

# QX SERIES


## HOW TO DOCUMENT



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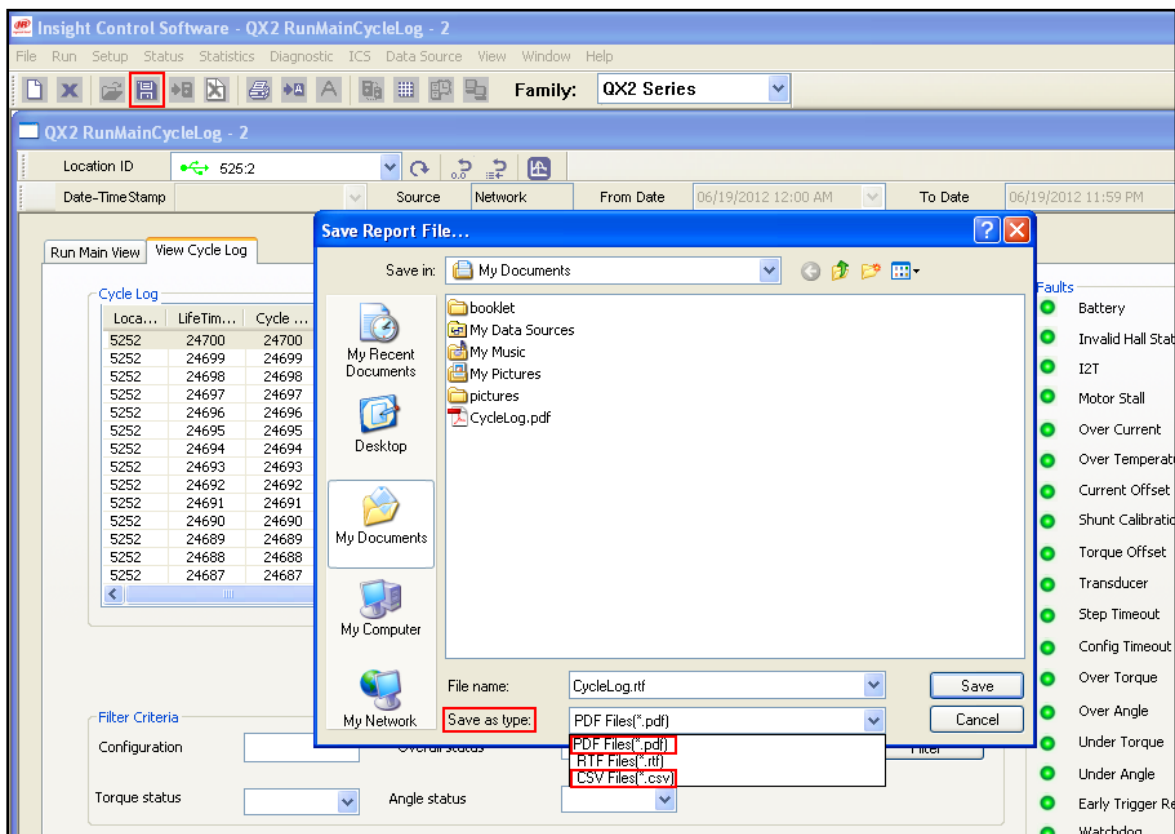
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## How to download data onto local PC

1. On the main page of ICS select Run → RunMainCycleLog, and select the correct Location ID.
2. Next, under the tab “Run Main View” (which will show you the data for the last cycle), select the tab that says “View Cycle Log.” This might take a few minutes to load.
3. This screen will show the data for up to the last 1200 cycles. This screen will show you all of the default EOR.
4. In order to save this data hit the save button  (while still having the RunMainCycleLog screen up). You can also go to File → Save. This will save the data onto the local PC, with the time and date, so it can be retrieved at a later.

## Saving Data to Excel or PDF

1. To save your data to a PDF or Excel format, you have to select File → Export and where it says “Save as Type” change the file type to PDF Files (\*.pdf) for a PDF file, and change the file type to CSV Files (\*.csv) for an Excel document.

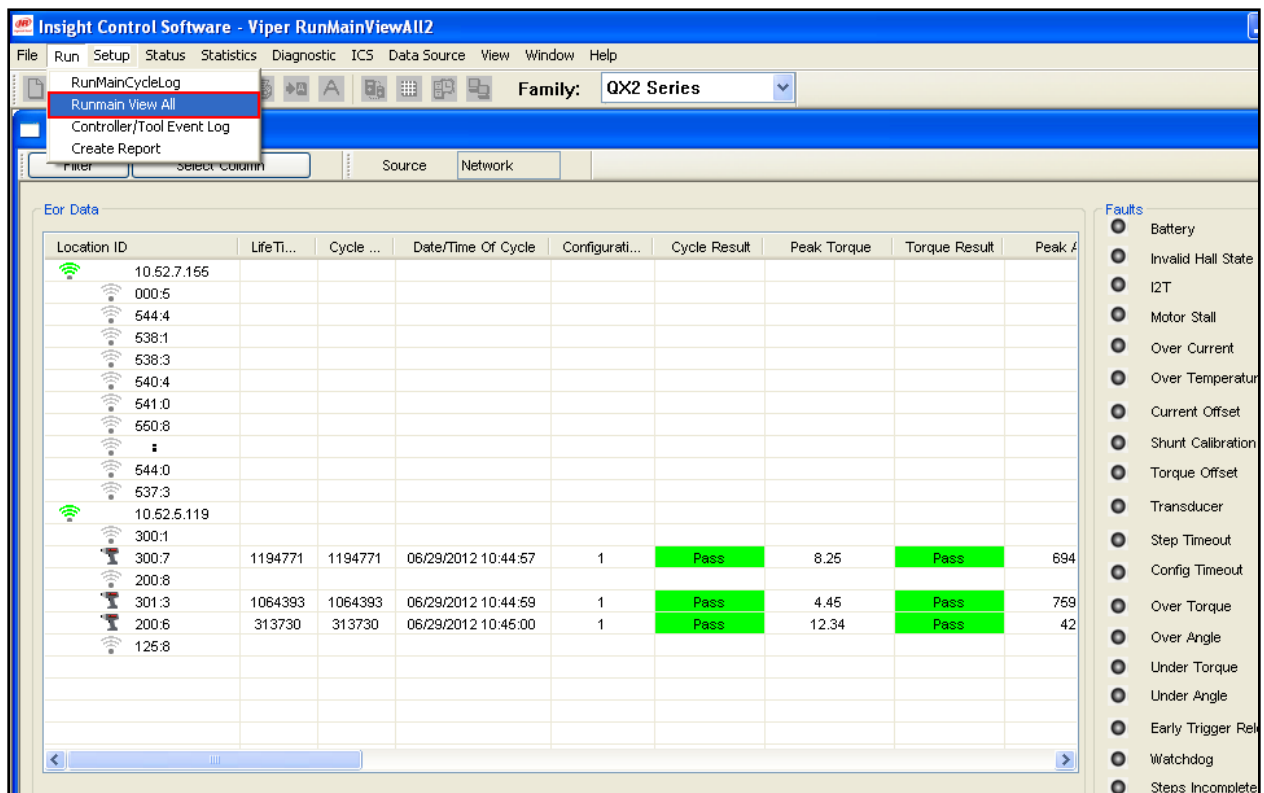


**Figure 1:** At the Top the save button will save the data to a local server, while the save options at the bottom will save the data in PDF or CSV format to any folder you would like.

