

Lean Automation Pack

Quick Start Guide



Models 187, 373 and 746

Introduction:

This document describes the procedure to setup the LAP187, LAP373, LAP746. The LAP consists of a HMI, a PLC, an AC Drive, Software and Accessories. The purpose of the document is to provide a configuration procedure, a working example, and a list of all hardware and tools required for assembly. The user can utilize the wiring diagrams and programs as a starting point to develop specific applications.

If you have any questions regarding assembly or operation of the Lean Automation Pack, please call:

1-800-556-6766, USA, Canada and Mexico
ia.techsupport@omron.com

A summary section at the end of this document provides a list of software reference materials and optional items. More detailed information is found on the LAP-RESOURCE-DVD.



WARNING

Warning when connecting the power source:

1. **Always** turn **OFF** the power source or unplug the power cord to the Unit before attempting to connect or wire the cables, connect or disconnect the connectors.

Warning - electric shock may occur:

1. Do not touch any of the terminals or terminal blocks while the power is being supplied. Doing so may result in electric shock.
2. Do not attempt to disassemble, repair, or modify any Units. Any attempt to do so may result in malfunction, fire, and electric shock.

All wiring must be performed by a qualified electrical technician in accordance with local and national electrical codes.

LAP187 Bill of Material:

LAP187 Bill of Materials		
Qty	Part Number	Description
1	NV3Q-SW21	NV HMI, 3.6", COLOR, SD CARD
1	XW2Z-200T-3	NV TO PLC CABLE, 2M., FLYING LEADS
1	CP1L-M30DT1-D	CP1L PLC, 10K USER MEMORY
1	CP1W-CIF01	CP1L/H RS-232C COMM. MODULE
1	3G3MX2-AB002	MX2, AC DRIVE, 1/4HP, 1PH, 220VAC
1	S8JX-G05024CD	50W. POWER SUPPLY, 100-240VAC IN.
1	USBAB6BLK	USB CABLE, BLACK, 2M.
1	LAP-RESOURCE-DVD	LAP RESOURCE LIBRARY DVD
1	LAP-ACDRIVE-QSG	LAP 187, 373, 746 QUICK START GUIDE
1	OMR-SCRW	OMRON MICRO FLAT SCREWDRIVER
1	CXONE-LT01C-V4	CXONE-LITE SOFTWARE SUITE
1	USB-MINIUSB	USB TO MINI-USB CABLE, 2M.

LAP373 Bill of Material:

LAP373 Bill of Materials		
Qty	Part Number	Description
1	NV3Q-SW21	NV HMI, 3.6", COLOR, SD CARD
1	XW2Z-200T-3	NV TO PLC CABLE, 2M., FLYING LEADS
1	CP1L-M30DT1-D	CP1L PLC, 10K USER MEMORY
1	CP1W-CIF01	CP1L/H RS-232C COMM. MODULE
1	3G3MX2-AB004	MX2, AC DRIVE, 1/2HP, 1PH, 220VAC
1	S8JX-G05024CD	50W. POWER SUPPLY, 100-240VAC IN.
1	USBAB6BLK	USB CABLE, BLACK, 2M.
1	LAP-RESOURCE-DVD	LAP RESOURCE LIBRARY DVD
1	LAP-ACDRIVE-QSG	LAP 187, 373, 746 QUICK START GUIDE
1	OMR-SCRW	OMRON MICRO FLAT SCREWDRIVER
1	CXONE-LT01C-V4	CXONE-LITE SOFTWARE SUITE
1	USB-MINIUSB	USB TO MINI-USB CABLE, 2M.

LAP746 Bill of Material:

LAP746 Bill of Materials		
Qty	Part Number	Description
1	NV3Q-SW21	NV HMI, 3.6", COLOR, SD CARD
1	XW2Z-200T-3	NV TO PLC CABLE, 2M., FLYING LEADS
1	CP1L-M30DT1-D	CP1L PLC, 10K USER MEMORY
1	CP1W-CIF01	CP1L/H RS-232C COMM. MODULE
1	3G3MX2-AB007	MX2, AC DRIVE, 1HP, 1PH, 220VAC
1	S8JX-G05024CD	50W. POWER SUPPLY, 100-240VAC IN.
1	USBAB6BLK	USB CABLE, BLACK, 2M.
1	LAP-RESOURCE-DVD	LAP RESOURCE LIBRARY DVD
1	LAP-ACDRIVE-QSG	LAP 187, 373, 746 QUICK START GUIDE
1	OMR-SCRW	OMRON MICRO FLAT SCREWDRIVER
1	CXONE-LT01C-V4	CXONE-LITE SOFTWARE SUITE
1	USB-MINIUSB	USB TO MINI-USB CABLE, 2M.

Note: Please check the contents of your Lean Automation Pack and verify all parts are present.

Additional tools and materials required to complete assembly of the Lean Automation Pack:

- Small standard screwdriver
- Medium Phillips screwdriver
- Wire strippers
- AWG14 gauge wire for power and ground connections
- AWG20 gauge wire for 24vdc power and control connections

Control System Wiring for LAP187, 373 and 746

Please refer to the connection diagram on the following page.

A. Begin with the wiring of the 3G3MX2 AC Drive.

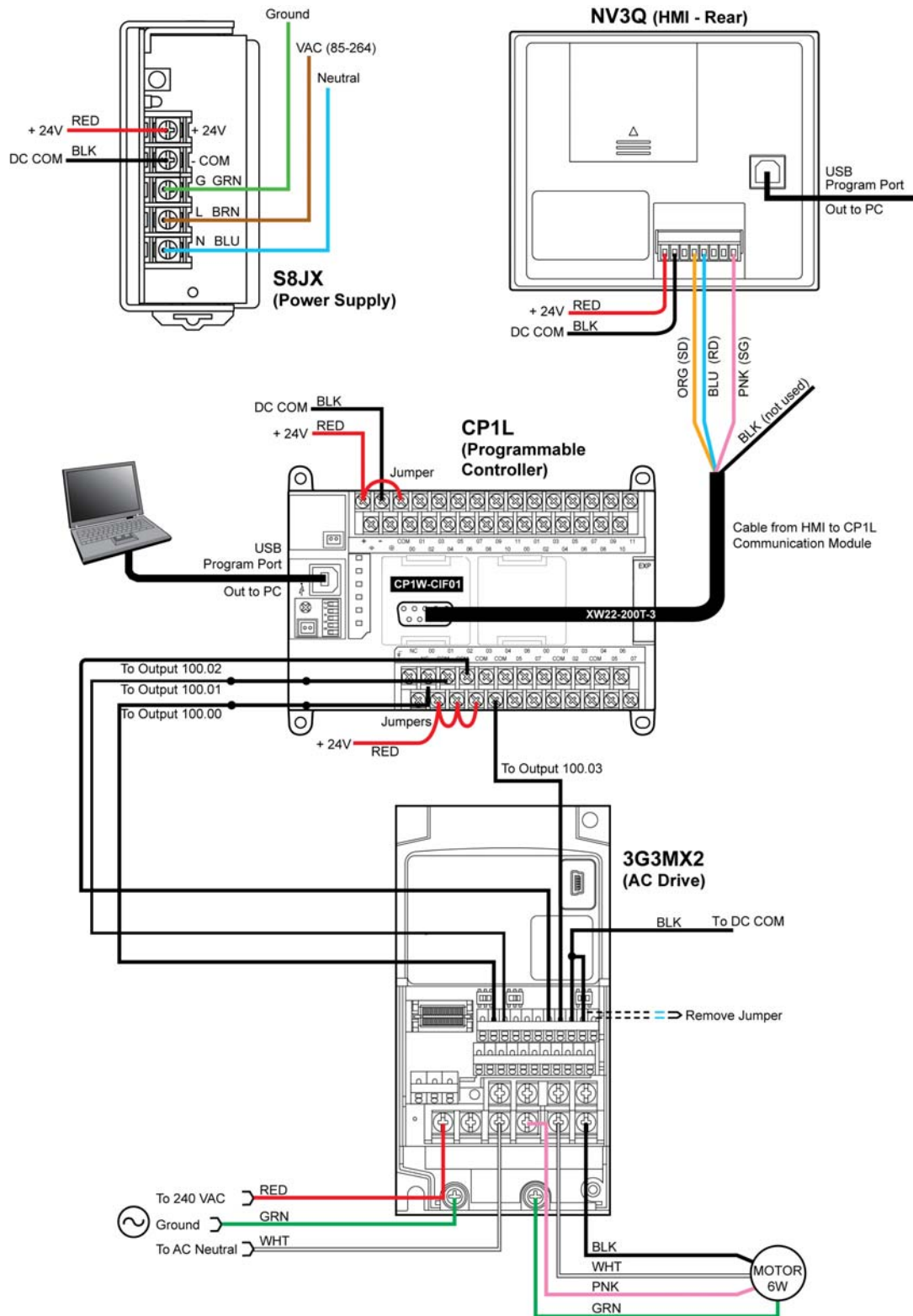
1. Terminal connections with AWG20 gauge wire:
 - a. Remove the jumper between terminals PSC and P24.
 - b. Connect 3G3MX2 input terminal S7 to PLC output terminal 100.00.
 - c. Connect 3G3MX2 input terminal S6 to PLC output terminal 100.01.
 - d. Connect 3G3MX2 input terminal S2 to PLC output terminal 100.02.
 - e. Connect 3G3MX2 input terminal S1 to PLC output terminal 100.03.
 - f. Connect 3G3MX2 terminals PSC & SC to -V terminal of the S8JX Power Supply.

