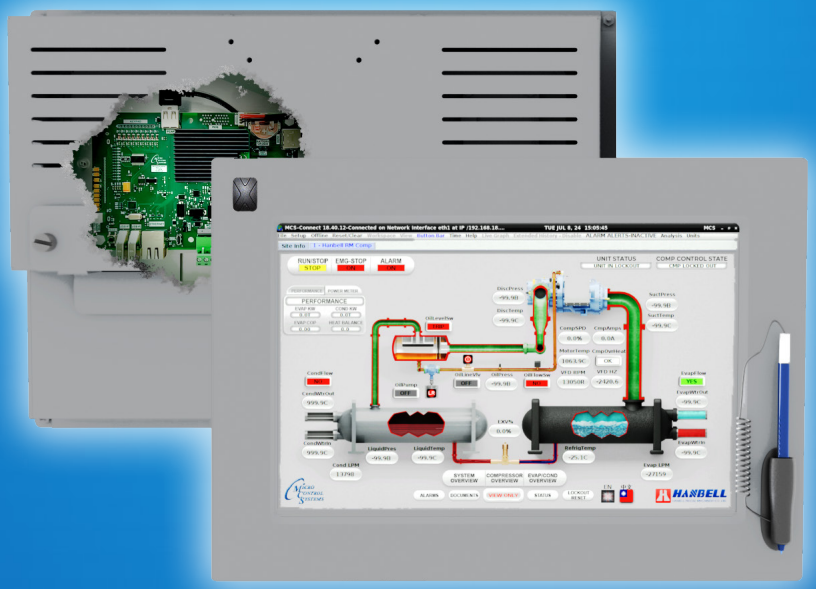
MCS-NitroMag-15.4

QUICK START

Version 1.3



Engineered for advanced HVAC/R applications

MICRO CONTROL SYSTEMS

5580 Enterprise Parkway / Fort Myers, FL 33905 / Phone: 239-694-0089
www.mcscontrols.com

July 3, 2025 10:13 AM

Introducing the latest additions to our product lineup. There are six basic versions of the MCS-NITROMAG each will need to connect to an MCS Expansion Board to complete the system.

- **MCS-NITROMAG-N**
- **MCS-NITROMAG-15.4**
- **MCS-OEM-** (MCS-NITROMAG and Keypad)
- **MCS-NITROMAG-DOOR** (MCS-NITROMAG and Keypad)
- **MCS-NITROMAG-DOOR-NEMA4** (MCS-NITROMAG and Keypad)
- **MCS-NITROMAG-PANEL** (MCS-NITROMAG and Keypad)

MCS-NitroMag - Microprocessor @ 1.5GHz

- The MCS-NitroMag is a powerful, next-generation microprocessor-based controller engineered for advanced HVAC/R applications. At its core is a Broadcom quad-core processor running at 1.5GHz, providing the processing power necessary to handle complex operations with speed and efficiency. Designed for integration flexibility, the MCS-NitroMag interfaces seamlessly with MCS expansion and extension boards, supporting up to 144 sensor inputs (SI), 90 relay outputs (RO), and 36 analog outputs (AO), making it highly adaptable for a variety of system configurations.

- Connectivity is a standout feature of the NitroMag controller, with built-in WiFi, dual HDMI ports, Ethernet (supporting 10/100Mbps/1Gbps), two USB 2.0 ports, and two user-configurable RS485 ports that support baud rates up to 115200. These options provide robust and versatile communication capabilities for both local and remote access. The MCS-NitroMag also features a significant upgrade in memory compared to previous MCS controllers, offering 16 GB of eMMC flash storage and 2 GB of DDR3 RAM—more than double the available memory of earlier models—allowing for faster performance and increased data handling capacity.

- In terms of protocol support, the NitroMag controller functions as a Modbus RTU Master capable of supporting up to 20 Modbus devices. It also supports BACnet IP, BACnet MSTP, Modbus IP, and Modbus RTU, enabling seamless integration with building automation and control systems. This combination of processing power, connectivity, memory, and protocol compatibility makes the MCS-NitroMag an ideal solution for modern, high-performance HVAC/R control applications.

TABLE OF CONTENTS

MCS-NITROMAG-N CONTOLLER

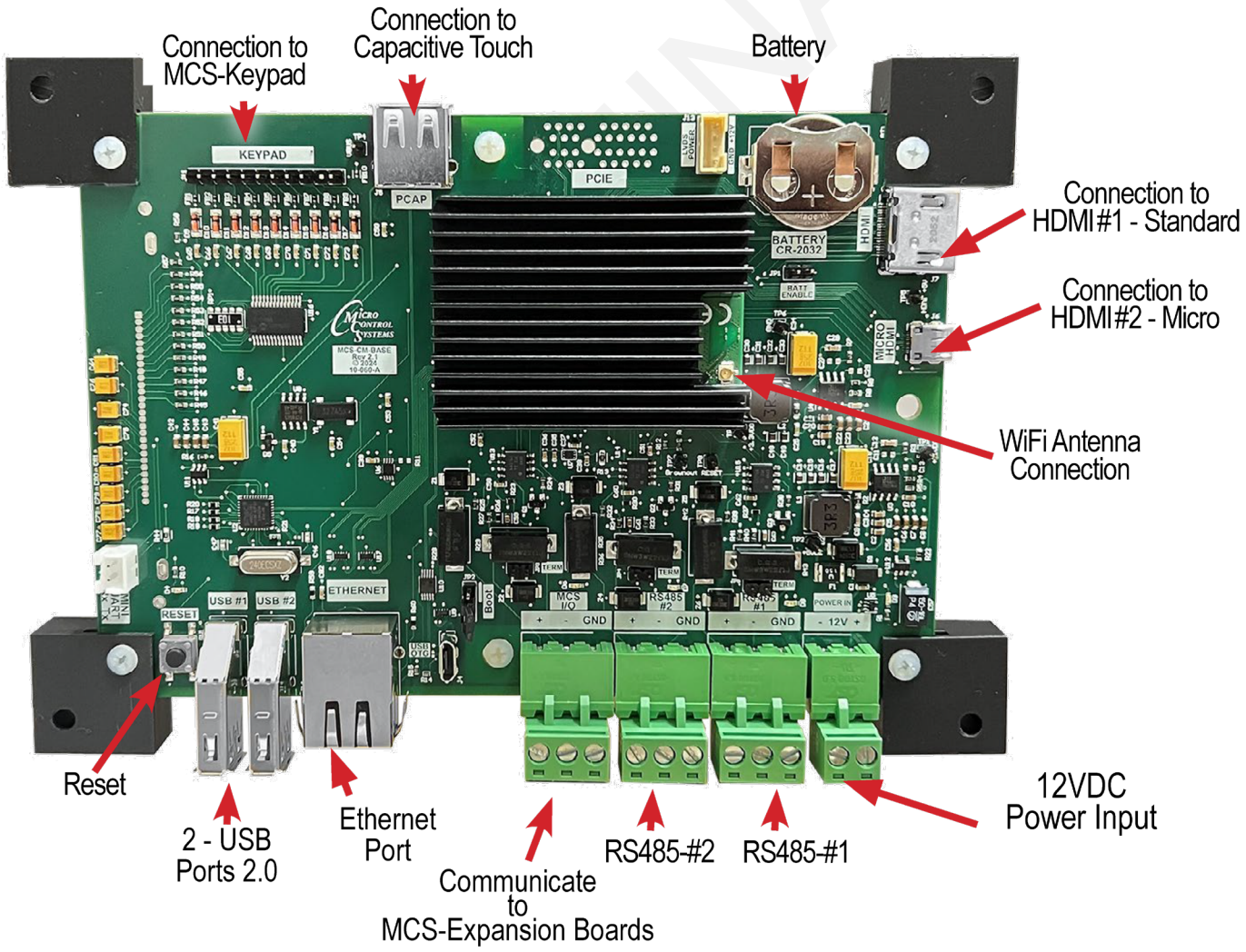
1. About the MCS-NITROMAG-N

The MCS-NITROMAG-N is a rugged microprocessor controller designed for the harsh environment of the HVAC/R industry. It is designed to provide primary control without needing mechanical controls. It will interface locally with a null modem serial cable, remotely through an Ethernet connection, and also through building management systems. The MCS-NITROMAG-N offers a great deal of flexibility with adjustable setpoints and control options that can be set prior to activating a system or even when the unit is operational. The MCS-NITROMAG-N is designed to safeguard the system being controlled, minimize the need for manual intervention, and to provide a simple but meaningful user interface.

MCS-Connect provides both local and remote communications to the MCS-NITROMAG-N, independent of software type. Local communications can be either through an RS485 or Ethernet connection. This program displays the status of the controller, and changes can be made to the system with proper authorization.

Configuration files can be transmitted to or received from a MCS-NITROMAG-N unit. The MCS-NITROMAG-N automatically performs history logging and this program allows the data to be presented in a useful graph form. A manual created in a PDF format is available on our web site:

www.mcscontrols.com, or available in other formats upon request.

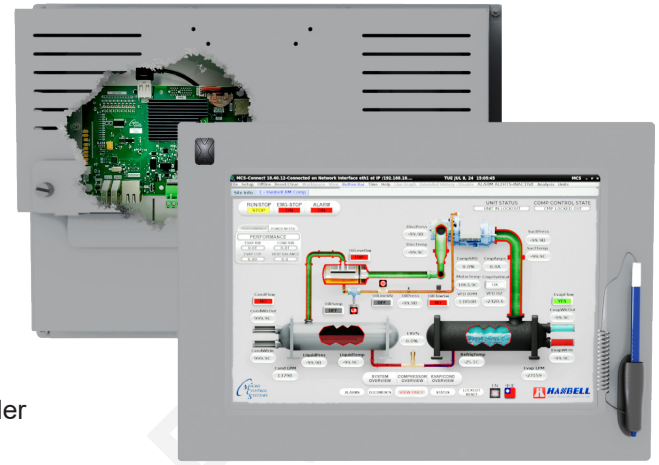


*Shown with mounting feet.

MCS-NITROMAG-15.4 INSTALLATION

The MCS-NITROMAG-15.4 is a control system cntaining a Capacitive Touchscreen, and a MCS-NITROMAG-N controller. It includes a processor, memory, eMMC Flash, and supporting power circuitry. The Broadcom quad-core processor on the MCS-NITROMAG-N delivers a blazing speed of 1.5GHz.

The MCS-NITROMAG-N controller connects with MCS Expansion boards and Extension boards, allowing for a maximum of 144 SI inputs, 90 RO outputs, and 36 AO outputs.



2. BASIC PACKAGE - MCS-NITROMAG-15.4

- 15.4 TOUCHSCREEN with NITROMAG-N controller
- 7 ft CAT 5e Crossover Patch Cord, Orange

2.1 SOFTWARE LOADED

- **NITROMAG OS -** Current Operating System
- **NITROMAG Firmaware -** includes MCS-CONFIG built for your system
- **MCS-CONNECT Software**

2.2 DOCUMENTS INCLUDED WITH SHIPMENT

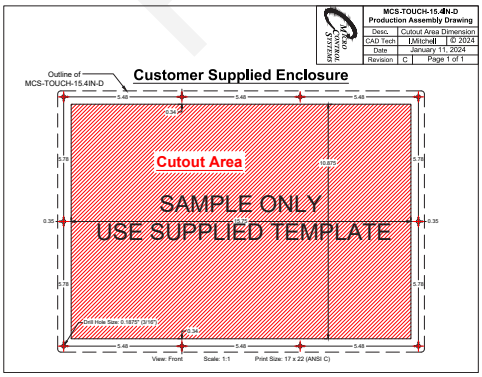
- Electrial Drawings

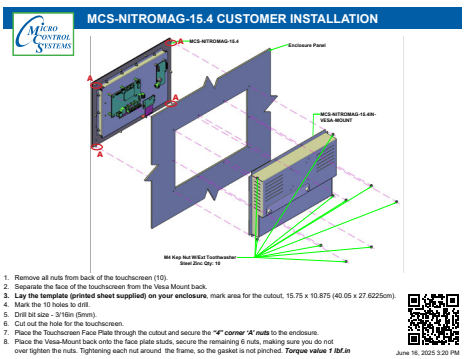
2.3 OPTIONAL EQUIPMENT

- MCS-12V-90W-B
- MCS-EXPANSION BOARDS

3. MOUNTING

- Template for mount and wiring instructions packed with shipment.
- 10 mount studs thru customers enclosure.
- Connection drawing to MCS EXPANSION BOARDS using MCS-I/O Comm Port.





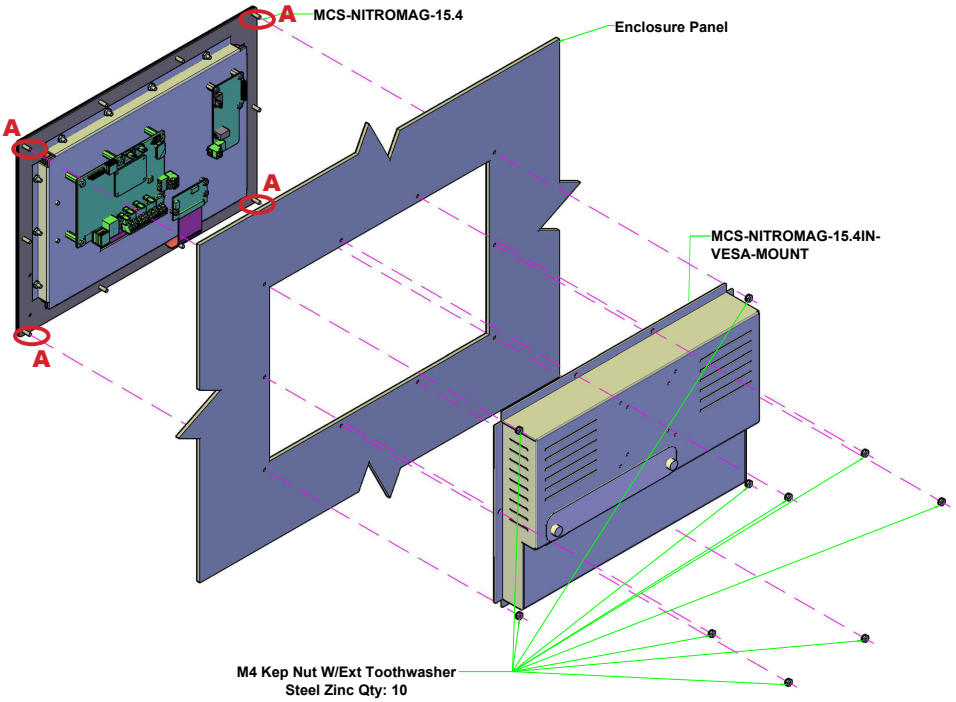
4. ELECTRICAL/COMMUNICATION WIRING - MCS-NITROMAG-15.4

IMPORTANT

NOTE: ALL 12V WIRING MUST BE 18 GUAGE MINIMUM.

- Wiring shows connection to MCS-IO-BASE expansion board using MCS I/O communication at 38,400 baud.
- Power is supplied by 12v-90w (MCS-12V-90w) to MCS-NITROMAG-15.4 and MCS-IO-BASE expansion board.
- Optional MCS-ETHERNAT-SWITCH-B shown.

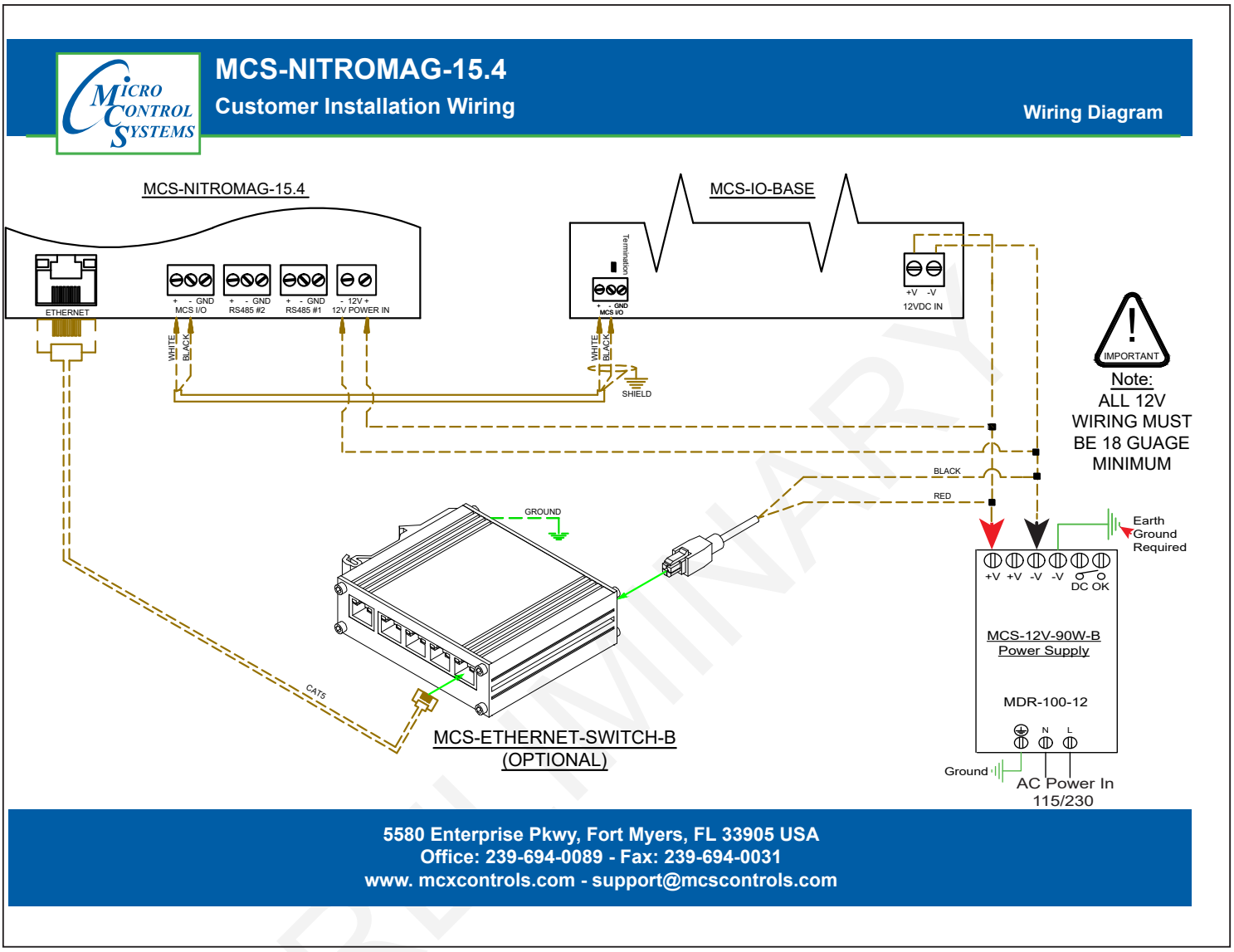
MCS-NITROMAG-15.4 CUSTOMER INSTALLATION



1. Remove all nuts from back of the touchscreen (10).
2. Separate the face of the touchscreen from the Vesa Mount back.
3. **Lay the template (printed sheet supplied) on your enclosure**, mark area for the cutout, 15.75 x 10.875 (40.05 x 27.6225cm).
4. Mark the 10 holes to drill.
5. Drill bit size - 3/16in (5mm).
6. Cut out the hole for the touchscreen.
7. Place the Touchscreen Face Plate through the cutout and secure the ***"4" corner 'A' nuts*** to the enclosure.
8. Place the Vesa-Mount back onto the face plate studs, secure the remaining 6 nuts, making sure you do not over tighten the nuts. Tightening each nut around the frame, so the gasket is not pinched. ***Torque value 1 lbf.in***

June 16, 2025 3:20 PM

5. RS485 WIRING - MCS-NITROMAG-15.4



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CAPACITIVE TOUCH SITE DOCUMENTS

1.1. Documents, Spec Sheets, Drawings, etc.

Stored in the Touchscreen's flash memory you will find pdf's and documents pertaining to the building of your unit.

