

# NI-FGEN Instrument Driver Quick Reference Guide










*Easy Programming for National Instruments  
Function and Arbitrary Waveform Generator*






ICON	FUNCTION NAME †	TYPE	PARAMETER	VALUE TO SET, COMMENTS
<b>Initiate and Close Functions</b>				
	niFgen_init	ViRsrc ViBoolean ViBoolean ViSession *	resourceName IDQuery resetDevice vi	DAQ::#, where # is the device number VI_TRUE, VI_FALSE VI_TRUE, VI_FALSE Reference to new session handle
	niFgen_close	ViSession	vi	Session handle
<b>Error Functions</b>				
	niFgen_ErrorHandler	ViSession ViStatus viChar[256]	vi status Code errorMessage	Session handle Error status code Error message
<b>Basic Instrument Operation</b>				
	niFgen_ConfigureOutputMode	ViSession ViInt32	vi outputMode	Session handle NIFGEN_VAL_OUTPUT_FUNC, NIFGEN_VAL_OUTPUT_FLIST, NIFGEN_VAL_OUTPUT_ARB, NIFGEN_VAL_OUTPUT_SEQ
	niFgen_ConfigureOutputEnabled	ViSession ViConstString viBoolean	vi channelName enabled	Session handle Channel name; always "0" for single channel Output enabled
	niFgen_InitiateGeneration	ViSession	vi	Session handle
	niFgen_AbortGeneration	ViSession	vi	Session handle

† Function name for C, C++, LabWindows/CVI, and Visual Basic.



‡ These functions are used to set specific parameters dynamically that are normally set within other configuration functions.





ICON	FUNCTION NAME †	TYPE	PARAMETER	VALUE TO SET, COMMENTS
<b>Standard Function Output</b>				
	niFgen_ConfigureStandardWaveform	ViSession ViConstString ViInt32  ViReal64 ViReal64  ViReal64 ViReal64	vi channelName waveform  amplitude * dcOffset  frequency * startPhase	Session handle Channel name; always "0" for single channel 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 0 to 10 V peak to peak -5 to +5 V; dcOffset and amplitude should not exceed 10V 0 Hz to 16 MHz for sine; 0 Hz to 1 MHz for all other waveforms -180 to 180 degrees
	niFgen_DefineUserStandardWaveform	ViSession ViConstString ViInt32 ViReal64 []	vi channelName wfmSize data	Session handle Channel name; always "0" for single channel Size of the waveform Waveform data scaled between -1 and 1
	niFgen_ClearUserStandardWaveform	ViSession ViConstStag	vi channelName	Session handle Channel name; always "0" for single channel

ICON	FUNCTION NAME †	TYPE	PARAMETER	VALUE TO SET, COMMENTS
<b>Frequency List Output</b>				
	niFgen_QueryFreqListCapabilities	ViSession ViInt32 * ViInt32 * ViInt32 * ViReal64 * ViReal64 * ViReal64 *	vi maxNumFLists minFListLength maxFListLength minFListDuration maxFListDuration fListDurationQuantum	Session handle Maximum number of frequency lists Minimum frequency list length Maximum frequency list length Minimum frequency list duration Maximum frequency list duration Duration must be a multiple of this quantum
	niFgen_CreateFreqList	ViSession ViInt32  ViInt32 ViReal64 []  ViReal64 [] ViInt32 *	vi waveform  fListLength frequencies  durations fListHandle	Session handle 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 Frequency list length Array of frequency values of size fListLength; 0 to 16 MHz for sine, and 0 Hz to 1 MHz for all other waveforms Array of durations in seconds of size fListLength; 0 to 3.36 s Returned frequency list handle, pass this to niFgen_ConfigureFreqList
	niFgen_ConfigureFreqList	ViSession ViConstString ViInt32 ViReal64 ViReal64 ViReal64	vi channelName FreqListHandle amplitude ‡ dcOffset startPhase	Session handle Channel name, always "0" for single channel Frequency list handle, as returned by niFgen_CreateFreqList 0 to 10 V peak-to-peak -5 to +5 V; dcOffset and amplitude should not exceed 10 V -180 to 180 degrees
	niFgen_ClearFreqList	ViSession ViInt32	vi FreqListHandle	Session handle Frequency list handle, as returned by niFgen_CreateFreqList, or NIFGEN_VAL_ALL_FLISTS





