



QUICK REFERENCE

NI-FGEN™ Instrument Driver

For information about which of these VIs/functions you can use with your NI signal generator module, refer to the *NI Signal Generators Help* at **Programs»National Instruments»NI-FGEN»Documentation**. The *NI Signal Generators Help* also contains detailed programming information for your module.


Initialize and Close

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_init[†]		
	ViRsrc	resourceName	NI-DAQmx device name, or DAQ::#, where # is the device number assigned in Measurement & Automation Explorer (MAX)
	ViBoolean	IDQuery	VI_TRUE, VI_FALSE
	ViBoolean	resetDevice	VI_TRUE, VI_FALSE
	ViSession *	vi	Returned instrument handle for the device

	niFgen_InitWithOptions		
	ViRsrc	resourceName	NI-DAQmx device name, or DAQ::#, where # is the device number assigned in MAX
	ViBoolean	IDQuery	VI_TRUE, VI_FALSE
	ViBoolean	resetDevice	VI_TRUE, VI_FALSE
	ViString	optionString	String specifying simulation, range checking, instrument status querying, caching, and driver setup options
	ViSession *	vi	Returned instrument handle for this device





	niFgen_close		
	ViSession	vi	Instrument handle

Error




ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_ErrorHandler		
	ViSession	vi	Instrument handle
	ViStatus	statusCode	Error status code
	ViChar[256]	errorMessage	Error message

[†] Function name for C, C++, LabWindows™/CVI™, and Visual Basic





Basic Instrument Operation

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_ConfigureOutputMode		
	ViSession	vi	Instrument handle
	ViInt32	outputMode	<ul style="list-style-type: none"> • NIFGEN_VAL_OUTPUT_FUNC • NIFGEN_VAL_OUTPUT_FREQ_LIST • NIFGEN_VAL_OUTPUT_ARB • NIFGEN_VAL_OUTPUT_SEQ
	niFgen_ConfigureOutputEnabled		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViBoolean	enabled	<ul style="list-style-type: none"> • VI_TRUE (output enable) • VI_FALSE (output disable)
	niFgen_InitiateGeneration		
	ViSession	vi	Instrument handle
	niFgen_AbortGeneration		
	ViSession	vi	Instrument handle






Standard Function Output

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_ConfigureStandardWaveform		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	waveform	<ul style="list-style-type: none"> • NIFGEN_VAL_WFM_SINE • NIFGEN_VAL_WFM_SQUARE • NIFGEN_VAL_WFM_TRIANGLE • NIFGEN_VAL_WFM_RAMP_UP • NIFGEN_VAL_WFM_RAMP_DOWN • NIFGEN_VAL_WFM_DC • NIFGEN_VAL_WFM_NOISE • NIFGEN_VAL_WFM_USER
	ViReal64	amplitude	Peak-to-peak amplitude in volts
	ViReal64	dcOffset	Offset in volts
	ViReal64	frequency	Frequency in hertz
	ViReal64	startPhase	Starting phase in degrees
	niFgen_DefineUserStandardWaveform		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	wfmSize	Waveform size in samples
	ViReal64 []	data	Waveform data scaled between -1.0 and +1.0
	niFgen_ClearUserStandardWaveform		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel


Frequency List Output


ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_QueryFreqListCapabilities		
	ViSession	vi	Instrument handle
	ViInt32 *	maxNumFLists	Maximum number of frequency lists
	ViInt32 *	minListLength	Minimum frequency list length
	ViInt32 *	maxFListLength	Maximum frequency list length
	ViReal64 *	minListDuration	Minimum frequency list duration in seconds
	ViReal64 *	maxFListDuration	Maximum frequency list duration in seconds
	ViReal64 *	fListDuration	Duration must be a multiple of this quantum Quantum
	niFgen_CreateFreqList		
	ViSession	vi	Instrument handle
	ViInt32	waveform	<ul style="list-style-type: none"> • NIFGEN_VAL_WFM_SINE • NIFGEN_VAL_WFM_SQUARE • NIFGEN_VAL_WFM_TRIANGLE • NIFGEN_VAL_WFM_RAMP_UP • NIFGEN_VAL_WFM_RAMP_DOWN • NIFGEN_VAL_WFM_DC • NIFGEN_VAL_WFM_NOISE • NIFGEN_VAL_WFM_USER
	ViInt32	fListLength	Frequency list length
	ViReal64 []	frequencies	Array of frequency values of size fListLength
	ViReal64 []	durations	Array of durations in seconds of size fListLength
	ViInt32 *	fListHandle	Returned frequency list handle
	niFgen_ConfigureFreqList		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name, always "0" for single channel
	ViInt32	freqListHandle	Frequency list handle
	ViReal64	amplitude	Peak-to-peak amplitude in volts
	ViReal64	dcOffset	Offset in volts
	ViReal64	startPhase	Start phase in degrees
	niFgen_ClearFreqList		
	ViSession	vi	Instrument handle
	ViInt32	freqListHandle	Frequency list handle returned by NIFGEN_VAL_ALL_FLISTS


Arbitrary Waveform Output


ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_QueryArbWfmCapabilities		
	ViSession	vi	Instrument handle
	ViInt32 *	maxNumWfms	Maximum number of waveforms allowed
	ViInt32 *	wfmQuantum	All waveform sizes must be a multiple of this quantum
	ViInt32 *	minWfmSize	Minimum waveform size in samples
	ViInt32 *	maxWfmSize	Maximum waveform size in samples
	niFgen_CreateWaveformI16		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	wfmSize	Waveform size in samples (function only)
	ViInt16 []	wfmData	Waveform data as 16-bit integers scaled between -32,768 and +32,767
	ViInt32 *	wfmHandle	Returned waveform handle
	niFgen_CreateWaveformF64		
	niFgen Create Waveform (DBL) VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	wfmSize	Waveform size in samples (function only)
	ViReal64 []	wfmData	Waveform data scaled between -1.0 and +1.0
	ViInt32 *	wfmHandle	Returned waveform handle
	niFgen Create Waveform (WDT) VI		
	ViSession	vi	Instrument handle
	ViConstString	ChannelName	Channel name; always "0" for single channel
	ViBoolean	useWaveformDt ForSampleRate	VI_TRUE, VI_FALSE
	LV WDT	waveform	Waveform data
	ViInt32 *	wfmHandle	Returned waveform handle
	niFgen_CreateWaveformFromFileI16		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViConstString	fileName	Full path and name of file with waveform data
	ViInt32	byteOrder	Byte order of the data in file <ul style="list-style-type: none"> • NIFGEN_VAL_LITTLE_ENDIAN • NIFGEN_VAL_BIG_ENDIAN
		ViInt32 *	wfmHandle

Arbitrary Waveform Output (continued)


ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_CreateWaveformFromFileF64		
	niFgen Create Waveform From File (DBL) VI		
ViSession	vi		Instrument handle
ViConstString	channelName		Channel name; always "0" for single channel
ViConstString	fileName		Full path and name of file with waveform data
ViInt32	byteOrder		Byte order of the data in file <ul style="list-style-type: none">• NIFGEN_VAL_LITTLE_ENDIAN• NIFGEN_VAL_BIG_ENDIAN
ViInt32 *	wfmHandle		Returned waveform handle

	niFgen_CreateWaveformFromFileHWS		
	niFgen Create Waveform From File (HWS) VI		
ViSession	vi		Instrument handle
ViConstString	channelName		Channel name; always "0" for single channel
ViConstString	fileName		Full path and name of file with waveform data
ViBoolean	useRateFromWaveform		VI_TRUE; VI_FALSE
ViBoolean	useGainAndOffsetFromWaveform		VI_TRUE; VI_FALSE
ViInt32*	wfmHandle		Returned waveform handle


	niFgen_ConfigureArbWaveform		
	niFgen Configure Arbitrary Waveform VI		
ViSession	vi		Instrument handle
ViConstString	channelName		Channel name; always "0" for single channel
ViInt32	wfmHandle		Waveform handle
ViReal64	arbGain		Gain to apply to the waveform
ViReal64	arbOffset		Offset to apply to the waveform in volts


	niFgen_ClearArbWaveform		
	niFgen Clear Arbitrary Waveform VI		
ViSession	vi		Instrument handle
ViInt32	wfmHandle		Waveform handle of waveform to be removed or NIFGEN_VAL_ALL_WAVEFORMS to clear all waveforms in memory