Each unit's configuration is different, so the 'SITE DOCUMENTS' file will pertain to that unit only.

An example of the contains of the 'SITE DOCUMENTS' folder may contain:

1. **DRAWINGS** (PDF'S) of the components used in this unit
2. **EXAMPLE OF MANUALS** (if installed in your unit)

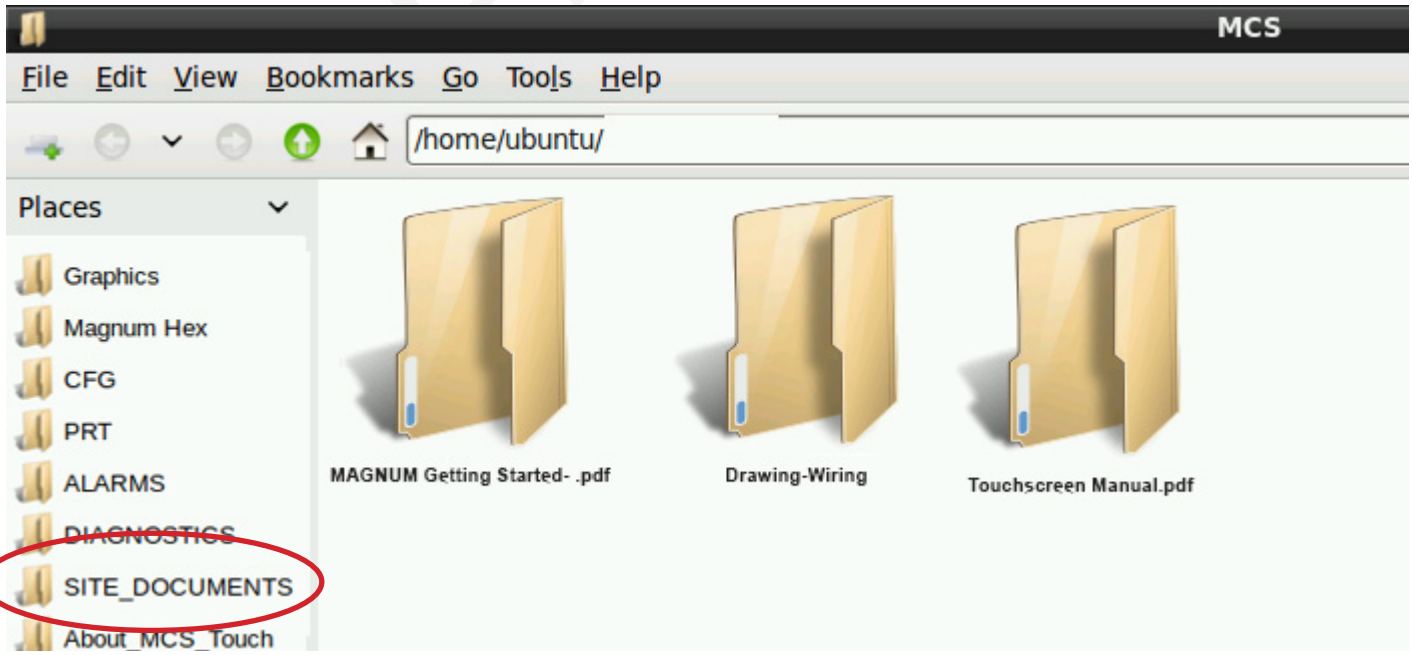
a. Getting Started Manual
b. Keypad Manual
c. Touchscreen Manual
d. EXV Manual
e. BMS-GATEWAY Startup Guide
f. Additional manual may be stored here depending on the configuration of the unit

3. **SPECIFICATION SHEETS**
Each part installed should have a spec (data) sheet included in the 'SITE DOCUMENTS' folder

4. **CONFIGURATION FILE** - This is the key file in building your unit. If your config file is somehow corrupted, this is the original file used and may need to be re-installed. Call MCS-SUPPORT for help in re-installing this file to your controller.

To locate the 'SITE DOCUMENTS' folder:

1. Navigate to the **'MCS TOOLS folder'** on your desktop
2. Double click on folder to open
3. Click on Site _Documents under Places on left.



MAIN SCREEN AND GRAPHICS

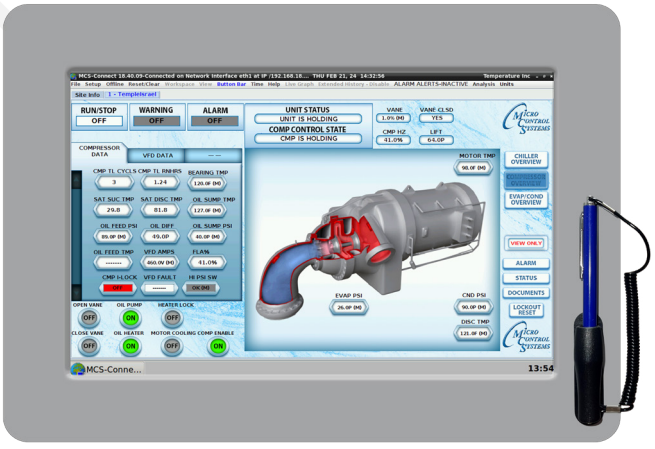
2.1. Layout of Main Screen on the Touchscreen

1. MCS Tools, icon
2. On Screen Keypad icon
3. MCS-Connect icon
4. Touchscreen Software Version
5. Time of Day (click to change)

2.2. COMPANY GRAPHICS

If your touchscreen came pre-installed with the 'Graphic Package', OEM's and trained Installers will be able to modify some of the displays after the initial installation using the Graphic Builder if they are authorized.

With its 1280x800 Resolution, the display is sharp and easy to read. Making use of the 'Stylus pen', and the on screen keypad adjustments are easy and lets the technician check readouts as to the status of the controller.



The Touchscreen now comes with a new Linux operating system version MCS 1.2.2 and above

Calibrating software is not needed for the capacitive touchscreens shipped after February 2024.

ON SCREEN KEYPAD

3.1. KEYPAD -

On the main screen, click on Keyboard Icon as shown in screen 1.

3.2. 'ON SCREEN KEYPAD'

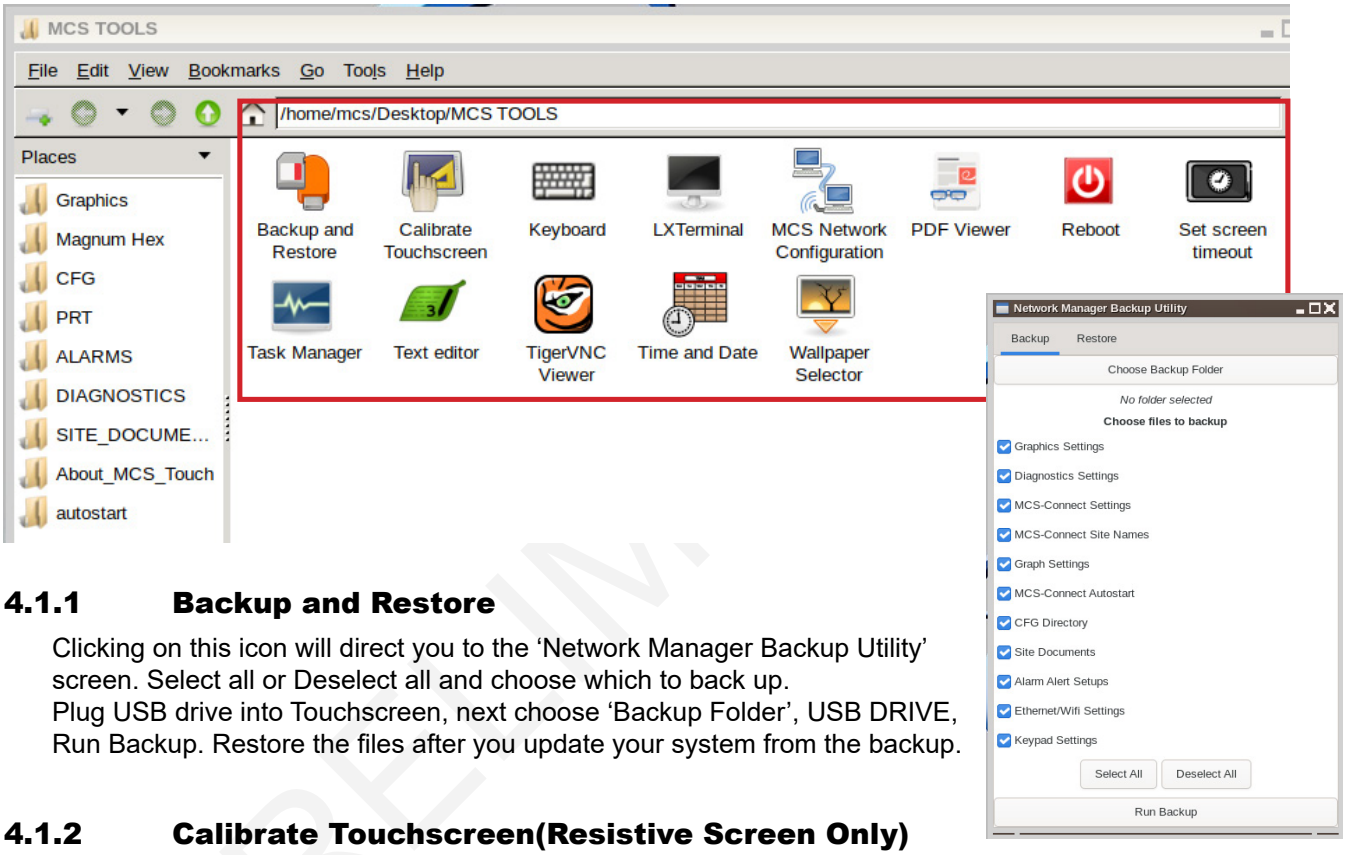
Screen 2 shows keyboard display. Use the stylus and keypad to enter or make adjustments.

UTILITIES FOLDERS

4.1. MCS-TOOLS folder and its sub folders

1. **Navigate to the '<u>MCS TOOLS folder</u>' on your desktop.**
2. **Double click on folder to open.**

Brief descriptions of these files will be shown on the following pages in this manual.



4.1.1 Backup and Restore

Clicking on this icon will direct you to the 'Network Manager Backup Utility' screen. Select all or Deselect all and choose which to back up.
Plug USB drive into Touchscreen, next choose 'Backup Folder', USB DRIVE, Run Backup. Restore the files after you update your system from the backup.

4.1.2 Calibrate Touchscreen(Resistive Screen Only)

NOTE: Calibration is not necessary on the New Capacitive Touch.

In the new version of Linux software, MCS 1.02 software is provided to calibrate your ***resistive touchscreen*** to pin point the accuracy on the touchscreen. When you touch an area on the screen the stylus point aligns with the screen area. We will describe how to do this later in this manual under the ***Resistive Touchscreen shipped prior to February, 2024***.

4.1.3 Keyboard

Clicking on this icon will open the on screen keyboard.

4.1.4 LX Terminal

LXTerminal is the LXDE version of a terminal emulator. It is used by programmers who are familiar with the Linux operating system.

4.1.5 Advanced Network Configuration

Clicking on this icon will direct you to a program which will allow you to setup your communications to the company's network and controllers.

4.1.6 PDF Viewer

Allows the tech to open a PDF viewer.

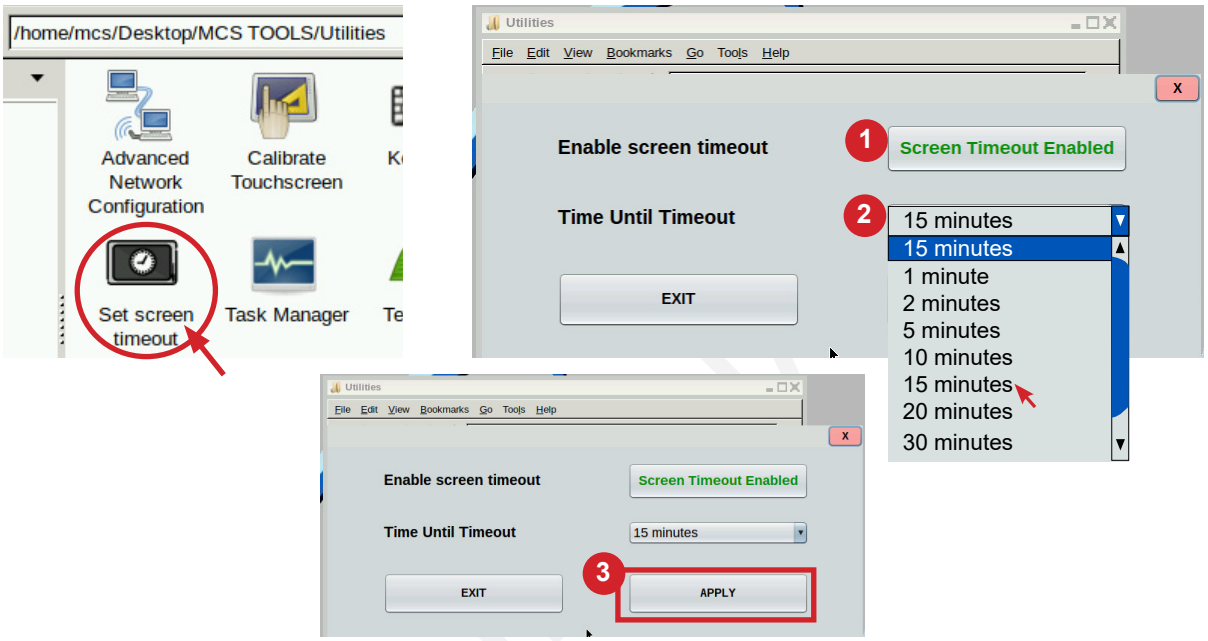
4.1.7 Reboot

Clicking on this icon will reboot your touchscreen.

4.1.8 Set screen timeout

Clicking on this icon allows the tech to set the amount of time that the screen will go into a screen timeout.

1. Click on 'Timeout Enabled' to set the time.
2. Click on 'Time Until Timeout' drop down arrow to show times available, choose time.
3. Click to 'APPLY'



4.1.9 Task Manager

Clicking on this icon that lets you manage, search, filter and terminate processes if necessary.

4.1.10 Text Editor

Text Editor is a text editing program enabling you to make changes to text files.

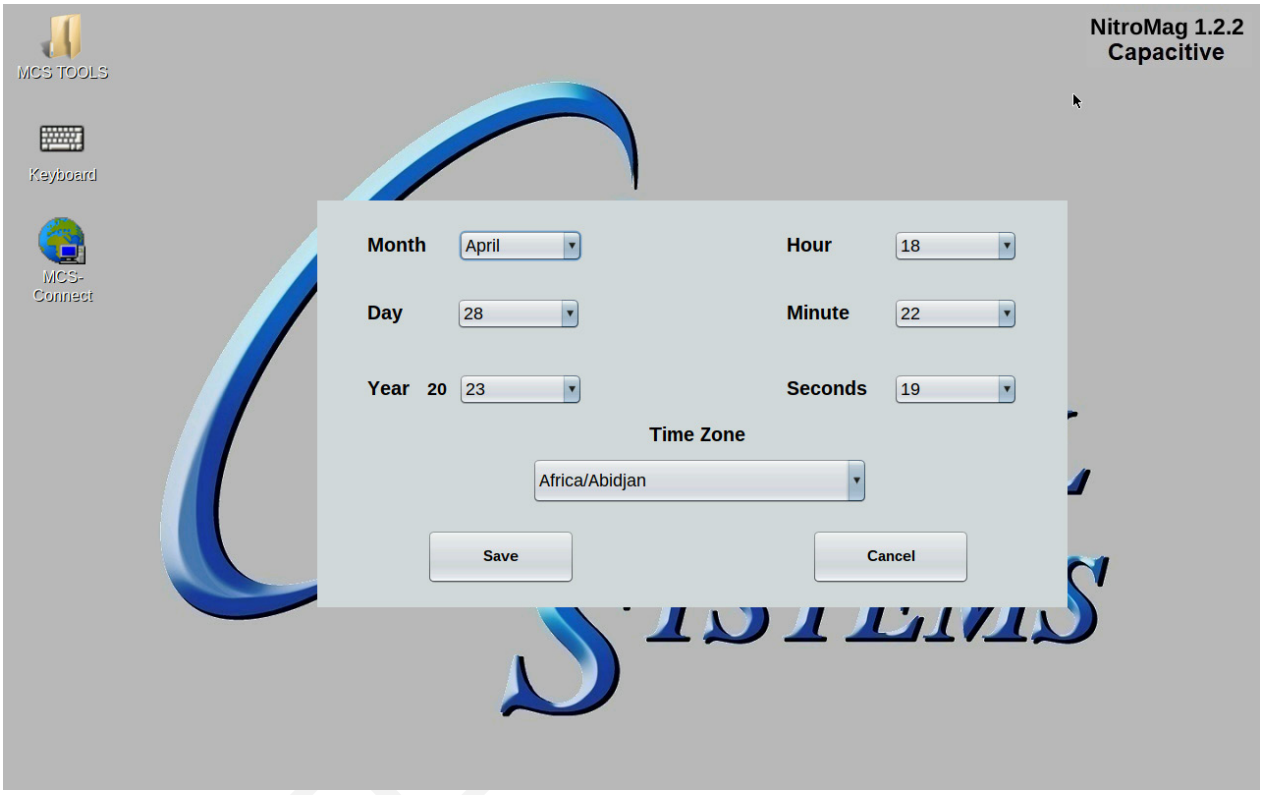
4.1.11 TigerVNC Viewer

TigerVNC is a high-performance, platform-neutral implementation of VNC (Virtual Network Computing), a client/server application that allows users to launch and interact with graphical applications on remote machines.

4.1.12 Time and Date

Clicking on this icon allow the tech to setup the time and date.

1. **Navigate to the 'MCS TOOLS' folder on your desktop.**
   Double click on folder to open.
2. Double Click **'Time And Date'** to make changes
3. Next screen will allow you to change time and date.
4. Click to save your changes.



