

Application Note #1232: PROFIBUS Migration to GP-Pro EX

Introduction

GP-Pro PB3 and Quick Designer projects can be converted into GP-Pro EX projects using a project converter. However additional steps are required because each software package uses a different method of addressing PROFIBUS direct input and output “I/O” data. GP-Pro EX uses the more recent PROFIBUS standard peripheral address format. This is a guide to convert the original project direct I/O addressing to the PROFIBUS standard “peripheral input (PI) and peripheral output (PQ)” format.

Both GP-Pro EX and the existing project configuration software will be required to complete the migration process. When a project is converted to GP-Pro EX the source project I/O addressing is retained in the result for programmer reference. All I/O these references must be manually converted in the GP-Pro EX project to peripheral I/O format.

Requirements

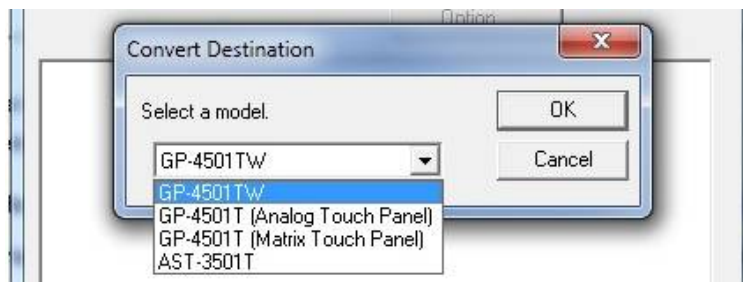
To replace an existing HMI the following items will be required:

- GP-Pro EX Pro-face configuration software
- Existing project file in editable form
- Configuration software for the existing project (GP-Pro PB3 or Quick Designer)
- CA5-PFSALL/EX-01 Pro-face PROFIBUS adapter
- GP3000 series Pro-face display compatible with the above adapter
- PROFIBUS master configuration software (from PROFIBUS master manufacturer)
- GSD electronic data sheet for CA5-PFSALL/EX-01 Pro-face available at:
http://www.hmisource.com/otasuke/download/exdriver/plc/profibus_dp.htm

GP-Pro PB3 to GP-Pro EX

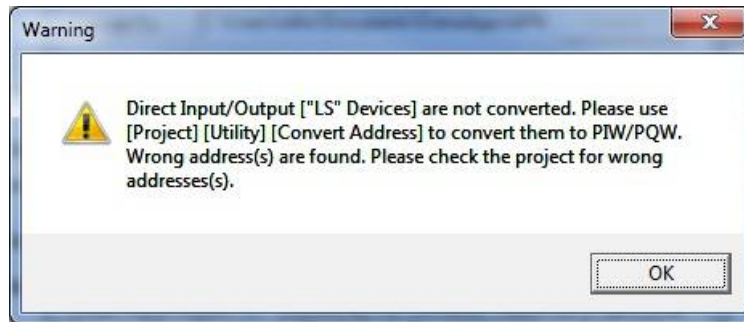
*** If you have a Quick Designer project skip this section ***

GP-Pro EX includes a utility “Project Converter” to convert your GP-Pro PB3 project into a GP-Pro EX project. At the time of this writing only GP3000 series displays and a CA5-PFSALL/EX-01 PROFIBUS DP slave communication module can connect to PROFIBUS. When configuring the Project Converter a dialog box “Convert Destination” will open with a request to “Select a model”.



The available choices may not include available GP3000 series models. In that case simply accept the default model. You can change it later in GP-Pro EX.

