GPIB for LabVIEW NXG

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Contents

GPIB-to-VISA Migration

LabVIEW GPIB functions are deprecated in LabVIEW NXG. When you create new applications, use VISA functions equivalent to the deprecated GPIB functions. LabVIEW VISA is extensible and supports other hardware interfaces in addition to GPIB. If you are programming multiple devices that communicate over more than one bus type, it is easier and more efficient to use VISA for your entire system.

Known Compatibility Issue Between GPIB and VISA Functions in LabVIEW NXG

Arbitration was built into LabVIEW to ensure VISA and GPIB functions that access instruments using the same GPIB Board Interface were synchronized. There is no arbitration in LabVIEW NXG, which may result in unexpected behavior including race conditions and intermittent errors. To prevent these problems, National Instruments recommends switching the deprecated GPIB functions to the equivalent VISA functions. This document assists you with the conversion. Refer to ***Converting GPIB Functions to VISA Functions in LabVIEW NXG*** for more information.

If you need to make minor modifications using GPIB functions and do not want to convert your application to VISA, contact National Instruments technical support.

Converting GPIB Functions to VISA Functions in LabVIEW NXG

As a resource to help you convert an existing GPIB application to VISA in LabVIEW NXG, the following tables list each LabVIEW GPIB function along with the equivalent VISA function, where applicable.

- The ***GPIB and VISA Functions*** table maps GPIB functions to the equivalent VISA functions.
- The ***Advanced GPIB Initialization and Misc Functions and VISA Functions*** table maps advanced GPIB Initialization and Misc functions to the equivalent VISA functions.
- The ***GPIB 488.2 Functions and VISA Functions*** table maps GPIB 488.2 functions to the equivalent VISA functions.

- The ***IEEE 488 Command Messages*** table lists IEEE 488 command messages that are command bytes, which you can use to configure the GPIB state.

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GPIB and VISA Functions

The following table maps GPIB functions to the equivalent VISA functions.

Table 1. GPIB and VISA Functions

GPIB Action	GPIB Function				VISA Action	VISA	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inputs
GPIB Clear			• address string	• status	VISA Clear		• session in (Instrume
GPIB Read Note: Both Synchronous and Asynchronous I/O modes are supported.			• timeout ms • address string • byte count • mode	• data • status	VISA Read Note: Only Asynchronous I/O mode is supported.		• session in (GPIB Boa Interface; Instrumer • byte coun
GPIB Serial Poll			• address string	• serial poll byte • status	VISA Read STB		• session in (Instrume
GPIB Status: • ERR (Error Detected) • TIMO (Timeout)			• address string	• status • GPIB error • byte count	VISA Property Note: Only a subset of status bits can be obtained:		• session in (GPIB Boa Interface) To get property-

GPIB Action	GPIB Function				VISA Action	VISA	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inputs
• END (EOI or EOS Detected) • SRQI (SRQ Detected while CIC) • CMPL (Operation Completed) • LOK (Lockout State) • REM (Remote State) • CIC (Controller-In-Charge) • ATN (Attention Asserted) • TACS (Talker Active) • LACS (Listener Active) • DTAS (Device Trigger State) • DCAS (Device Clear state)					• SRQ State (SRQ Detected) while CIC) • REN State (Remote State) • Is CIC (Controller-In-Charge) • ATN State (Attention Asserted) • Address State (Talker Active or Listener Active)		Board Interface» Settings» ◦ Line State ◦ Line State ◦ Is Cont In Ch ◦ Line State ◦ Addr State
GPIB Trigger			• address	• status	VISA Software Trigger		• session in

GPIB Action	GPIB Function				VISA Action	VISA	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inputs
			string				(GPIB Boa Interface, Instrumer
GPIB Wait: • Device Clear State • Device Trigger State • Listener Active • Talker Active • Controller-In-Charge • SRQ Detected while CIC			• timeout ms • address string • wait state vector	• status	VISA Wait on Event: • Clear • Trigger • GPIB Listen • GPIB Talk • GPIB CIC • Service Request		• wait time • session in (GPIB Boa Interface) • event typ
GPIB Wait: • Attention Asserted • Remote State • Lockout State • EOI or EOS Detected			• timeout ms • address string • wait state vector	• status	VISA action does not support these events For the Attention Asserted and Remote Sta Loop to check the VISA Property of ATN Sta To get property— • GPIB Board Interface»GPIB Settings»Li • GPIB Board Interface»GPIB Settings»Li • Instrument»GPIB Settings»Line REN St		
GPIB Wait for RQS			• address string • timeout	• poll response byte	VISA Wait on Event: • Service		• wait time • session in (Instrume

