PI
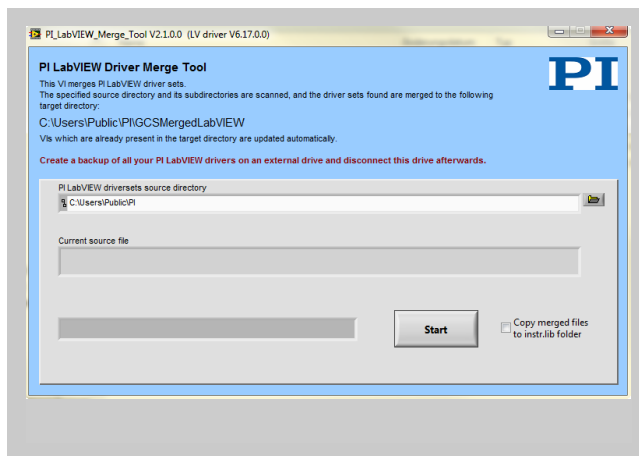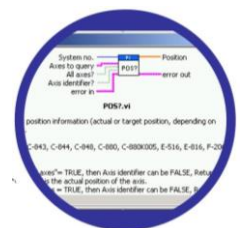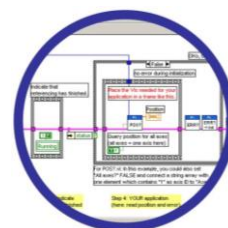
SM154E Software Manual

PI GCS Merge Tool for NI LabVIEW

Release: 6.17.2   Date: 2018-07-16

This document describes software for use with the following product(s):

- ■ ■ All Systems

Table of Contents

The following company names and brands are registered trademarks of Physik Instrumente (PI) GmbH & Co. KG:
PI®, PICMA®, PILine®, PiezoWalk®, NEXACT®, NEXLINE®, NanoCube®, Picoactuator®, PInano®, PIMag®, Q-Motion®

Notes on third-party brand names and trademarks:
Microsoft® and Windows® are either registered trademarks or trademarks of Microsoft Corporation in the United States and / or other countries.
LabVIEW, National Instruments and NI are trademarks of National Instruments. Neither the driver Software, nor any software programs or other goods or services offered by PI, are affiliated with, endorsed by, or sponsored by National Instruments.

The patents owned by PI can be found in our patent list.

Software products that are provided by PI are subject to the General Software License Agreement of Physik Instrumente (PI) GmbH & Co. KG and may incorporate and/or make use of third-party software components.
For more information, please read the General Software License Agreement and the Third Party Software Note linked below.

General Software License Agreement

Third Party Software Note

Release: 6.17.2
File:PILabVIEWMergeTool_SM145E.pdf

1. Working with two PI products which understand PI's General Command Set (GCS) in NI LabVIEW

When installing the NI LabVIEW programming support for two different PI products, there are two "Low Level" folders installed, one in each product-specific driver set for NI LabVIEW. This is because every product comes with only the VIs which are used with the product. Another product may have different libraries or different library contents due to the product supporting more or fewer functions. When working with two product-specific driver set installations for NI LabVIEW on one computer, it is important to make sure that NI LabVIEW always uses the right libraries.

a) When working separately with two products, the "Low Level" folder of each product must be located in the same folder as the product-specific main VI which calls sub-VIs from the product-specific driver set. Otherwise NI LabVIEW will start searching for sub VIs wherever it finds them, which may result in version conflicts and "broken Run" arrows. Please make sure that no VIs are saved under NI LabVIEWs own "user.lib" sub-folder. If they are, NI LabVIEW will always find them there first, which will cause errors in many cases.

b) When working with two products in parallel, the libraries should be combined. Please use "MergePIDriver.vi", located in "C:\Users\Public\PI\PI_LabVIEW_Merge_Tool\MergeDrivers.llb" (also available via the Windows start menu), to combine two or more PI driver sets. Make sure to work thereafter with the combined libraries instead of the product-specific libraries. If you encounter any broken arrows or error messages after merging please contact your local sales representative with the following information:

      i. Product names of PI drivers for NI LabVIEW to merge

      ii. Version file "version.txt" of all driver sets to merge (located in the Low Level folder of each source driver set after merging)

      iii. Name(s) of VI(s) with broken arrows

      iv. Error code (if any) and name of VI in which the error occurred

Before combining driver sets, please do always run the PIUpdateFinder to check if there is an update available for one of the driver sets to merge, or for the Merge Tool itself.