## How to look at all the tools from your computer

ICS allows you to watch every QX2 Series tool that is on your network at the same time. This feature allows you to see everything that is going on every tool during each cycle. This feature shows you all the data that the cycle log will, except it is only for one cycle at a time. It shows values such as the Cycle Result, Peak Torque, and Torque Result and so on. It is a very helpful and very simple to find. The steps can be found below.

1. Open the ISC software and change the Family setting to QX2 Series.
2. Select Run → Runmain View All.
3. This screen will display all of the PCMs on your network along with all of the tools that are connecting with the PCM. It will only show non-wireless tools when they are plugged into the computer using the USB to MiniUSB cord.

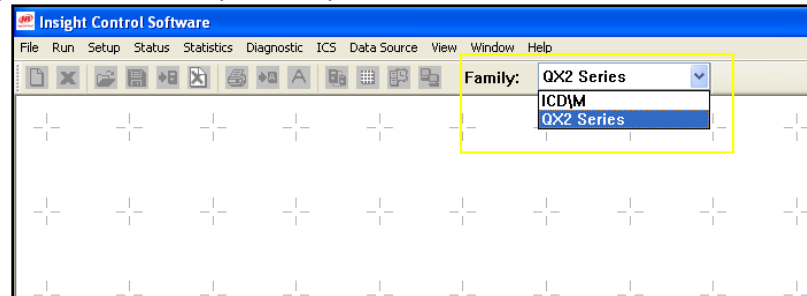


**Figure 2:** This is the screen that shows all of the data for many tools

## How to set up multiple configurations

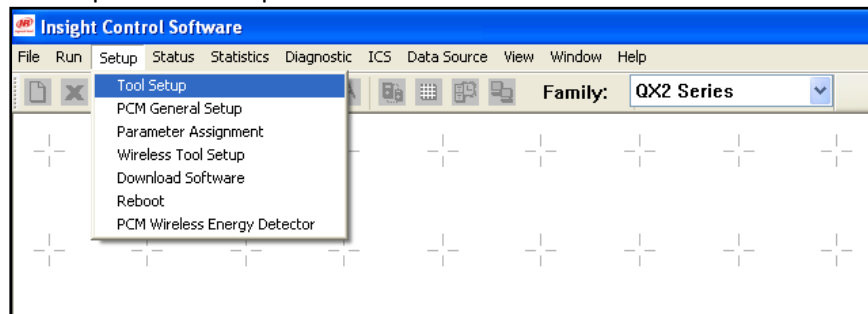
Have you ever wanted to have multiple configurations saved directly to the tool so that you didn't need to have eight tools to do one tool's job? The new QX2 Series of tools allows this to be possible. By being able to hold multiple configurations at one time, the QX2 makes it easy to program and switch between up to eight different configurations!

1. To program configurations 2-8 you must be using the ICS software, because programming it using the keypad only allows you to override the 1<sup>st</sup> configuration spot.
2. Set the dropdown box that says "Family" to "QX2 Series".



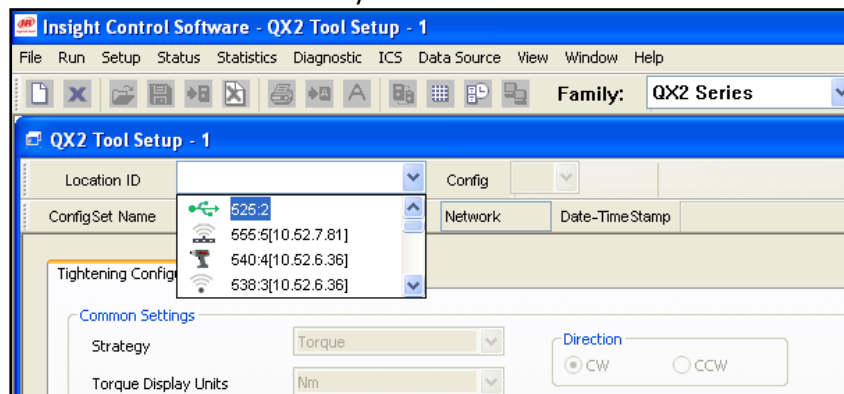
**Figure 3:** This is where you can switch the Family setting to QX2 Series

3. Next, select Setup → Tool Setup.



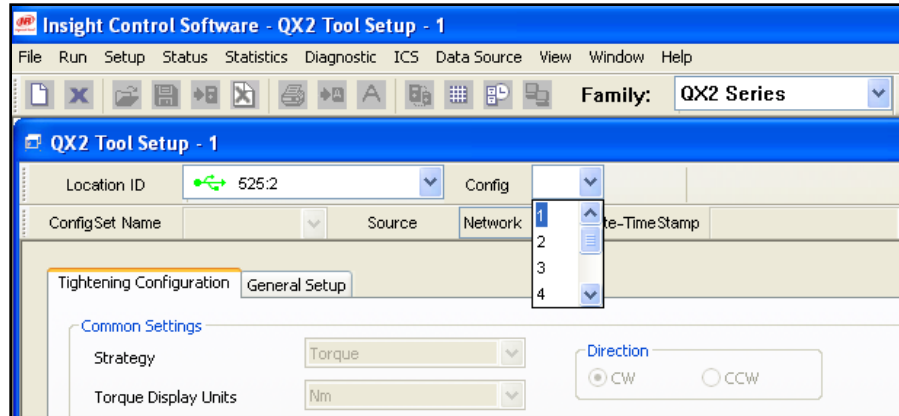
**Figure 4:** Click Tool Setup in order to bring up the configuration screen