4.1.13 Wallpaper Selector

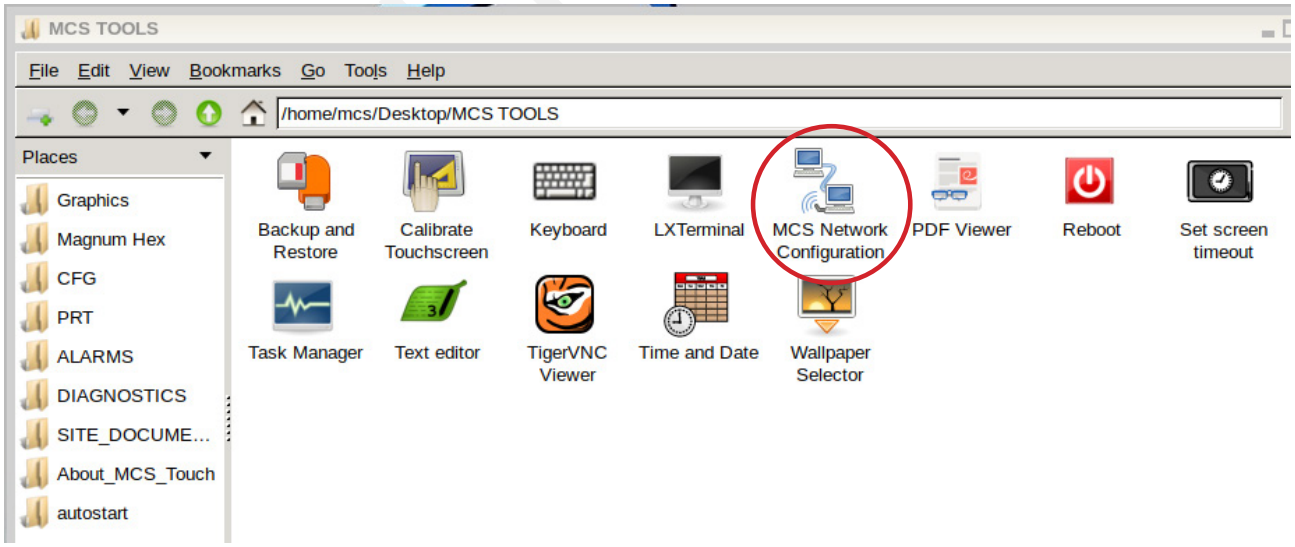
Set up for OEM only.

SECTION- 5. CAPACITIVE TOUCH NETWORK

5.1. Setting Up Network For Communication With Your Controller

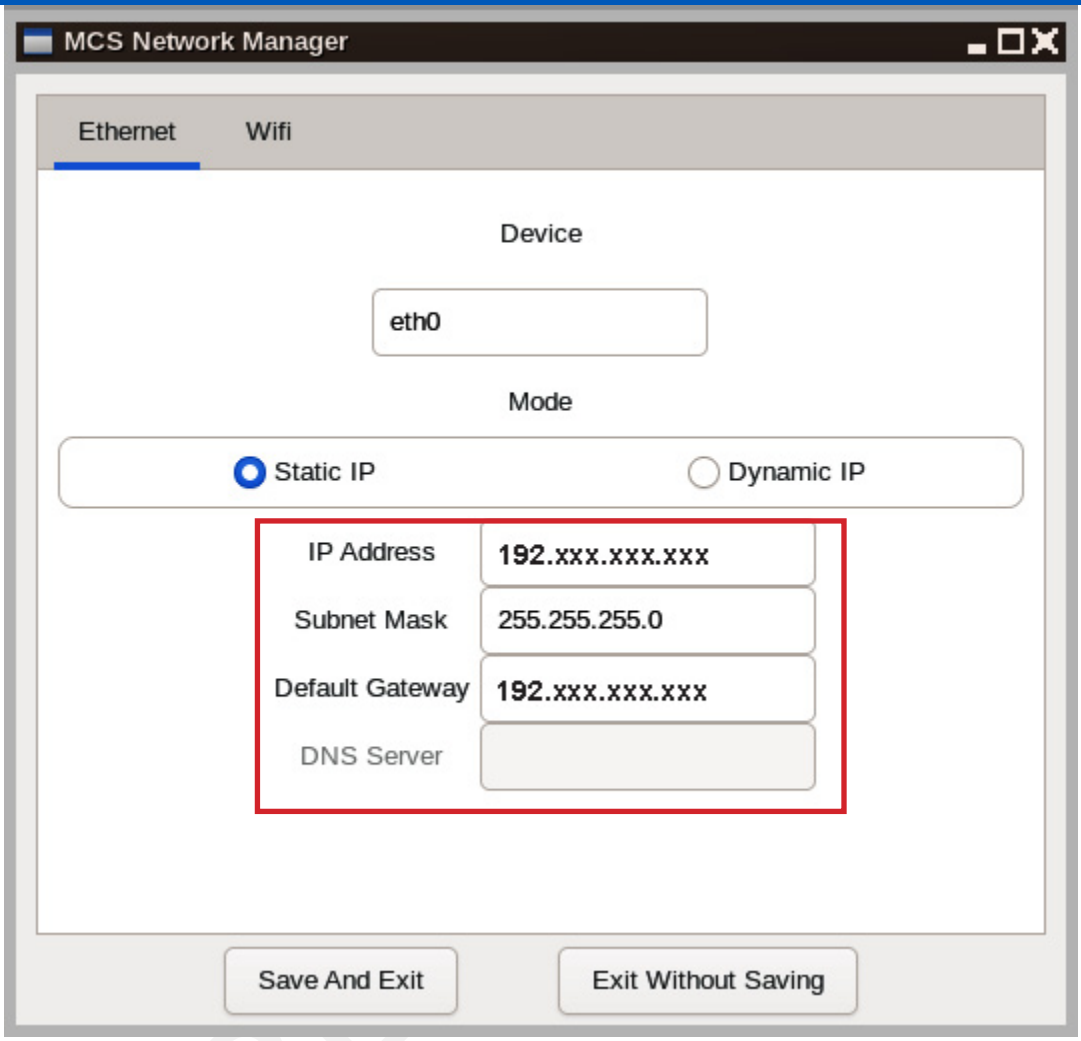
At the touchscreen main screen, click on **'MCS TOOLS' folder' as** seen screen 1.

5.2. MCS TOOLS Folder



Click **'Advanced Network'** as shown.

CAPACITIVE TOUCH NETWORK



5.2.1.1. Selecting a Ethernet Port

1. Go to the Ethernet tab.
2. Choose either Static IP or Dynamic IP
3. Setup the following to connect to the network in your location.
   a. IP Address
   b. Subnet Mask
   c. Default Gateway

SECTION- 6. Update MCS-CONNECT for Capacitive Touch

NOTE: MAKE SURE YOU DOWNLOAD THE LATEST LINUX VERSION OF MCS-CONNECT FROM OUR WEBSITE AT:

http://www.mcscontrols.com/software.html

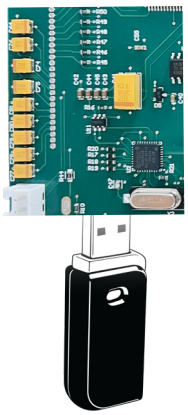
This will walk you through updating MCS-CONNECT on your Capacitive touch screen.

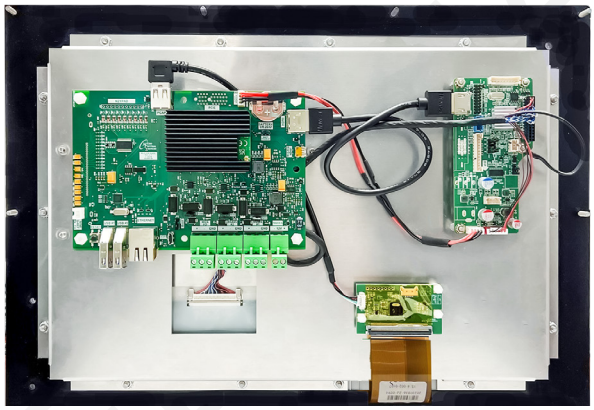
1. Format a new USB drive prior to installing this update, insert into your computer.
2. Go to the MCS-WEBSITE and down the latest MCS-CONNET for your touchscreen.

Please Note
Locate the Serial Number on your touchscreen board and follow the installation procedure for proper deployment.

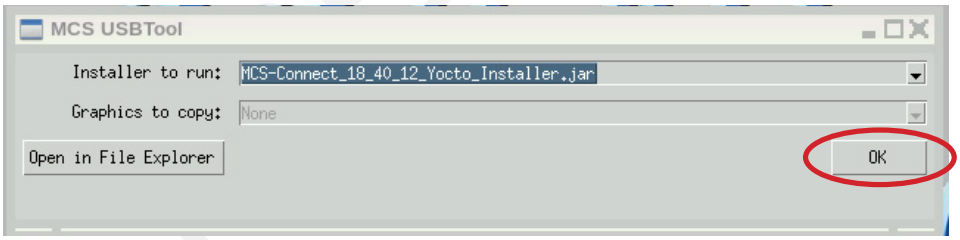
3. Save the correct file to the attached USB drive on your computer.
4. Insert the USB drive into the back of the touchscreen.

On back of touchscreen, locate the USB PORT as shown on screen 2 and insert the USB drive with the new version of MCS-CONNECT.



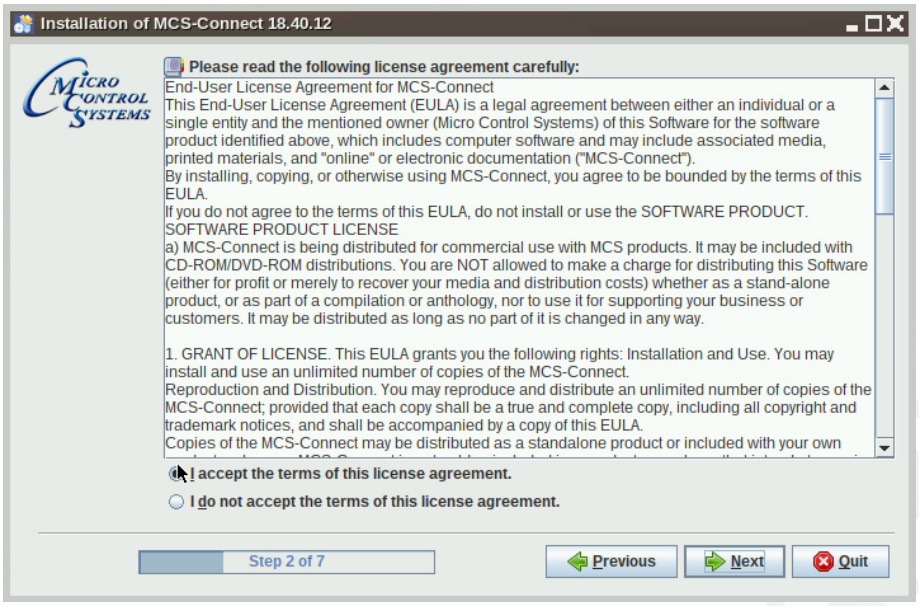


The below screen will appear, click OK.

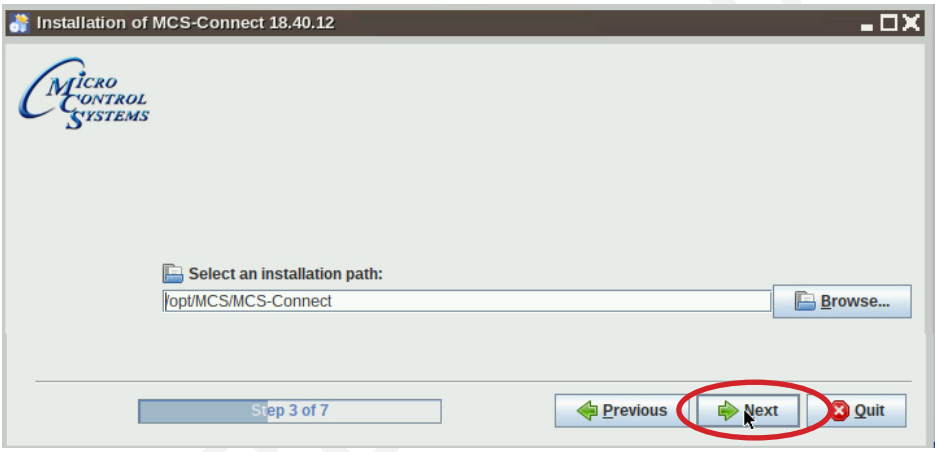


5. Click ‘Next” to continue.

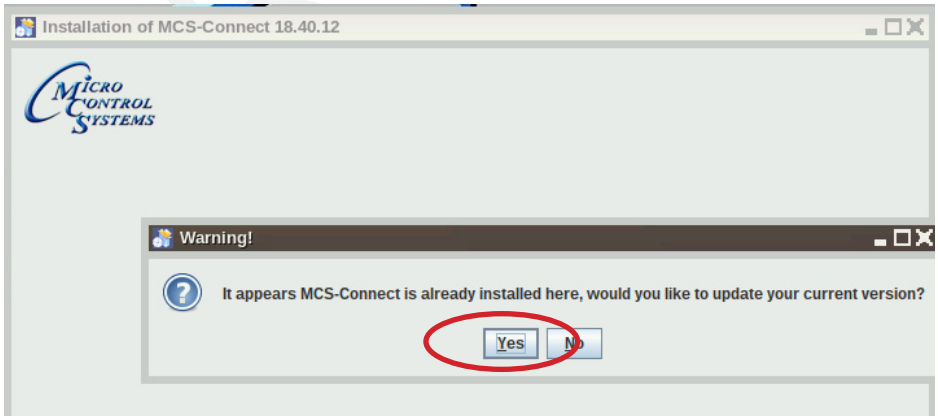
6. Click to accept terms of license agreement, click ‘Next’ to continue.



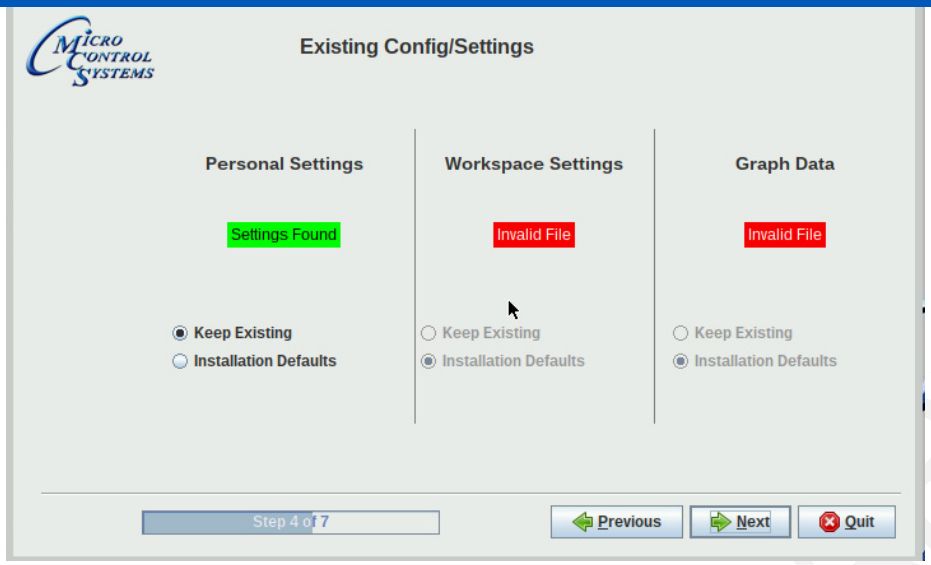
7. Select the installation path as shown.



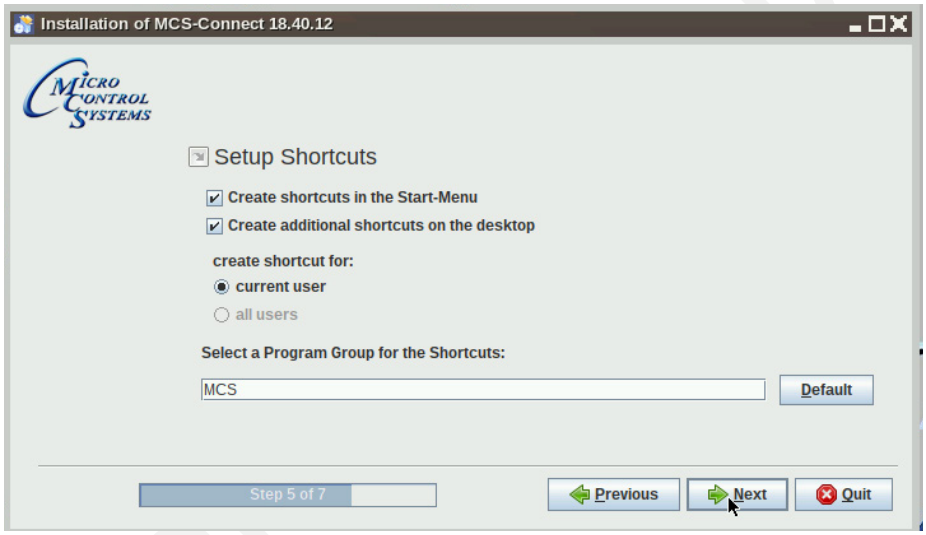
8. Next screen, click ‘Yes’ to update the current version on the touchscreen.



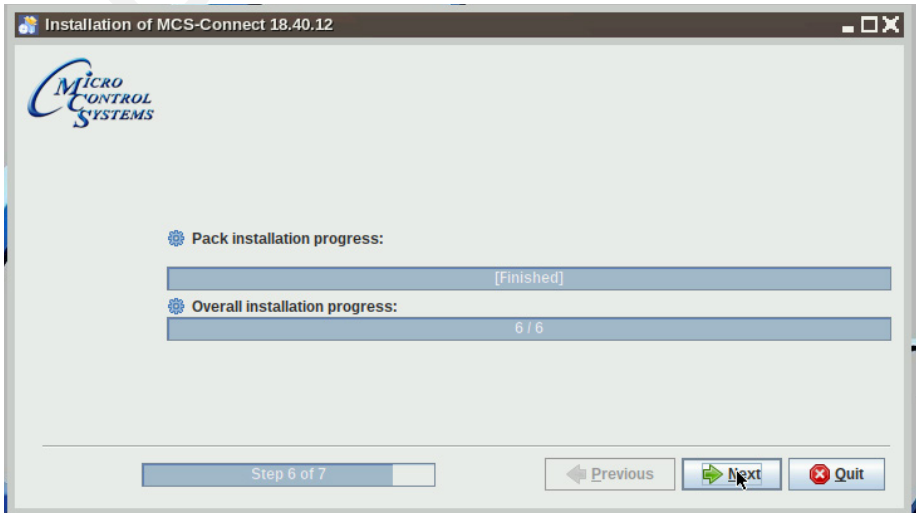
UPDATE MCS-CONNECT FOR CAPACITIVE TOUCH



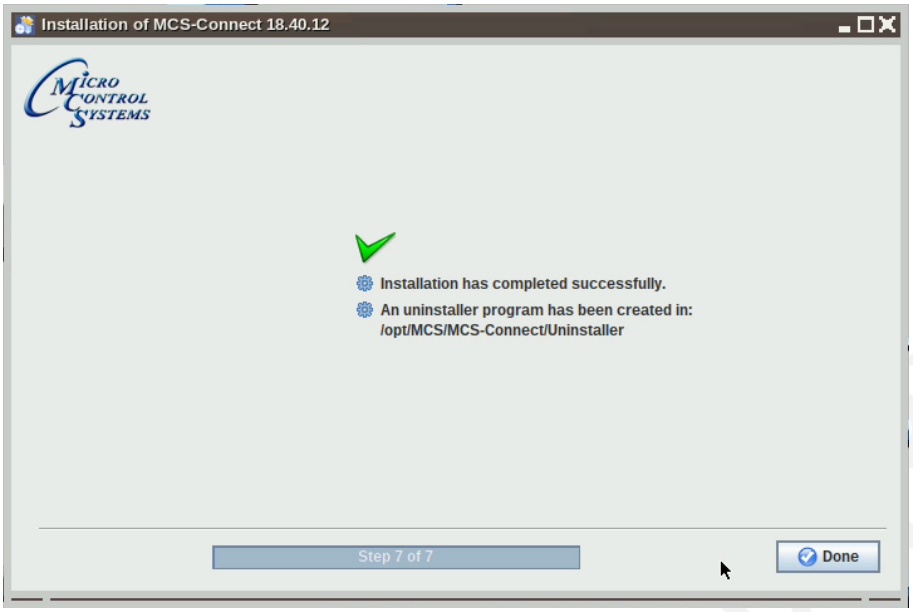
10. Setup Shortcuts, click to check boxes for Start-Menu and shortcuts on the desktop, click next.