Select a unique "System no." in each XXXX_Configuration_Setup.vi (with XXXX being the PI product number of your system) and use this System no. in all command VIs to tell NI LabVIEW which system to send commands to.

1.1. Merge Driverset VIs ("MergeDrivers.llb")

1.1.1. MergePIDriver.vi (MergeDrivers.llb)

Valid for	All systems
Input	PI program folder (C:\Users\Public\PI)
Output	none
Remarks	Please create a backup of your <PI program folder> structure prior to using this administrative tool.

This VI scans the <PI program folder> and its subfolders for any driver sets for NI LabVIEW and merges all driver sets found to the output folder "C:\Users\Public\PI\GCSMergedLabVIEW".

Filetypes considered are *.vi, *.llb and *.dll. Files that are already present in the destination path will be overwritten only if the source version is higher than the destination version. The files in the source folders are compressed to the "Backup" subdirectory of the output directory and afterwards deleted to prevent NI LabVIEW from accessing them. Any read-only file attribute will be reset.
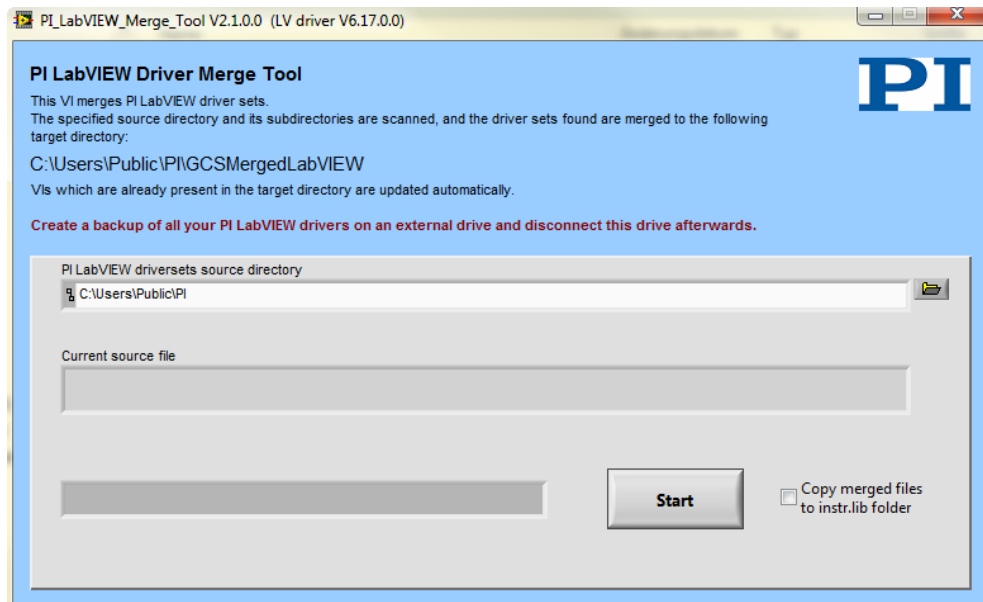
Constraints and remarks:

> ➢ The optional supplemental merge support folder must be named "MergeSupport" and be located in the "MergeDrivers.llb" folder

> ➢ "MergeDrivers.llb" does not need to be located inside the <PI program folder> structure

> ➢ The destination folder is named " GCSMergedLabVIEW " and created inside C:\Users\Public\PI

> ➢ The "communication.llb" file must be present in a valid PI GCS driver set's Low Level folder

> ➢ File names are case insensitive

> ➢ Customer VIs must not have the same name as any PI VI

> ➢ The " GCSMergedLabVIEW \Low Level\merged.txt" file must not be modified outside this merge tool

> ➢ You need write access rights for the <PI program folder> and its

subfolders

> For the "Copy merged files to instr.lib folder" option, you need write permission in the NI LabVIEW→instr.lib folders. When selecting this option, all merged files will be moved to the instr.lib folders of all LabVIEW installations. You will have direct access to the drivers via the palette in the block diagram.