ICON	FUNCTION NAME †	TYPE	PARAMETER	VALUE TO SET, COMMENTS
<b>Arbitrary Waveform Output</b>				
	niFgen_QueryArbWfmCapabilities	ViSession ViInt32 * ViInt32 *  ViInt32 * ViInt32 *	vi maxNumWfms wfmQuantum  minWfmSize maxWfmSize	Session handle Maximum number of waveforms at one time All waveform sizes must be a multiple of this quantum Minimum waveform size Maximum waveform size
	niFgen_CreateArbWaveform	ViSession ViInt32 ViReal64 [] ViInt32 *	vi wfmSize wfmData wfmHandle	Session handle Waveform size Waveform data scaled between -1 and 1 Returned waveform handle; pass this to niFgen_ConfigureArbWaveform, or use it in an array passed to niFgen_CreateArbSequence
	niFgen_CreateBinary16ArbWaveform	ViSession ViInt32 ViInt16 []  ViInt32 *	vi wfmSize ViInt16 wfmData  wfmHandle	Session handle Waveform size Waveform data as 16-bit integers scaled between -32,768 and 32,767 Returned waveform handle; pass this to niFgen_ConfigureArbWaveform, or use it in an array passed to niFgen_CreateArbSequence
	niFgen_ConfigureArbWaveform	ViSession ViConstString ViInt32 ViReal64 ViReal64	vi channelName wfmHandle arbGain † arbOffset	Session handle Channel name; always "0" for single channel As returned by niFgen_CreateArbWaveform 0 to 5 V peak 0 to 2.5 V
	niFgen_ClearArbWaveform	ViSession ViInt32	vi wfmHandle	Session handle Must be NIFGEN_VAL_ALL_WAVEFORMS






### Arbitrary Sequence Output

	niFgen_QueryArbSeqCapabilities	ViSession ViInt32 * ViInt32 * ViInt32 * ViInt32 *	vi maxNumSeqs minSeqLength maxSeqLength maxLoopCount	Session handle Maximum number of sequences Minimum sequence length Maximum sequence length Maximum loop count
	niFgen_CreateAdvancedArbSequence	ViSession ViInt32 ViInt32 []  ViInt32 []  ViInt32 []  ViInt32 []  ViInt32 *	vi seqLength wfmHandles  loopCounts  sampleCounts  markers  coercedMarkers  seqHandle	Session handle Sequence length Array of waveform handles of size seqLength, as returned from niFgen_CreateArbWaveform Array of loop counts of size seqLength or VI_NULL; either the number of loops or NIFGEN_VAL_INFINITE_LOOP; Array of sample counts of size seqLength or VI_NULL; Either the number of samples or NIFGEN_VAL_WHOLE_BUFFER; if it is VI_NULL each element will be the whole buffer Array of markers of size seqLength or VI_NULL; either the marker position or NIFGEN_VAL_NO_MARKER; if it is VI_NULL then there will be no markers Returns an array of where each of the markers were coerced to. NOTE: the array MUST be an already or VI_NULL-allocated array of size seqLength Returned sequence handle; pass this to niFgen_ConfigureArbSequence






ICON	FUNCTION NAME †	TYPE	PARAMETER	VALUE TO SET, COMMENTS
<b>Arbitrary Sequence Output (continued)</b>				
	niFgen_CreateArbSequence	ViSession ViInt32 ViInt32 [] ViInt32 [] ViInt32 *	vi seqLength wfmHandle wfmLoopCount seqHandle	Session handle Sequence length Array of size seqLength of waveform handles , as returned from niFgen_CreateArbWaveForm Array of loop counts of size seqLength; either the number of loops or NIFGEN_VAL_INFINITE_LOOP Returned sequence handle; pass this to niFgen_ConfigureArbSequence
	niFgen_ConfigureArbSequence	ViSession ViConstString ViInt32 ViReal64 ViReal64	vi channelName seqHandle arbGain * arbOffset	Session handle Channel name; always "0" for single channel Sequence handle, as returned by niFgen_CreateArbSequence Or niFgen_CreateAdvancedArbSequence 0 to 5 V peak 0 to 2.5 V
	niFgen_ClearArbSequence	ViSession ViInt32	vi seqHandle	Session handle Sequence handle, as returned by niFgen_CreateArbSequence Or niFgen_CreateAdvancedArbSequence, or NIFGEN_VAL_ALL_SEQUENCES
	niFgen_ClearArbMemory	ViSession	vi	Session handle