Waveform Write


ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_AllocateWaveform		
	niFgen Allocate Waveform VI		
ViSession	vi		Instrument handle
ViConstString	channelName		Channel name; always "0" for single channel
ViInt32	wfmSize		Waveform size in samples
ViInt32 *	wfmHandle		Returned waveform handle

Waveform Write (continued)


ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_SetWaveformNextWritePosition		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	wfmHandle	Waveform handle
	ViInt32	relativeTo	<ul style="list-style-type: none">• NIFGEN_VAL_WAVEFORM_POSITION_START• NIFGEN_VAL_WAVEFORM_POSITION_CURRENT
	ViInt32	offset	The next write position is offset by this amount from the location specified by relativeTo

	niFgen_WriteWaveform		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	wfmHandle	Waveform handle
	ViInt32	size	Number of samples to write (function only)
	ViReal64 []	data	Waveform data must be scaled between -1.0 and +1.0


	niFgen_WriteBinary16Waveform		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	wfmHandle	Waveform handle
	ViInt32	size	Number of samples to write (function only)
	ViInt16 []	data	Waveform data must be between -32,768 and +32,767


	niFgen Write WDT Arb Waveform VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViBoolean	useWaveformDTForSampleRate	VI_TRUE, VI_FALSE
	ViInt32	wfmHandle	Waveform handle
	LV WDT	waveform	Waveform data


Arbitrary Sequence Output

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_QueryArbSeqCapabilities		
	ViSession	vi	Instrument handle
	ViInt32 *	maxNumSeqs	Maximum number of sequences
	ViInt32 *	minSeqLength	Minimum sequence length
	ViInt32 *	maxSeqLength	Maximum sequence length
	ViInt32 *	maxLoopCount	Maximum loop count

Arbitrary Sequence Output (continued)

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_CreateArbSequence		
	ViSession	vi	Instrument handle
	ViInt32	seqLength	Number of waveforms in the sequence to be created
	ViInt32 []	wfmHandles	Array of waveform handles of size seqLength
	ViInt32 []	wfmLoopCounts	Array of loop counts of size seqLength
			Either the number of loops or NIFGEN_VAL_INFINITE_LOOP
	ViInt32 *	seqHandle	Returned sequence handle





	niFgen_CreateAdvancedArbSequence		
	ViSession	vi	Instrument handle
	ViInt32	seqLength	Number of waveforms in the sequence
	ViInt32 []	wfmHandles	Array of waveform handles of size seqLength
	ViInt32 []	loopCounts	Array of loop counts of size seqLength or VI_NULL
			Either the number of loops or NIFGEN_VAL_INFINITE_LOOP
	ViInt32 []	sampleCounts	Array of sample counts of size seqLength or VI_NULL
			Either the number of samples to generate or NIFGEN_VAL_WHOLE_BUFFER
			If VI_NULL, then each element is the whole buffer
	ViInt32 []	markers	Array of markers of size seqLength or VI_NULL
			Either the marker position or NIFGEN_VAL_NO_MARKER
			If VI_NULL, then there are no markers
	ViInt32 []	coercedMarkers	Returns an array indicating where each marker was coerced
			Note: The array must be an already allocated array of size seqLength or VI_NULL.
	ViInt32 *	seqHandle	Returned sequence handle

	niFgen_ConfigureArbSequence		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	seqHandle	Sequence handle
	ViReal64	arbGain	Gain to apply to the waveform
	ViReal64	arbOffset	Offset to apply to the waveform in volts

	niFgen_ClearArbSequence		
	ViSession	vi	Instrument handle
	ViInt32	seqHandle	Sequence handle