GPIB Action	GPIB Function				VISA Action	VISA	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inputs
			ms		Request…		• event typ
					Followed by VISA Read STB		• session in (Instrume
GPIB Write Note: Both Synchronous and Asynchronous I/O modes are supported.			• timeout ms • address string • data • mode	• status	VISA Write Note: Only Asynchronous I/O mode is supported.		• session in (GPIB Boa Interface, Instrumer • write buff

Advanced GPIB Initialization and Misc Functions and VISA Functions

The following table maps advanced GPIB Initialization and Misc functions to the equivalent VISA functions.

Table 2. Advanced GPIB Initialization and Misc Functions and VISA Functions

GPIB Action	GPIB Function				VISA Action	VISA F	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inpu
GPIB Initialization: • Require readdressing			• require readdressing • address string		VISA Property		• session in (• Readdress To get or set propert

GPIB Action	GPIB Function				VISA Action	VISA F	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inpu
							properties» Settings»Re
GPIB Initialization: • Assert REN with IFC			• assert REN when IFC • address string		VISA Send Remote Local Command		• session in (Interface) • mode: ◦ Assert ◦ Deasse
GPIB Initialization: • System Controller			• system controller • address string		VISA Property		• session in (Interface) • SysCntrl St To get or se property— Interface»G Settings»Sy Controller
GPIB Initialization: • IST bit sense (Individual Status bit)			• address string • IST bit sense		VISA action does not support Parallel P		
GPIB Initialization: • Disallow DMA			• address string • disallow DMA		VISA Property		• session in (Interface, I • Allow DMA To get or se ◦ GPIB B Interfa Setting

GPIB Action	GPIB Function				VISA Action	VISA F	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inpu
							Transf ◦ Instru Setting Transf
GPIB Misc: • command to Become Active Controller			• command string: "cac [0/1]"	• output string • status	VISA GPIB Control ATN		• session in (Interface) • mode: ◦ Assert ◦ Assert Immed
GPIB Misc: • command to Send IEEE 488 commands			• command string: "cmd [string]" (refer to the ***IEEE 488 Command Messages*** table for possible command strings)	• output string • status	VISA GPIB Send Command		• session in (Interface) • command ***IEEE 488*** ***Messages*** possible co strings)
GPIB Misc: • command to set DMA or programmed I/O mode			• command string: "dma [0/1]"	• output string • status	VISA Property		• session in (Interface, I • Allow DMA To get or se ◦ GPIB B Interfa Setting Transf ◦ Instru

GPIB Action	GPIB Function				VISA Action	VISA F	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inpu
							Setting Transf
GPIB Misc: • command to go from active controller to standby			• command string: "gts [0/1]"	• output string • status	VISA GPIB Control ATN		• session in (Interface) • mode: ◦ Deasse ◦ Deasse Hands
GPIB Misc: • command to set Individual Status Bit			• command string: "ist [0/1]"	• output string • status	VISA action does not support Parallel P		
GPIB Misc: • command for Local lockout			• command string: "llo"	• output string • status	VISA Send Remote Local Command		• session in (Interface) • mode: ◦ Local L (Addre
GPIB Misc: • command to place controller in Local State			• command string: "loc"	• output string • status	VISA action does not support this call		
GPIB Misc: • command to go to Local			• command string: "loc [address]"	• output string • status	VISA Send Remote Local Command		• session in (• mode: ◦ Local

GPIB Action	GPIB Function				VISA Action	VISA F	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inpu
for an instrument							◦ Local v Lockou
GPIB Misc: • command to take controller offline			• command string: "off"	• output string • status	VISA Close		• session in (Interface)
GPIB Misc: • command to take device offline			• command string: "off [address]"	• output string • status	VISA Close		• session in (
GPIB Misc: • command to pass control			• command string: "pct [address]"	• output string • status	VISA GPIB Pass Control		• session in (Interface) • primary ad • secondary
GPIB Misc: • command for parallel poll configure (enable and disable)			• command string: "ppc [byte]"	• output string • status	VISA action does not support Parallel P		
GPIB Misc: • command for parallel poll			• command string: "ppc [byte address]"	• output string • status	VISA action does not support Parallel P		