1.1.2. AskVersion.vi (MergeDrivers.llb)

Valid for	All systems
Input	Version.txt (empty path constant), Error in (no error)
Output	Version string, Error out
Remarks	Opens a modal dialog to ask for a version string. A "Version.txt" file is then generated in the corresponding Low Level directory.
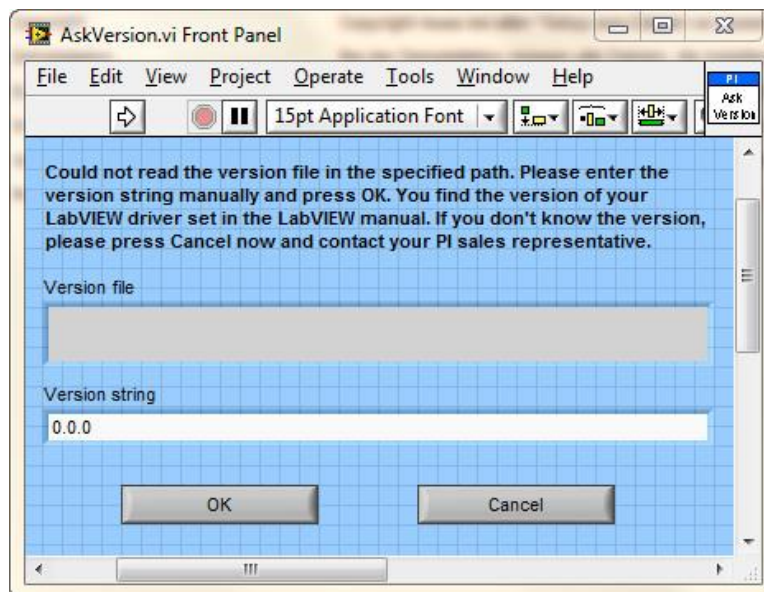
1.1.3. BuildPath.vi (MergeDrivers.llb)

Valid for	All systems
Input	Version info (Cluster of VI (empty string), Version (0), LLB (empty string) and Path (empty path)), Dest. Path (empty path)
Output	Source path, Dest. path
Remarks	Builds a VI's full path from Version info record.

1.1.4. CopyGCSTranslatorDLL.vi (MergeDrivers.llb)

Valid for	All systems
Input	Error in (no error)
Output	Error out
Remarks	Copies the "GCSTranslator.dll" from \DLL_Versions\GCSTranslator_win32 or \DLL_Versions\GCSTranslator_win64, depending on the used NI LabVIEW Version (32 Bit or 64Bit), to "MergeSupport\Low Level".

1.1.5. CopyToInstrLib.vi (MergeDrivers.llb)

Valid for	All systems
Input	Copy to instr.lib? (Boolean), Dest. Path (empty path), Error in (no error)

Output	percentage of files copied, current file that is being copied, Error out
Remarks	This vi copies all merged driversets for NI LabVIEW to the instr. lib folder of all installed NI LabVIEW versions (32Bit, if the PI GCS Merge Tool is run in 32Bit NI LabVIEW or 64Bit if PI GCS Merge Tool is run in 64Bit NI LabVIEW), if "Copy merged files to instr.lib folder" is selected in the MergePIDriver.vi frontpanel.

1.1.6.   DeleteObsolete.vi (MergeDrivers.llb)

Valid for	All systems
Input	Dest. Version (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Error in (no error)
Output	Dest. version out, Error out (no error)
Remarks	Deletes old VIs specified in the batch file <obsolete.txt> from merged libraries if the latest version of all merged driver sets is newer than the version specified in the file.

1.1.7.   ErrorIfFolderIsLink.vi (MergeDrivers.llb)

Valid for	All systems
Input	Path input (empty path)
Output	Error out
Remarks	Checks if the "Path input" string contains ".lnk" (which is a link to another Windows Folder). If it contains ".lnk", an error is generated.

1.1.8.   FileOperation.vi (MergeDrivers.llb)

Valid for	All systems
Input	Source path (empty path), Destination path (empty path), Error in (no error)
Output	Error out
Remarks	Resets read only attributes. Deletes a single file if <u>destination path</u> is not empty. Moves a single file if <u>destination path</u> and <u>source path</u> are not empty.