4. Select the correct "Location ID" for your tool.



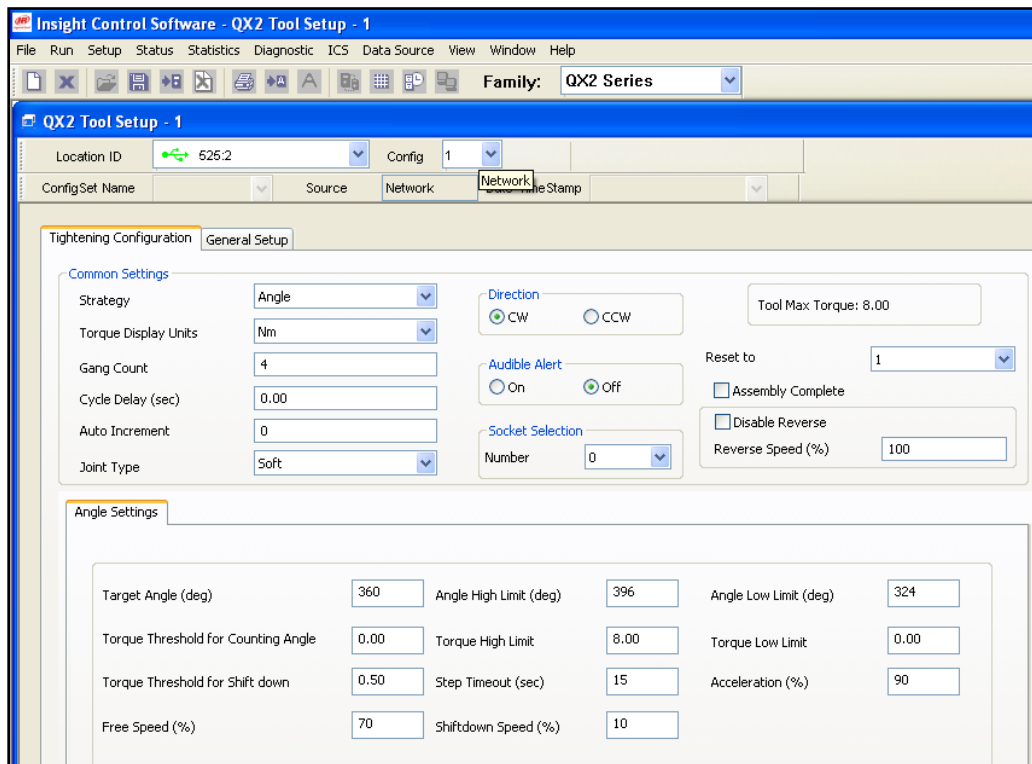
**Figure 5:** Under Location ID, select the correct tool that is being used

5. Next, the box that says "Config" directly to the right lights up and you can select what configuration you want to program.



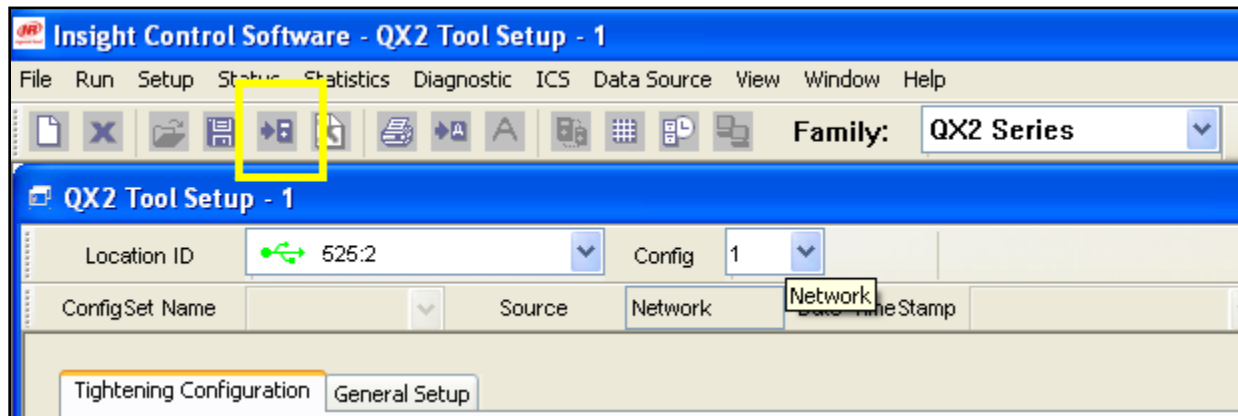
**Figure 6:** Here is where you select which configuration to program

6. If you want to program configuration 1, you would click that drop down box and select the number 1.
7. After that, all of the items below become lit up and you can select and change any values that you would like.
8. From here you can program the 3 types of strategies onto the tool with all of the parameters that are needed for the specific job. You can even have it set that after you complete a task on a certain configuration it will automatically reset back to a different configuration of your choosing, with the use of Auto Increment.



**Figure 7:** This is the screen that allows you to program the given configuration. Using this you can set different strategies, gang counts, units, and much more.

9. Now to set up the next configuration, you would go back up to step 6 and select 2 or 3 or 4... all the way up until you reach 8. Each time you switch configurations it will ask if you would like to send the data, hit yes. You can also manually send the data using the button in figure 8.



**Figure 8:** This button will send the data you have on the top window of the screen directly to the tool.

10. After you are done with all the configurations that you need, you are done programming the tool.
11. When running the tool you need to scroll (by using the up and down arrows) to find the screen that has 3 horizontal bars on the left side with an arrow pointing towards the second one, and a number between 1 and 8 on the right side.
12. If you hit the button with the check mark on it the screen will become back lighted with a line under the number. Now you can press up and down on the keypad arrows and select whatever configuration number that you need before you start your cycle.
13. After performing a rundown it should say "ok" in the lower right hand part of the screen. Now you have to press the button with the check mark on it and that "ok" should go away. Now if you press up on the keypad once it should bring you back to the pick configuration menu. Now you can repeat step number 12.

Below is a list of what each option means in the Tightening Configuration screen.

Location ID Drop box	Location ID is used as a unique identifier for each tool on the network.
Config Drop box	Configuration drop box allows selection of all available configurations, 1 through 8, for Programming and/or Viewing the Tightening settings.
Strategy	Allows selection of valid fastening strategies: Torque control, Angle control and Prevailing Torque. Torque control is the default Strategy.
Torque Display	Allows selection of all available Torque Units: Nm, Ft-lbs, In-lbs, and d-Nm. All

Units	the Torque values will be displayed with the selected units. Nm is the default units.
Gang Count	Gang Count can be used if the assembly requires multiple bolts to be fastened in a group. The default value is 0 and the range is between 0 – 99.
Cycle Delay (Sec)	Time interval between each fastening cycle. Tool will be in locked state until the time interval elapses. The default value is 0 and the range is 0 – 10 seconds.
Auto increment	Auto increment can be used to move through a specific sequence of fastening configurations. After a Pass cycle, the tool will automatically increment to the Configuration programmed in this field. The default value is 0 and valid values are Config 1 through 8.
Joint Type	Allows selection of Joint Type. There are two options – Hard and Soft. Hard will be selected by default.
Direction	Sets the tool tightening direction to CW (Clockwise) or CCW (Counter-clockwise). CW is selected by default.
Audible Alert	Turns 'On' or 'Off' the tool buzzer. The Audible Alarm will sound for any Failed cycle when this feature is turned 'On'.
Socket Selection	Smart socket is intended as an interlock for the user. On selection of the configuration, the tool will be disabled and an LED will glow in socket tray, indicating which socket the user must select (the one programmed in this field). The tool will only be enabled when all other sockets are in place and the required socket removed from the tray. The default value is 0 and valid values are 1 through 8.
Tool Max Torque	The maximum allowable Torque for the connected tool. This Field is not applicable in the Local Database Mode.
Reset To	The Reset to parameter is used to indicate which configuration the tool should be set to after the Configuration Reset Input is received by the PCM.
Assembly Complete	When checked, the tool will send an Assembly Complete Event to the IC-PCM-2 which will then turn on a programmed External Output.
Disable Reverse	When checked, the tool will not run in the Reverse direction.