GPIB Action	GPIB Function				VISA Action	VISA F	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inpu
configure							
GPIB Misc: • command for parallel poll unconfigure			• command string: "ppu"	• output string • status	VISA action does not support Parallel P		
GPIB Misc: • command to conduct parallel poll			• command string: "rpp"	• output string • status	VISA action does not support Parallel P		
GPIB Misc: • command to release or request system control			• command string: "rsc [0/1]"	• output string • status	VISA Property		• session in (Interface) • SysCntrl St To get or se property—(Interface»G Settings»Sy Controller S
GPIB Misc: • command to request service and/or set the serial poll status byte			• command string: "rsv [byte]"	• output string • status	VISA Property		• session in (Interface) • Device STB To get or se property—(Interface»M Settings»De Byte

GPIB Action	GPIB Function				VISA Action	VISA F	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	Inpu
GPIB Misc: • command to send interface clear			• command string: "sic"	• output string • status	VISA GPIB Send Interface Clear		• session in (Interface)
GPIB Misc: • command to assert or unassert remote enable			• command string: "sre [0/1]"	• output string • status	VISA Send Remote Local Command		• session in (Interface) • mode: ◦ Assert ◦ Deasse

GPIB 488.2 Functions and VISA Functions

The following table maps GPIB 488.2 functions to the equivalent VISA Functions.

Table 3. GPIB 488.2 Functions and VISA Functions

GPIB Action	GPIB Function				VISA Action	V	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	
AllSpoll			• bus • address list	• serial poll byte list • status • byte count	VISA Read STB[1]		• session
DevClear			• bus	• status	VISA Clear		• session

GPIB Action	GPIB Function				VISA Action	V	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	
			• address				
DevClearList			• bus • address list	• status	VISA Clear[1]		• session
EnableLocal			• bus • address list	• status	VISA GPIB Send Command (refer to the ***IEEE 488 Command Messages*** table for the command strings)		• session Interfac • comma example MTA0, UNListe MLA1, MLA2, MLA3, GTL Descrip Board I Talker, i make th Address issue G
EnableRemote			• bus • address list	• status	VISA GPIB Send Command (refer to the ***IEEE 488***		• session Interfac

GPIB Action	GPIB Function				VISA Action	V	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	
					Command Messages table for the command strings)		• comma example MTA0, UNListe MLA1, MLA2, MLA3 Descript Board In Talker, i then ma at Addre
FindLstn			• bus • address list • limit	• listener address list • status • number of listeners	VISA Find Resource		• express To scan Instrum the GPI use a re "GPIB0: alternat array of loop thr • return a
FindRQS			• bus • address list	• requester status byte	VISA Read STB[1]		• session

GPIB Action	GPIB Function				VISA Action	V	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	
				• status • requester index			
MakeAddr			• primary address • secondary address	• packed address	Use the primary and secondary addresses with the ***session in***		• Session use—GP address address Optiona are show brackets
PassControl			• bus • address	• status	VISA GPIB Pass Control		• session Interfac • primary • seconda
PPoll			• bus	• parallel poll byte • status	VISA action does not support Parallel P		
PPollConfig			• bus • address • dataline • sense	• status	VISA action does not support Parallel P		
PPollUnconfig			• bus • address list	• status	VISA action does not support Parallel P		

GPIB Action	GPIB Function				VISA Action	V	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	
RcvRespMsg			• bus • mode • count	• data string • status • byte count	VISA Read (use VISA GPIB Send Command first—refer to ReceiveSetup)		• session Interfac • byte cou
ReadStatus			• bus • address	• serial poll response	VISA Read STB		• session
Receive			• bus • address • mode • count	• data string • status • byte count	VISA Read		• session Interfac • byte cou
ReceiveSetup			• bus • address	• status	VISA GPIB Send Command (refer to the ***IEEE 488 Command Messages*** table for the command strings)		• session Interfac • comma example UNListe MLA0, MTA3 Descript UNListe Board In Listener

GPIB Action	GPIB Function				VISA Action	V	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	
							Instrum be the T
ResetSys			• bus • address list	• status	VISA GPIB Send Command (refer to the ***IEEE 488 Command Messages*** table for the command strings)		• session Interfac • comma example DCL, MTA0, UNListe MLA1, MLA2, MLA3 Descript Clear, m Interfac Talker, i then ma at Addre
					VISA Write		• session Interfac • write bu