1.1.9.   Filter.vi (MergeDrivers.llb)

Valid for	All systems
Input	Folder names input (1-D array of string), Error in (no error)
Output	Folder names output (1-D array of string), Error out
Remarks	Checks if folder names are links or contain "Recycle" or "Mergesupport" and deletes them if necessary. Also checks if files are accessible. If not, these files are deleted from array (this may be system or network directories with missing read permission).

1.1.10. FindVIs.vi (MergeDrivers.llb)

Valid for	All systems
Input	Highlevel paths (array of path (empty path)), error in (no error)
Output	Source versions, Array of cluster of (Path, LLB, VI, Version)
Remarks	Scans the <u>Highlevel paths</u> folders and their "Low Level" folders for VIs, VIs in LLBs and DLLs and adds them to the <u>Source Versions</u> array. Duplicate entries of same VIs in the array are reduced to the latest one only.

1.1.11. GetHighlevelFolders.vi (MergeDrivers.llb)

Valid for	All systems
Input	PI folder (empty path), error in (no error)
Output	Highlevel paths, Lowlevel paths, Error out
Remarks	Scans PI folder and all subfolders for the essential "Communication.llb" PI driver library. If found, the appropriate Highlevel path is added to the Highlevel paths array. Creates subfolder "Merged_GCS_LabVIEW"

1.1.12. GetLowlevelFolders.vi (MergeDrivers.llb)

Valid for	All systems
Input	Highlevel paths, error in (no error)
Output	Lowlevel paths, Error out
Remarks	Subfolders of HighLevel Paths are scanned for "Communication.llb". The containing folder is then returened als Low Level Path. If more than one "Communication.llb" is found, an error occurs, because the given path then is no HighLevel path.

1.1.13. GetVersion.vi (MergeDrivers.llb)

Valid for	All systems
Input	Highlevel path (empty path), Error in (no error)
Output	Version, Error out
Remarks	Opens the "Highlevel path\Low Level\Version.txt" file and searches for the line starting with (case insensitive) "VERSION". The following string is converted to a double constant Version, see "VersionString.vi". If file or "Version" is not found, a dialog window pops up. See "AskVersion.vi".

1.1.14. HandleOldCommands.vi (MergeDrivers.llb)

Valid for	All systems
Input	Source versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Dest versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Error in (no error)
Output	Source versions Out, Dest versions Out, Error out
Remarks	Removes all vis from source or destination versions array, if vi is listed twice, once in "Old Commands.llb" and once in another llb-file. Only vis of "Old Commands.llb" will be considered for merge process.

1.1.15. IsDestinationOlder.vi (MergeDrivers.llb)

Valid for	All systems
Input	Dest. path (empty path), Source versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Error in (no error)
Output	Source versions, Error out
Remarks	This vi scans the version information of the source vis and sorts vis out if the version is older than the destination version.

1.1.16. IsMTOld?.vi (MergeDrivers.llb)

Valid for	All systems
Input	Source versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Dest versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Error in (no error)
Output	Source versions Out, Dest versions Out, Error out
Remarks	This vi finds the latest driver version for NI LabVIEW in the source versions and destination versions arrays and checks if the PI GCS Merge Tool is older than the latest PI GCS driver for NI LabVIEW version that has been found.
	Throws an error (5006) if the PI GCS MergeTool is older than the latest driver set for NI LabVIEW.

1.1.17. IsPathValid.vi (MergeDrivers.llb)

Valid for	All systems
Input	Input Path
Output	Exists and is not empty (boolean)
Remarks	Checks if input path is not an empty string and exists on the system.

1.1.18. LVPUBINSTRLIBDIR.vi (MergeDrivers.llb)

Valid for	All systems
Input	Error in (no error)
Output	Instr.lib Directories (1-D array of file path), Error out
Remarks	This vi reads the instr.lib directories from the Windows-Registry. All found registry entries are added to "instr.lib Directories" array.

1.1.19. MergeFiles.vi (MergeDrivers.llb)

Valid for	All systems
Input	Dest. path (empty path), Source versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Dest. versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Source VI refnum (empty refnumber), Percent done (empty refnumber), Error in (no error)
Output	# of merged files, Dest. versions out, Error out
Remarks	Copies all files in <u>Source versions</u> to the appropriate destination folder. Updates or adds an entry to the <u>Dest versions</u> array.