	niFgen_ClearArbMemory		
	ViSession	vi	Instrument handle



Configure Output

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_ConfigureOutputImpedance		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViReal64	outputImpedance	<ul style="list-style-type: none">• NIFGEN_VAL_50_OHMS• NIFGEN_VAL_75_OHMS
	niFgen_EnableAnalogFilter		
	niFgen Configure Analog Filter VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViReal64	filterCorrectionFreq	Filter correction frequency in hertz
	niFgen_DisableAnalogFilter		
	niFgen Configure Analog Filter VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	niFgen_EnableDigitalFilter		
	niFgen Configure Digital Filter VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	niFgen_DisableDigitalFilter		
	niFgen Configure Digital Filter VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	niFgen_EnableDigitalPatterning		
	niFgen Configure Digital Patterning VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	niFgen_DisableDigitalPatterning		
	niFgen Configure Digital Patterning VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel


Configure Clock


ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_ConfigureSampleRate		
	niFgen Set Sample Rate VI		
	ViSession	vi	Instrument handle
	ViReal64	sampleRate	Sample rate in samples per second
	niFgen_ConfigureRefClockSource		
	ViSession	vi	Instrument handle
	ViInt32	refClockSource	<ul style="list-style-type: none"> • NIFGEN_VAL_CLK_IN • NIFGEN_VAL_ONBOARD_REFERENCE_CLOCK • NIFGEN_VAL_REF_CLOCK_EXTERNAL • NIFGEN_VAL_REF_CLOCK_INTERNAL • NIFGEN_VAL_REF_CLOCK_RTSM_CLOCK • NIFGEN_VAL_PXI_CLK10 • NIFGEN_VAL_REF_IN • NIFGEN_VAL_RTSM_<0..7>
	niFgen_ConfigureUpdateClockSource		
	ViSession	vi	Instrument handle
	ViInt32	source	<ul style="list-style-type: none"> • NIFGEN_VAL_INTERNAL • NIFGEN_VAL_EXTERNAL • NIFGEN_VAL_CLK_IN • NIFGEN_VAL_DDC_CLK_IN • NIFGEN_VAL_PXI_STAR • NIFGEN_VAL_RTSM_<0..7>
	niFgen_ConfigureClockMode		
	ViSession	vi	Instrument handle
	ViInt32	clockMode	<ul style="list-style-type: none"> • NIFGEN_VAL_AUTOMATIC • NIFGEN_VAL_DIVIDE_DOWN • NIFGEN_VAL_HIGH_RESOLUTION

Configure Trigger & Synchronization


ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_SendSoftwareTrigger		
	ViSession	vi	Instrument handle
	niFgen_ConfigureTriggerMode		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	mode	<ul style="list-style-type: none"> • NIFGEN_VAL_SINGLE • NIFGEN_VAL_CONTINUOUS • NIFGEN_VAL_STEPPED • NIFGEN_VAL_BURST

Configure Trigger & Synchronization (continued)


ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_ConfigureTriggerSource		
	niFgen Configure Trigger VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	trigSource	<ul style="list-style-type: none">• NIFGEN_VAL_IMMEDIATE• NIFGEN_VAL_EXTERNAL• NIFGEN_VAL_SOFTWARE_TRIG• NIFGEN_VAL_RTSLI_<0..7>• NIFGEN_VAL_PFL_<0..3>• NIFGEN_VAL_PXI_STAR

	niFgen_RouteSignalOut		
	niFgen Route Signal Out VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	source	<ul style="list-style-type: none">• NIFGEN_VAL_NONE• NIFGEN_VAL_MARKER• NIFGEN_VAL_ONBOARD_REFERENCE_CLOCK• NIFGEN_VAL_SYNC_OUT• NIFGEN_VAL_OUT_START_TRIGGER• NIFGEN_VAL_BOARD_CLOCK• NIFGEN_VAL_SYNCHRONIZATION• NIFGEN_VAL_SOFTWARE_TRIG• NIFGEN_VAL_REF_IN• NIFGEN_VAL_PXI_CLK10• NIFGEN_VAL_PXI_STAR• NIFGEN_VAL_PFL_0• NIFGEN_VAL_RTSLI_<0..7>• NIFGEN_VAL_REF_CLOCK_RTSLI_CLOCK• NIFGEN_VAL_CLOCK_OUT• NIFGEN_VAL_UPDATE_CLOCK• NIFGEN_VAL_PLL_REF_SOURCE
	ViInt32	destination	<ul style="list-style-type: none">• NIFGEN_VAL_RTSLI_<0..7>• NIFGEN_VAL_PFL_<0, 1, 4, 5>• NIFGEN_VAL_PXI_STAR• NIFGEN_VAL_DDC_CLK_OUT• NIFGEN_VAL_REF_OUT




