Interfacing of Any PLC to Lab VIEW Using Modbus Protocol

Sunil Kr Singh Kushwaha, Ravi Kumar, Chanchal

Master of Technology in Electronics and Communication form Maharshi Dayanand University, Rohtak

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Abstract - *Lab VIEW is frameworks designing programming for applications that require test, estimation, and control with fast access to equipment and information experiences. Lab VIEW By National Instruments is very good graphical programming tool for Engineers.*

Lab VIEW can be interface may peripheral devices for getting data from surrounding, different type of sensors and other hardware. In this Paper we are showing interfacing of PLC to Lab VIEW software for our application.

1. INTRODUCTION

The Modbus modern convention was produced in 1979 to make correspondence conceivable between robotization gadgets. Initially executed as an application-level convention planned to exchange information over a serial layer, the convention has extended to incorporate usage over serial, TCP/IP, and the client datagram convention (UDP). Today, it is a typical convention utilized by innumerable gadgets for straightforward, solid, and proficient correspondence over an assortment of present day systems.

2. STUDY

We have studied about labview and an additional software VI package Manger. JKI Software's VI Package Manager (VIPM) makes utilizing and dispersing a NI LabVIEW add-on straightforward. With VIPM, it is anything but difficult to oversee and share reusable VIs over numerous undertakings, PCs, and groups of designers. The extra rearranges the way toward packaging your VIs and setting them up for conveyance.
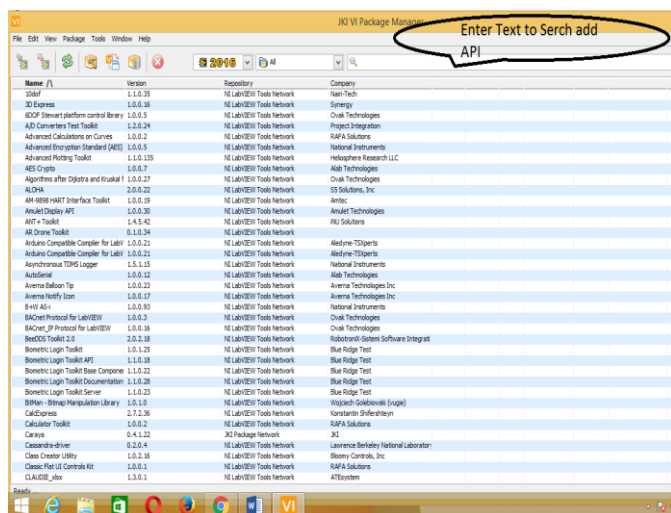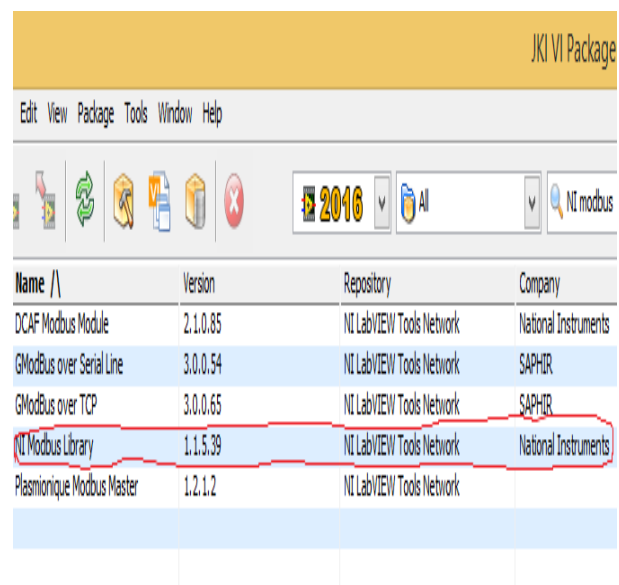

Fig.1 VI package manger

3. WORKING

Adding Modbus API to lab VIEW using VIPM this procedure can be followed:

1. First of all download the VIPM from the internet using the URL https://vipm.jki.net/get. Here you get free as well as paired software. Just download the free version of the VIPM.

2. Then install the VIPM to the computer.

3. After installing the VIPM you have to open the VIPM which is open like fig.1

4. Now search for NI Modbus library in the search box. Then select NI Modbus Library. And install it. When you install it automatically opens the labview. If your computer does not have labview developing system then it will not installed. For installing it you have to install labview first.