Upon successfully converting a GP-Pro PB3 project to GP-Pro EX the following warning will appear:

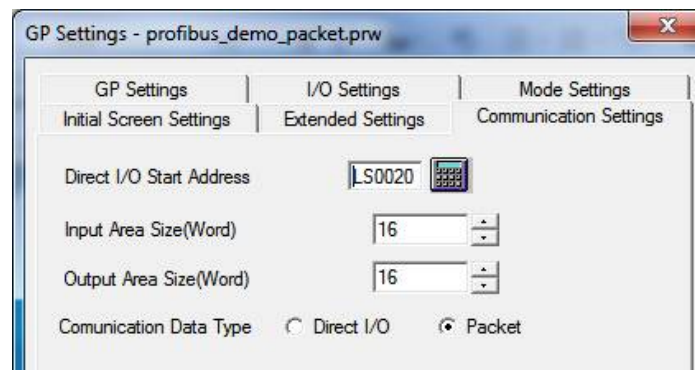


Actually the "Direct Input/Output" registers referred to are the LS addresses assigned to the PROFIBUS direct I/O in GP-Pro PB 3. The message is a notification that they were not modified during the conversion to GP-Pro EX. The Address Block Conversion feature in GP-Pro EX can be used to change these LS addresses to the PROFIBUS standard PI and PQ address format used in GP-Pro EX.

Note: The term "Input Area" in GP-Pro refers to outputs from the perspective of the PROFIBUS PLC or master. GP-Pro EX uses the PLC or master perspective PROFIBUS standard addressing, so "Input Area" becomes PQ and PQW output addresses. Likewise "Output Area" in GP-Pro becomes PI and PIW input addresses in GP-Pro EX.

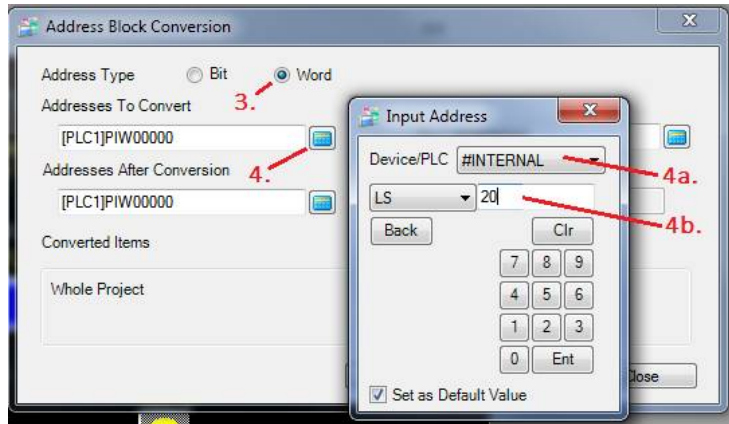
To convert word references:

1. Open the original project in GP-Pro PB3 for reference.
 - a. Click on "GP Setup"
 - b. Click on the "Communications Settings" tab.