### Configure Output

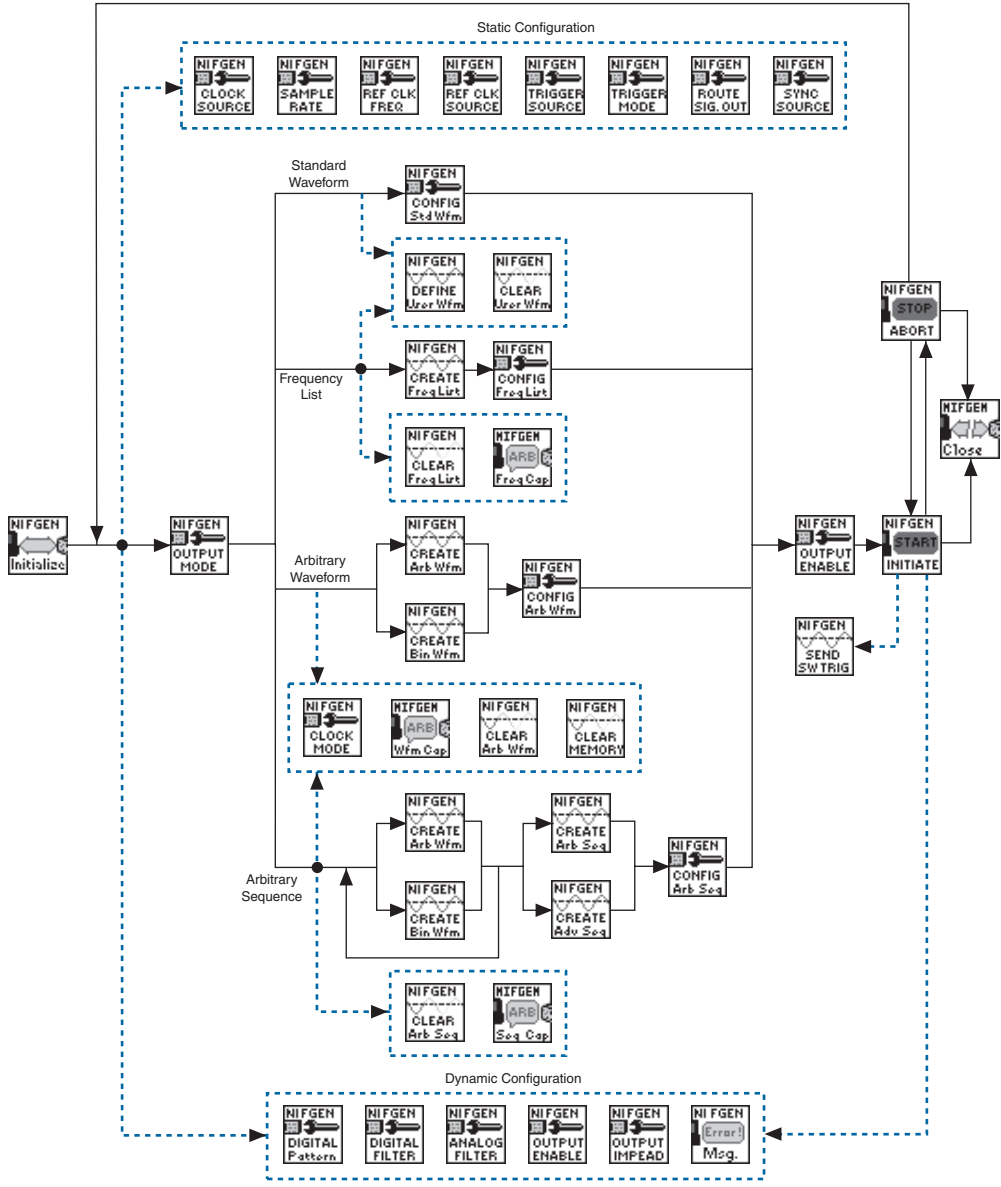
	niFgen_ConfigureOutputImpedance	ViSession ViConstString ViReal64	vi channelName outputImpedance	Session handle Channel name; always "0" for single channel NIFGEN_VAL_50_OHMS, NIFGEN_VAL_75_OHMS
	niFgen_EnableAnalogFilter	ViSession ViConstString ViReal64	vi channelName filterCorrectionFreq	Session handle Channel name; always "0" for single channel 0 Hz to 16 MHz
	niFgen_DisableAnalogFilter	ViSession ViConstString	vi channelName	Session handle Channel name; always "0" for single channel
	niFgen_EnableDigitalFilter	ViSession ViConstString	vi channelName	Session handle Channel name; always "0" for single channel
	niFgen_DisableDigitalFilter	ViSession ViConstString	vi channelName	Session handle Channel name; always "0" for single channel
	niFgen_EnableDigitalPatterning	ViSession ViConstString	vi channelName	Session handle Channel name; always "0" for single channel
	niFgen_DisableDigitalPatterning	ViSession ViConstString	vi channelName	Session handle Channel name; always "0" for single channel