1.1.20. ReadImplicit.vi (MergeDrivers.llb)

Valid for	All systems
Input	Error in (no error)
Output	Implicit VIs, Error out
Remarks	Reads out textfile implicit.txt.

1.1.21. ReadMergedTXT.vi (MergeDrivers.llb)

Valid for	All systems

Input	LowLevel path, Error in (no error)
Output	Merged.txt exists (Boolean), Dest versions, Error out
Remarks	Checks if merged.txt exists in Low Level directory. If merged.txt exists the versions of all listed vis are returned.

1.1.22. RemoveAnalogDummyFromSourceVersions.vi (MergeDrivers.llb)

Valid for	All systems
Input	Source versions in (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Error in (no error)
Output	Source versions out, Error out (no error)
Remarks	This vi scans the source versions array for "Analog control.llb" and in case of duplicate entries removes all dummy vis of digital driver sets for NI LabVIEW.

1.1.23. RemoveGCSTranslatorDLL.vi (MergeDrivers.llb)

Valid for	All systems
Input	Error in (no error)
Output	Error out (no error)
Remarks	This vi deletes the "MergeSupport\Low Level\GCSTranslator.dll" file, if existing.

1.1.24. RemoveOlderVIs.vi (MergeDrivers.llb)

Valid for	All systems
Input	Source versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Dest. versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Error in (no error)
Output	Source versions out, Error out (no error)
Remarks	Reduces the <u>Source versions</u> array. Entry is removed if
	1. Source is not newer than destination, or
	2. Analog "dummy" VI would overwrite a functional VI, or
	3. Source is merge support supplement and destination nonexistent

1.1.25. RemoveOriginalDrivers.vi (MergeDrivers.llb)

Valid for	All systems
Input	HighLevel Paths, Error in (no error)
Output	Error out
Remarks	This vi deletes the original PI driversets for NI LabVIEW, that were already merged and Backup had been created.
	The "Version.txt" file in Low Level is not deleted due to the PIUpdateFinder.

1.1.26. Rename.vi (MergeDrivers.llb) (obsolete)

|	
Valid for	All systems
Input	Highlevel paths (empty path array), Error in (no error)
Output	Error out (no error)

Remarks	Renames all files *.vi, *.llb, *.dll in the <u>Highlevel paths</u> and their "Low Level" subfolders to *.v_, *.ll_ or *.dl_ to prevent NI LabVIEW from accessing them.

1.1.27. ReturnDefaultDirectories.vi (MergeDrivers.llb)

Valid for	All systems
Input	Error in (no error)
Output	Output path (empty path), PI driver for NI LabVIEW source directory (empty path), Error out (no error)
Remarks	Checks the used Windows version and returns the default directories for the merged GCS driver sets for NI LabVIEW and the source directory.

1.1.28. SelectDriversets.vi (MergeDrivers.llb)

Valid for	All systems
Input	Highlevel paths (empty path array), Destination Path (empty path array), Error in (no error)
Output	Highlevel paths out, Lowlevel paths out, OK (Boolean) Error out (no error)
Remarks	Lets the user select driver sets to merge interactively. All found PI driver sets for NI LabVIEW of the prior specified <PI Program folder> are listed in the path array. The user may remove driver sets by disabling the checkbox next to the unwanted driver set for NI LabVIEW. Or the user may add additional PI driver sets for NI LabVIEW.
	On top the output directory for the merged driver set and the merge support directory are listed but may not be changed by the user.
	Please note: In some cases, more than 6 driver sets may be present. To access them one has to increase the number in the Index display on the left.
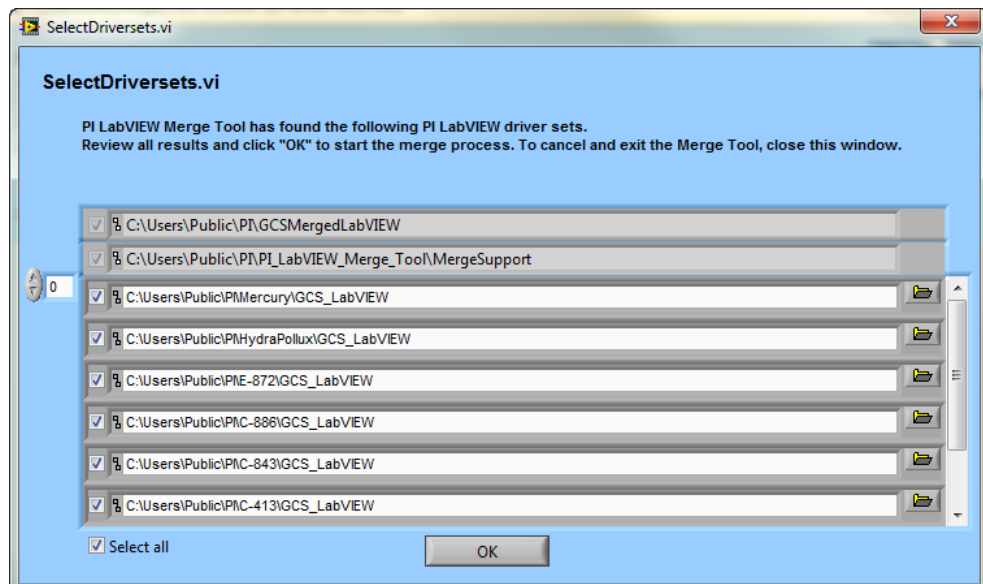
1.1.29. SetAttributes.vi (MergeDrivers.llb)