11. Next screen shows progress bar.

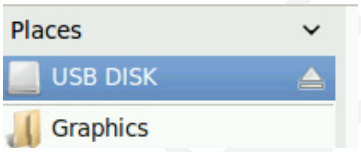


12. Last screen shows installation has completed successfully.
The installation placed an ‘unstaller program in /opt/MCS-CONNECT/Uninstaller.



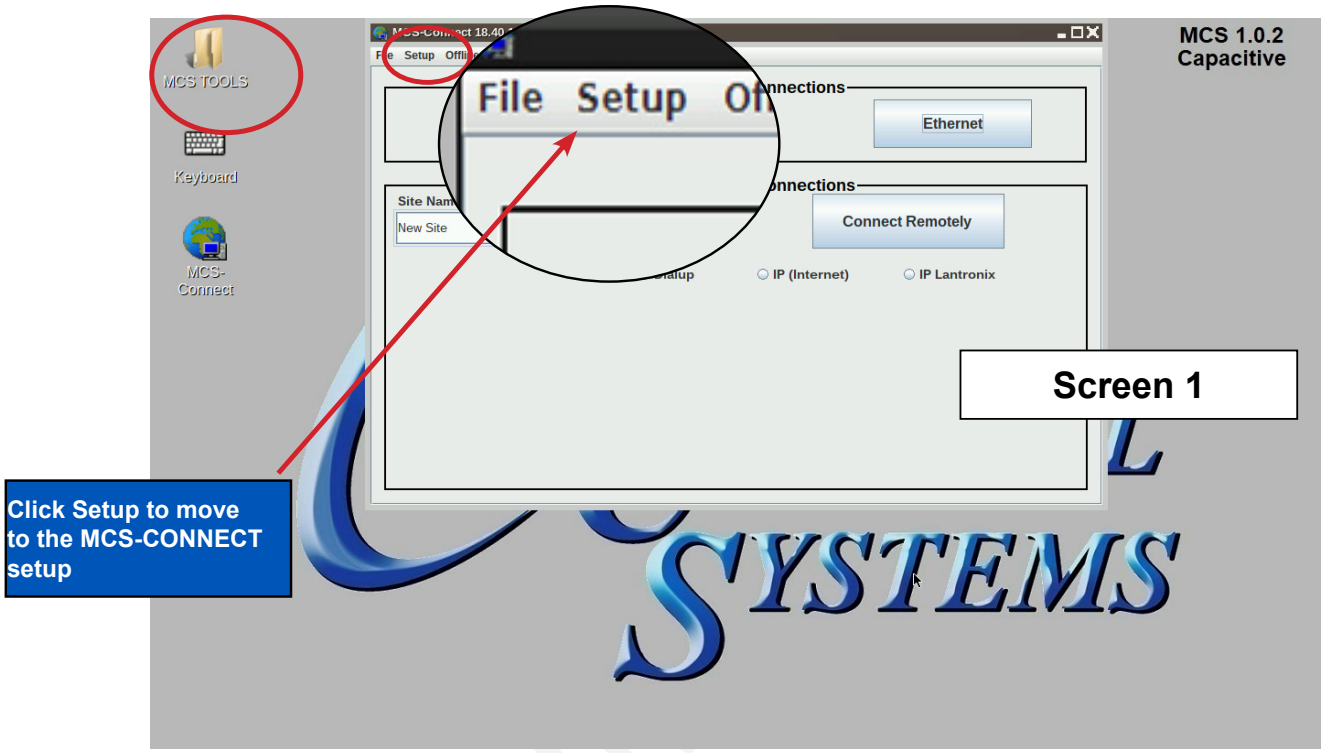
13. Double click on the USB drive on the desktop, opens in file manager.

14. Click on ‘ARROW’ to eject and remove from the back of the touchscreen.

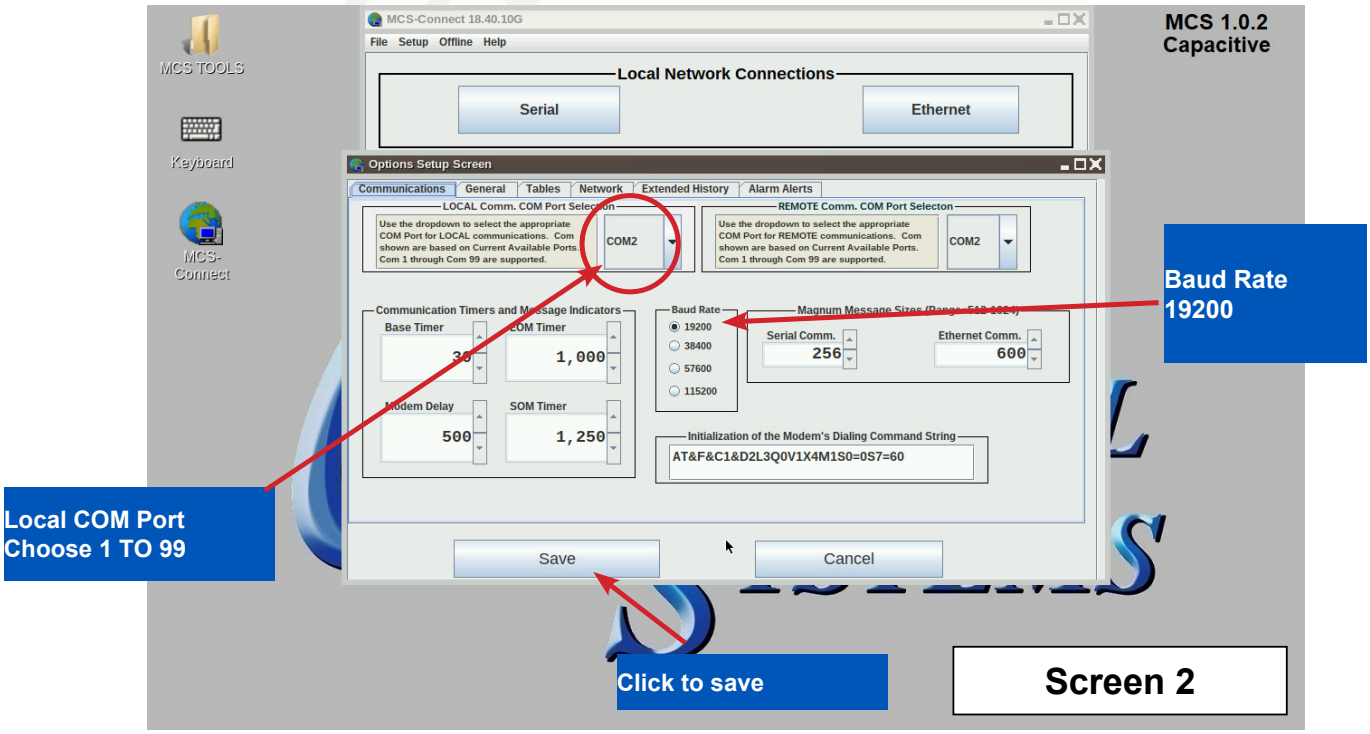


SECTION- 7. MCS-Connect Communication

1. At the 'Desktop screen' click on the **'MCS-CONNECT shortcut'**.
2. Click on **'Setup'** at the MCS-CONNECT' screen.



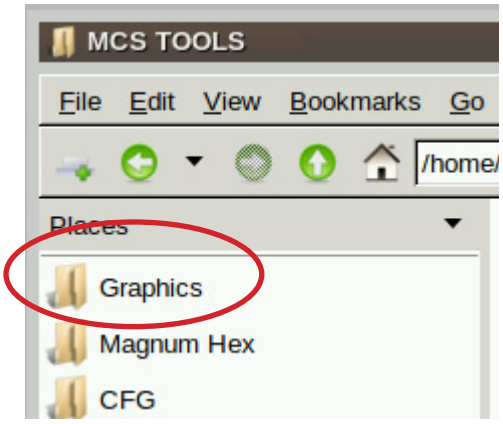
3. Next screen is the setup screen for communicating with your controller or PC.
4. You can change the "Com port' and 'Baud Rate" depending on how you are communicating with your controller or computer.



SECTION- 8. Replacing Graphics for Capacitive Touch

1. Click on the 'MCS TOOLS' folder on the desktop.

2. When MCS TOOLS opens, Double click on the 'GRAPHICS' on the left in the bookmarks.

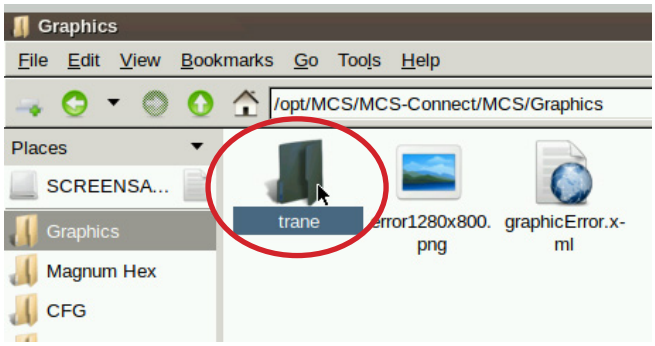


8.1. DELETE THE SUB FOLDER FOR YOUR GRAPHICS

IF YOU HAVE NOT MADE A BACKUP OF THE FILES IN GRAPHICS FOLDER - STOP

BACKUP NOW TO A FORMATTED USB STICK AND SAVE THESE BEFORE PROCEEDING TO THE NEXT STEP.

1. Delete the existing Graphic file in the graphics folder
2. In this case the example shows 'TRANE' for graphics sub folder.
3. DELETE THIS SUB FOLDER ONLY, CLICK WITH STYLES PEN, HOLD AND A DROP-DOWN MENU APPEARS, 'DRAG TO MOVE TO TRASH'

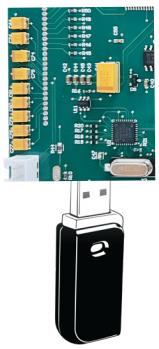


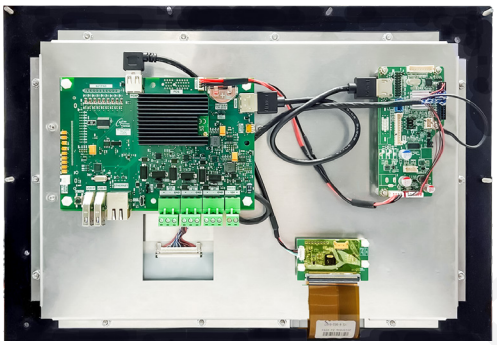
8.1.1 NEXT STEP FOR INSTALLING THE NEW GRAPHICS FOLDER

Continue to next page.

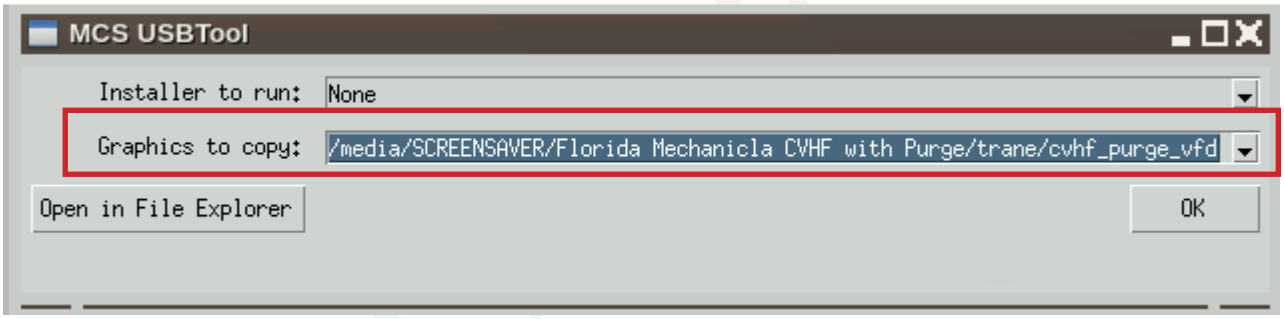
MCS-CONNECT COMMUNICATION

3. Click on folder which contains your graphic file.
4. Copy new graphics file to a formatted USB Stick.
5. Plug the USB Stick with the new graphics file into the back of the touchscreen.

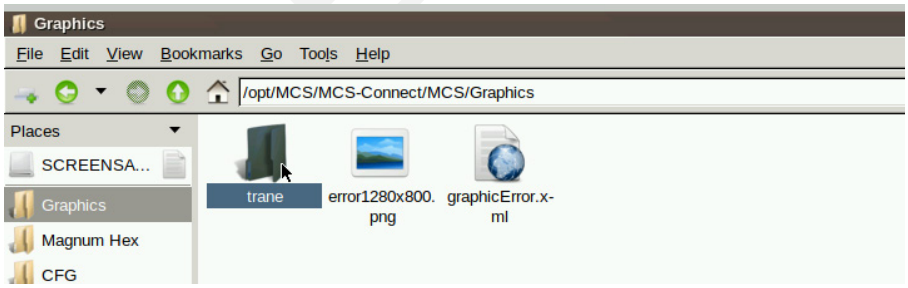




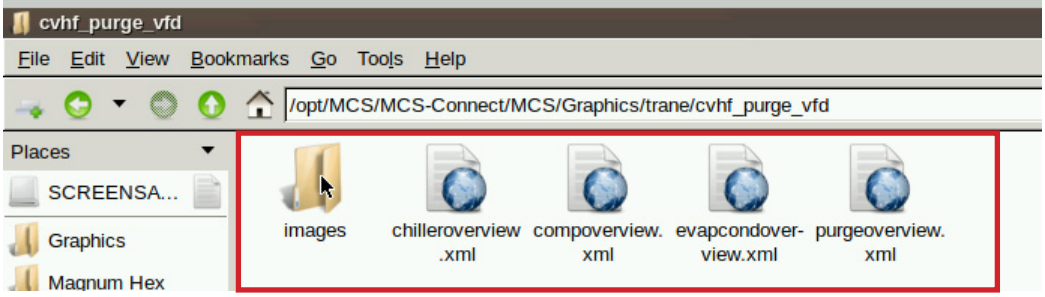
6. USB disk opens, click on small arrow for ‘Graphics to copy”, click okay.
7. File that will be copied to the ‘Graphics folder in the bookmarks.



8. On bookmarks Places, click on Graphics, Your new graphic files will be in the subfolder of the Graphics folder. Example shows file that was placed in this folder ‘TRANE’.



9. (Generic names can be used for different chillers (Trane, Carrier, etc.)
10. Double click on the subfolder “Trane” to see files needed for the replaced graphics.



REPLACING GRAPHICS FOR CAPACITIVE TOUCH

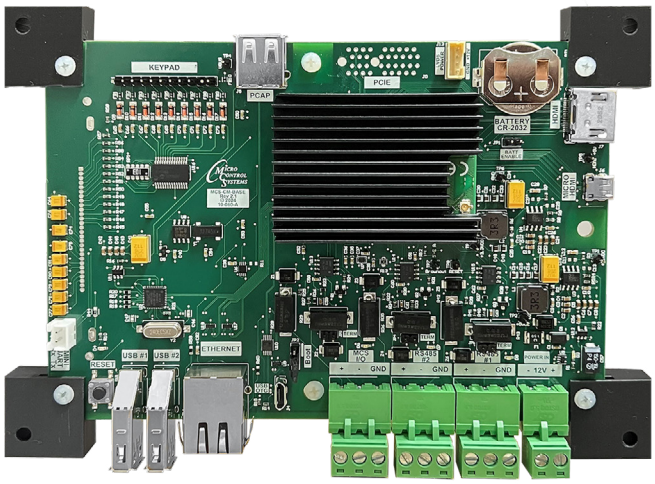
TESTING THE GRAPHICS

ON MCS-CONNECT SCREEN

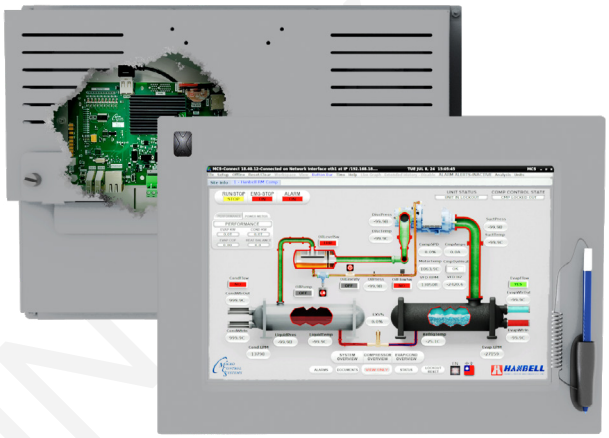
1. Click on ‘OFFLINE’ at top
2. Load your chilleroverview.xml file, Enable Auto Screen Refresh
3. Click to open your graphics folder in the graphics folder under places
4. Highlight ‘chilleroverview.xml’, and click open
5. When MCS-CONNECT opens, click on the ‘chilleroverview.xlm tab to open your graphics
6. Once you verified the graphics have been loaded, close MCS-CONNECT and re-connect to the controller and click on the graphics tab at the top right.

MCS- NitroMag WiFi Setup

MCS-NitroMag WiFi Setup



MCS-NitroMag-N



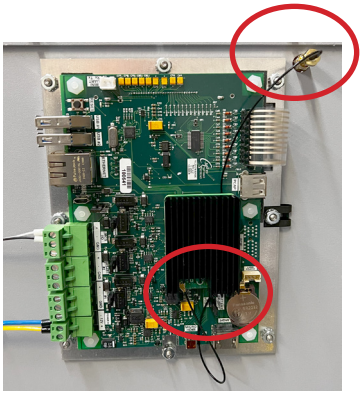
MCS-NitroMag-15.4

MCS-NitroMag-OEM

WiFi Antenna shipped with
MCS-NItromag-OEM
& MCS-NitroMag-PANEL

MCS-NitroMag-PANEL

WiFi Antenna
(Slim Mount Style)



WiFi Antenna shipped connected
to MCS-NitroMag-DOOR
MCS-NitroMag-DOOR-NEMA4
MCS-NitroMag-15.4

1.1. WiFi Connection

The MCS-NitroMag-N is equipped with 2.4 GHz, 5.0 GHz 802.11 b/g/n ac wireless.