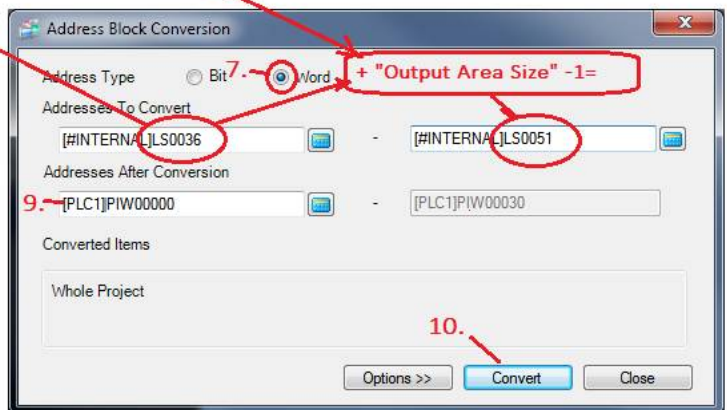
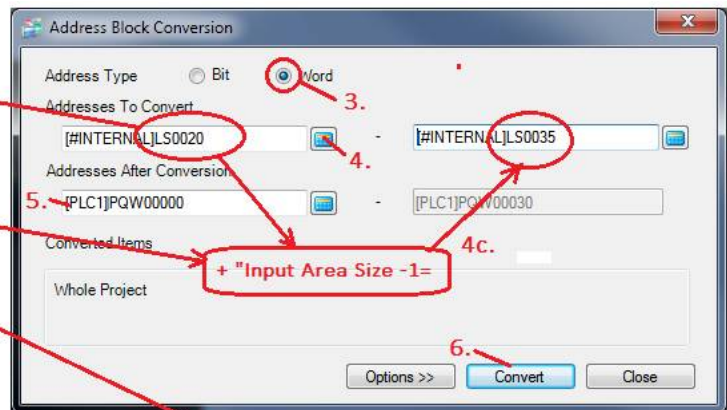
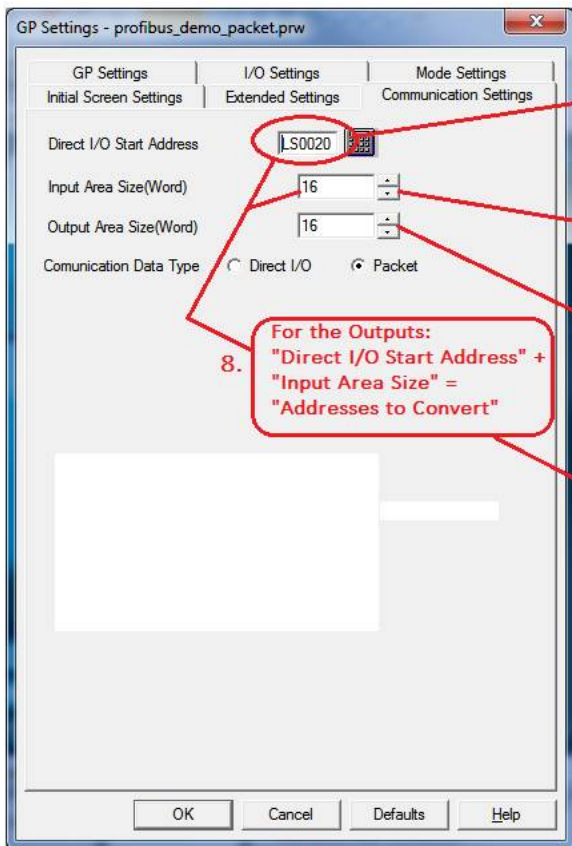


2. Open the converted project in GP Pro EX.
 - a. Save a copy of the project under a different file name.
 - b. At the top of the screen click on Project > Utility > Convert Addresses
 - c. The "Address Block Conversion" window will open.

3. For "Address Type" select Word.
4. For "Address to Convert" Click on the button to the right of the entry field.
 - a. For Device/PLC select "#INTERNAL". Keep the default "LS" selection.
 - b. In the numeric field enter the GP-Pro PB3 "Direct I/O start Address" value.
 - c. To that value add "Input Area Size" minus 1 and enter the result in the field to the right.



5. For "Addresses After Conversion" click on the button and select PQW. The address should remain 0000.



6. Click [Convert]
7. Verify "Address Type" selection is Word.

8. For “Address to Convert” Click on the button to the right of the entry field.
 - a. For Device/PLC select “#INTERNAL”. Keep the default “LS” selection
 - b. In the numeric field enter the sum of GP-Pro PB3 “Direct I/O start Address” + “Input Area Size”.
 - c. To that value add “Output Area Size” minus 1 and enter the result in the field to the right.
9. “Addresses After Conversion” should be [PLC1]PIW0000. If it is not click on the button and select PIW.
10. Click [Convert]
11. Save the project under another name to preserve these changes before proceeding.