GPIB Action	GPIB Function				VISA Action	V	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	
Send			• bus • address • mode • data string	• status • byte count	VISA Write		• session Interfac • write bu
SendCmds			• bus • command string (refer to the ***IEEE 488 Command Messages*** table for the command strings)	• status • byte count	VISA GPIB Send Command		• session Interfac • comma ***IEEE 4 Messag*** comma
SendDataBytes			• bus • mode • data string	• status • byte count	VISA Write (use VISA GPIB Send Command first—refer to SendSetup)		• session Interfac • write bu
SendIFC			• bus	• status	VISA GPIB Send Interface Clear		• session Interfac
SendList			• bus • address list • mode • data string	• status • byte count	VISA Write[1]		• session Interfac • write bu

GPIB Action	GPIB Function				VISA Action	V	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	
SendLLO			• bus	• status	VISA Send Remote Local Command		• session Interfac • mode: ◦ Loc (Ad ◦ Loc ◦ Loc
SendSetup			• bus • address list	• status	VISA GPIB Send Command (refer to the ***IEEE 488 Command Messages*** table for the command strings)		• session Interfac • comma example MTA0, UNListe MLA3 Descrip Board In Talker, i then ma Address Listener
SetRWLS			• bus • address list	• status	VISA GPIB Send Command (refer to the ***IEEE 488 Command Messages*** table for the		• session Interfac • comma example

GPIB Action	GPIB Function				VISA Action	V	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	
					command strings)		MTA0, UNListe MLA1, MLA2, MLA3, LLO Descript Board In Talker, i make 3 Address issue Lo
SetTimeOut			• new timeout	• previous timeout	VISA Property		• session Interfac • Timeou To get o ◦ GPI Inte Set Val ◦ Inst Set Val
TestSRQ			• bus	• SRQ • status	VISA Property		• session Interfac • SRQ Sta

GPIB Action	GPIB Function				VISA Action	V	
	LabVIEW	LabVIEW NXG	Inputs	Outputs		LabVIEW NXG	
							To get p Board In Settings
TestSys			• bus • address list	• result list • status • failed devices	VISA Write[1]		• session Interfac • write bu
					VISA Read[1]		• session Interfac • byte cou
Trigger			• bus • address	• status	VISA Software Trigger		• session Interfac
TriggerList			• bus • address list	• status	VISA Software Trigger[1]		• session Interfac
WaitSRQ			• bus	• SRQ • status	VISA Wait on Event		• wait tim • session Interfac • event ty Request

[1]For GPIB functions that take an address list, to set up the equivalent functionality in VISA, set up an array of add through the VISA function.

IEEE 488 Command Messages

The ***IEEE 488 Command Messages*** table lists IEEE 488 command messages that are command bytes, which you can use to configure the GPIB state.

For more information about the messages table, refer to the ANSI/IEEE Standard 488.1-1987, ***IEEE Standard Digital Interface for Programmable Instrumentation***, and ANSI/IEEE Standard 488.1-2003, ***IEEE Standard for Higher Performance Protocol for the Standard Digital Interface for Programmable Instrumentation***.

Refer to the ***Multiline Interface Message Definitions*** table below the ***IEEE 488 Command Messages*** table for the message definitions.

Table 4. IEEE 488 Command Messages

Hex	Decimal	ASCII	Message
00	0	NUL	—
01	1	SOH	GTL
02	2	STX	—
03	3	ETX	—
04	4	EOT	SDC
05	5	ENQ	PPC
06	6	ACK	—
07	7	BEL	—
08	8	BS	GET
09	9	HT	TCT
0A	10	LF	—
0B	11	VT	—
0C	12	FF	—
0D	13	CR	—
0E	14	SO	—
0F	15	SI	—
10	16	DLE	—

Hex	Decimal	ASCII	Message
11	17	DC1	LLO
12	18	DC2	—
13	19	DC3	—
14	20	DC4	DCL
15	21	NAK	PPU
16	22	SYN	—
17	23	ETB	—
18	24	CAN	SPE
19	25	EM	SPD
1A	26	SUB	—
1B	27	ESC	—
1C	28	FS	—
1D	29	GS	—
1E	30	RS	—
1F	31	US	CFE
20	32	SP	MLA0
21	33	!	MLA1
22	34	"	MLA2
23	35	#	MLA3
24	36	$	MLA4
25	37	%	MLA5
26	38	&	MLA6
27	39	'	MLA7
28	40	(	MLA8
29	41	)	MLA9
2A	42	*	MLA10
2B	43	+	MLA11