B. Wire the PLC, HMI and power supply:

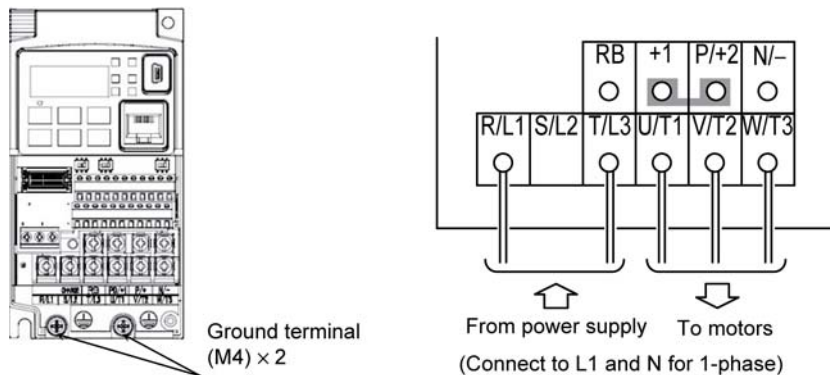
1. The CP1W-CIF01 must be installed in the leftmost Option Board position on the PLC. First, remove the left cover and insert CP1W-CIF01 in the orientation shown on the next page.
2. Using Red 20AWG wire, jumper the three COM outputs of PLC terminals as shown in the following page. To supply DC power to the output commons connect one longer wire to the +V terminal on the S8JX Power Supply.
3. Using Red 20AWG wire, connect the 24VDC + input terminal of the PLC and 24VDC + terminal of the HMI to the +V terminal of the S8JX Power Supply. Jumper the 24VDC + input terminal of the PLC to the input COM.
4. Using Black 20AWG wire, connect 24VDC – terminal of PLC and the 24VDC - terminal of the HMI to the -V terminal of S8JX Power Supply.
5. Connect leads from the gray cable XW2Z-200T-3 to the HMI terminal as shown on the following page. Plug this cable into the serial port on the PLC (CP1W-CIF01). Note - the black wire lead is not used.
6. Connect your grounded AC power cord to the S8JX Power Supply, plug into an AC power outlet.

Lean Automation Pack 187, 373 and 746 – Connection Diagram

Wire the LAP as per the drawing below. **Be sure to remove the Jumper between PSC and P24 on the 3G3MX2.**



- Before wiring the 3G3MX2 power circuits, refer to the 3G3MX2 Operations Manual section 2-1 Safety Precautions and Installation.
- Follow safe wiring practices as outlined in your local electrical code. Always provide a Means of Disconnect and Short circuit protection for each 3G3MX2 installation. Overload protection is provided in the 3G3MX2. Later in the procedure, be sure to set 3G3MX2 parameter **B012** to the motor full load current found on the nameplate.
- Some States and Provinces require that by law, a licensed electrician install power circuits, be sure to follow local laws and safety practices.



Step-by-Step Procedure **to download program to PLC (CP1L), HMI (NV3Q) and AC Drive (3G3MX2)**

CXONE-Lite software suite of programming tools is needed to program all of the components of this system. Install CXONE-Lite software by inserting Disk 1 into your computer and follow the on-screen prompts. The application software used to program the NV3Q is NV-Designer, the application software used for the CP1L is CX-programmer, and the application software used to program the 3G3MX2 is CX-Drive.

Step 1

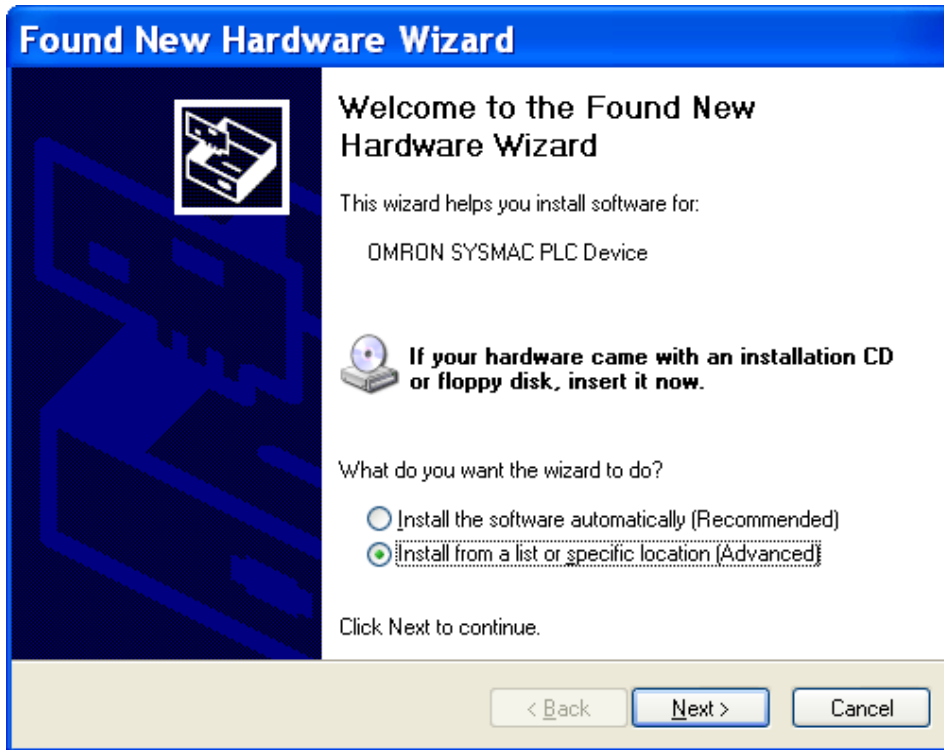
- Follow if this is the first time using CXONE software, if not go to Step 2.
Insert CXONE-Lite installation disk 1 into PC and follow on-screen prompts to load software.

Step 2

- Install the PLC USB communication driver program, if already installed, go to Step 3.

A - Power up the CP1L controller and computer.
B - Connect computer to CP1L via USB cable (provided).

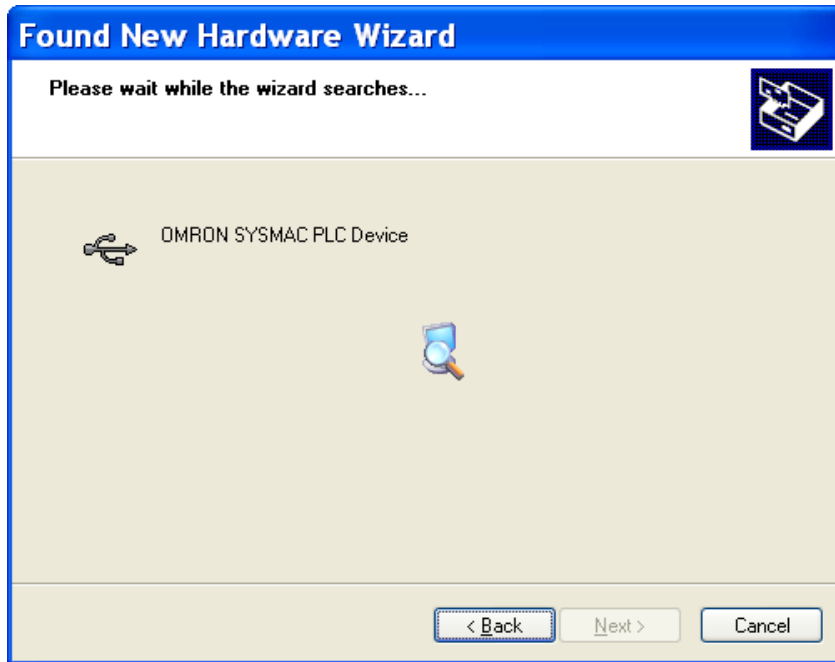
C - Select 'Install from a list or specific location (Advanced)' and click 'Next'.



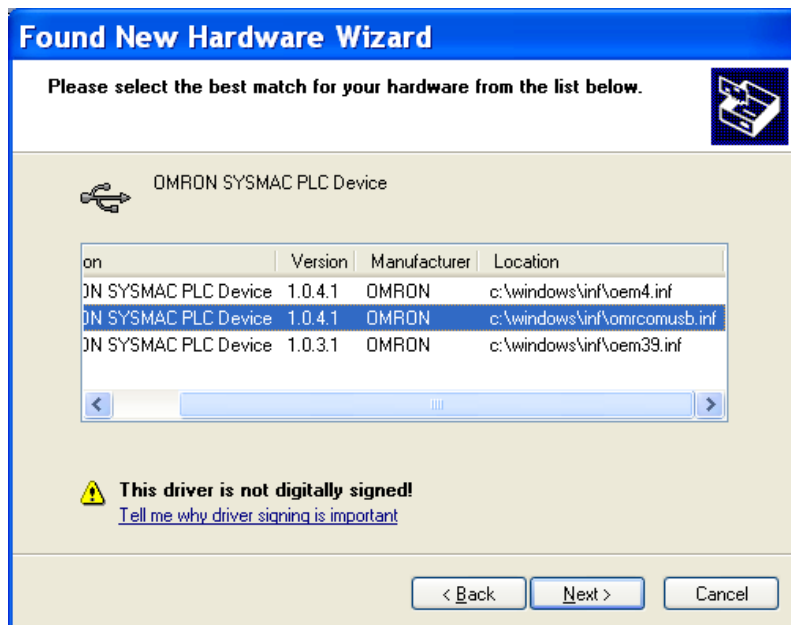
- 'Browse' to the following path:
- C:\Program Files\OMRON\CX-Server\USB\Win2000_XP\Inf
- Then click 'Next'.



- The following windows will pop-up to search for the suitable driver.

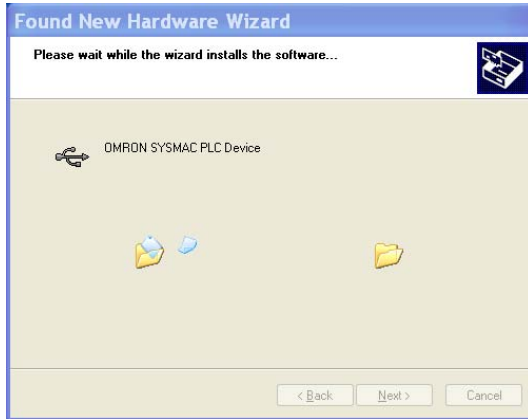


- If this window appears select the 'omrcomusb.inf' and click 'Next'.

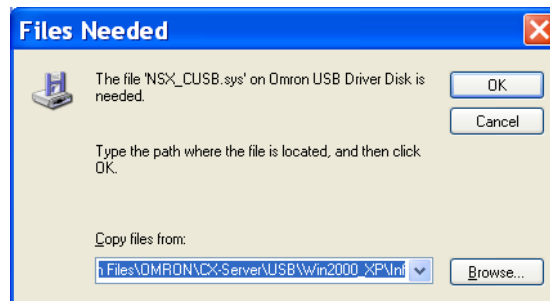


- Hardware Wizard is installing the device driver.