To convert bit references:

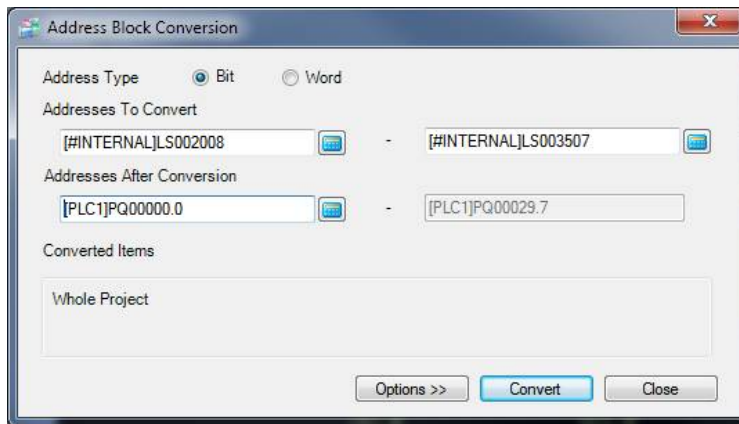
PROFIBUS addressing is Byte oriented. GP-Pro PB 3 exchanges data between PROFIBUS direct I/O and arrays in LS memory. LS memory is word oriented so each word address consists of 2 byte addresses of PROFIBUS I/O. Also in the case of the GP-Pro EX PB3 Siemens PROFIBUS device driver, like Siemens S7 PLCs and some other Intel oriented devices, the bytes are swapped when combined into a word.

Because the bytes are swapped when converting LS registers to PROFIBUS addressing LS word bits 15 – 8 become bit 7 – 0 in the first byte and LS bits 7 – 0 become bits 7 – 0 in the next byte.

Note: LS bit registers are word address followed by the bit reference. Examples the bit reference LS4312 is LS word 43 bit 12. Bit reference LS12304 is LS word 123 bit 04.

Assuming words are byte swapped and even numbered byte addressed in Siemens S7 format use this procedure. In each entry the appropriate bit value must be appended to the word address:

1. For “Address Type” select Bit.
2. For “Address to Convert” Click on the button to the right of the entry field.
 - a. For Device/PLC select “#INTERNAL”. Keep the default “LS” selection
 - b. In the numeric field enter the GP-Pro PB3 “Direct I/O start Address”. Append the digits 08. Click Enter. Example: If “Direct I/O Start Address” is 20 the entry is 2008.
 - c. In the field to the right enter the result of the expression (“Direct I/O start Address” + “Input Area Size” – 1). Append the digits 07. Click enter. Example: “Direct I/O Start Address” is 20 and the Input area size is 16 the entry is 3507.
3. “Addresses After Conversion” should be [PLC1]PQ0000.0 If it is not click on the button and select PQ.



4. Click [Convert]
5. Verify “Address Type” selection is Bit.
6. For “Address to Convert” Click on the button to the right of the entry field.
 - a. For Device/PLC select “#INTERNAL”. Keep the default “LS” selection
 - b. In the numeric field enter the sum of GP-Pro PB3 “Direct I/O start Address” + “Input Area Size”. Append the digits 08. Click Enter.
 - c. To the sum of “Direct I/O start Address” + “Input Area Size” + “Output Area Size” subtract 1 and enter the result in the field to the right. Append the digits 07. Press enter.
7. “Addresses After Conversion” should be [PLC1]PI0000.0 If it is not click on the button and select PI.
8. Click [Convert]

Compare the Results

Compare a range of addresses in the GP-Pro EX with the original GP-Pro project to confirm the results of the address conversion are correct.

If Data Packet is Selected

If Individual Device Settings in GP-Pro EX has “Use Packet Transfer” checked the System Area Start Address and Watchdog Write Address in GP-Pro EX must be defined. Please select valid Data Block integer (word) addresses from the PLC project.

Warning: Be sure to carefully verify the final results for proper addressing and byte and bit orientation before operating machinery. Verify data exchanged between the PROFIBUS master device and GP-Pro EX is the correct value and in the expected location for each data type.

Quick Designer to GP-Pro EX

**** If you have a GP-Pro project skip this section. ****

A free Quick Designer to GP-Pro EX project migration tool, the Panel Station Import Utility, is available from Pro-face at:

<http://www.profaceamerica.com/cms/site/6d600be545e5a6af/index.html>

Review the Panel Station Import utility help manual carefully before beginning the conversion. You will also need the Quick Designer editor to make changes before the conversion and to compare the results after the conversion. At the time of this writing only GP3000 series displays and a PROFIBUS DP slave communication module p/n CA5-PFSALL/EX-01 are offered for hardware migration.