Reverse Speed (%)	The percent of Max Speed at which the tool will in the reverse direction. The default value is 100%.

There are three strategies as described below:

Torque Settings	
Target Torque	Target Torque value of the selected configuration. Must be $\leq$ Tool Max Torque.
Torque High Limit	The maximum acceptable torque value for a fastening. Must be $\geq$ the Target Torque and cannot exceed 120% of the tool max torque value. Once the Target Torque value is entered, this value will be populated as 120% of the Target.
Torque Low Limit	The minimum acceptable torque value for a fastening. Must be $\leq$ the Target Torque. Once the Target Torque value is entered, this value will be populated as 80% of the Target.
Angle high Limit (deg)	The maximum acceptable angle through which the fastener may turn. Maximum value cannot exceed 32000 degs, which is the default value.
Angle Low Limit (deg)	The minimum angle through which the fastener must turn. The default value is 0.
Torque Threshold for Count Angle	The torque required to seat components in the joint and also the torque point at which angle begins to be measured. Must be $\leq$ the Target Torque. Once the Target Torque value is entered, this value will be populated as 50% of the Target.
Torque Threshold for Shiftdown	The Torque point during the final stage of tightening at which the tool shifts to a lower speed (to improve accuracy). Must be $\leq$ the Target Torque. Once the Target Torque value is entered, this value will be populated as 25% of the Target.
Step Timeout (Sec)	Maximum allowable time for completing the step. The default value is 15 seconds and the range is 1- 65 seconds.
Acceleration (%)	Tool motor acceleration at the start of a tightening. The default value is 90% and the range is 5% to 100%.

Free Speed (%)	Speed at which tool will run before reaching Torque Threshold for Shiftdown. The default value is 100% and the range is 10% to 110%.
Shiftdown Speed (%)	Speed at which tool will run after reaching Torque Threshold for Shiftdown. Must be $\leq$ Free Speed. The default value is 10% and the range is 10% to 110%.
Angle Settings	
Target Angle (deg)	Target Angle value for the selected configuration.
Angle high Limit (deg)	The maximum acceptable angle through which the fastener may turn. Must be $\geq$ the target and cannot exceed more than 35200 deg. Once the Target Angle value is entered, this value will be populated as 120% of the Target.
Angle Low Limit (deg)	The minimum angle through which the fastener must turn. Must be $\leq$ the target value. Once the Target Angle value is entered, this value will be populated as 80% of the Target.
Torque High Limit	The maximum acceptable torque value for a fastening. Cannot exceed the Tool Max torque value. The default value is 0.
Torque Low Limit	The minimum acceptable torque value for a fastening. Cannot exceed the Tool Max torque value. The default value is 0.
Torque Threshold for Count Angle	The torque required to seat components in the joint and also the torque point at which angle begins to be measured. Must be $\leq$ Torque High Limit.
Torque Threshold for Shiftdown	The Torque point during the final stage of tightening at which the tool shifts to a lower speed (to improve accuracy). Must be $\leq$ Torque High Limit.
Step Timeout (Sec)	Maximum allowable time for completing the step. The default value is 15 seconds and the range is 1- 65 seconds.
Acceleration (%)	Tool motor acceleration at the start of a tightening. The default value is 90% and the range is 5% to 100%.
Free Speed (%)	Speed at which tool will run before reaching Torque Threshold for Shiftdown. The default value is 100% and the range is 10% to 110%.

Shiftdown Speed (%)	Speed at which tool will run after reaching Torque Threshold for Shiftdown. Must be $\leq$ Free Speed. The default value is 10% and the range is 10% to 110%.
Prevailing Torque Settings	
Cut In Zone Settings	
Target Cut-In Angle (deg)	Target Angle value for the Cut-In Zone step.
Torque High Limit	Maximum torque that is allowed during the Cut In Zone. If the measured torque is $\geq$ this value the step is halted and a fault declared. Value must be $\leq$ the Tool Max Torque.
Snug Torque	The torque point at which angle begins to be measured. Must be $\leq$ the Torque High Limit.
Prevailing Zone Settings	
Target Prevailing Angle (deg)	Target Angle value for the Prevailing Torque Zone step.
Angle High Limit (deg)	Maximum angle of rotation allowed during the Prevailing Torque Zone. If the measured Angle is $\geq$ this value the step is halted and a fault declared.
Angle Low Limit (deg)	Minimum angle of rotation that must be turned during the Prevailing Torque Zone. When the Prevailing Torque Zone is exited the measured Prevailing Angle is checked to make sure it is greater than this limit. If it is not an Under Angle Fault is indicated.
Torque High Limit	The maximum allowable torque during the Prevailing Torque Zone. If the measured torque equals or exceeds this limit the step is halted and a fault declared.
Torque Low Limit	Minimum torque that should be achieved during the Prevailing Torque Zone. If

	the cycle is stopped during the Prevailing Torque Zone Step (trigger release or some other failure) and the measured torque value is below the Torque Low Limit, a failure will be indicated (Yellow LED). If Low Torque is the only fault, the tool will continue to the Torque Step.
Common Settings	
Free Speed (%)	Speed at which tool will run during the Cut In and Prevailing Torque Zones. The default value is 80%.
Final Torque Settings	
Same as for a normal Torque Strategy.	

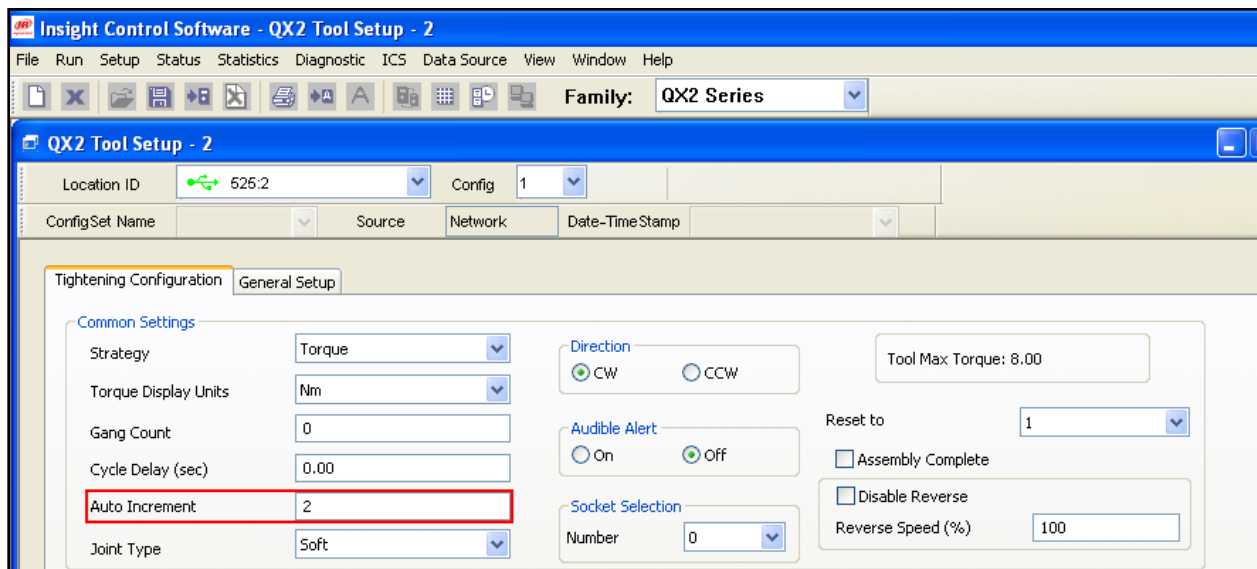
After performing these steps I found it easy to program and switch between all 8 configurations. If people are still having a hard time with it then they have the option of while they are programming the tool, they can preset what the next configuration will be after the run down. If this is still confusing, they can also buy a bit box, which once you select a bit the tool will automatically switch configurations to the correct one.