Click 'Continue Anyway'.



- 'Browse' to the following path: C:\Program Files\OMRON\CX-Server\USB\Win2000_XP\Inf
- Then click 'OK' (this step is only required if the USB Driver is not present, path may differ from below).

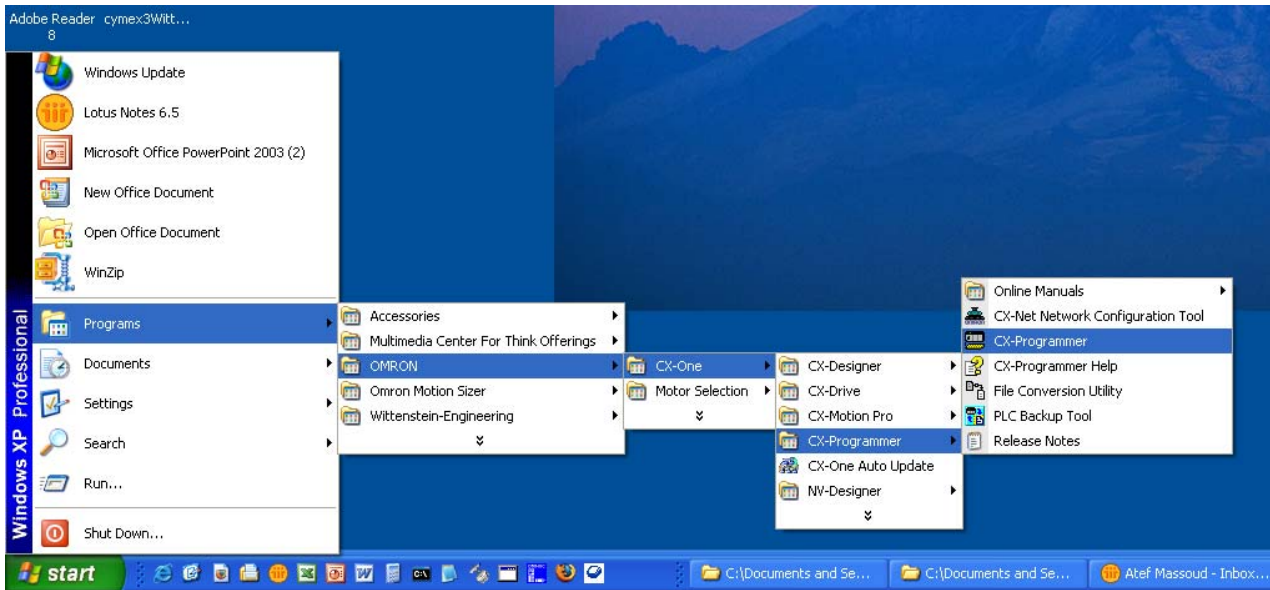


- Click 'Finish' to complete installation.



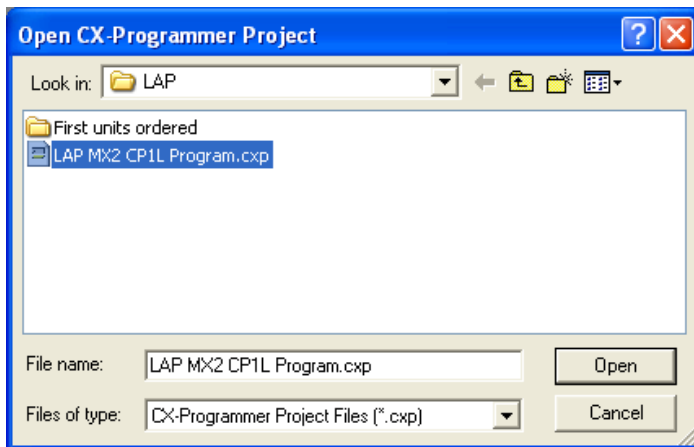
Step 3: CP1L Program Installation

- Start the application 'CX-Programmer'
 - Go to Windows 'Start' menu and Select . . . Programs > OMRON > CX-One > CX-Programmer, , as shown on the following window.



Step 4:

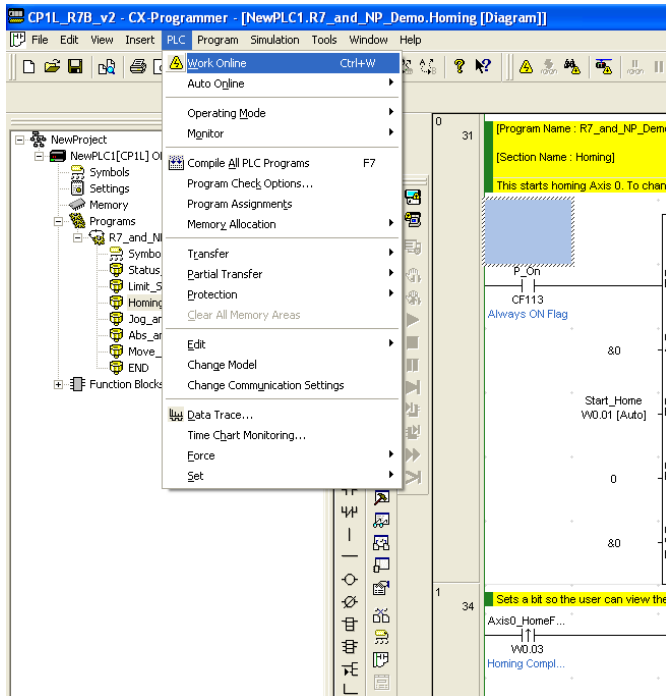
- Insert LAP Resource DVD
- Open the supplied CP1L program in CX-Programmer by selecting 'File' in the Menu bar and then Selecting 'Open'.
- The next window will open, *path may differ*, Select the CP1L Program (*LAP MX2 CP1L Program.cxp*).



- Click 'Open'.
The CX-Programmer software will open and display the Project.

Step 5:

- Go on-line using CX-Programmer. Select 'PLC' from the menu bar and select 'Work online'.

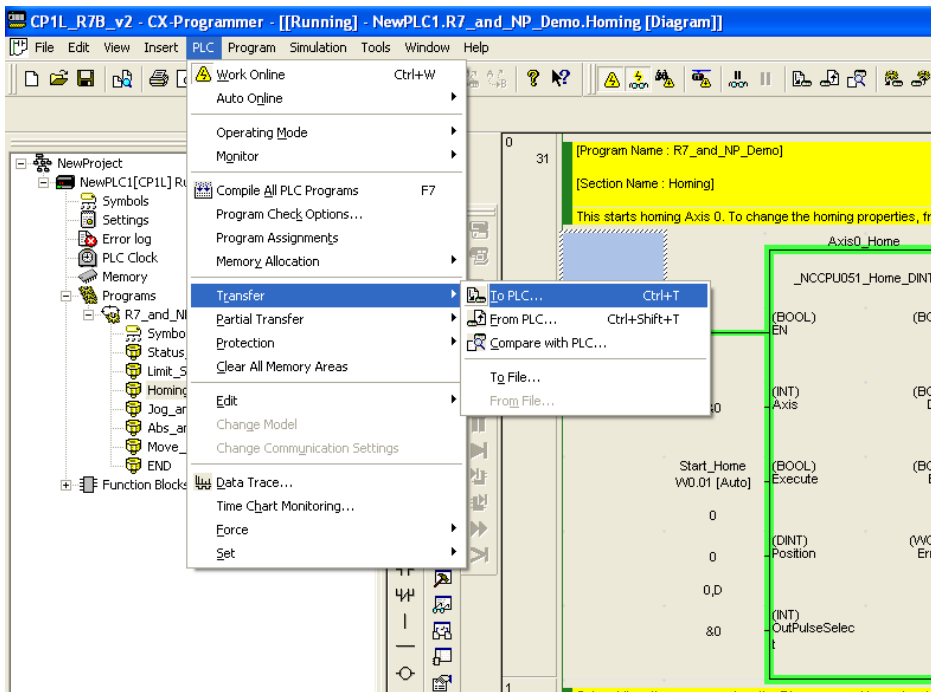


- Click 'Yes'.

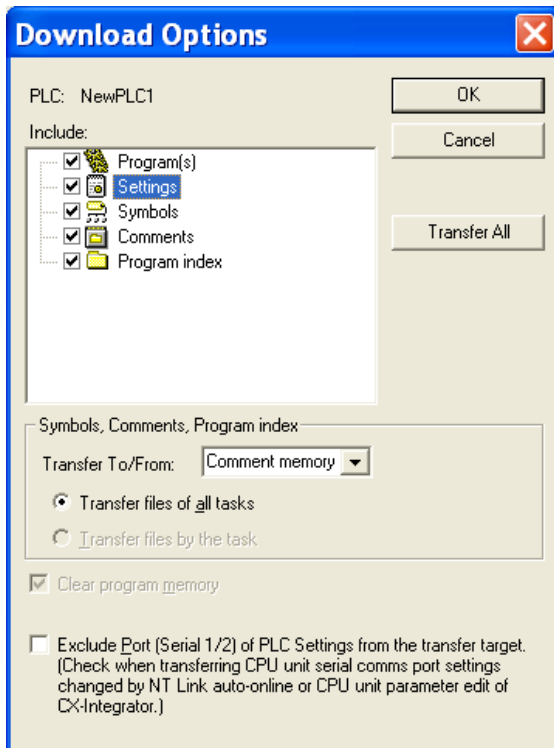


Step 6:

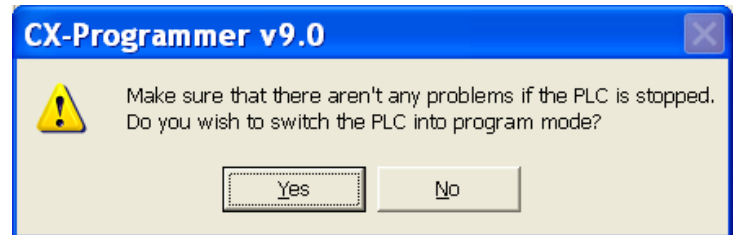
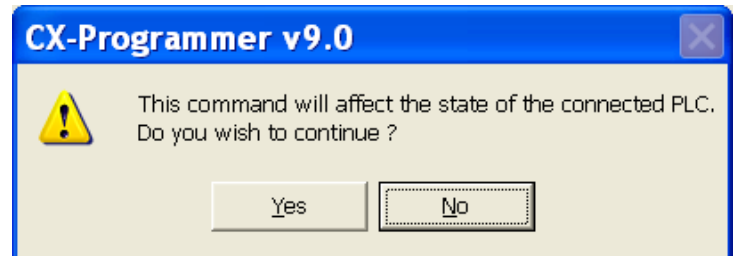
- Download the CP1L program.
- In the menu bar go to 'PLC', select 'Transfer' then select 'To PLC'.