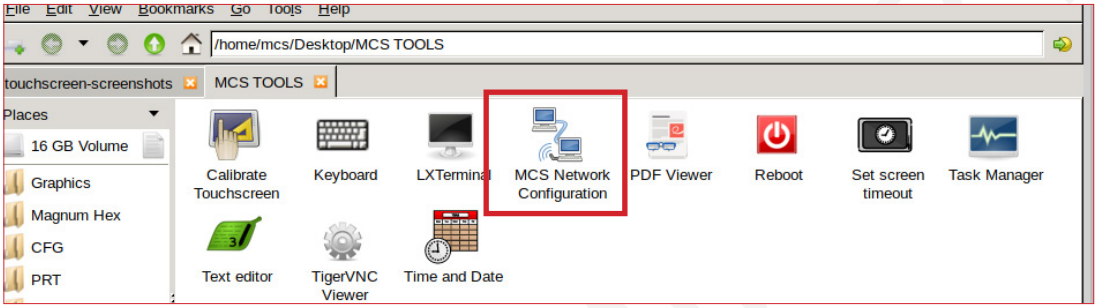
A Wi-Fi antenna converts radio frequency (RF) waves, which contain packets of information, into electrical signals, or electrical signals into RF. This conversion method permits wireless devices such as routers, smartphones, laptops, and tablets to communicate wirelessly.

The board included an external antenna connection, If used it should be positioned outside an encloser or panel that is not surrounded by metal, including any ground plane.

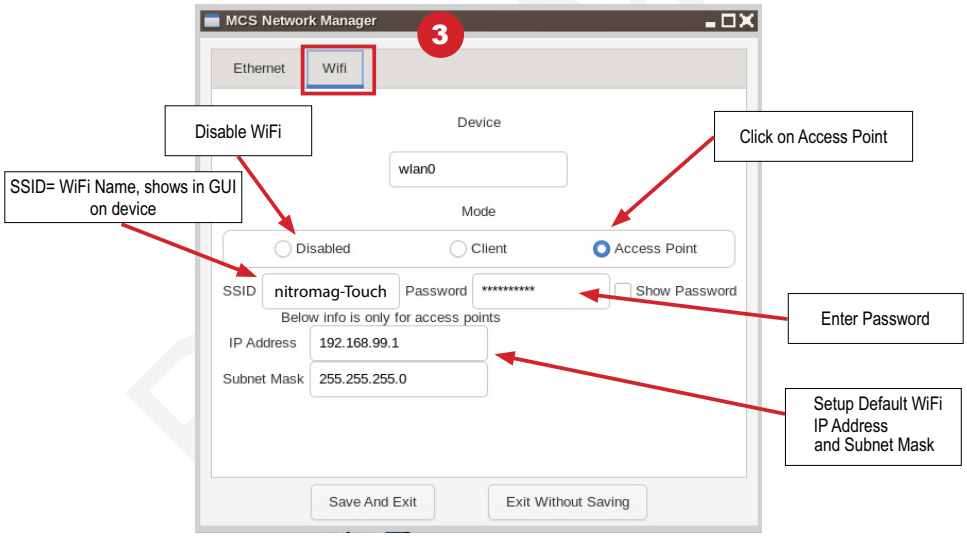
The hotspot can be connected to your PC's Wifi to wirelessly get connected through MCS-NitroMag-N.

1.1.1 Setup for Connecting to WiFi

1. Click on Touchscreen **MCS TOOLS** on the desktop.
2. Next click on **MCS-NETWORK CONFIGURATION.**

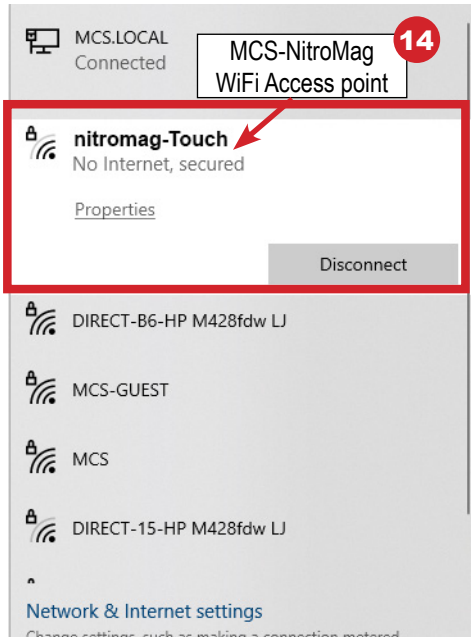


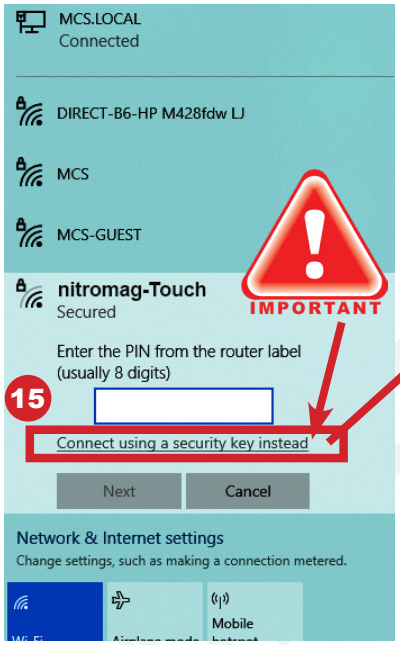
3. Click on the **WiFi** tab to setup the Access point for the WiFi.

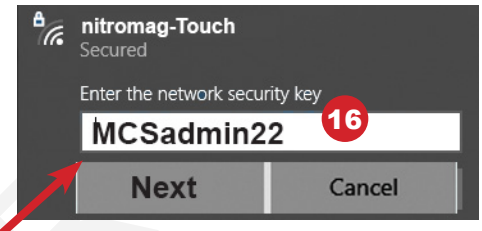


4. Click on **'ACCESS POINT'**
5. Click on **'SSID'** and enter a name for your WiFi.
6. Enter the defautl '**IP ADDRESS'** for your new WiFi network.
7. Enter a **'PASSWORD'**
8. Enter the **'SUBNET MASK'**, default **'255.255.255.0'**
9. Save and Exit

11. Open your mobile phone / computer and view the GUI connection for the MCS-NitroMag.
12. This works just as you'd expect it to with Laptops or smart phones.
13. Refresh your WiFi, your new hotspot will be ready to connect.
14. Click on GUI, sample **'nitromag-Touch'**.



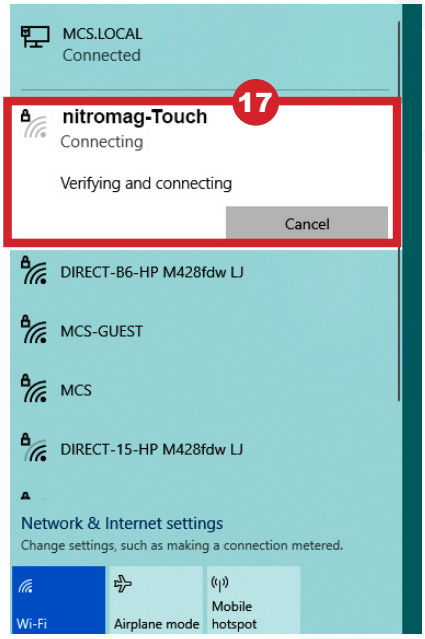




15. Click on the **"Connect using a security key instead"**

NOTE: THE SECURITY KEY IS THE PASSWORD YOU ENTERED IN THE WIFI ACCESS POINT

16. Enter the Password (default password: MCSadmin22) entered in the WiFi setup in the previous screen.
17. Next screen shows **'CONNECTING, VERIFYING AND CONNECTING'**



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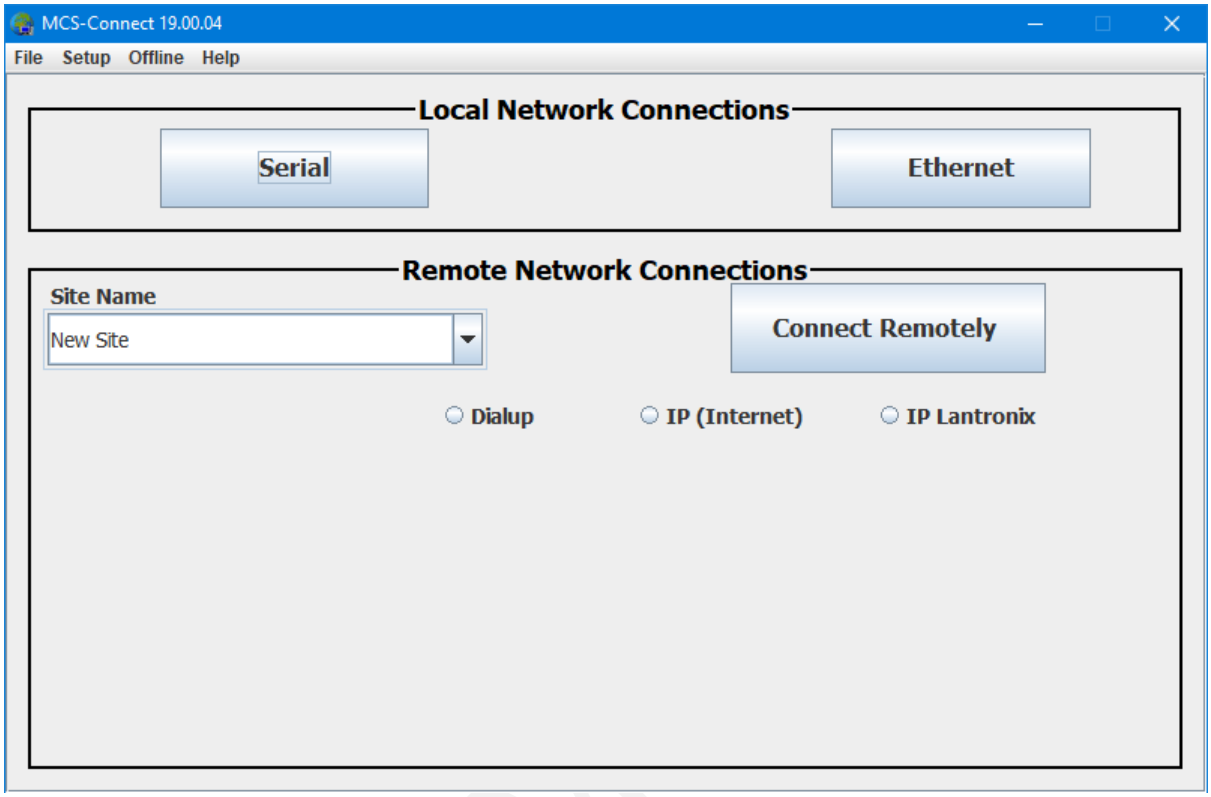
MCS-CONNECT

MCS-CONNECT software is part of the MCS Support System. Its purpose is to provide both local and remote communication for MCS micro controllers either by themselves or as part of a network.



MCS-CONNECT supports the following controllers:

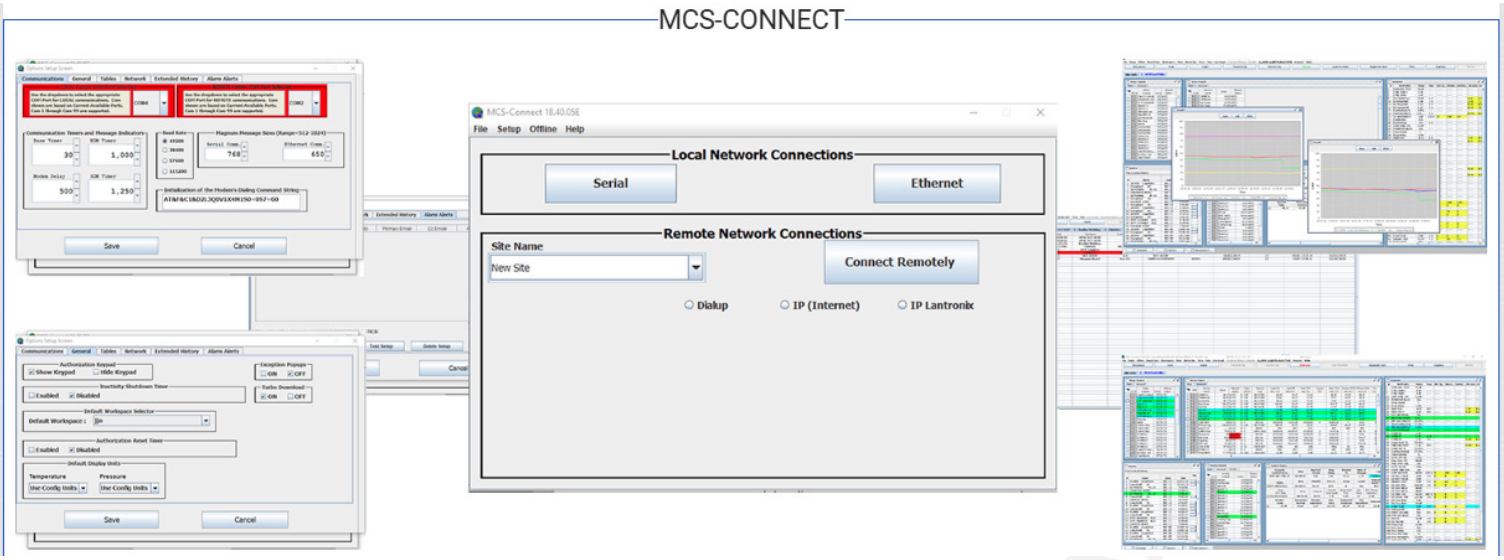
- MCS-NitroMag controller
- MCS-MAGNUM controller
- MicroMag controller
- MCS-8 controller with firmware version # (call MCS-SUPPORT)
- MCS-6 controller (limited with firmware)

MCS-CONNECT permits the user to monitor the status of the micro controller in real time and, with proper authorization, changes can be made to the system. In as fast as 10 seconds configuration files can be transmitted to or received from a MCS micro controller.

Another powerful feature of MCS-CONNECT is its ability to graph event history. Since MCS controllers automatically perform history logging, the user can select which inputs or outputs to graph and view the results either in real time or over a user selectable period of time.

MCS-CONNECT supports the SAVE of history data in the GRAPH function as a *.txt file. This allows the user to bring the data up in MCS-CONNECT offline or in a spreadsheet program such as Microsoft Excel.

Updates for MCS-CONNECT can be downloaded directly from the MCS website under “Support”, PC Software.



MCS-CONNECT PRODUCT FEATURES

- Java application runs on Windows/Linux
- Local communication @ 19200 baud
- Local Ethernet @ 10/100 MBPS
- Remote communication via phone or Internet
- Email/Test Message alarm alerts
- Auto Print to file on alarms
- Daily Scheduled Print to Files
- Temperature and PSI Conversion Wizard
- Extended History File Save - (MCS-MAGNUM 1008 Samples) - (MCS-MICROMAG 300 Samples)
- Interactive P/T Chart
- Lookup Tables
- Hide / Show Applicable Data
- Diagnostic Save/Auto-Send
- Window/Grids auto sizing based on screen resolution
- Customizable Workspace saving allow easy recall of window position & sizing
- Algorithm control states display
- Static & dynamic graphing / trending data
- Alarm retrieval & handling - these items can be printed and saved to PC for analysis and backup
- Manual / Auto mode control
- Setpoint modification
- Schedule modification
- Multiple authorization levels for security
- Runtime / Cycle count information
- Transmit / Receive configuration in as fast as 10 seconds
- Sensor Diagnostics
- Graphic Interface Sub List
    1. Customized to application
    2. User Customizable Gauges
    3. State Based Color and Image changes
    4. Animated device—pump rotating, comp moving, fan spin, etc.
    5. Easy view and access via graphic interface

1.6. Downloading from our Website

The latest versions of MCS-CONNECT can be downloaded from our website by going to:
http://www.mcscontrols.com/software.html

Navigate to MCS-CONNECT and choose the Windows or Linux version of the software.

MCS-CONNECT-WINDOWS and LINUX communicates with MCS-8, MCS-MAGNUM, and MicroMag micro controllers.

1.6.1 ► VIEW ONLY VERSION

This version is available to all OEM, Contractors, Installers and their personnel for downloading to their computers or laptop.

Changes cannot be made to a system when using this version.

It is used for 'VIEW' only.

1.6.2 ► AUTH CODE VERSION

If you are an authorized OEM, Contractor, or Installer using Mirco Control Systems, you can be authorized to download this version of the software.

Changes can be made to your system when using this version.

Contact MCS for the authorization code needed.

Please Note:

The software contained on our website is the latest official release of MCS-CONNECT for Windows and Linux versions.

We post 'BETA' versions of the software here also. This is software that is being tested in our plant and is made available for testing in the field before its general release to OEM's, Contractors and Installers.

These are full install versions and does not require previous versions to have been installed. To install the software, first download (Save) the file to your computer or flash drive.

If installing on our Touchscreens, move the installer to the touchscreen via network or flash drive. Then run it by clicking on the downloaded file and following the instructions given.

IMPORTANT!!

Prior to making any changes to your Touchscreen, read the application notes which are posted to our website on upgrading.

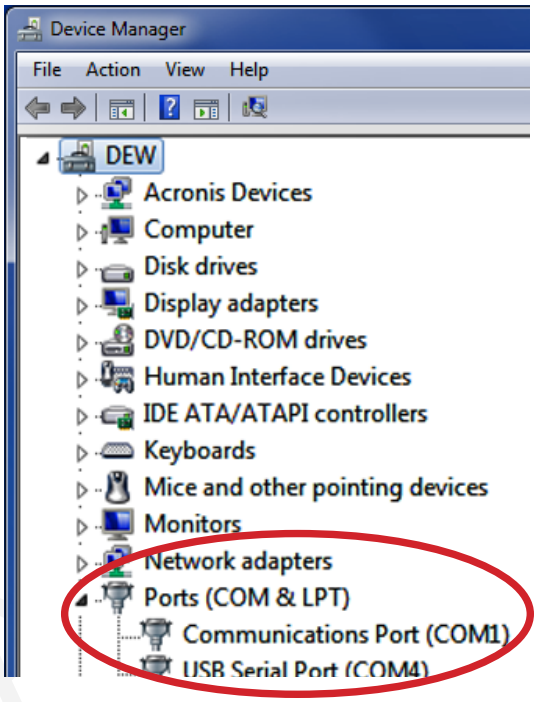
APP113-UPGRADING MCS-CONNECT ON TOUCHSCREEN

Prior to upgrading MCS-CONNECT
make sure your firmware and Graphics are up to date
Consult MCS for support

SETUP OPTIONS FOR MCS-CONNECT

1.7. Finding your Communication Ports on your PC.

MCS-CONNECT defaults to COM1 for Local communications and COM2 for Remote communications. Local communication refers to a direct connection between your PC and the Unit, whereas Remote communication refers to communication via your modem. If your PC uses a different port, use the button to select the appropriate port.