Configure Onboard Signal Processing

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_ConfigureCustomFIRFilterCoefficients		
	niFgen Configure Custom FIR Filter Coefficients VI		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViInt32	numberOfCoefficients	Specify the number of coefficients
	ViReal64[]	CoefficientsArray	Array of coefficients



Configure Onboard Signal Processing (continued)

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_GetFIRFilterCoefficients		
	ViSession	vi	Instrument handle
	ViConstString	channelName	Channel name; always "0" for single channel
	ViIntr32	arraySize	Pass the size of the coefficient array
	ViReal64[]	coefficientsarray	Array of coefficients
	ViInt32[]	numberOfCoefficientsRead	Specify the array containing the number of coefficients to be read (function only)

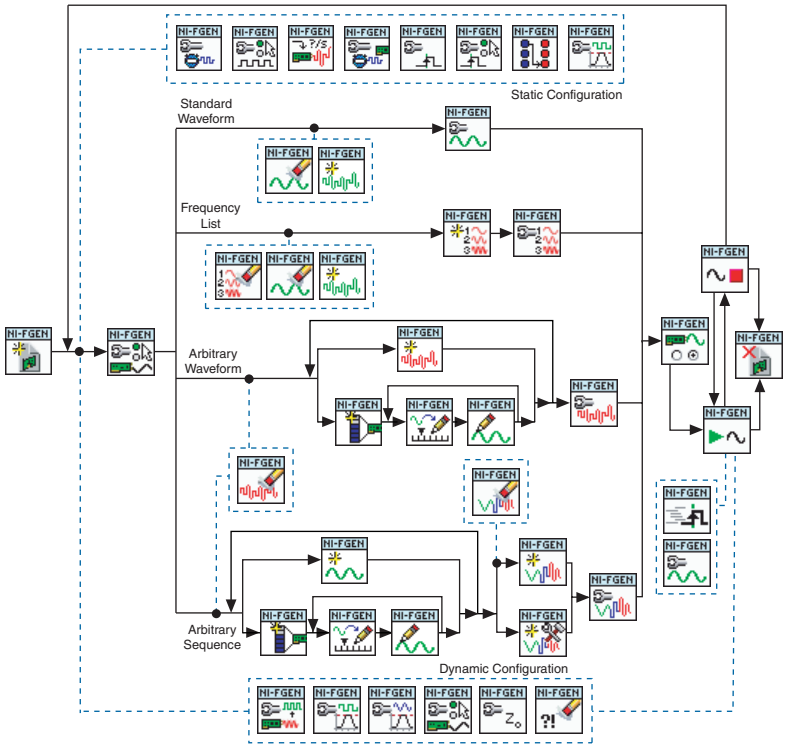
Waveform Control

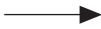

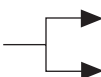
ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_Commit		
	ViSession	vi	Instrument handle
<hr/>			
	niFgen_WaitUntilDone		
	ViSession	vi	Instrument handle
	ViInt32	maxTime	Time to wait in milliseconds
<hr/>			
	niFgen_IsDone		
	ViSession	vi	Instrument handle
	ViBoolean *	done	VI_TRUE, VI_FALSE

Utilities

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_reset		
	ViSession	vi	Instrument handle
<hr/>			
	niFgen_ResetDevice		
	ViSession	vi	Instrument handle

Programming Flow



-  Required programming sequence
-  Optional step
-  Optional branch in required programming sequence

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