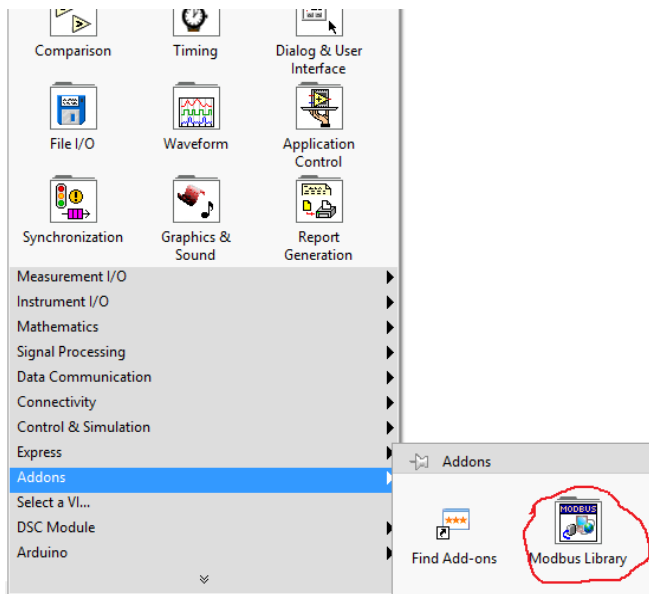**Fig.2 Installing NI Modbus library**

Fig3. Modbus library I function pallet

5. When it installed successfully the Modbus APIs are automatically comes in function pallet in addons

Now you are ready for controlling and monitoring the PLC data like Memory and registers.

Now every PLC have some standard communication protocols and communication address. All the memory coils and registers in the PLC have a unique address. By using this address labview and PLC can be easily interfaced.

These communication protocols can be obtained from the Manufacturer of PLC or it may be available on the Website of the Programmable logic control.

4. COMMUNICATION (**Delta plc with Lab VIEW**)

As demonstration we are going to communicate delta PLC with Lab view. First of all we have to download the communication protocols of the delta PLC from the website of delta. It will be a document file and contains the list of address of memories and data resisters. As we can see that all the given address are in the Hexadecimal. So in the programming we have to use them by changing in decimal form.

1. For this task the block diagram is shown in fig. Now there are some steps of programming to read and write data to the PLC.
2. Open the labview and create a new VI.
3. Now in functional block diagram window select create Modbus instance by using the address addon>Modbus library>Master API>create Modbus instance.

Now suppose that we want to turn ON M0 and want to monitor status of M1. And also want to read the data register D0 and want to write the register D1.
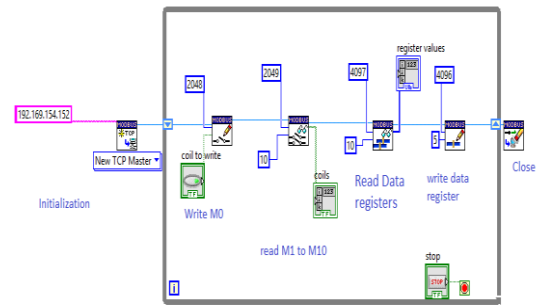

Fig.4: Main Block diagram for reading and writing data

Device	Range	Type	Address
S	000~255	bit	0000~00FF
S	246~511	bit	0100~01FF
S	512~767	bit	0200~02FF
S	768~1023	bit	0300~03FF
X	000~377 (Octal)	bit	0400~04FF
Y	000~377 (Octal)	bit	0500~05FF
T	000~255	bit/word	0600~06FF
M	000~255	bit	0800~08FF
M	256~511	bit	0900~09FF
M	512~767	bit	0A00~0AFF
D	000~256	word	1000~10FF
D	256~511	word	1100~11FF
D	512~767	word	1200~12FF
D	768~1023	word	1300~13FF

Table.1: Delta PLC communication Address

Explanation of block diagram:

1. First step is the initialization of the Modbus instance or can be called reference. While initializing the instance we have to choose one mode of communication such that new TCP master OR slave. The TCP is for communication by Ethernet and we have to provide IP address of the slave device Address.
2. If you are communicating by RS232 serial port then you have to select New serial Master or Slave. If you have select serial master then you have to provide VISA resource name as Slave device. While using the serial master make sure that you have install NI-VISA 16.0 driver to your computer. Otherwise it does not works and does

not shows and virtual COM Ports while you add VISA resource to the VI.

3. Now after that in the second step the added VI is to write single coil. 2048 is the address of M0. It can be seen from the table where Address for the MO starts from 800 in HEX. If we convert it in decimal then we get 2048.

4. Similarly the third VI is for reading the coils. It reads multiple coils and we have to provide starting device address and number of devises. it gives Array of the Boolean.

5. The fourth VI is for Reading multiple data register. From the table we can see that the Address of the D0 is 1000 in HEX. When we convert it into decimal then we get 4096. So the address of D0 will be 4097 and address of D1 will be 4097 in decimal format.

6. Similarly the last VI id for writing the single register. It writes in data register D0 of the PLC and value to be write is 5.

7. The last VI is for closing Modbus instance.

8. For running continually and control and monitoring continually we put a while loop for reading and writing VI.

5. CONCLUSIONS

As we are trying to communicate our PLC to Lab VIEW is now working correctly. Now if run our Lab VIEW program by RUN button provided on Program. When we RUN the VI anyone can able to access the PLC data.

ACKNOWLEDGEMENT

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BIOGRAPHIES

Er. Sunil Kumar Singh Kushwaha (Automation Engineer at Comapl Electronic)
BTech From EI-UPTU 2015
MTech From EC-MDU 2017

Er Ravi Kumar
(Automation Engineer at Autotest Mechnism)
BTech From EI-UPTU 2015
MTech From EC-MDU 2017

Chanchal
(Electronics Engineer at Dixon Technologies)
BTech From EC-UPTU
MTech From EC-MDU 2017