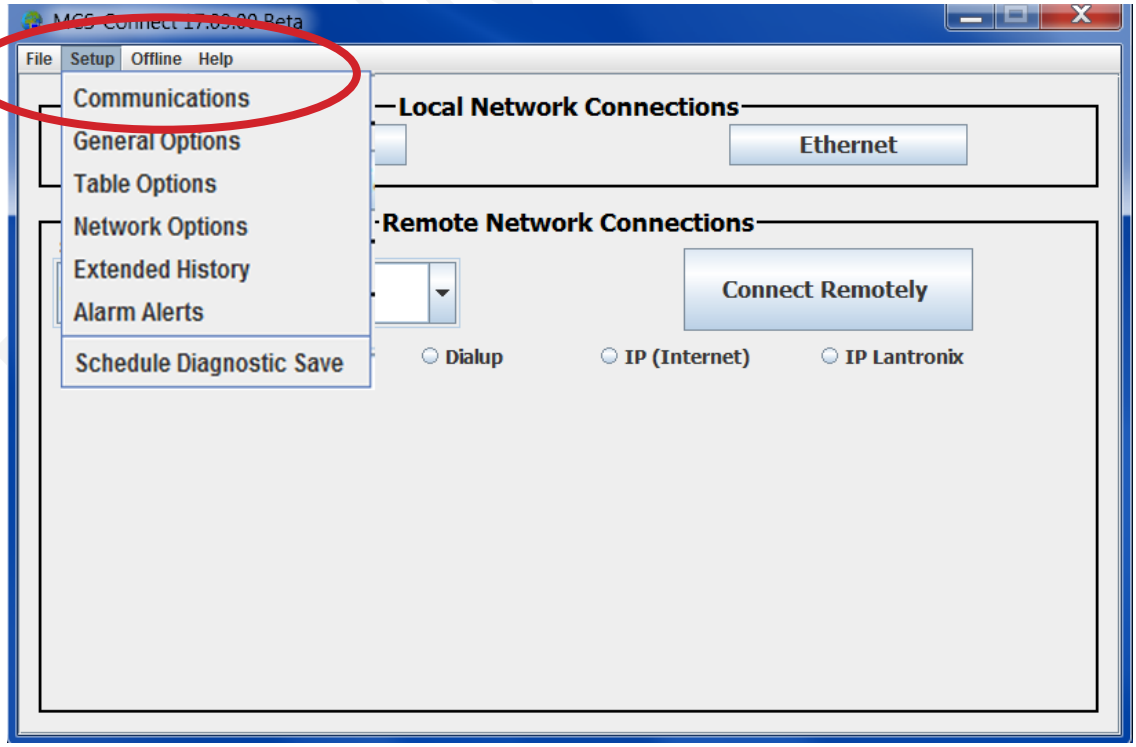
To find your PC's com port before starting setup for MCS-CONNECT:

For Microsoft Windows 7and up:

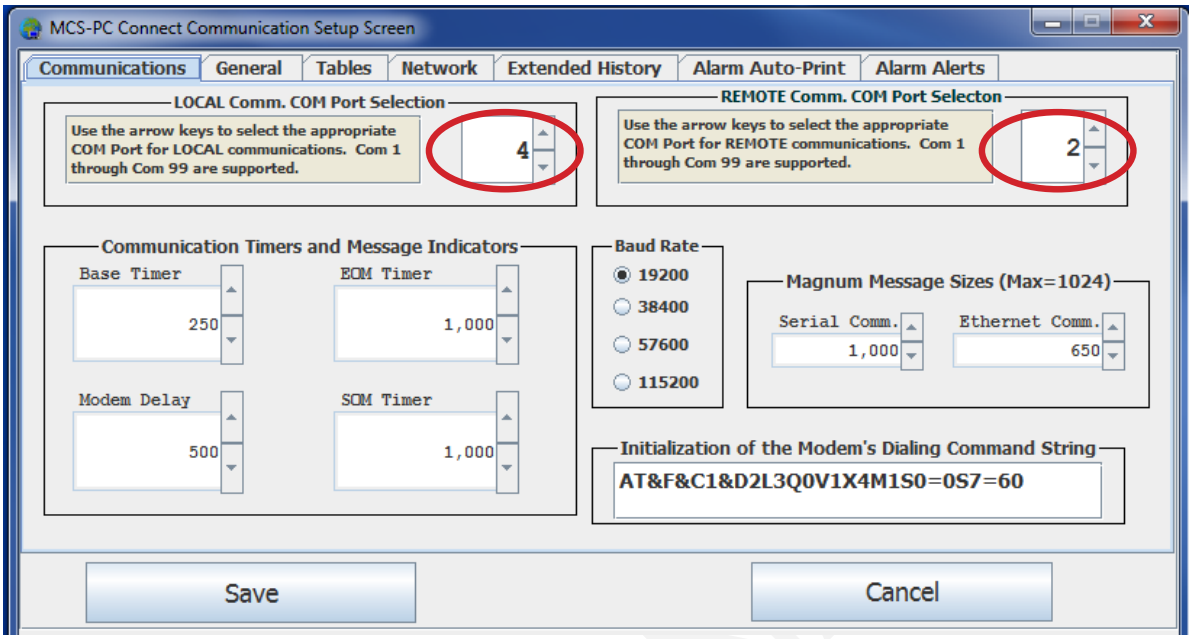
1. At your desktop, left click on Start.
2. Left click on Control Panel button.
3. Click on Device Manager.
4. Left click on Ports (COM & LPT) to see Port information.

7.1 MCS-PC-CONNECT Communication Setup

Before a serial connection can be made to an MCS controller the COM (communication) PORT must be selected. To select a COM PORT for communication, choose the Setup menu option and then choose Communication,



Next screen shows com ports - make changes as per your computer's communication ports and save these changes.



1.8. PC Communication Speed & Wait Timers

Base Timer: Time is length of wait before windows activates the main program loop where the normal communications occur. (Mouse clicks also cause an interrupt to the program to handle that function.)

SOM Timer: Timer is used to perform two functions:

When the system is scanning the network for active MCS controllers, this is the wait time before that address is considered not to have an active controller. When a controller is found or this amount of time has expired the system moves to the next network address.

Once communication has been established, the system will wait this length of time for a valid start of message (SOM) from the controller in response to a message request. If none is received, the system will retry and extend this time. Three retries are attempted before an error is reported. (Note that when communicating with an MCS-8 controller you should set this value to 1000 or greater to ensure proper communication.)

EOM Timer: Once a valid SOM has been received, the system will wait this length of time to receive a valid end of message (EOM) from the communicating controller.

1.9. PC Communication Modem - Remote

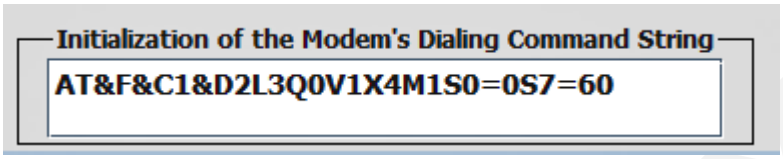
Modem Delay: Used only with remote communications. Once the PC's modem has been verified that it is active, on the COM PORT specified and the dial string has been sent to it, the system will wait this length of time for the response from the called modem. This is used only for the first response after communications has been established the SOM and EOM timers are used. The SOM timer will be extended with remote communications.

1.10. Initialization Dial String

If you have a standard “Hayes” compatible modem, no changes are required. If not, you must locate (your modem’s manual) and enter the equivalent values.

Note: Try AT&F if default string does not work.

Once you have set the modem initialization command string you should select the ‘Save’ button. If you want to abandon the change you should select the ‘Cancel’ button.

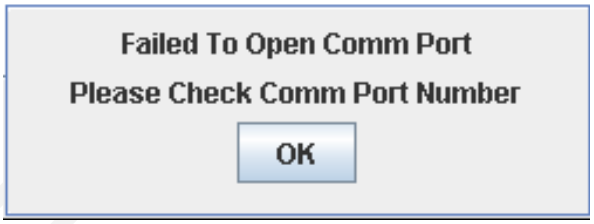


Communications can now be established.

1.10.1 Local Communication Errors

No modem detected or Comm Port initialization error – Can occur in either the local or remote modes. The COM PORT cannot be initialized. Check the COM PORT setting to determine if the correct port, base address and IRQ has been selected. A malfunctioning COM PORT on the PC can also cause this error.

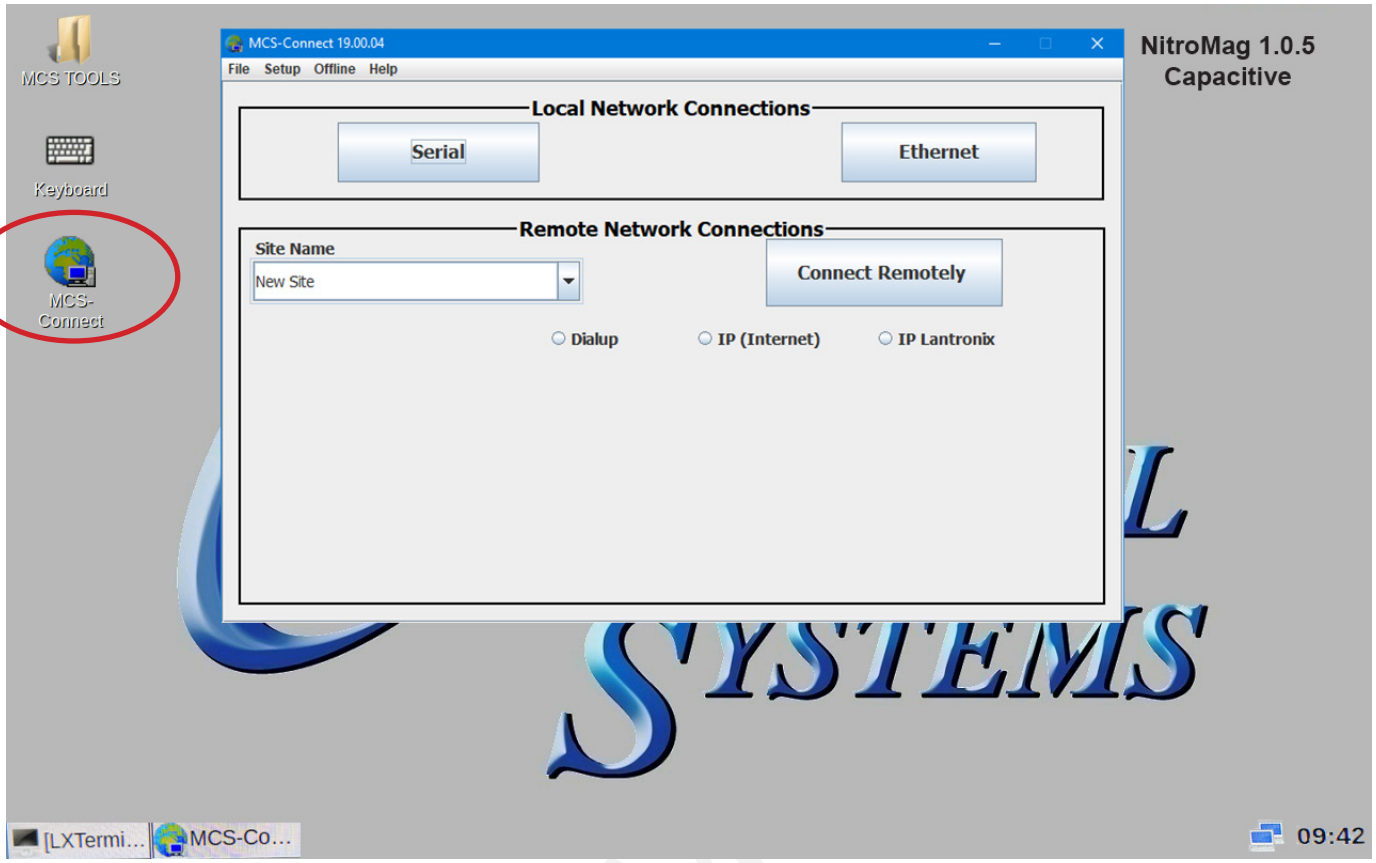
This can be checked by executing a Windows terminal program and then shorting pins 2 and 3 together on the cable. Any characters that are typed at the PC will appear on the screen of the PC if the port is functioning. The following message will be displayed:



COM PORT is in use – Can occur in either the local or remote modes.

COM PORT is not available, it is busy - This can occur if another MCS-CONNECT is running on the network or another program is using the requested COM PORT. When this condition occurs the above message will be displayed:

11. Getting Connected - MCS-NitroMag-15.4



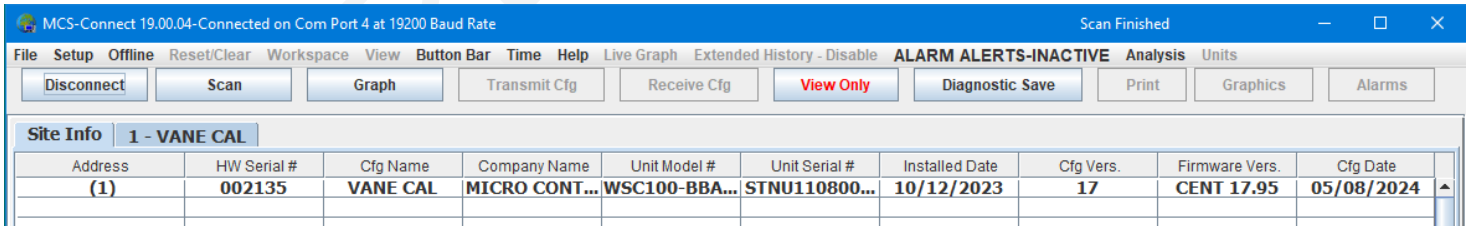
Once you have completed your setup of MCS-CONNECT, click on the communications button for MCS-CONNECT program to start scanning for MCS-controllers.

1.12. SCAN FOR CONTROLLERS

MCS-CONNECT will search for up to 60 MCS controllers that could be connected on the network.

Once all of the units are displayed or when the unit you want is displayed you may select that unit from the tab at the top of the grid or double click anywhere on that row to load up the controller's status.

You can use the horizontal or vertical arrows to scroll for more controllers tabs in the site info.

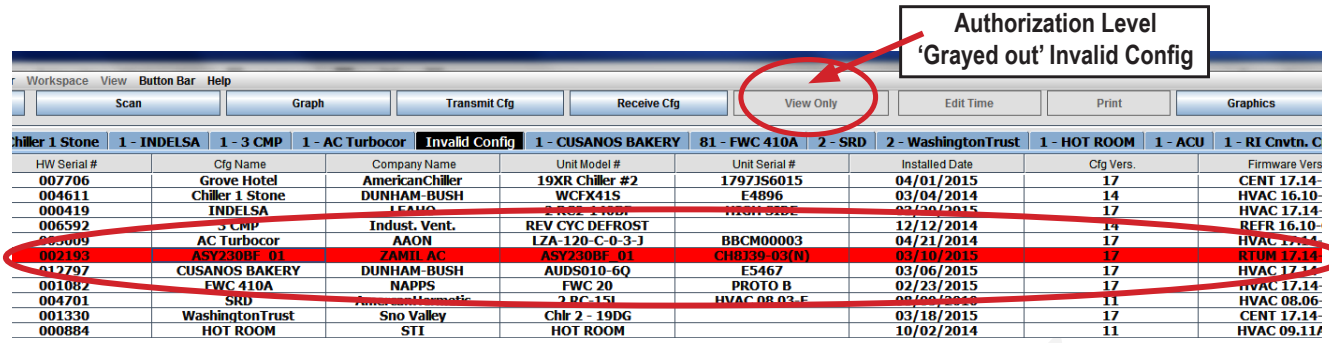


Serial Network Connection: If MCS-CONNECT does not find any MCS controllers, the Scan Finished message will be displayed in the title bar and no units will be displayed in the grid.

In the info grid MCS-CONNECT version and scanning information is displayed in the title bar.

Once in the Status Screen MCS-CONNECT version, day, date and time, plus the company name will be displayed.

If a MCS Controller has an invalid configuration, its entire row will have a RED background. Installer needs to Transmit a new configuration file to this controller before continuing with setup. The installer is authorized at 'View' level to 'Transmit Cfg' and 'Receive Cfg'.



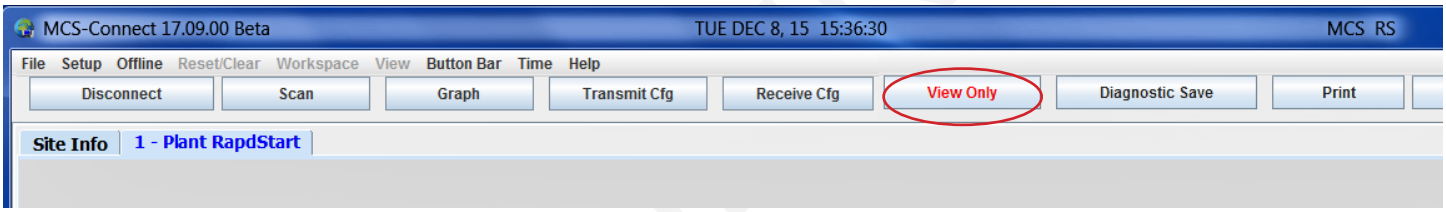
1.13. PASSWORDS - GETTING AUTHORIZED

VIEW ONLY MCS-CONNECT SOFTWARE CANNOT BE AUTHORIZED TO A HIGHER LEVEL

OEM'S, CONTRACTORS and INSTALLERS MUST DOWNLOAD THE 'AUTH CODE' VERSION OF MCS-CONNECT TO BE ABLE TO MAKE CHANGES. CONSULT MCS SUPPORT.

At any time while connected to a MCS controller the user can get authorized to a higher level by clicking on the **'View Only'** button located at the top of the screen. Higher levels of Authorization may be necessary to make changes to the controller you are connected to.

See levels below:

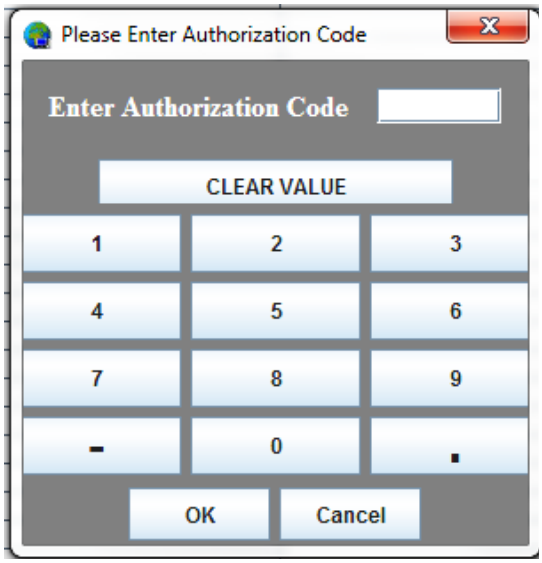


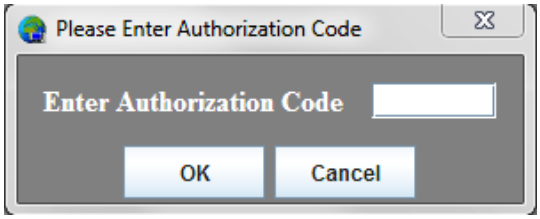
Note: The color of the Authorization button indicates what level you are authorized, and the current level of authorization. The system default is 'View' only.