- Check all boxes and click OK.

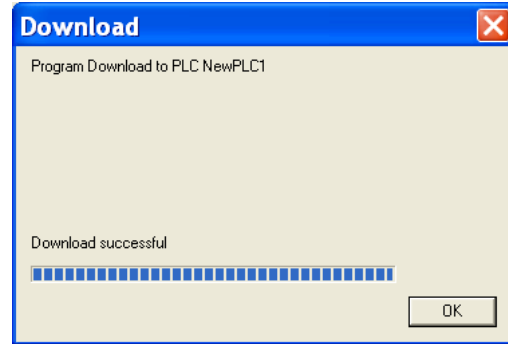
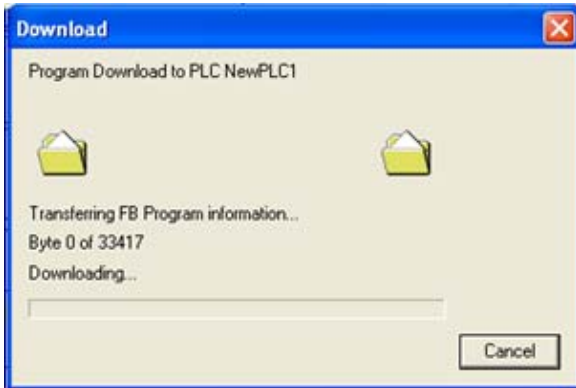


- Click 'Yes' on the following windows.



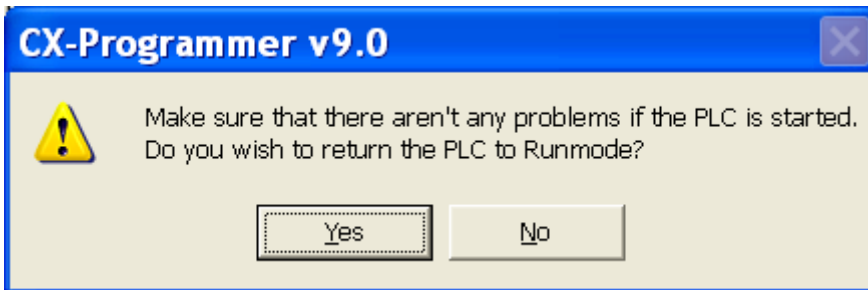
- You will see the downloading progress.

Click 'OK' on the following window.

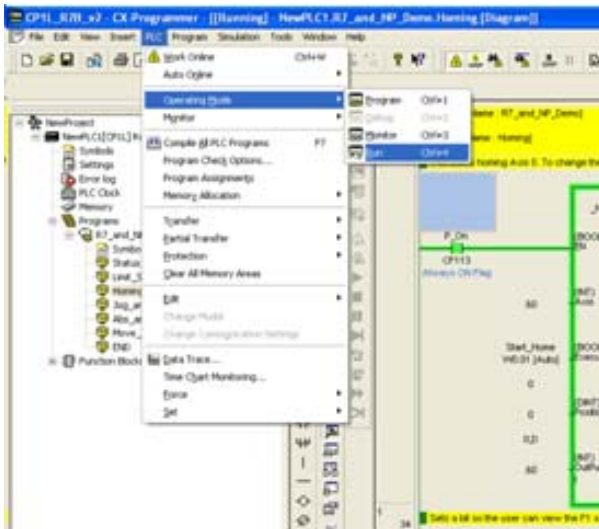


Step 7:

- Put the CP1L in run mode.
- Click 'Yes' on the following window to put the PLC to run mode.



- You can also put the PLC in run mode by going to the menu bar select 'PLC', 'Operating Mode', and then select 'Run' as shown on the following window.



Step 8:

- Close CX-Programmer. Chose 'Do Not Save File'.

Step 9:

- Download the NV USB communication driver. If already installed go to step 10.
- Connect the computer to the NV3Q via USB cable (provided) and power up NV3Q.



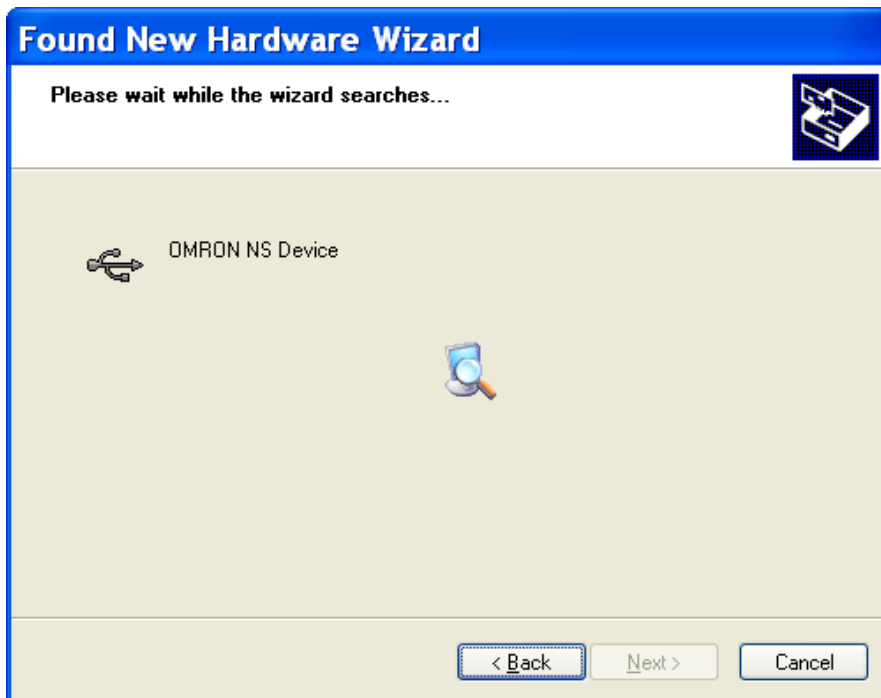
- Select 'Install from a list or specific location (Advanced)' and click 'Next'.



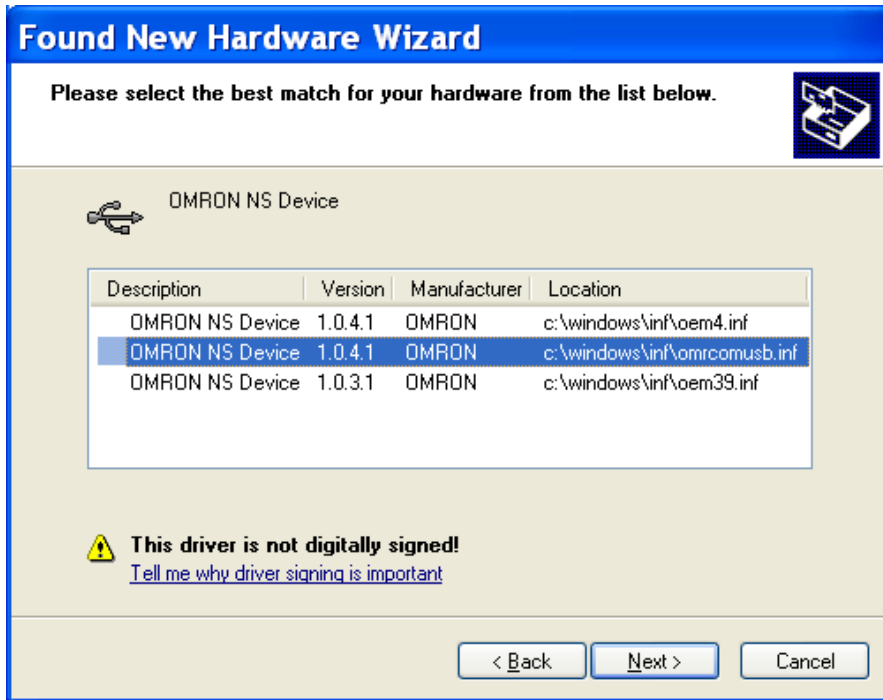
- 'Browse' to the following path (*path may differ from below*):
C:\Program Files\OMRON\CX-One\NV-Designer\USB\Inf
Then click 'Next'.



- The following window will pop-up while searching for the suitable driver.



- Select 'omrcomusb.inf' and click 'Next'.



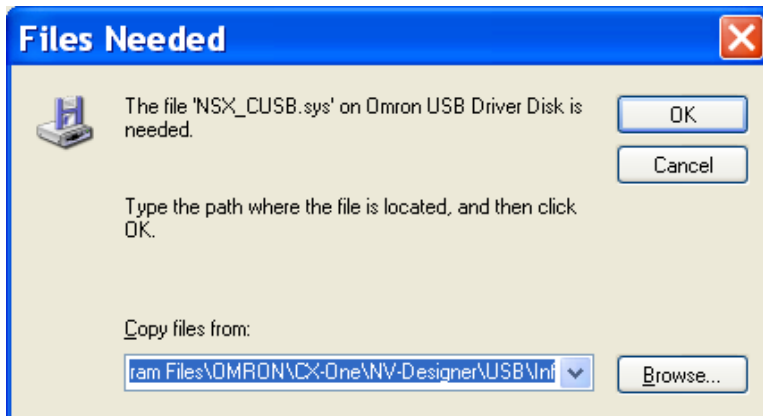
- The Hardware wizard is installing the device driver.



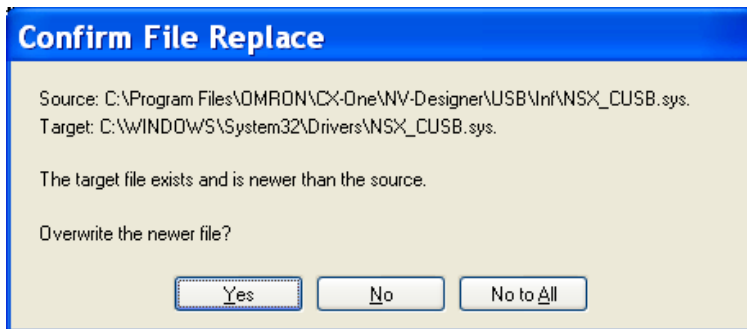
- Click 'Continue Anyway'.