## Switching between multiple configurations while still working

Have you ever needed to switch between different torques or angles while wanting to stay fast and efficient on the job? With the new QX series of tools, you are able to have this unique option of switching between eight different configurations without ever taking your hand off the tool. This leads to a more efficient production line!

1. After the tool goes through a cycle, they should be at the run screen (figure 10). From here they would have to press the button with the check mark to allow them to scroll up and down through the screens.
2. Now, they should be able to scroll up one screen to get to a screen that resembles figure 11. This is the configuration selection page.
3. Now, if you press the button with the checkmark the screen becomes back lighted. There should also be a line underneath the number displayed on the screen. You can now use the up and down arrow keys to change the configuration number to the desired configuration.
4. After locating the desired configuration, press the button with the checkmark to lock in that configuration. After locking in the configuration, the screen should return to normal (figure 13). Now you are able to scroll through the screens to ensure that the parameters of the configuration are correct.

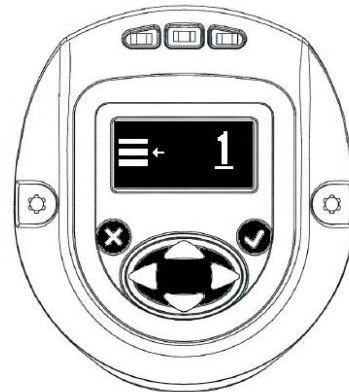
Other ways to automatically switch configurations can be done by setting Auto Increments so after your done the cycle, the tool will automatically switch to the next given configuration. Another strategy is the use of Bit boxes; they can be used to control what configuration is used for different bits that are placed into the tool. Lastly you can use barcode scanners to scan which part is on the production line and it will tell the tool to set itself to a predetermined configuration.



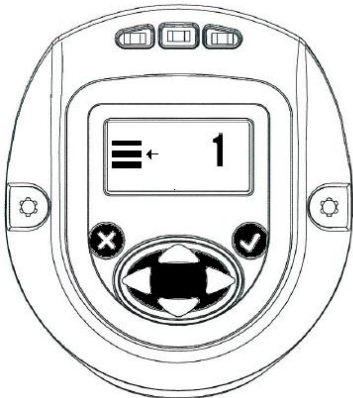
**Figure 9:** Auto Increment is what configuration you would like to have the tool automatically switch to after you are done with the current cycle.



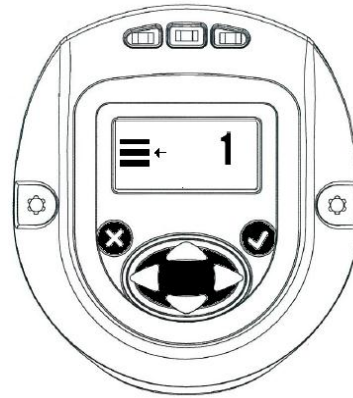
**Figure 10:** This is the Run Screen. It is the first screen you see when you turn on the tool, or complete a cycle.



**Figure 12:** While on the Configuration Selection page, if you press the button with the check mark this is what appears. From here you can use the up and down arrows to select the appropriate configuration.



**Figure 11:** This is the configuration selection page. Here you can choose between 8 unique configurations.

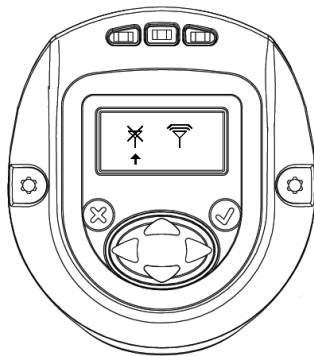


**Figure 13:** After selecting the correct configuration, the screen will go back to normal. Now you can scroll up and down through the screens to make sure the parameters are correct.

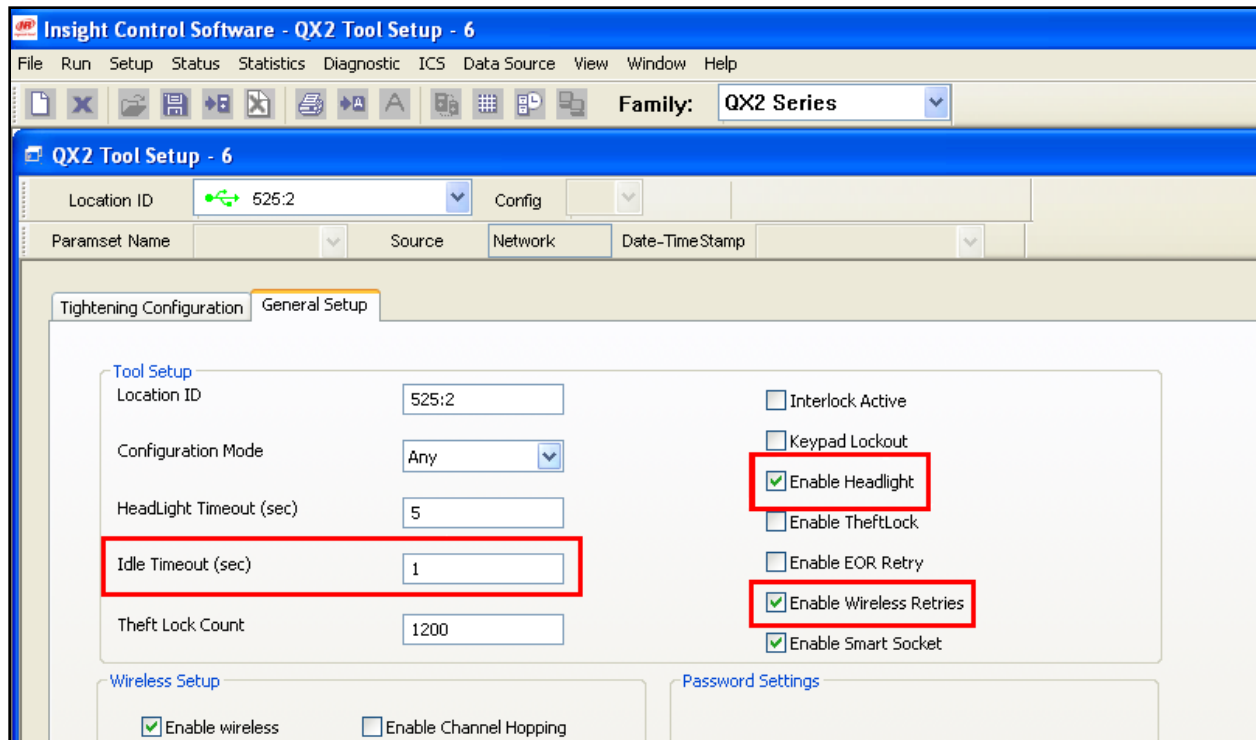
## Programming the QX2 for an improved battery life

