output
	<b>niDMM Get Aperture Time Info</b> (niDMM_GetApertureTimeInfo)		Returns the aperture time and aperture time units.
	ViSession	vi	Session handle
	ViReal64*	ApertureTime	Output
	ViInt32*	ApertureTime Units	Output (seconds or PLC)
	<b>niDMM Get Measurement Period</b> (niDMM_GetMeasurementPeriod)		Returns the measurement period, which is the amount of time it takes to complete one measurement with the current configuration.
	ViSession	vi	Session handle
	ViReal64*	Measurement Period	Output (seconds)




# Acquisition

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Read</b> (niDMM_Read)		Acquires a single measurement and returns the measured value.
	ViSession	vi	Session handle
	ViInt32	Maximum Time	Milliseconds
	ViReal64*	Measurement	Output
	<b>niDMM Read Multi Point</b> (niDMM_ReadMultiPoint)		Acquires multiple measurements and returns an array of measured values.
	ViSession	vi	Session handle
	ViInt32	Maximum Time	Milliseconds
	ViInt32	Number to Read	Default = 4
	ViReal64 [ ]	Measurements	Output
	ViInt32*	Actual Number	Output




## Acquisition (continued)

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Read Waveform</b> (niDMM_ReadWaveform)		
	Acquires a waveform and returns an array representing the digitized waveform on the NI 4070/4071/4072.		
	ViSession	vi	Session handle
	ViInt32	MaximumTime	Milliseconds
	ViInt32	Number to Read	Default = 1
	ViReal64[*]	Waveform Data	Output
	ViInt32*	Actual Number	Output
	<b>niDMM Is Over Range</b> (niDMM_IsOverRange)		
	Takes a measurement value and determines if the value is a valid measurement or a value indicating that an overrange condition occurred.		
	ViSession	vi	Session handle
	ViReal64	Measurement	Input
	ViBoolean*	Over range?	Output




## Low-Level Acquisition

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Initiate</b> (niDMM_Initiate)		
	Initiates an acquisition.		
	ViSession	vi	Session handle
	<b>niDMM Fetch</b> (niDMM_Fetch)		
	Returns the value from a previously initiated measurement. You must call niDMM Initiate before calling this VI.		
	ViSession	vi	Session handle
	ViInt32	MaximumTime	Milliseconds
	ViReal64*	Measurement	Output
	<b>niDMM Fetch Multi Point</b> (niDMM_FetchMultiPoint)		
	Returns an array of values from a previously initiated multipoint measurement.		
	ViSession	vi	Session handle
	ViInt32	MaximumTime	Milliseconds
	ViInt32	Number to Fetch	Default = 4
	ViReal64[ ]	Measurements	Output
	ViInt32*	Actual Number	Output

## Low-Level Acquisition (continued)

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Fetch Waveform</b> (niDMM_FetchWaveform)		
Acquires an array of data from a waveform on the NI 4070/4071/4072.			
	ViSession	vi	Session handle
	ViInt32	Maximum Time	Milliseconds
	ViInt32	Number to Fetch	Default = 1
	ViReal64[ ]*	Waveform Data	Output
	ViInt32*	Actual Number	Output
	<b>niDMM Read Status</b> (niDMM_ReadStatus)		
Returns measurement backlog and acquisition status on the NI 4060 and NI 4070/4071/4072.			
	ViSession	vi	Session handle
	ViInt32*	Backlog	Output
	ViInt16*	Acquisition State	Output
	<b>niDMM Abort</b> (niDMM_Abort)		
Aborts a previously initiated measurement and returns the DMM to the Idle state.			
	ViSession	vi	Session handle

## Utility




ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Reset</b> (niDMM_reset)		
Resets the instrument to a known state and sends initialization commands to the instrument.			
	ViSession	vi	Session handle
	<b>niDMM Self Test</b> (niDMM_self_test)		
Performs a self-test on the DMM to ensure that the DMM is functioning properly.			
	ViSession	vi	Session handle
	ViInt16*	Self Test Result	Output
	ViChar [ ]	Self Test Message	Output
	<b>niDMM Revision Query</b> (niDMM_revision_query)		
Returns the revision numbers of the instrument driver and instrument firmware.			
	ViSession	vi	Session handle
	ViChar [ ]	Instrument Driver Revision	Output
	ViChar [ ]	Firmware Revision	Output