Valid for	All systems
Input	Path (empty path), Error in (no error)
Output	Error out (no error)

| Remarks | Resets read only file attributes of all files in <u>Path</u> recursively. |

1.1.30. SortOutOld.vi (MergeDrivers.llb)

Valid for	All systems
Input	Dest versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Source Versions in (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Does_merged_txt_exist? (Boolean), Error in (no error)
Output	Source Versions out, Error out (no error)
Remarks	Scans the source version and the destination version information of all vis and in case of duplicate entries removes all old vis.

1.1.31. UnzipMergedZip.vi (MergeDrivers.llb)

Valid for	All systems
Input	Dest Path (empty path), Error in (no error)
Output	Zip file exists (Boolean), Error out (no error)
Remarks	Unzips the content of the "Dest Path".zip file (if existing and located in the destination directory) to the destination directory.

1.1.32. VersionInfo_Load.vi (MergeDrivers.llb)

Valid for	All systems
Input	Dest. Path (empty path), Error in (no error)
Output	Dest. versions, Error out (no error)
Remarks	Loads the version information of VIs in <u>Dest Path</u> from the "Low Level\merged.txt" file.

1.1.33. VersionInfo_Save.vi (MergeDrivers.llb)

Valid for	All systems
Input	Dest. Path (empty path), Dest. versions (empty array of cluster of Path (empty path), LLB (empty string), VI (empty string) and Version (0)), Error in (no error)
Output	Error out (no error)
Remarks	Saves the version information of all merged VIs in <u>Dest. path</u> to the "Low Level\merged.txt" file, also if there is an incoming error.

1.1.34. VersionString.vi (MergeDrivers.llb)

Valid for	All systems
Input	Version string (empty string)
Output	Version
Remarks	Converts a PI version string to a double constant. Only the 5 most significant digits in the string are considered. Digit separator is the decimal point character. Decimal point is optional, i.e. every single character is treated as a significant digit (1.29 is the same as 1.2.9). Only alphanumeric characters '0-9' and 'A-I' are evaluated, all others are omitted. Case does not matter. "Beta" decreases double by 0.5. First digit can be 0-99.
	Sample version string: 3.1.4a, 3.1.4(a), 2.8beta, 1.29 Illegal version string: 1.2.3.456 consists of 6 digits

1.1.35. zip.vi (MergeDrivers.llb)

Valid for	All systems
Input	Highlevel Path (path constant), Output Path (empty path), Error in (no error)
Output	Error out (no error)
Remarks	Zips the driver directory for NI LabVIEW and all subdirectories to the "Backup" directory located in the destination directory.
	In addition to that the timestamp is appendend to the zip-filename.

1.1.36. ZipMergedDirectory.vi (MergeDrivers.llb)

Valid for	All systems
Input	Dest Path (empty path), Copy to instr.lib? (Boolean), Error in (no error)
Output	Error out (no error)
Remarks	If the content of the Dest Path is copied to the instr.lib directories, "Dest Path" is compressed as "Dest Path".zip file.

End of document