- 'Browse' to the following path: C:\Program Files\OMRON\CX-One\NV-Designer\USB\Inf Then click 'OK'.



- If the window below appears click 'No'.

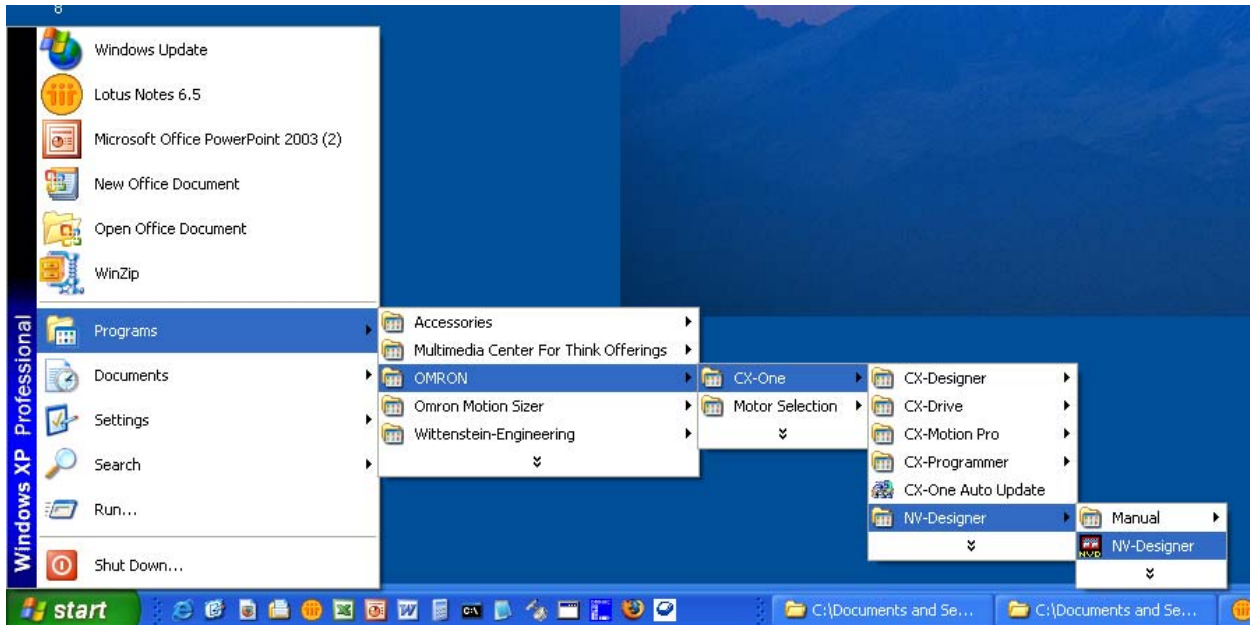


- Click 'Finish'.



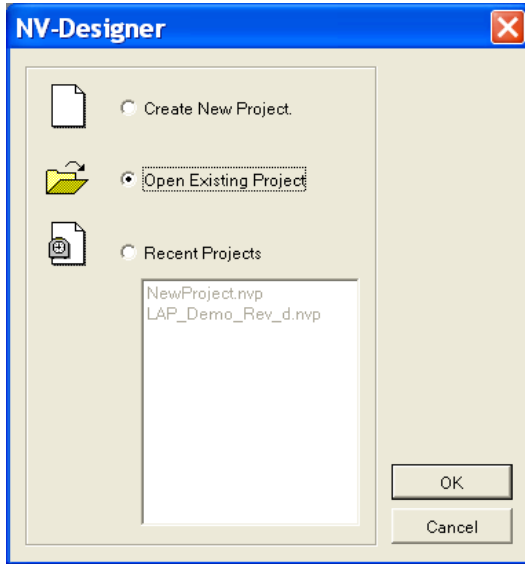
Step 10:

- Start NV-Designer.
- Go to Windows 'Start' > Programs > Omron > CX-One > NV-Designer > NV-Designer.

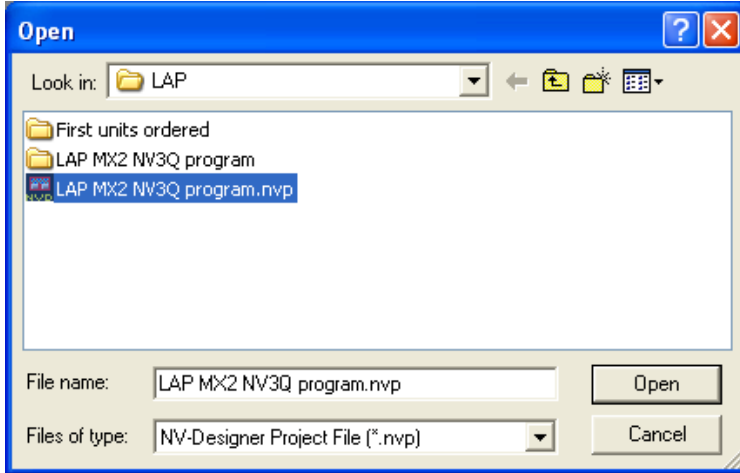


Step 11:

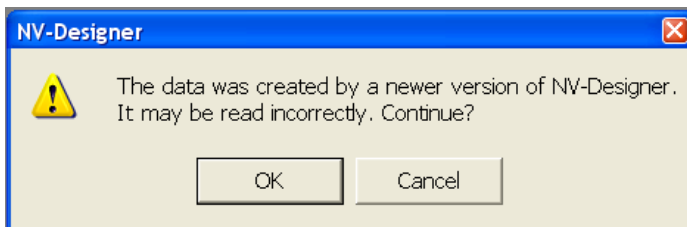
- Open the supplied NV3Q program.
- You can select 'Open Existing Project' and click 'OK'.



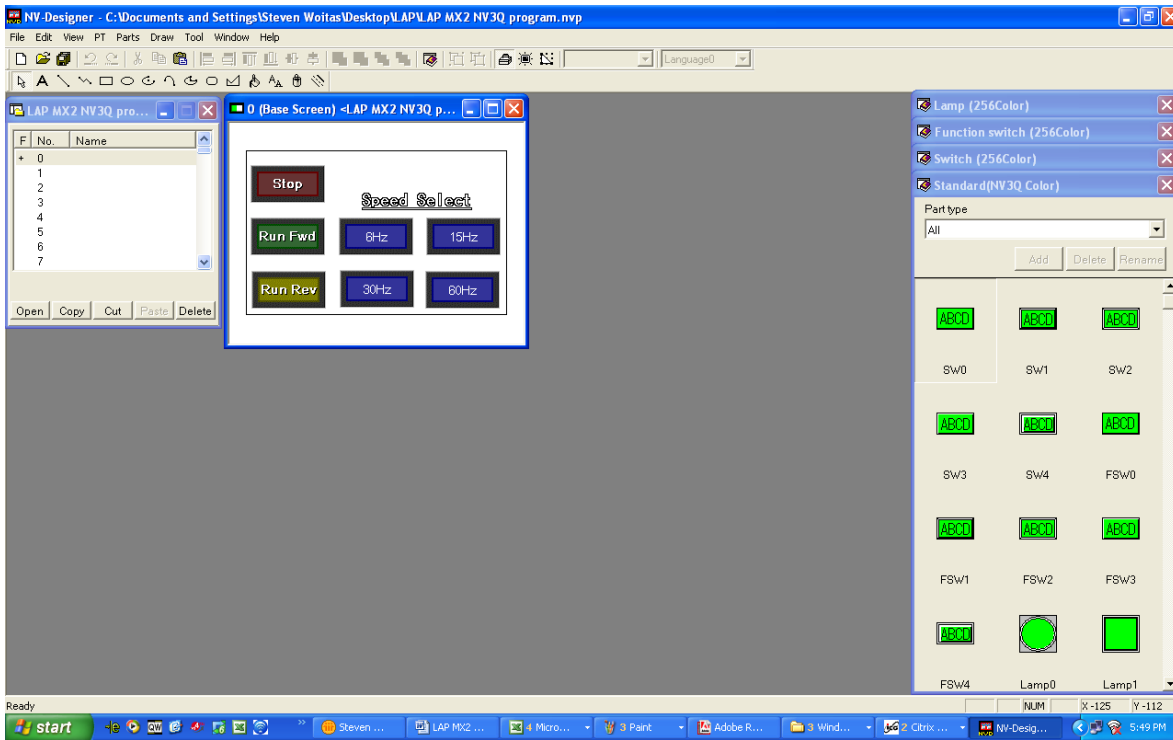
- At the top menu bar select File and 'Open' (LAP 3G3MX2 NV3Q Program), *path may differ from below.*



- If you see this warning select 'OK'.