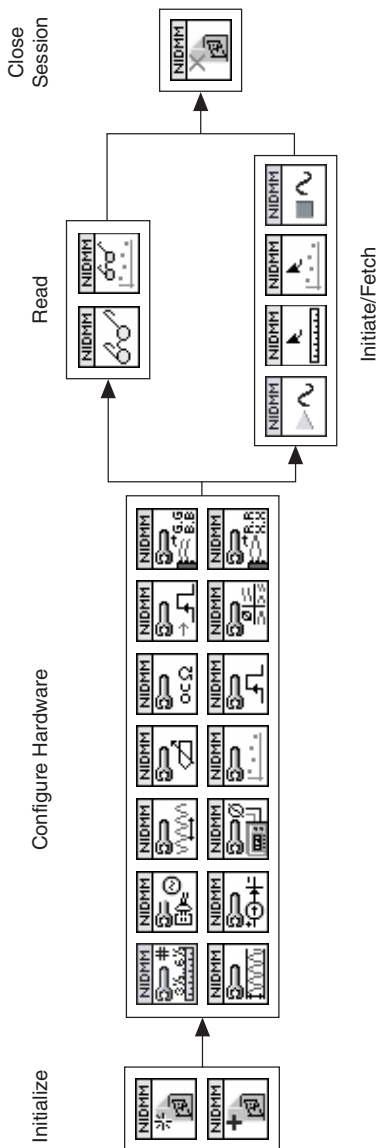
## Utility (continued)

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Format Measurements Absolute</b> (niDMM_FormatMeasAbsolute)		Formats the measurement to the proper number of displayed digits.
	ViInt32	Function	DC volts, AC volts, and so on
	ViReal64	Range	Input
	ViReal64	Resolution	Input
	ViReal64	Measurement	Input
	ViChar [ ]	Mode String	Output
	ViChar [ ]	Range String	Output
	ViChar [ ]	Data String	Output
	<b>niDMM Get Digits Of Precision</b> (niDMM_GetDigitsOfPrecision)		Returns the digits of precision calculated from the range and resolution information specified in niDMM Configure Measurement.
	ViSession	vi	Session handle
	ViReal64*	Digits	Output (3.5/4.5/5.5/6.5)
	<b>niDMM Error Message</b> (niDMM_error_message)		Takes the error cluster returned by the VIs, interprets it, and returns it as a user-readable string.
	ViSession	vi	Session handle
	ViBoolean	Message Box (Only applies to LV)	Default = Do not show dialog
	ViStatus*	Error Code	Input/Output
	ViChar [ ]	Error Message	Output
<b>Calibration</b>			
ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Self Cal</b> (niDMM_SelfCal)		Executes the self-calibration routine to maintain measurement accuracy on the NI 4070/4071/4072.
	ViSession	vi	Session handle
	<b>niDMM Get Cal Count</b> (niDMM_GetCalCount)		Returns the calibration count for the specified type of calibration.
	ViSession	vi	Session handle
	ViInt32	Area	Default = Internal
	ViInt32*	Count	Output

## Calibration (continued)

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	<b>niDMM Get Dev Temp</b> (niDMM_GetDevTemp)		
			Returns the current temperature of the NI 4070/4071/4072.
	ViSession	vi	Session handle
	ViString	Reserved	" "
	ViReal64*	Temperature	Output
	<b>niDMM Get Last Cal Temp</b> (niDMM_GetLastCalTemp)		
			Returns the temperature during the last calibration procedure on the NI 4070/4071/4072.
	ViSession	vi	Session handle
	ViInt32	Area	Default = Internal
	ViReal64*	Temperature	Output
	<b>niDMM Get Cal Date and Time</b> (niDMM_GetCalDateAndTime)		
			Returns the date and time of the last calibration performed on the NI 4070/4071/4072.
	ViSession	vi	Session handle
	ViInt32	Area	Default = Internal
	ViInt32*	Month	Output
	ViInt32*	Day	Output
	ViInt32*	Year	Output
	ViInt32*	Hour	Output
	ViInt32*	Minute	Output

# DMM Programming Flow



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