YOU MUST HAVE AUTHORIZATION TO MAKE CHANGES TO THE SYSTEM HIGHER THAN VIEW. CONSULT YOUR SUPERVISOR FOR WHAT AUTHORIZATION LEVEL IS NEEDED FOR MAKING CHANGES TO THE SYSTEM.

Red = VIEW ONLY
Light Blue = USER LEVEL
Fuscia = SERVICE
Blue = SUPERVISOR
Green = FACTORY

When you select the Authorization button the following pop up will be displayed:
Enter the 4 digit authorization code in the space provided and press the 'enter' button.
The **Cancel** button will return the user to the previous screen with no changes made to the authorization level. *Note: That the code that is entered is not visually displayed*. If an invalid authorization code is entered, no message is displayed. The Authorization color and level will remain unchanged.





Authorization popup showing with keypad display and without keypad display.
This is set in the 'General Options' in the setup.

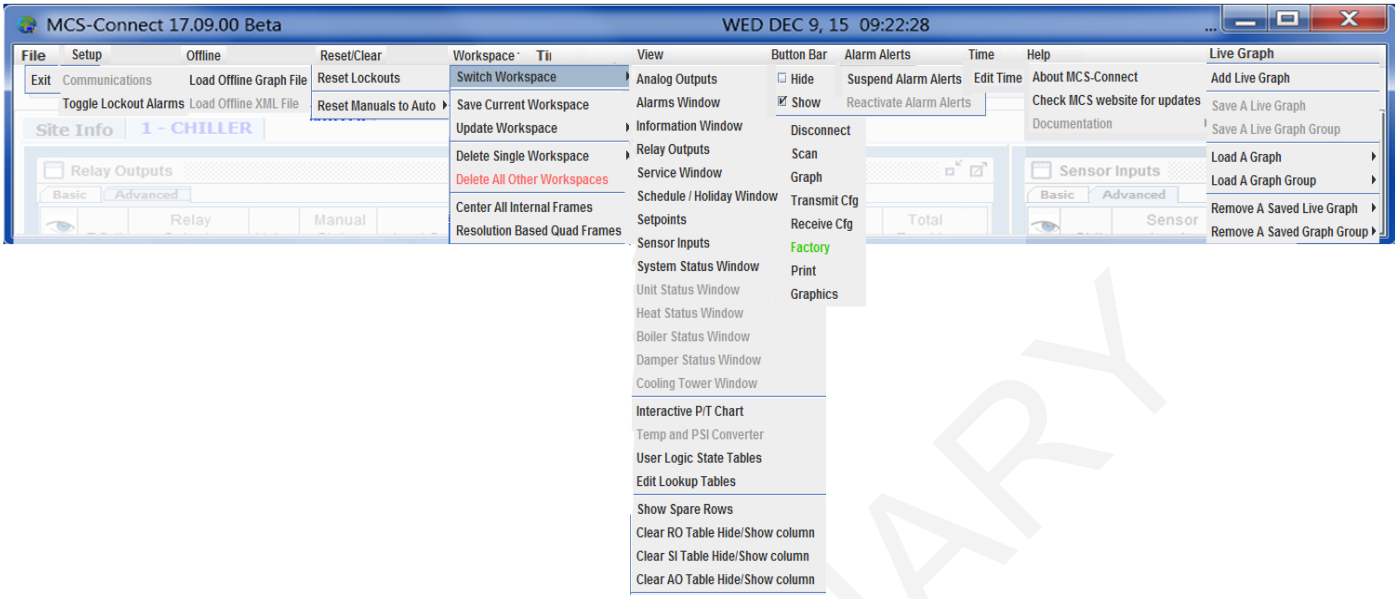
NOTE: MCS-CONNECT version 19.00 and up allows for a combination code using both ALPHA and NUMERICAL passwords

USING THE KEYPAD ON THE TOUCHSCREEN

1. Using the stylus pen, click on the Keypad on the desktop.
2. Click on the **'minimize'** button on the top cornor of the keypad to hide the keypad. (the keypad can be shown at the bottom of your desktop when you move the stylus over the bottom).
3. Double click on **MCS-CONNECT** icon on your desktop to open.
4. Click either the Ethernet or Serial tabs to scan for your controllers.
5. Click on the controller which you want to open.
6. Click on the **'VIEW ONLY'** tab at the top of the menu bar. *You must be authorized to make changes*.
7. Click on the bottom of the desktop to show minimized Keypad.
8. Click on the Keypad to open. This will enable you to enter both **'ALPHA'** and or **'NUMERICAL'** passwords.
9. Click on **'ENTER AUTHORIZATION ONLY'** on MCS-CONNECT.
10. With the cursor shown blinking, use the stylus to enter your combination code in MCS-CONNECT.
11. Click **'OK'** to change authorization.

MENU BAR DESCRIPTIONS

Below is a pull down list of functions for the Menu Bar Tabs. The tabs allows the user to make fast screen changes, save custom workspaces, etc. See a description for each item below.



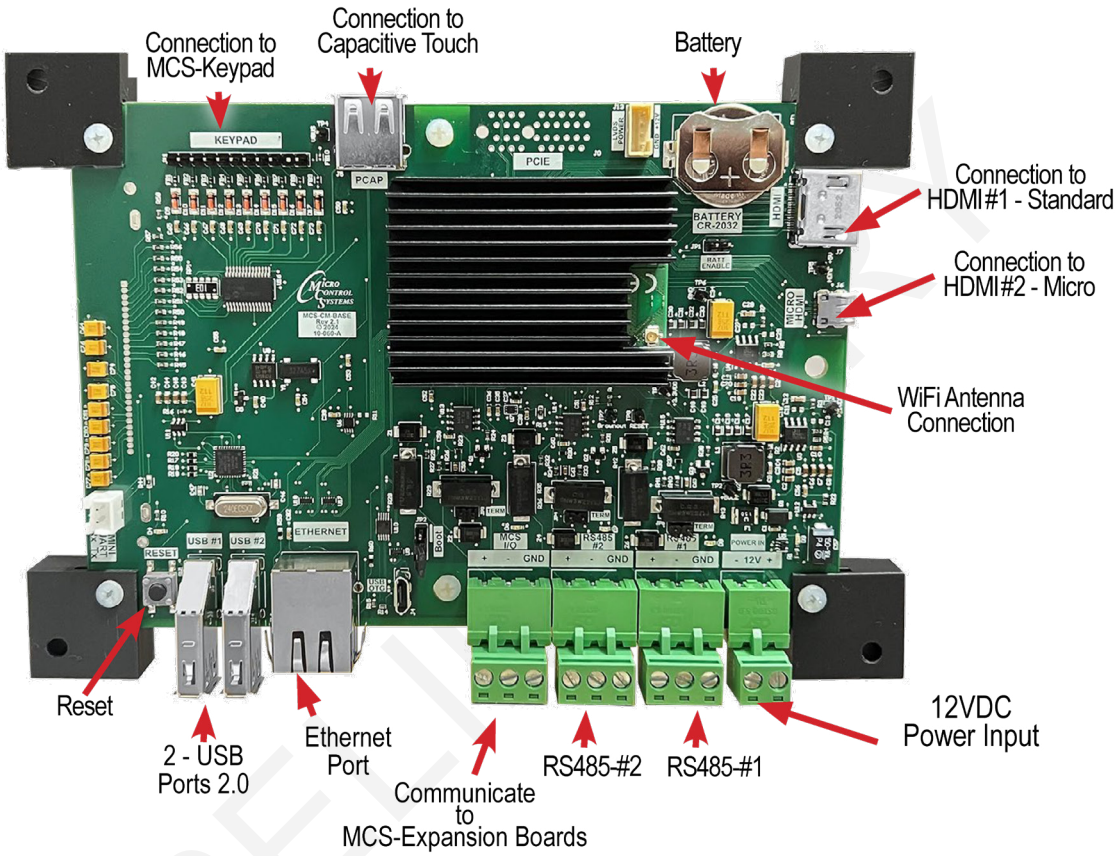
Click on MCS-TOOLS at the main screen and click on the MCS-CONNECT Manual.pdf supplied in the 'Site Documents bookmark to see all the functions for the MENU BAR.

MCS-NitroMag-N LAYOUT

1. Components of MCS-NitroMag-N

NITROMAG OPERATION SYSTEM - REV 1.05 & up

NITROMAG HVAC FIRMWARE - REV 19.00E & up

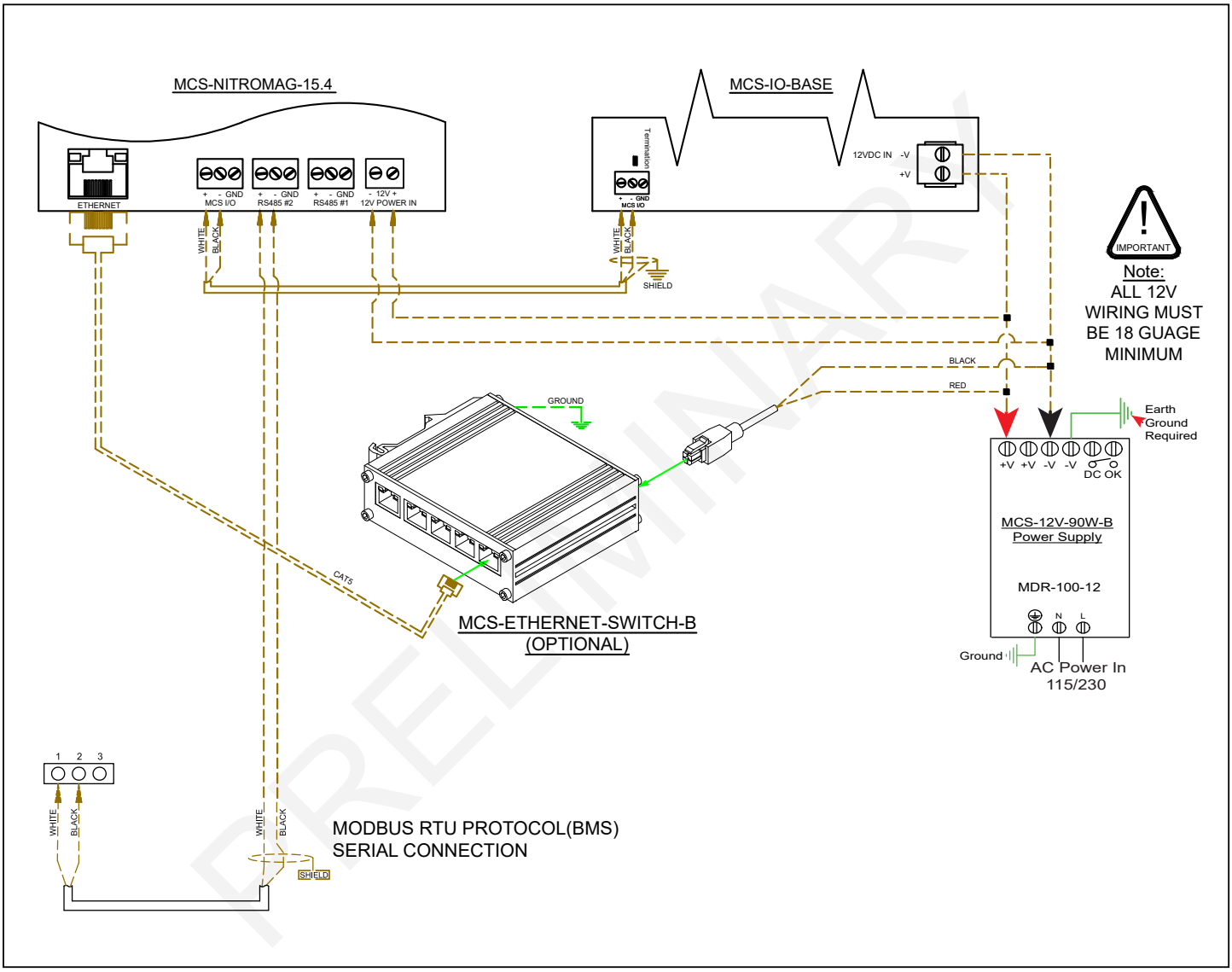


- RS-485 PORTS
  Each port suports up to 115200 baud rate.
- BMS NETWORK CONNECTIVITY
  BUILD IN SUPPORT - Modbus RTU Master
  Protocols - BACnet IP, BACnet MSTP, Modbus IP, Modbus RTU Slave
  (N2 coming soon) (LonTalk requires MCS-BMS-GATEWAY)
- MODBUS MASTER

  BUILD IN SUPPORT - Supports up to 20 Modbus devices e.g., VFD's KW Meter, Compressors.
  (MCS-Modbus I/O no longer required).

MODBUS WIRING TO SLAVE / MCS-IO-BASE

MCS-NitroMag-N communicated through the MCS-I/O communication port at 38,400 baud rate.
The firmware includes a MODBUS INTERFACE which enables it to act as a MODBUS MASTER using the MODBUS RTU protocol, which allows communication with the MODBUS slave for parameter access over the RS485 communication port on the MCS-Nitromag-N.



The MCS-NitroMag-N is configured through the MCS-CONFIG firmware. The MODUS RTU MASTER supports up to 20 MODBUS decives e.g., VFD's, KW Meter, Compressors.

Using MCS-CONFIG firmware, a configutation file is created based on the slave parameters.

Each parameter is assigned a pre-programmed register number.

Those register numbers are named in the configuration file, which will display in MCS-CONNECT when viewing the controller.

The register parameters will be assigned to Sensors inputs, Relay outputs and Analog outputs to relay the information from the MODBUS slave.

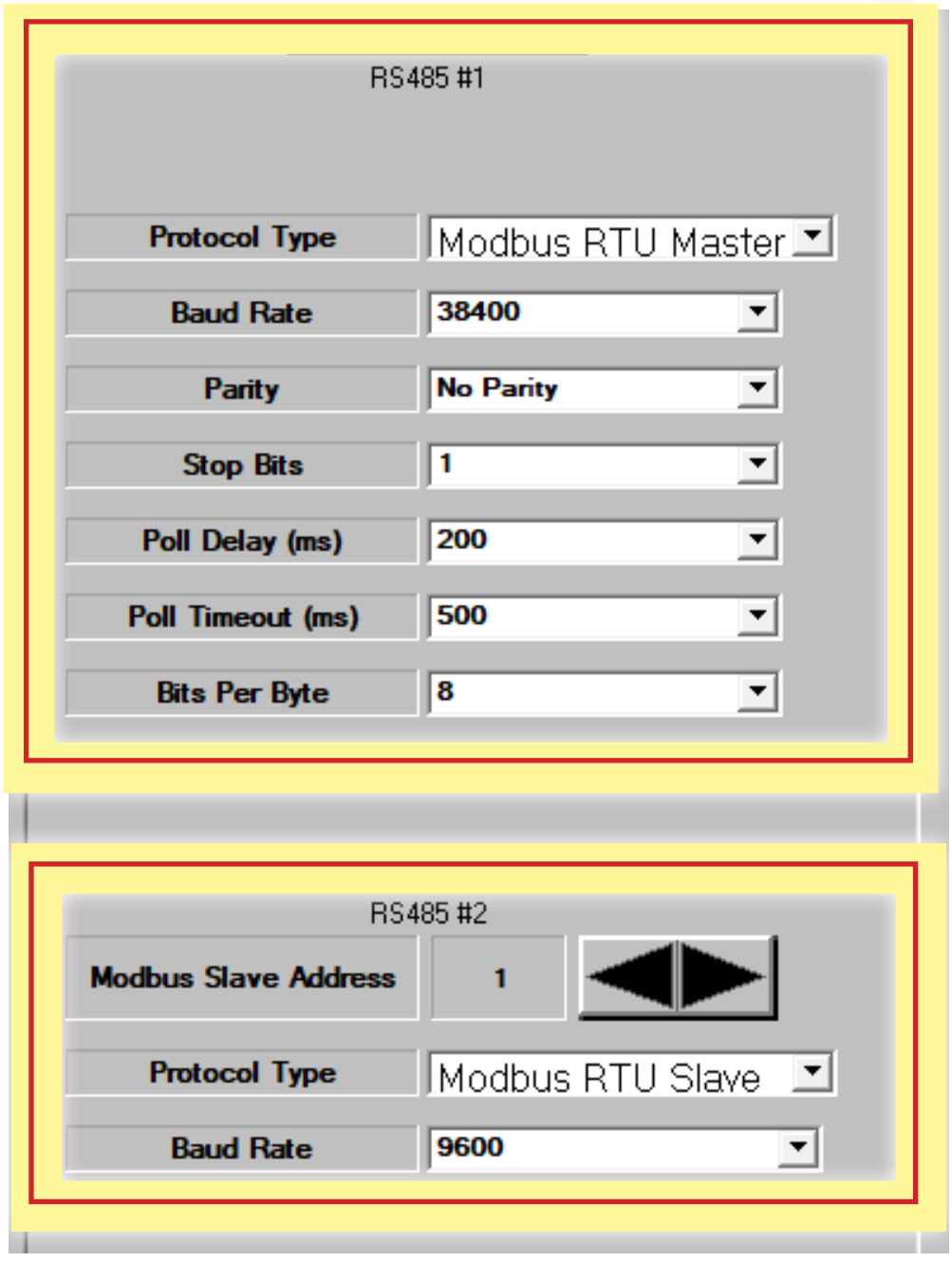
The next pages shows information on how this is setup in the MCS-CONFIG file.

MODBUS / MCS-CONFIG SETUP

RS 485 ports Communication with MCS-NitroMag-N

MCS-CONFIG version 18.xxx.xx and up allows the programming of the RS485 ports in the setup section.

- Up to 20 MODBUS devices can be set up.
- RS 485 #1 and RS 485 #2 ports can be assigned as shown on the right.
- RS485 port #1 Protocol type can be set up as Modbus RTU Master.
- Port #2 can be set up as a MODBUS RTU slave.
- Check with the slave manufacturer to change the Baud Rate, Parity, and Stop Bits.



1. Modbus RTU Master

BUILT IN SUPPORT

MCS-NitroMag-N Supports up to 20 Modbus devices e.g., VFD's KW, compressors.

(Modbus I/O no longer required)

Supports protocols BACnet IP, BACnet MSTP,L Modbus IP, Modbus RTU slave, Modbus RTU Master.

(Lontalk needs MCS-BMS-GATEWAY), N2 coming soon)

1.1. MODBUS SLAVES

Slaves are pre-programmed in the configuretaion file setup for your controller when shipped.

A sample configuration file is shown below and on the next page. MCS-NitroMag can be pre-rogrammed with the MODBUS write registers found in documentation supplied by the manufacturer using MCS-CONFIG software.