Simple steps can be taken to improve the battery life of your QX2 series tool.

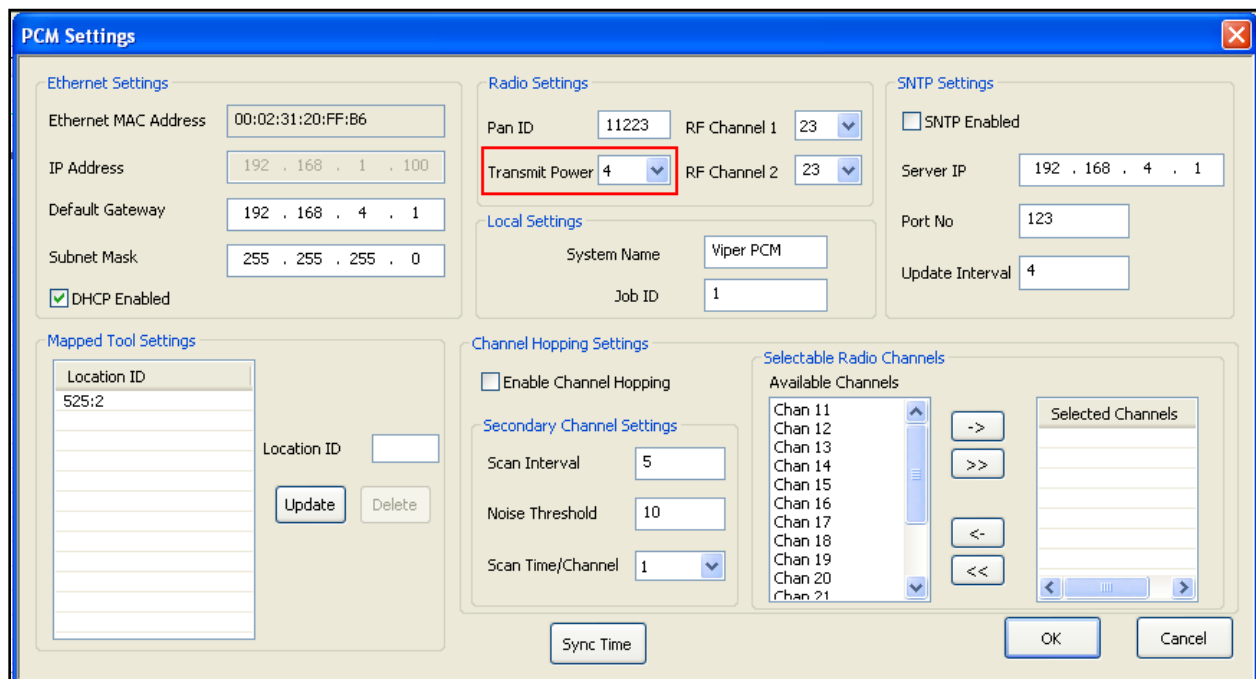
1. The best way to improve your tool's battery life is to change your idle timeout. This will cause the screen to go into sleep mode after a certain amount of seconds. The lower you set this time, the longer your battery will last. In order to do this you need to follow these simple steps.
  - a) Select Setup → Tool Setup and select the Location ID for the tool you want to change.
  - b) Next select the "General Setup" tab.
  - c) Inside the tool setup section set the "Idle Timeout" section as low as you want.
2. Another way to increase battery life is to turn off the headlight on the tool.
  - a) Select Setup → Tool Setup and select the Location ID for the tool you want to change.
  - b) Next select the "General Setup" tab.
  - c) On the right hand side there is a box that says "enable headlight", make sure that box is unchecked.
  - d) If you do not want to completely shut off the headlight, you can set the idle timeout for the headlight as low as possible.
3. If you have a wireless tool but are not utilizing the wireless features, you should turn the wireless receiver off so that it saves battery life. The quickest way to turn of the wireless radio is to use the display screen on the tool.
  - a) First, enter the password on the password screen and click to the right arrow key.
  - b) Next, scroll until you find the wireless signal screen, and then select the off option.



- c) Another way to do a similar technique without completely shutting off wireless is, under Setup → Wireless Tool Setup → double click PCM IP. In the new screen there is a box called "Transmit Power," set this as low as possible to save battery life. The lower you can go with the transmit power the longer your battery life will last. But, the lower you go the closer you will have to be to the PCM to get a good wireless connection. If you choose to lower your Transmit Power you must also go to Setup → Tool Setup, then click the Location ID and select General Setup. Under the General Setup tab you will see a box that says Transmit Power; you must lower this Transmit Power also.
4. Also when the tool is not in use if you take out the battery it will make it last longer because even though you are not using the tool, a small amount of current is going through it.