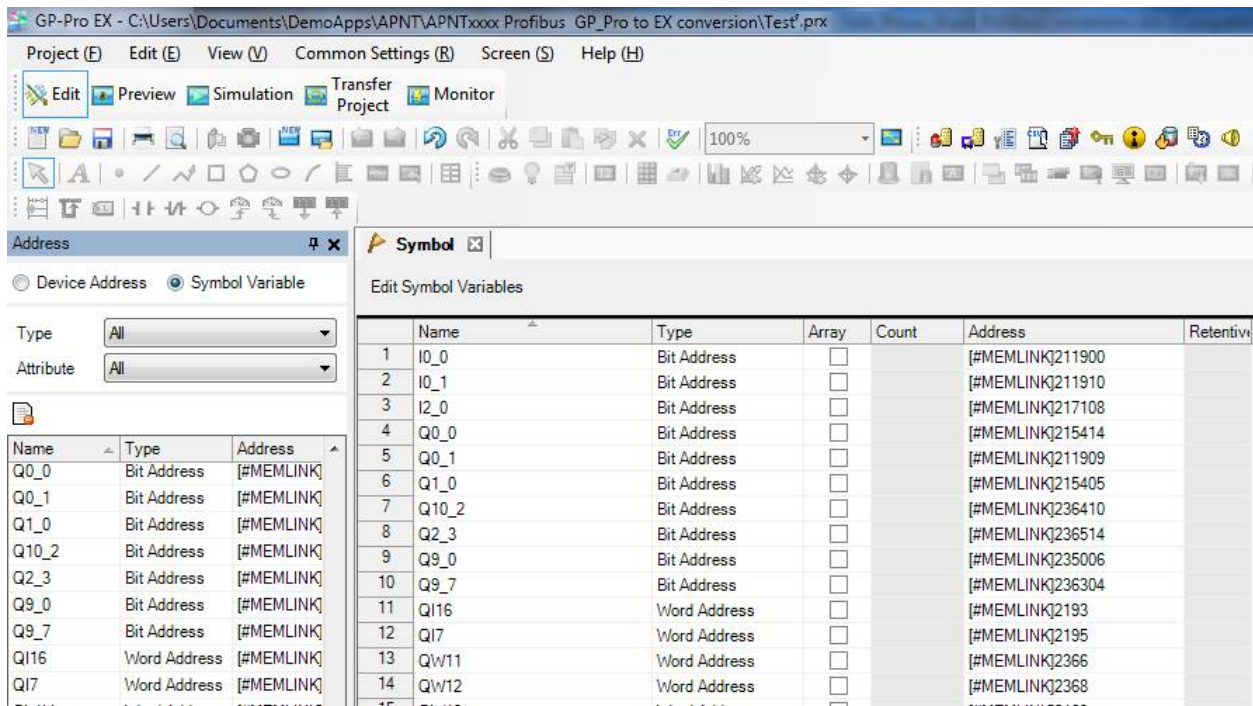
Note: Quick Designer has various options for Word and bit Storage format and addressing. The following steps assume Siemens Step 7 bit and word orientation as well as byte addressing. If your Quick Designer project is configured differently following the steps below may not provide the correct results.