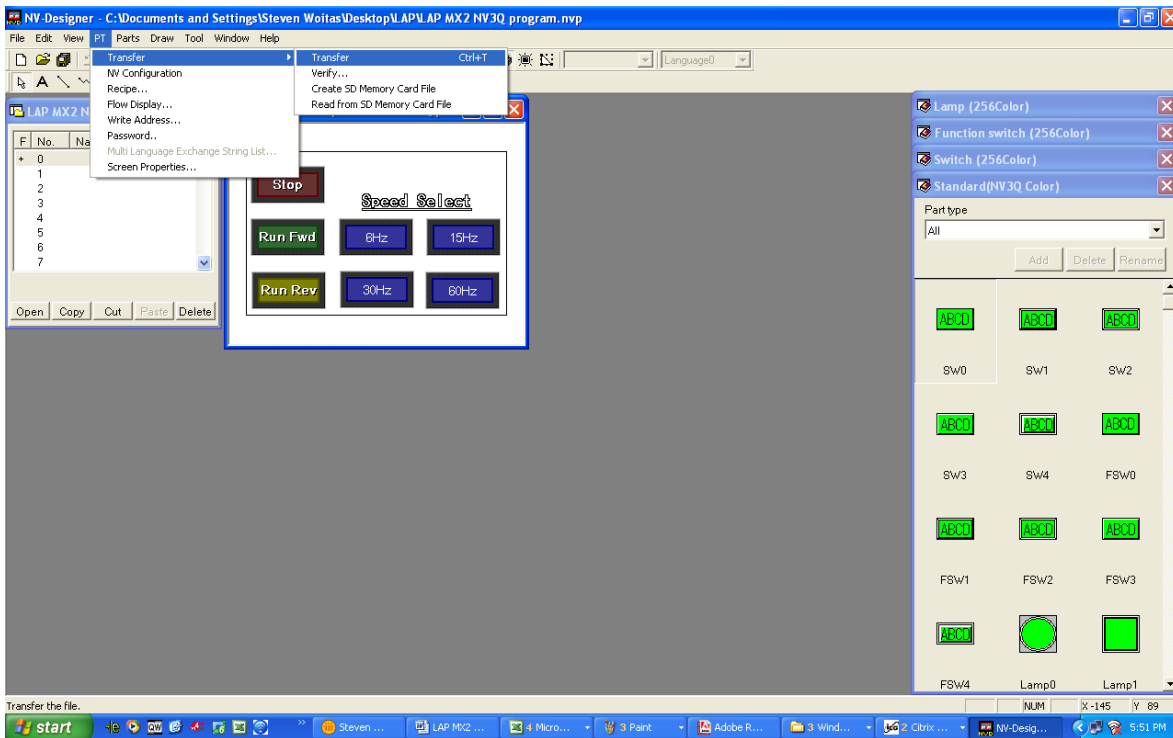


- Double click on screen '0' to view base screen.

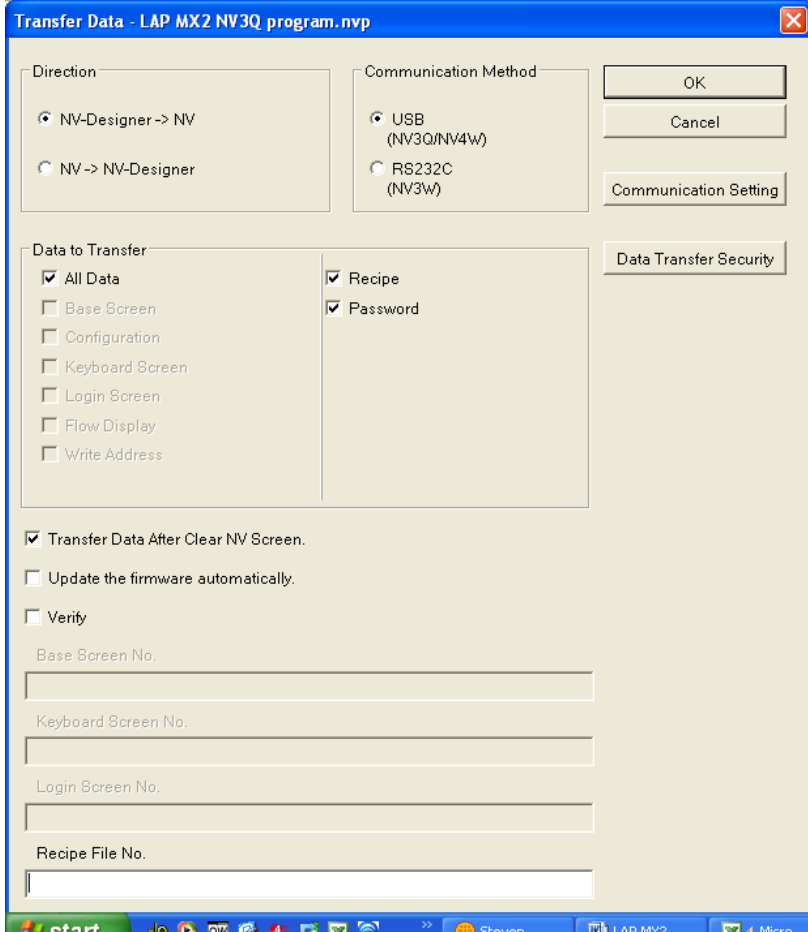


Step 12:

- Download the NV3Q program.
From the top menu select, PT > Transfer > Transfer.



- A 'Transfer Date' window will open.
- In 'Direction' select 'NV-Designer->NV'.
- In 'Communication Method' select 'USB'.
- In 'Data to Transfer' select 'all Data', 'Recipe' and 'Password'.
- Select 'Transfer Data After Clear NV Screen' and click 'OK'.



- The transfer procedure will take a minute. The NV3Q will be cleared and the NV3Q will display 'Transferring PC > NV' NV3Q will then re-boot.
- When the process is complete, you will see your screen as below.

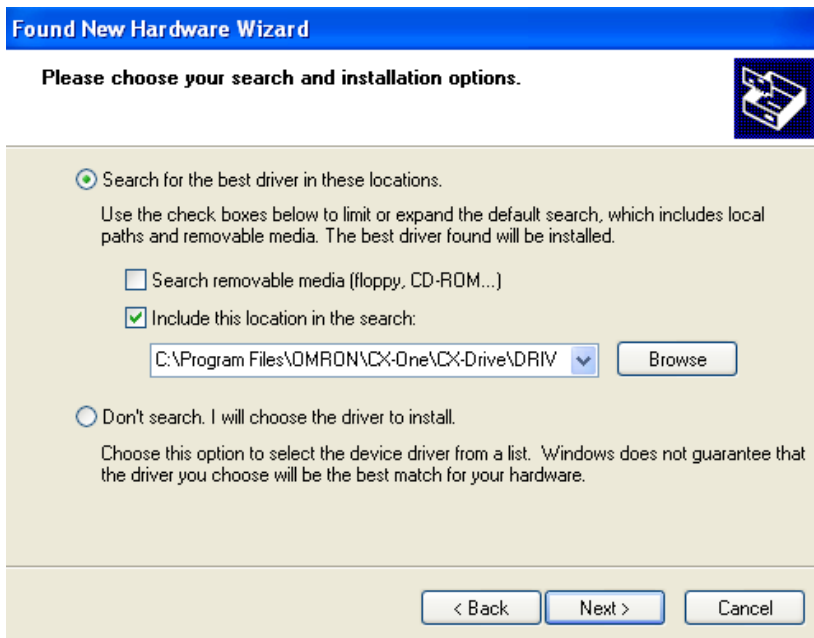


- Close NV-designer.

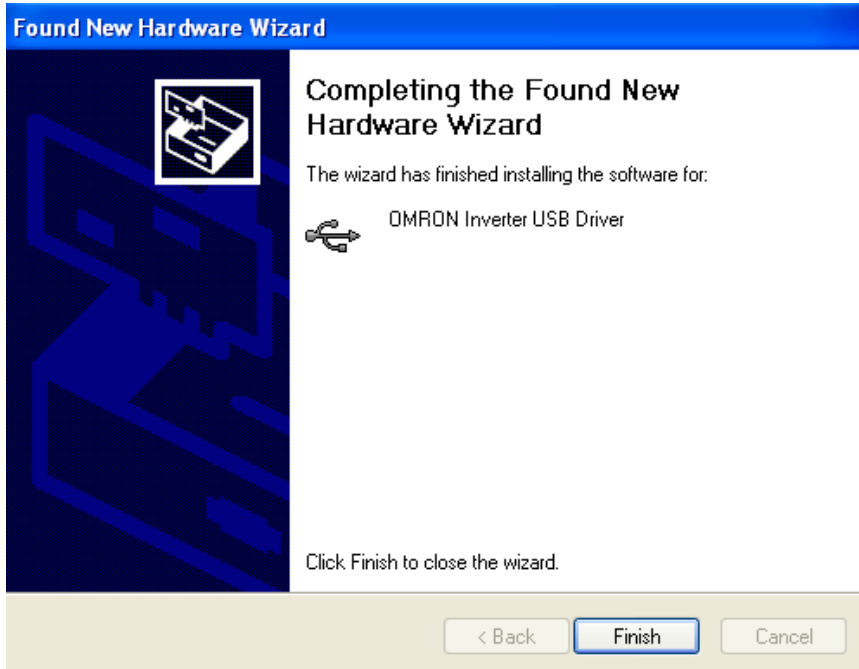
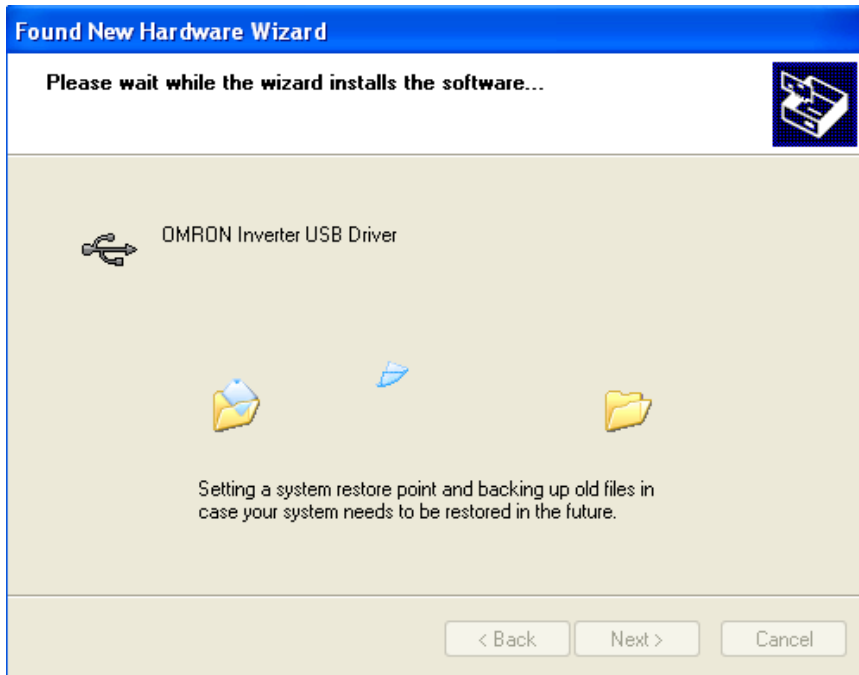
- Plug-in USB cable from your computer to the 3G3MX2 AC Drive.
To access the 3G3MX2 mini-USB, peel back the tab on the front of the unit.
- Select 'Install from a list or specific location (Advanced)'



- Browse to the following location
C:\Program Files\ OMRON\ CX-One\ CX-Drive\ DRIVERS \3G3MX2 \Driver
Click 'Next'.