**Figure 1:** The three red boxes are what need to be selected in steps 1, 2 and 3.



**Figure 2:** Shows where the Transmit Power option is located for step 3-d.

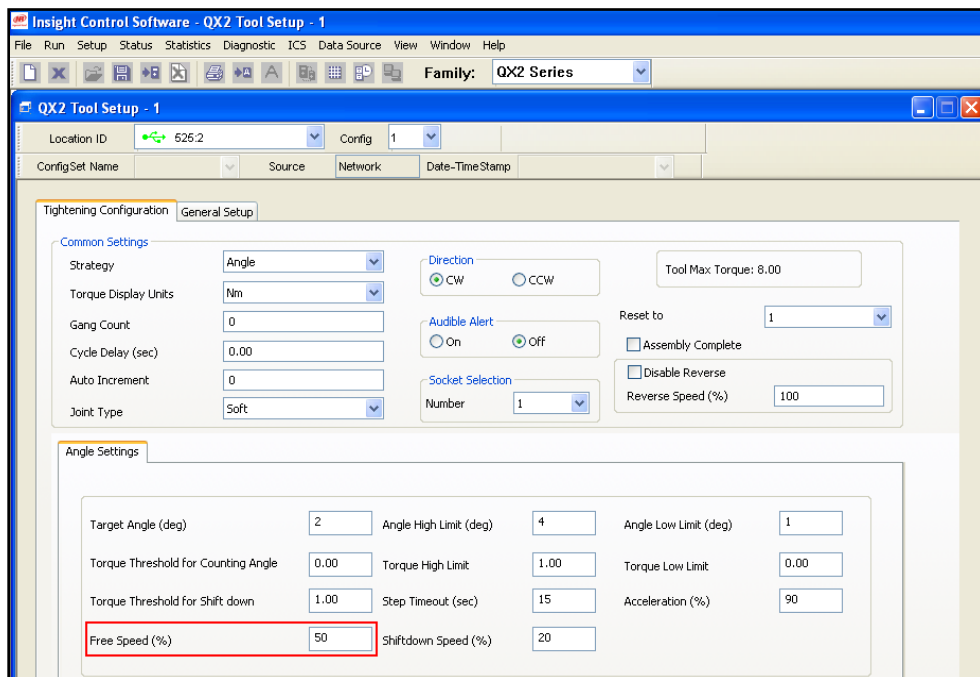


## How to program the QX2 series tool for improved repeatability

There are many ways to program your tool so that your outcome has a better accuracy. The first major way to do this is to make sure that you are using the right strategy for the job. This means if you should make sure that you are using the angle strategy if you have a certain amount of turns you want the tool to make, or the torque strategy if you have a precise torque you would like to hit. When you are in the angle strategy, you can set a torque high and low limit. This will make sure that the reaction torque stays within a certain limit while also getting to the target angle. This can also be done with the torque strategy with a high and low limit on angle. Other than this major way of making sure that your tool is accurate, there miniscule changes that can be made that will also increase your accuracy. This “how to” will focus on these small strategies.

The first strategy that will be discussed is to slower your free speed. This will help the tool have less inertia so when it comes to the set torque or angle it will be easier to stop.

1. Open up ICS and set the Family settings to QX2 Series.
2. Select, Setup → Tool Setup
3. Select the Location ID and configuration that you would like to make more accurate.
4. Under the “tightening configuration” tab there is a “torque setting” section where there is a field for “free speed (%)”.
5. If you lower the percent of the free speed, your tool will become more accurate, but it will take more time to complete the job.

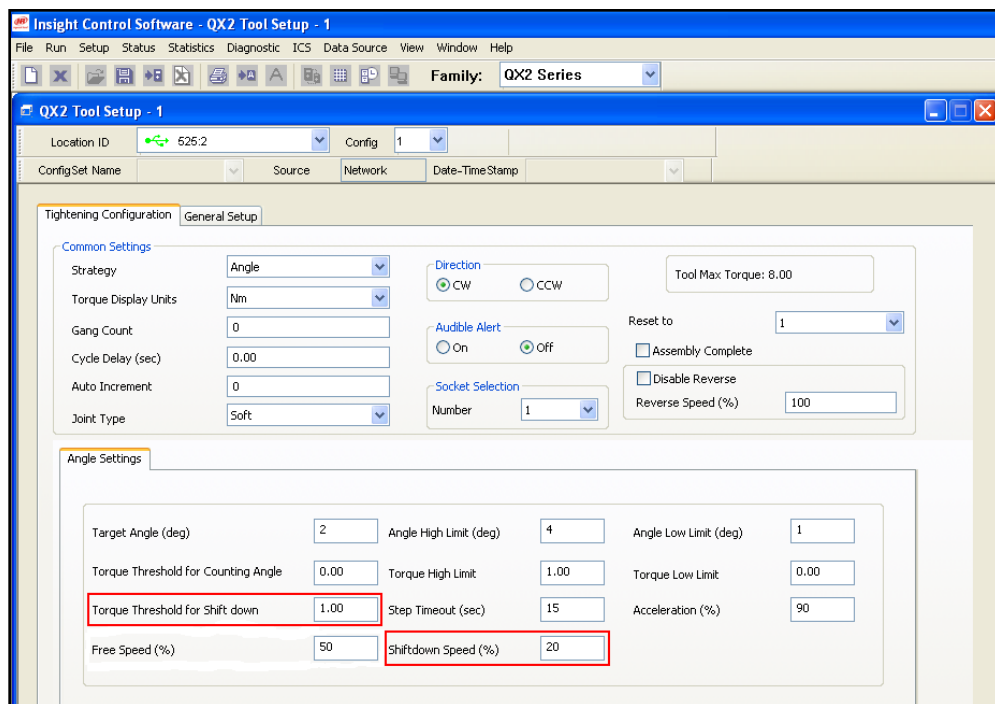


**Figure 1:** The outlined box is where you set your free speed

The best thing to do is play around with the numbers until you reach a speed that is fast enough but very accurate.

The next strategy for increasing the accuracy of the tool is to set shift down points and speeds. This strategy, like lowering the free speed, slows down the tool but does not take as much time to complete the cycle. Having a shift down point will cause the speed of the tool to slow down once a certain torque is reached. The following are steps on how to set a shift down torque.

1. Open up ICS and set the Family settings to QX Series.
2. Click on Setup → Tool Setup
3. Select the Location ID and configuration that you would like to make more accurate.
4. Under the “tightening configuration” tab on the bottom there is a “torque setting” section where there is a field for “Torque threshold for shift down”.
5. The smaller this value is the more accurate your torque will be, but the longer it will take to complete the cycle.
6. Next, go to the field that says “Shiftdown speed (%)”.
7. If you set this value to a smaller number, the tool will be more accurate, but the smaller you make this number the slower the cycle rate will be.