MODBUS Device Setup in MCS-CONFIG

Currently Editing Device Named: Test1

Modbus Devices Setup

#	Device Name	Device Address	RS485 Number	Configuration
1	Test1	1	RS485-2	Custom - Sample Slave
2	SPARE-2	0	Not Set	Not Used
3	SPARE-3	0	Not Set	Not Used
4	SPARE-4	0	Not Set	Not Used
5	SPARE-5	0	Not Set	Not Used

- 20 Devices can be added - (drop down window)
- Device Name can be edited
- Device Address is asigned
- Rs485 port number is assigned (RS485-2 default)
- Configuration is the Name of Slave (additional slaves can be programmed using Custom setting)

General Read/Write Modbus Master Points

Device Lockout	#	Register Number Offset	Register Number Offset (HEX)	Register Type	Modbus Data Types
No Lockout	1	84	0x0054	(R-FC01) Coil Status	Single Bit
No Lockout	2	0	0x0000	Not Set	Not Set
No Lockout	3	0	0x0000	Not Set	Not Set
No Lockout	4	0	0x0000	Not Set	Not Set
No Lockout					

- Register Number offset
- Register Number offset (HEX)
- Register Type (drop down window)
- Modbus data type (drop down window)

MODBUS / MCS-CONFIG SETUP

1. MODBUS DEVICE LIST

Currently Editing Device Named: Comp1A1000

Modbus Device List

Modbus Devices Setup

#	Device Name	Device Address	RS485 Number	Configuration	De
1	Comp1A1000	1	RS485-1	YASKAWA GA800/A1000	N
2	Comp2A1000	2	RS485-1	YASKAWA GA800/A1000	N
3	ApmPowerMete	3	RS485-2	POWER METER APM PWR APO	N
4	SPARE-4	0	Not Set	Not Used	N
5	SPARE-5	0	Not Set	Not Used	N

Modbus Data Types

Not Set
Not Set
Not Set
Not Set

Line 1 information is added for the MODBUS Device

1. Device Name
2. Device Address
3. RS485 Port Number
4. Device Configuration setup
   a. Information is programmed into the MCS-CONFIG file
5. ***Sensors Inputs, Relay and Analog Outputs will populate when Configuration Device is chosen.***

2. SENSORS INPUTS

#	Name (1 to 10 char)	Display Type	Manual Value or NC/NO (select to change)	Select Display Type					ypes	Bitmask	MB
6-1	VfdFault 1	MB RTU Read	Closed=OFF	DIGITAL/SW					t	8	
6-2	Vfd Hz 1	MB RTU Read	45	DEC1NOCH					Byte	65535	
6-3	Vfd KW 1	MB RTU Read	17	KW	Comp1A1000	40	0x0028	(R-FC03) Holding Registers	Signed Int16 High Byte	65535	
6-4	VfdAmps 1	MB RTU Read	75	AMPS/CT	Comp1A1000	39	0x0027	(R-FC03) Holding Registers	Signed Int16 High Byte	65535	
6-5	VfdVolts 1	MB RTU Read	460	VOLTS-1Dec	Comp1A1000	38					
6-6	VfdDCBus 1	MB RTU Read	600	VOLTS-0Dec	Comp1A1000	50					
6-7	VfdHsink 1	MB RTU Read	105	TEMP	Comp1A1000	105					
6-8	VfdFlt #1	MB RTU Read	Open=OFF	DIGITAL/SW	Comp1A1000	129					

3. RELAY OUTPUTS

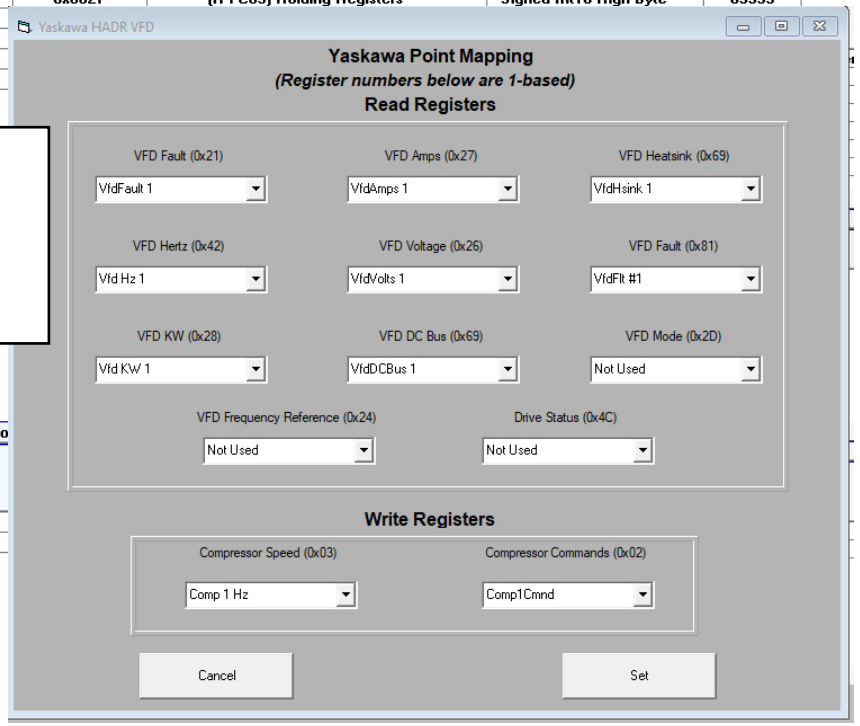
#	Name

1. A popup screen will show the registers (points) assigned to the MODBUS Device in HEX numbers.
2. Information for Sensors Inputs, Relay and Analog Out puts are populated after the Device Configuration is entered.

4. ANALOG OUTPUTS

Analog Output Modbus Master Po

#	Name	Control Type	Modbus Display Type	Device Name	Register Number Offset	Register Number Offset (HEX)
6-1	Comp 1 Hz	MB RTU AO Write	Spare	Comp1A1000	3	0x0003
6-2	Comp1Cmnd	MB RTU AO Write	Spare	Comp1A1000	2	0x0002



EXAMPLE OF CONFIG SETUP FOR MODBUS SLAVES

MCS-CONNECT - Startup

MCS-CONNECT software is part of the MCS Support System. Its purpose is to provide both local and remote communication for MCS micro controllers either by themselves, or as part of a network.

MCS-CONNECT supports the following controllers:

- MCS-MAGNUM controller
- MCS-NitroMag controller
- MicroMag controller

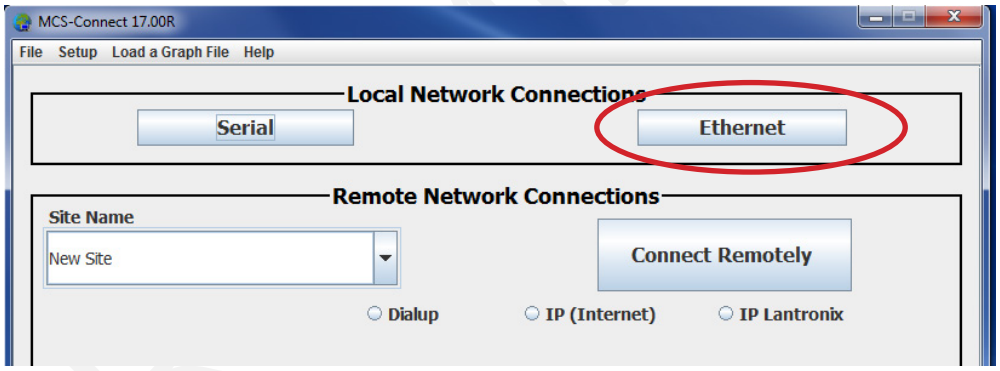
5. Communicating with MCS-CONNECT

1. MCS-CONNECT must be setup for the correct network address for your buildings IP address in order to connect to your controllers.
2. Configuration files and Firmware software can be changed based on your authorization to make those changes.
3. Information for makeing changes can be found in the MCS-CONNECT latest manual located on:

www.https://mcscontrols.com/manuals.html

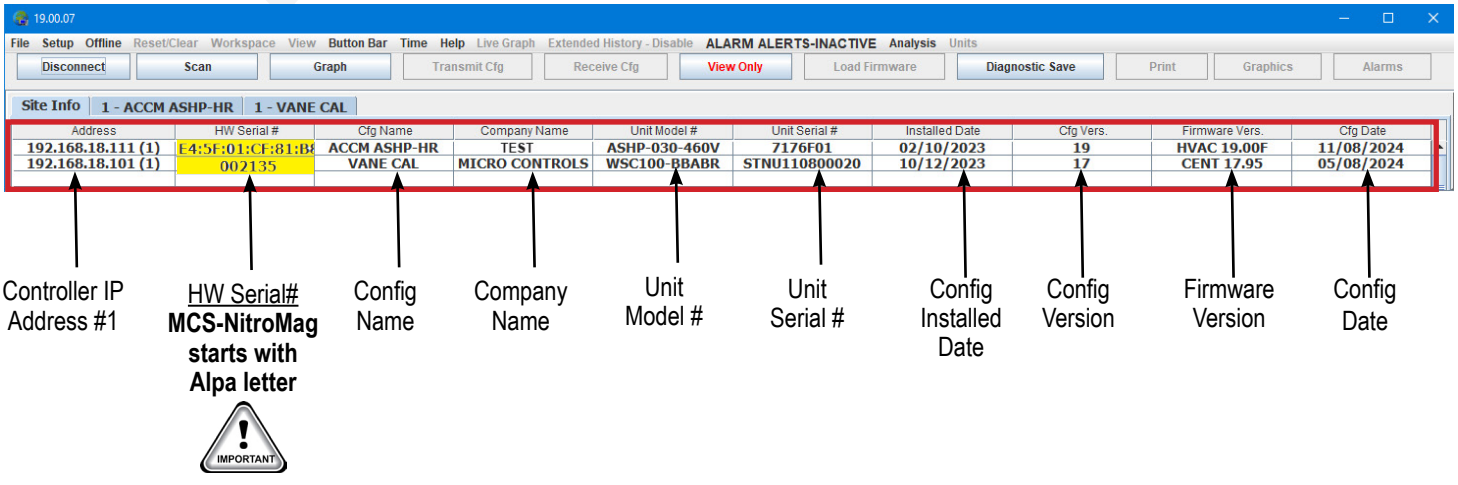
Scan for Controller

Once connected, click on the MCS-CONNECT program to open.Changes to the config and firmware software can be changed if you are authorized. Click on the Ethernet tab to open available controllers.



Next screen shows MCS-CONNECT scan for controller. Click anywhere in the row to open your controller.

(if there is a RED line through your controller, you need to update the config file/firmware.)

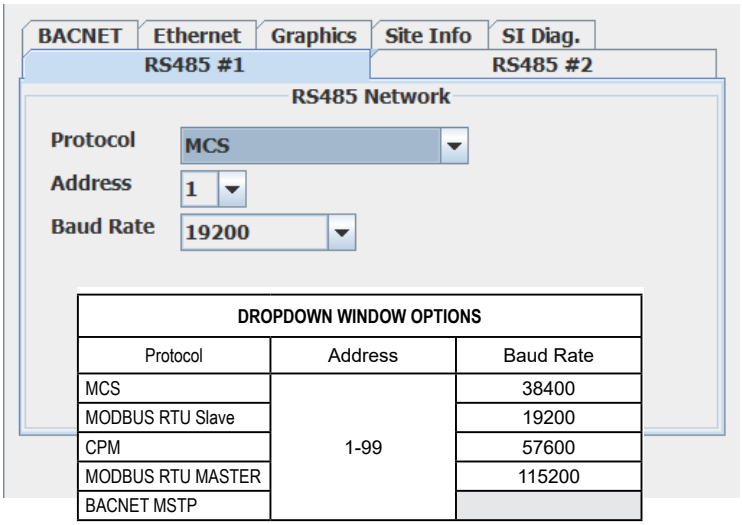


6. RS485 PORTS SETUP(service menu, MCS-CONNECT)

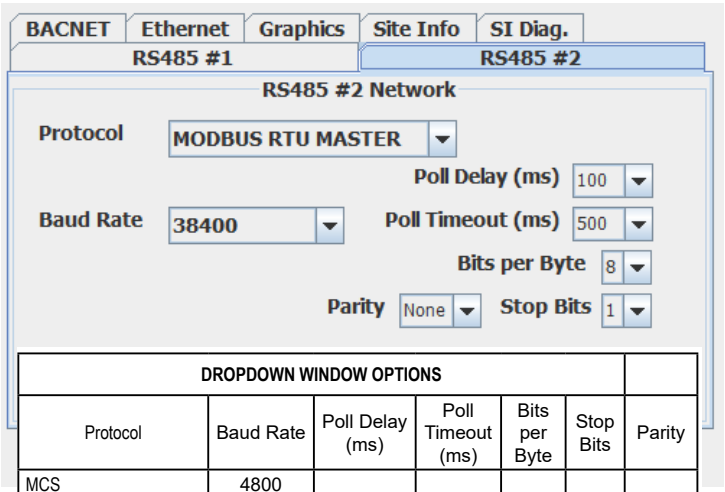
RS-485 Ports..... 2 @ up to 115200 baud rate

Sample Screens for setup MODBUS salve (receive Cfg file received)

1. RS485 #1 - Setup for MCS I/O communicating -19,200 baud - address #1
2. RS485 #2 - Setup for MODBUS RTU MASTER - 38,400 BAUD. Bits per Byte=8, Stop Bits= 1



DROPDOWN WINDOW OPTIONS		
Protocol	Address	Baud Rate
MCS	1-99	38400
MODBUS RTU Slave		19200
CPM		57600
MODBUS RTU MASTER		115200
BACNET MSTP		

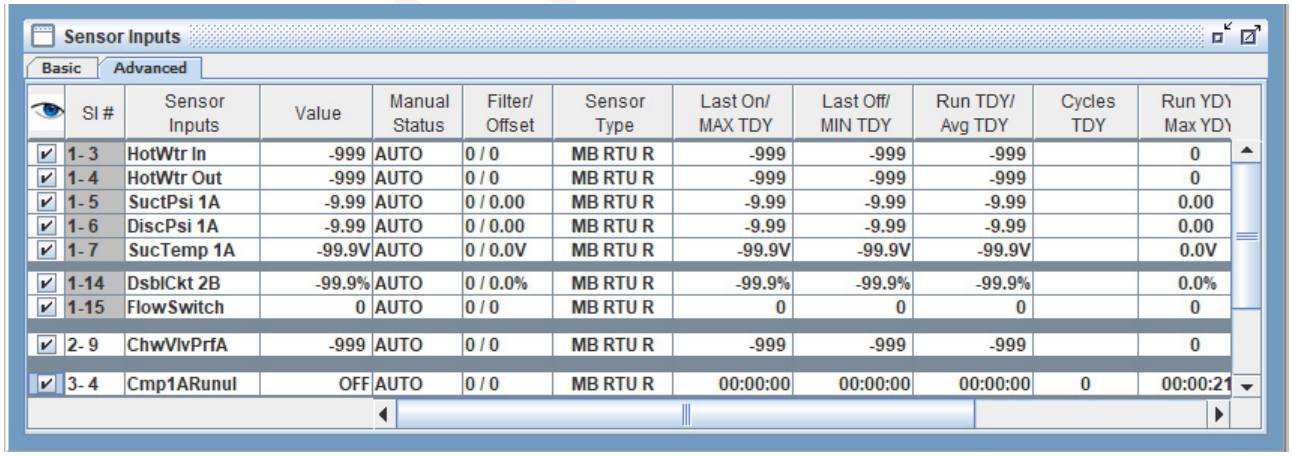


DROPDOWN WINDOW OPTIONS						
Protocol	Baud Rate	Poll Delay (ms)	Poll Timeout (ms)	Bits per Byte	Stop Bits	Parity
MCS	4800	10 ↓ 1000	100 ↓ 2000	7 or 8	1 or 2	None Even Odd
MODBUS RTU Slave	9600					
CPM	19200					
MODBUS RTU MASTER	38400					
	57600					
	115200					

7. SENSOR INPUTS

Sample - ABB MODBUS Read Sensor Inputs

9 Sensor Inputs pre-programmed into software. **(receive Cfg file received)**

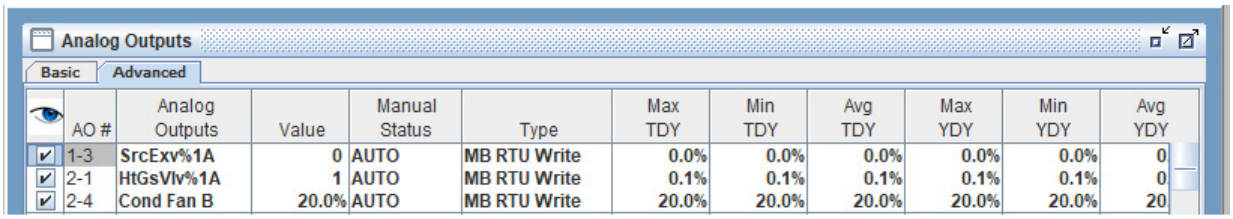


	SI #	Sensor Inputs	Value	Manual Status	Filter/ Offset	Sensor Type	Last On/ MAX TDY	Last Off/ MIN TDY	Run TDY/ Avg TDY	Cycles TDY	Run YDY Max YDY
☑	1-3	HotWtr In	-999	AUTO	0 / 0	MB RTU R	-999	-999	-999		0
☑	1-4	HotWtr Out	-999	AUTO	0 / 0	MB RTU R	-999	-999	-999		0
☑	1-5	SuctPsi 1A	-9.99	AUTO	0 / 0.00	MB RTU R	-9.99	-9.99	-9.99		0.00
☑	1-6	DiscPsi 1A	-9.99	AUTO	0 / 0.00	MB RTU R	-9.99	-9.99	-9.99		0.00
☑	1-7	SucTemp 1A	-99.9V	AUTO	0 / 0.0V	MB RTU R	-99.9V	-99.9V	-99.9V		0.0V
☑	1-14	DsblCkt 2B	-99.9%	AUTO	0 / 0.0%	MB RTU R	-99.9%	-99.9%	-99.9%		0.0%
☑	1-15	FlowSwitch	0	AUTO	0 / 0	MB RTU R	0	0	0		0
☑	2-9	ChwVlvPrfA	-999	AUTO	0 / 0	MB RTU R	-999	-999	-999		0
☑	3-4	Cmp1ARunul	OFF	AUTO	0 / 0	MB RTU R	00:00:00	00:00:00	00:00:00	0	00:00:21

8. ANALOG OUTPUTS

Sample - ABB MODBUS Read Analog Outputs

3 Analog Outputs pre-programmed into software. **(receive Cfg file received)**



	AO #	Analog Outputs	Value	Manual Status	Type	Max TDY	Min TDY	Avg TDY	Max YDY	Min YDY	Avg YDY
☑	1-3	SrcExv%1A	0	AUTO	MB RTU Write	0.0%	0.0%	0.0%	0.0%	0.0%	0
☑	2-1	HtGsVlv%1A	1	AUTO	MB RTU Write	0.1%	0.1%	0.1%	0.1%	0.1%	0
☑	2-4	Cond Fan B	20.0%	AUTO	MB RTU Write	20.0%	20.0%	20.0%	20.0%	20.0%	20

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