ICON	FUNCTION NAME †	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niFgen_ConfigureSampleRate	ViSession ViReal64	vi sampleRate	Session handle 610 Hz to 40 MHz in Divide Down Mode, 0 Hz to 40 MHz in Hi Res Mode
	niFgen_ConfigureRefClockSource	ViSession ViInt32	vi refClockSource	Session handle NIFGEN_VAL_EXTERNAL, NIFGEN_VAL_INTERNAL, NIFGEN_VAL_RTSI_CLOCK, NIFGEN_VAL_TTL7
	niFgen_ConfigureRefClockFrequency	ViSession ViReal64	vi frequency	Session handle 1 MHz or 5 MHz to 20 MHz in 1 MHz intervals
	niFgen_ConfigureUpdateClockSource	ViSession ViInt32	vi source	Session handle NIFGEN_VAL_INTERNAL, NIFGEN_VAL_EXTERNAL
	niFgen_ConfigureClockMode	ViSession ViInt32	vi updateMode	Session handle NIFGEN_VAL_DIVIDE_DOWN, NIFGEN_VAL_HIGH_RESOLUTION

### Configure Trigger & Synchronization

	niFgen_SendSoftwareTrigger	ViSession	vi	Session handle
	niFgen_ConfigureTriggerMode	ViSession ViConstString ViInt32	vi channelName mode	Session handle Channel name; always "0" for single channel NIFGEN_VAL_SINGLE, NIFGEN_VAL_CONTINUOUS, NIFGEN_VAL_STEPPED, NIFGEN_VAL_BURST
	niFgen_ConfigureTriggerSource	ViSession ViConstString ViInt32	vi channelName trigSource	Session handle Channel name; always "0" for single channel NIFGEN_VAL_IMMEDIATE, NIFGEN_VAL_EXTERNAL, NIFGEN_VAL_SW_TRIG_FUNC, NIFGEN_VAL_RTSI_0 through NIFGEN_VAL_RTSI_6, NIFGEN_VAL_TTL_0 through NIFGEN_VAL_TTL_6
	niFgen_ConfigureSynchronization	ViSession ViConstString ViInt32	vi channelName Synchronization source	Session handle Channel name; always "0" for single channel NIFGEN_VAL_NONE, NIFGEN_VAL_RTSI_0 through NIFGEN_VAL_RTSI_6, NIFGEN_VAL_TTL_0 through NIFGEN_VAL_TTL_6
	niFgen_RouteSignalOut	ViSession ViConstString ViInt32  ViInt32	vi channelName from  to	Session handle Channel name; always "0" for single channel NIFGEN_VAL_NONE, NIFGEN_VAL_MARKER, NIFGEN_VAL_SYNC_OUT, NIFGEN_VAL_OUT_START_TRIGGER, NIFGEN_VAL_BOARD_CLOCK, NIFGEN_VAL_SYNCHRONIZATION  NIFGEN_VAL_RTSI_0 through NIFGEN_VAL_RTSI_6, NIFGEN_VAL_RTSI_CLOCK

# Programming Flow



—> Required programming sequence  
 - - -> Optional step