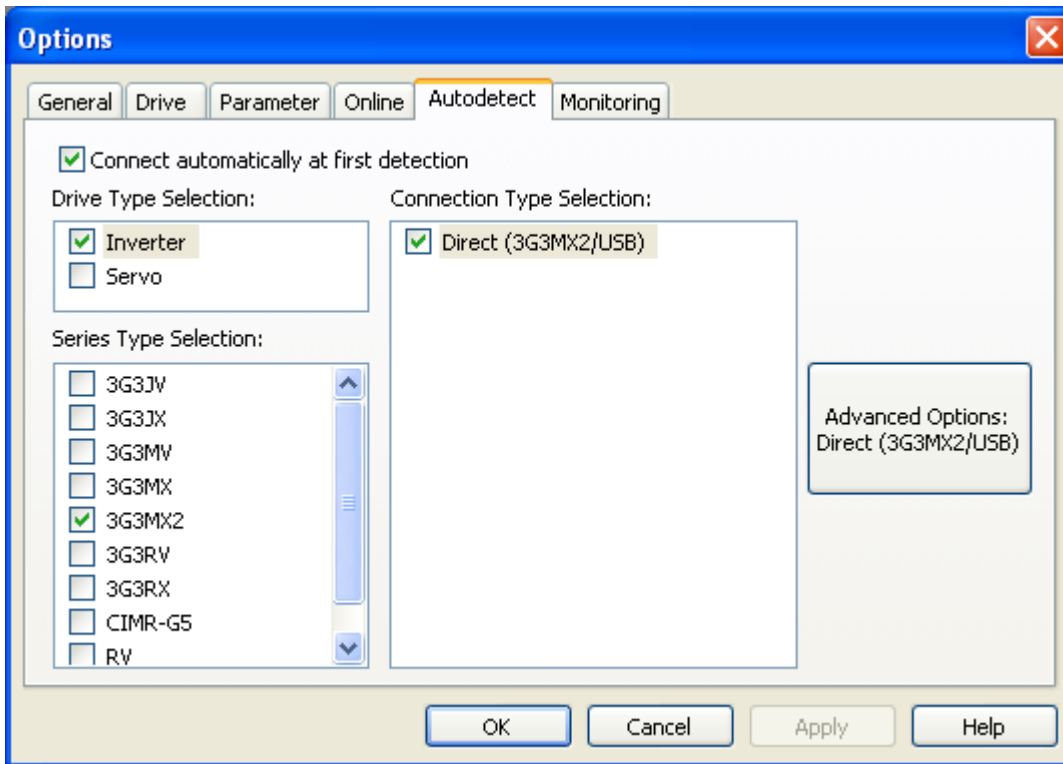
- The Hardware Wizard is installing the Device Drive.



- Click 'Finish'.

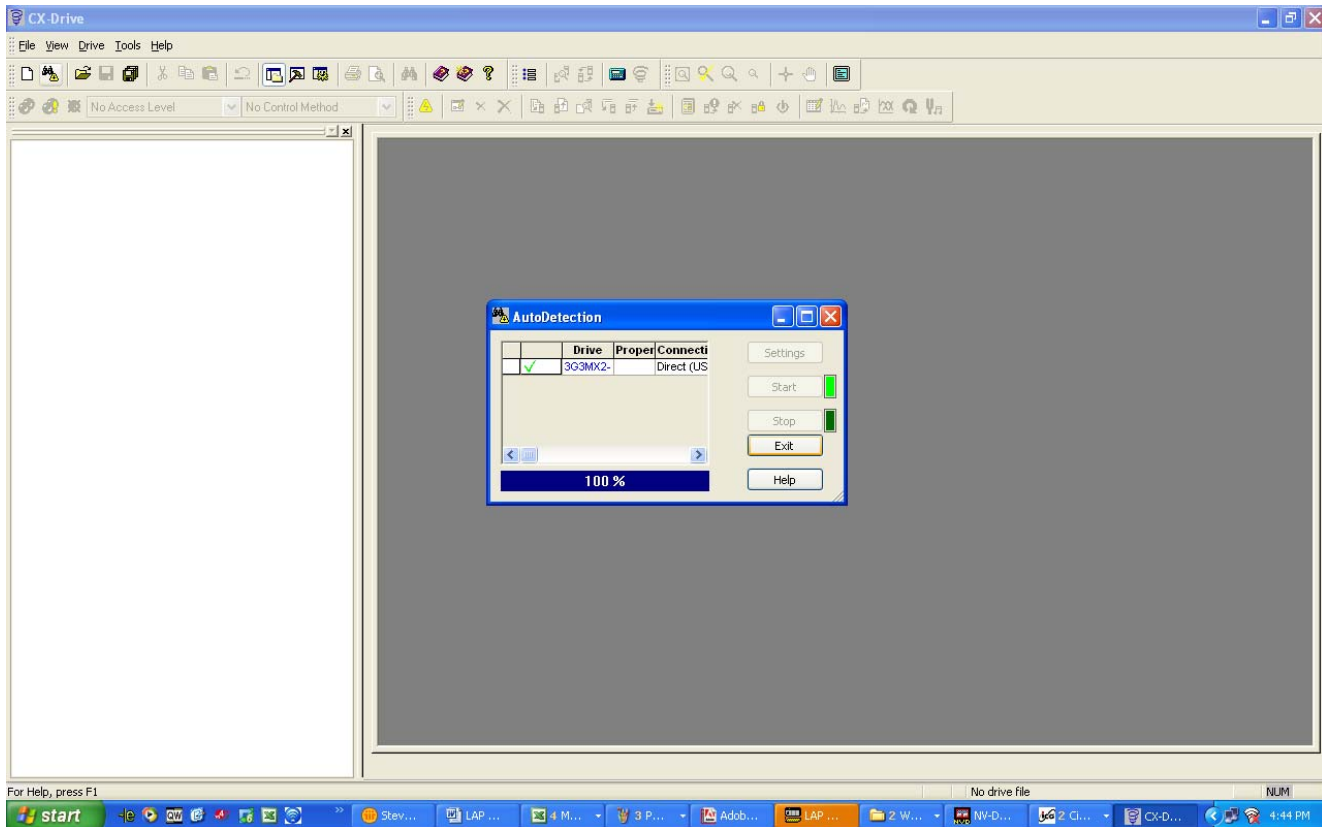
Step 13: 3G3MX2 Parameter Installation

- Apply Line power to the 3G3MX2.
- Start the application 'CX-DRIVE'.
 - Start, ALL Programs, Omron, CX-ONE, CX-Drive, 
- At the top menu of CX-Drive select 'Drive', then 'Autodetect options' 



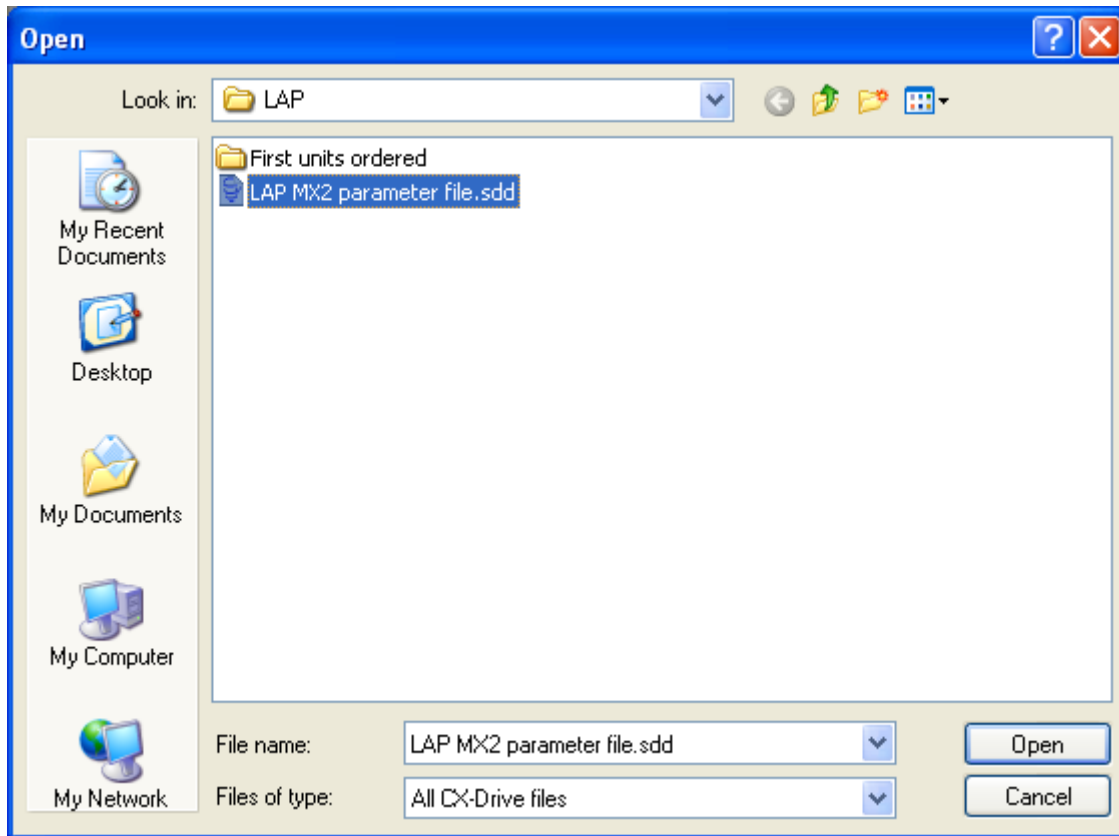
- Make the options screen appear as above, click 'OK'.

- At the top menu select 'Drive > Auto Detect'.