Hex	Decimal	ASCII	Message
2C	44	,	MLA12
2D	45	-	MLA13
2E	46	.	MLA14
2F	47	/	MLA15
30	48	0	MLA16
31	49	1	MLA17
32	50	2	MLA18
33	51	3	MLA19
34	52	4	MLA20
35	53	5	MLA21
36	54	6	MLA22
37	55	7	MLA23
38	56	8	MLA24
39	57	9	MLA25
3A	58	:	MLA26
3B	59	;	MLA27
3C	60	<	MLA28
3D	61	=	MLA29
3E	62	>	MLA30
3F	63	?	UNL
40	64	@	MTA0
41	65	A	MTA1
42	66	B	MTA2
43	67	C	MTA3
44	68	D	MTA4
45	69	E	MTA5
46	70	F	MTA6

Hex	Decimal	ASCII	Message
47	71	G	MTA7
48	72	H	MTA8
49	73	I	MTA9
4A	74	J	MTA10
4B	75	K	MTA11
4C	76	L	MTA12
4D	77	M	MTA13
4E	78	N	MTA14
4F	79	O	MTA15
50	80	P	MTA16
51	81	Q	MTA17
52	82	R	MTA18
53	83	S	MTA19
54	84	T	MTA20
55	85	U	MTA21
56	86	V	MTA22
57	87	W	MTA23
58	88	X	MTA24
59	89	Y	MTA25
5A	90	Z	MTA26
5B	91	[	MTA27
5C	92	\	MTA28
5D	93	]	MTA29
5E	94	^	MTA30
5F	95	–	UNT
60	96	`	MSA0, PPE
61	97	a	MSA1, PPE, CFG1

Hex	Decimal	ASCII	Message
62	98	b	MSA2, PPE, CFG2
63	99	c	MSA3, PPE, CFG3
64	100	d	MSA4, PPE, CFG4
65	101	e	MSA5, PPE, CFG5
66	102	f	MSA6, PPE, CFG6
67	103	g	MSA7, PPE, CFG7
68	104	h	MSA8, PPE, CFG8
69	105	i	MSA9, PPE, CFG9
6A	106	j	MSA10, PPE, CFG10
6B	107	k	MSA11, PPE, CFG11
6C	108	l	MSA12, PPE, CFG12
6D	109	m	MSA13, PPE, CFG13
6E	110	n	MSA14, PPE, CFG14
6F	111	o	MSA15, PPE, CFG15
70	112	p	MSA16, PPD
71	113	q	MSA17, PPD
72	114	r	MSA18, PPD
73	115	s	MSA19, PPD
74	116	t	MSA20, PPD
75	117	u	MSA21, PPD
76	118	v	MSA22, PPD
77	119	w	MSA23, PPD
78	120	x	MSA24, PPD
79	121	y	MSA25, PPD
7A	122	z	MSA26, PPD
7B	123	{	MSA27, PPD
7C	124	|	MSA28, PPD

Hex	Decimal	ASCII	Message
7D	125	}	MSA29, PPD
7E	126	~	MSA30, PPD
7F	127	DEL	—

Table 5. Multiline Interface Message Definitions

Message	Definition
CFE	Configuration Enable (This multiline interface message is part of the IEEE 488.1-2003 specification and supports the HS488 high-speed protocol.)
CFG	Configure (This multiline interface message is part of the IEEE 488.1-2003 specification and supports the HS488 high-speed protocol.)
DCL	Device Clear
GET	Group Execute Trigger
GTL	Go To Local
LLO	Local Lockout
MLA	My Listen Address
MSA	My Secondary Address
MTA	My Talk Address
PPC	Parallel Poll Configure
PPD	Parallel Poll Disable
PPE	Parallel Poll Enable
PPU	Parallel Poll Unconfigure
SDC	Selected Device Clear
SPD	Serial Poll Disable
SPE	Serial Poll Enable
TCT	Take Control
UNL	Unlisten

Message	Definition
UNT	Untalk