The conversion:

1. Save a copy of the project so it can be opened later in Quick Designer for reference.
2. The Panel Station Import Tool does not support the PROFIBUS protocol. Open the Quick Designer project and change the protocol setting to <no protocol>.
3. Make any other changes to the project as suggested by the Panel Import Utility help manual and follow the steps to perform the migration to GP-Pro EX.
4. Open the converted project in GP-Pro EX.
5. Click on Project > System Settings> Device/PLC. Click Add Device/PLC.
6. Under Device Specific Settings click on the button to the right of PLC1.
7. Open the original Quick Designer project. Click on Setup > Protocol > Configure I/O
8. Copy these settings from the original Quick Designer project "I/O Configuration" dialog box to the new GP-Pro EX project "Individual Device Settings" dialog box.
 - a. Copy Input # of Words to Direct I/O "Input Size".
 - b. Copy Output # of Words to Direct I/O "Output Size".
9. Open "Common Settings" > Symbol Variables

Quick Designer uses the actual PROFIBUS master I/O addresses. These addresses are retained in the converted project as Symbol Variables. The symbols have an underscore instead of a dot between the address and the bit. The next four steps describe how to replace the Memlink addresses with PROFIBUS "Peripheral PI and PQ" addresses.

Note: If your project is large it may be easier to make a few sample address change of each data type and then export the Symbol Variable table to Excel to complete the addressing.



10. Input Words appear in the Name columns as IW** where ** is the PROFIBUS master address. The data type is Word Address.
 - a. Click on the address field to the right of the Name. Click on the button that appears. Select PLC1. Select the default PIW.
 - b. For the address subtract the original Quick Designer Project I/O configuration dialog box "Inputs Start Address" from the value in the GP-Pro EX Name column. *Note: If the Quick Designer I/O Configuration is set to "Word Boundaries" multiply the Name column value x 2.*
 - c. Click on Enter.
 - d. Repeat steps a. to d. for each input word.

11. Output Words appear in the Name columns as QW** where ** is the PROFIBUS master address. The data type is Word Address.
 - a. Click on the address field to the right of the Name. Click on the button that appears. Select PLC1. Select the default PQW.
 - b. For the address subtract the original Quick Designer Project I/O configuration dialog box "Outputs Start Address" from the value in the GP-Pro EX Name column. *Note: If the Quick Designer I/O Configuration is set to "Word Boundaries" multiply the Name column value x 2.*
 - c. Click on Enter.
 - d. Repeat steps a. to d. for each output word.

Note: If the Quick Designer I/O Configuration is set to "Word Boundaries" or bytes are not swapped in the Quick Designer project the following steps for bit addressing are not expected to produce the correct results. Several scenarios are possible depending on the settings selected in Quick Designer and the PROFIBUS master configuration.

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12. Input Bits appear in the Name column as I**_* where the decimal point is replaced by an underscore separating the master PROFIBUS address and bit designation.
 - a. Click on the address field to the right of the Name. Click on the button that appears. Select PLC1. Select the default PI.
 - b. For the address subtract the original Quick Designer Project I/O configuration dialog box "Inputs Start Address" from the value to the left of the underscore in the GP-Pro EX Name column.
 - c. Enter a decimal point followed by the value to the right of the underscore in the Name column.
 - d. Click on Enter.
 - e. Repeat steps a. to e. for each input word.

 13. Output Bits appear in the Name column as Q**_* with the decimal point separating the master byte address and bit designation replaced with an underscore.
 - a. Click on the address field to the right of the Name. Click on the button that appears. Select PLC1. Select the default PI.
 - b. For the address subtract the original Quick Designer Project I/O configuration dialog box "Outputs Start Address" from the value to the left of the underscore in the GP-Pro EX Name column.
 - c. Enter a decimal point followed by the value to the right of the underscore in the Name column.
 - d. Click on Enter.
 - e. Repeat steps a. to e. for each input word.

Compare the Results

Compare a range of addresses in the GP-Pro EX with the original Quick Designer project to confirm the results of the address conversion are correct.

Warning: Be sure to carefully verify the final results for proper addressing and byte and bit orientation before operating machinery. Verify data exchanged between the PROFIBUS master device and GP-Pro EX is the correct value and in the expected location for each data type.

For more information on Pro-face and our full line of HMI, Operator Interface and Industrial PC products please visit our web site at www.profaceamerica.com.

For technical support email: support@profaceamerica.com or call: 800.289.9266.

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