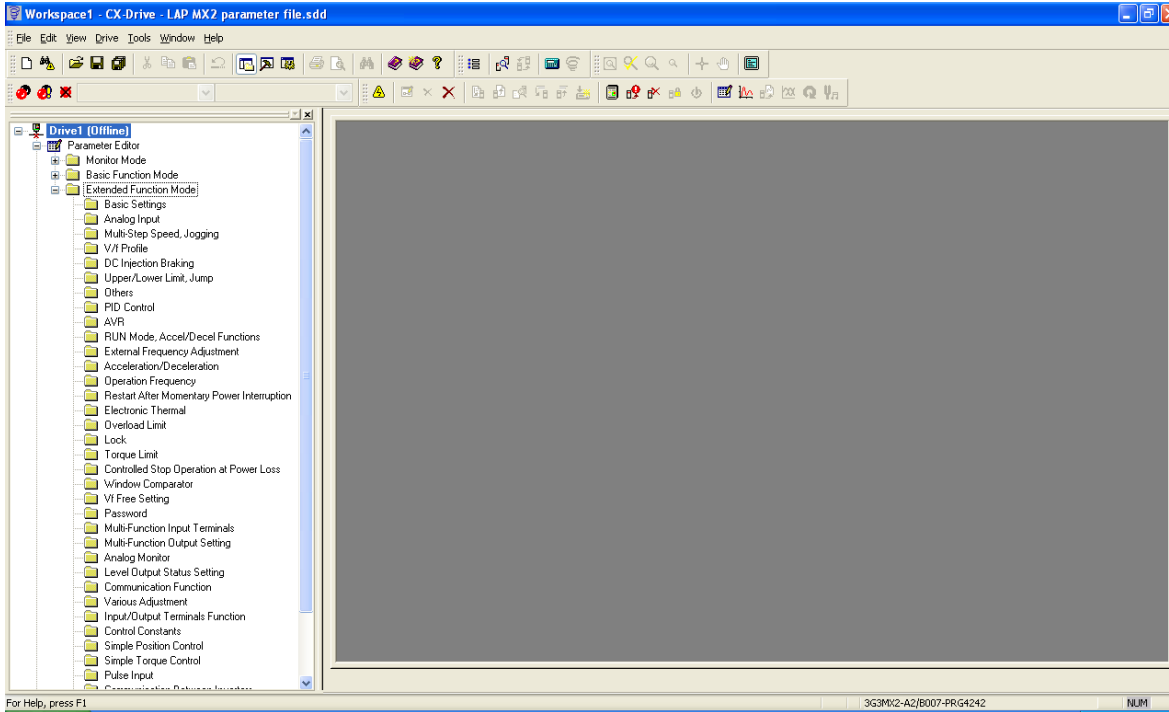


- You should now be connected to the 3G3MX2.
- If connection fails, cycle power to the 3G3MX2 and start again from Step 13.

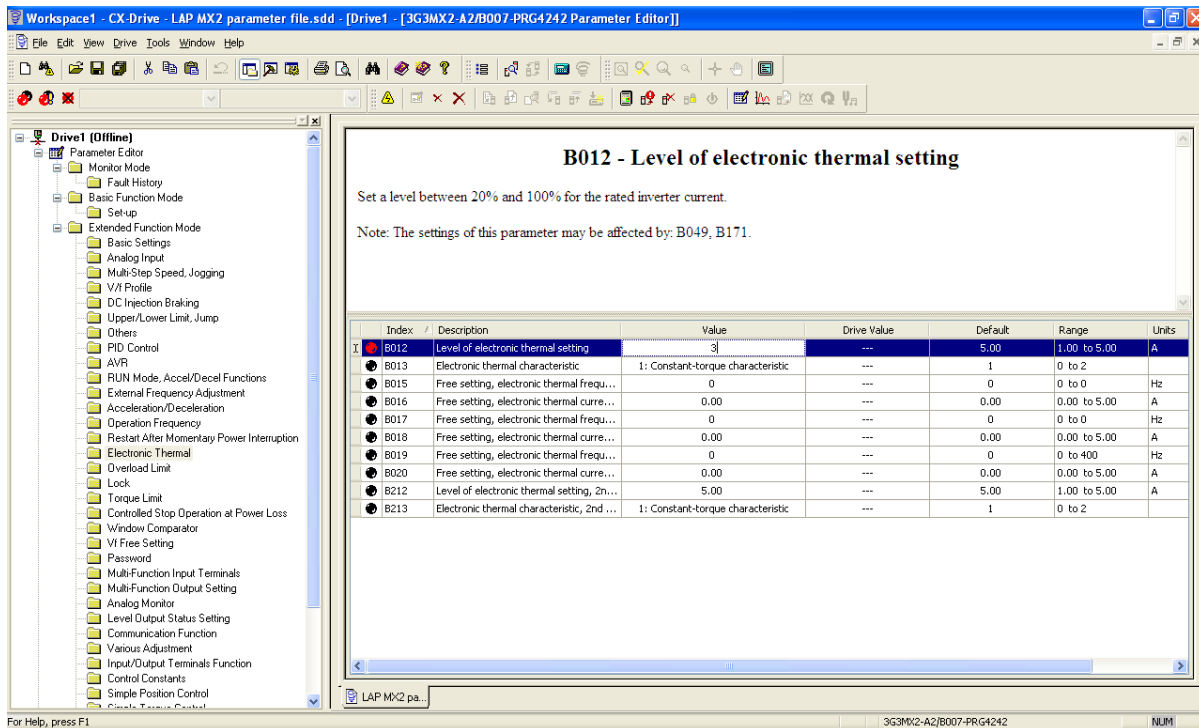
- At the top menu of CX-Drive, select 'File', 'Open' (LAP 3G3MX2 parameter file.sdd) *path may differ from below.*



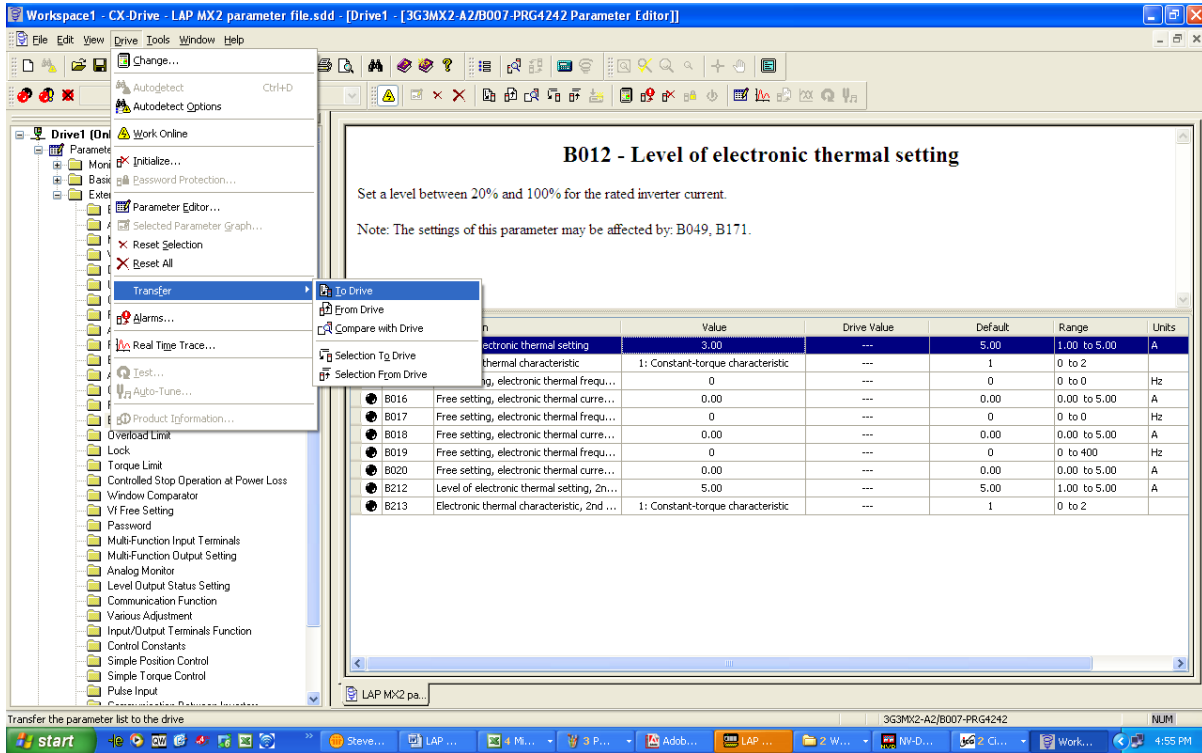
- At the top of the Drive tree, select the online drive and right click.
- Select 'Close' and DO NOT save changes.
- Expand the Drive tree menu by selecting the '+' sign, Parameter Editor > Extended Function Mode.



- Double click the Electronic Thermal folder. In B012, enter your Motor FLA value.



- Highlight 'Drive 1 Online'.
- From the tool bar, Select Drive > Work Online > Drive > Transfer > To Drive.



- When the 'At Parameter Successfully Complete' prompt appears, click 'OK'.
- Save and Exit CX-Drive.
- **Remove power from the 3G3MX2.**

Step 14: LAP Test

- Verify that the motor is safe to rotate.
- Apply Power the 3G3MX2.
- The LAP speed is set for 6Hz by default, Press 'Run Fwd' (Motor should run FWD).
- Press 'Stop' (Motor should stop).
- Try 'Run Rev' and different speeds.



Summary and References

This section provides a summary and list of references needed to work on the LAP control components, including the HMI, the PLC and the Servo drives.

Summary:

This document provided the starting steps with sample programs to quickly assist the user in working with the LAP system and components. It helps the user to immediately get familiar with the hardware, the software, and see the system in motion. The user should collect his/hers application requirements, design the programs for the application, use the provided sample programs and additional reference material to accomplish the motion solution.

References:

The following table lists the reference documents, software tools and cables need to work on the LAP and further develop more programming/functionalities.

Item number	Description	Name
1	CX-One	Programming suite of tools
2	CX-One NV-Designer	Tool for programming the NVQ
3	CX-One Programmer	Tool for programming the CP1L
4	CX-One Drive	Tool for programming/troubleshooting/tune the 3G3MX2
5	CP1L Quick start guide	'W07E-EN-01A+CP1L+GettingStartedGuide.pdf'
6	CP1L Programming Manual	'W451-E1-03_0420.pdf'
7	CP1L Operation Manual	'W462-E1-01.pdf'
8	3G3MX2 drive manual	'Operators Manual_3G3MX2_EN_09721'
9	NV3Q setup manual	'V103.pdf'
10	USB cable	'Generic USB cable'
11	Drive cable	'Generic USB to Mini B cable'