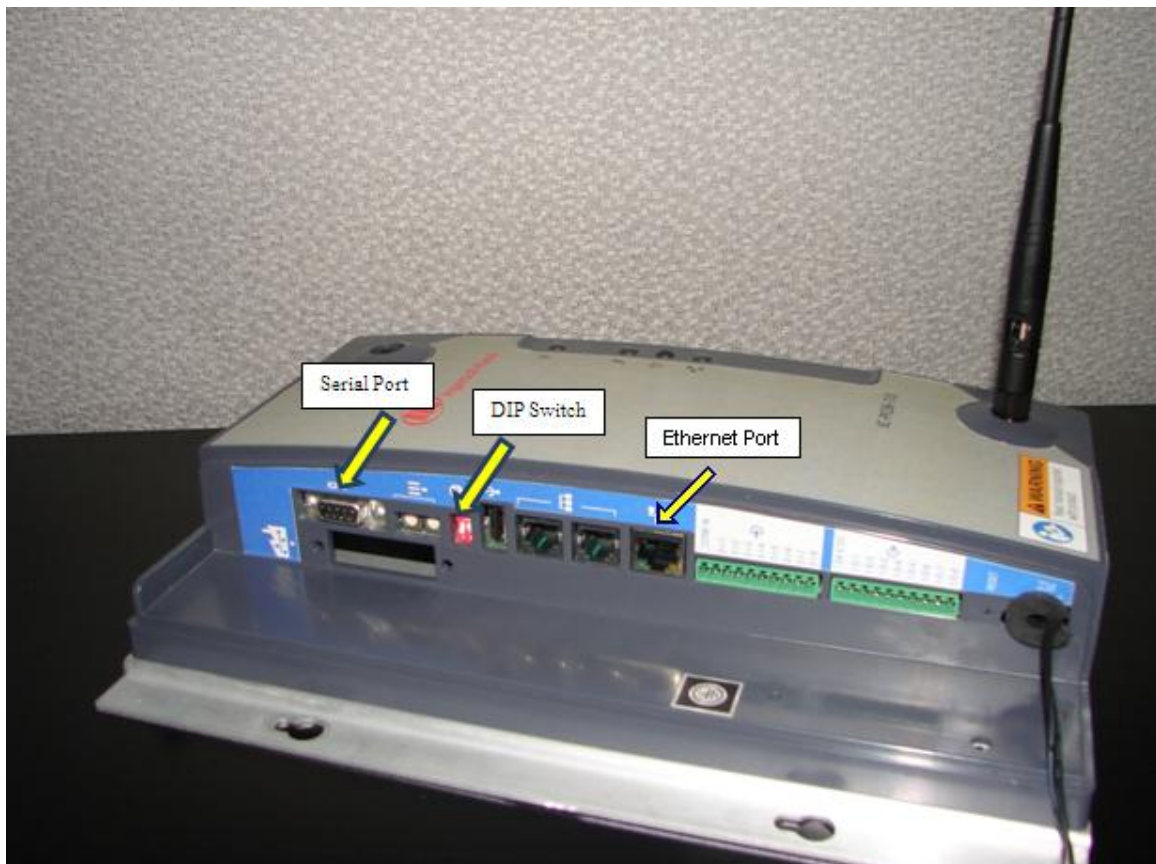
**Figure 2:** The highlighted boxes are where you set your Torque Threshold for Shift Down and Shiftdown Speed

If you use these two techniques together, this tool will become extremely accurate every single cycle.

## How to set up your PCM

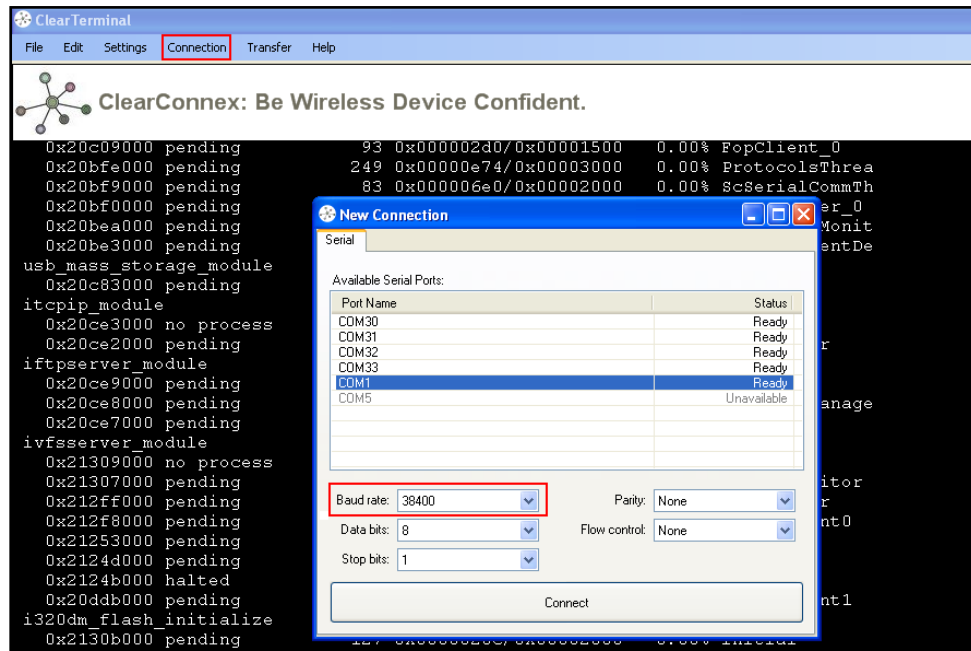
PCMs are used to wirelessly control you QXX series tool. They can also be used to control attachments like the 8 Position Bit Tray. They are very helpful because instead of having to run back to the computer and plug in the tool to change the parameters of multiple configurations, you can wirelessly update the tool so the worker never has to leave the production line. The PCM only works with the QXX series and does not work with the QXC series because the QXC does not have wireless capabilities. The following is a set of simple steps that need to be taken in order to set up your PCM.

1. First you need 6 items; the PCM itself, a Serial RS-232 null-modem cable, an Ethernet cable, the 5 volt power supply, a program such as Hyper Terminal or Clear Terminal, and a computer running the ICS software.
2. Plug in the Serial cable and Ethernet cable from your PCM to the back of your computer. (If you do not have a Serial cable port on your computer there are adapters that convert the serial cable to a USB port)
3. Before plugging in the power supply into the PCM, first switch the red DIP switch on the side of the PCM to OFF for switch 1 and ON for switch 2.



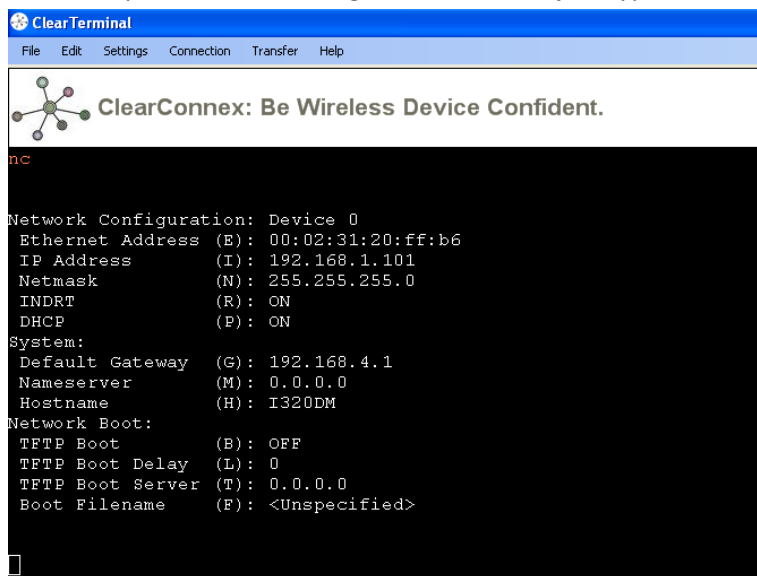
**Figure 1:** Location of the DIP Switch, the Serial Port, and the Ethernet Port on the PCM.

4. Next, plug in the 5 volt power supply to the port on the power supply that says +5V and –DC
5. Open the Clear Terminal program. Select Connection → New Connection. A new screen will open, select the correct COM port (most likely COM1), and change the Baud rate to 38400, hit Connect.



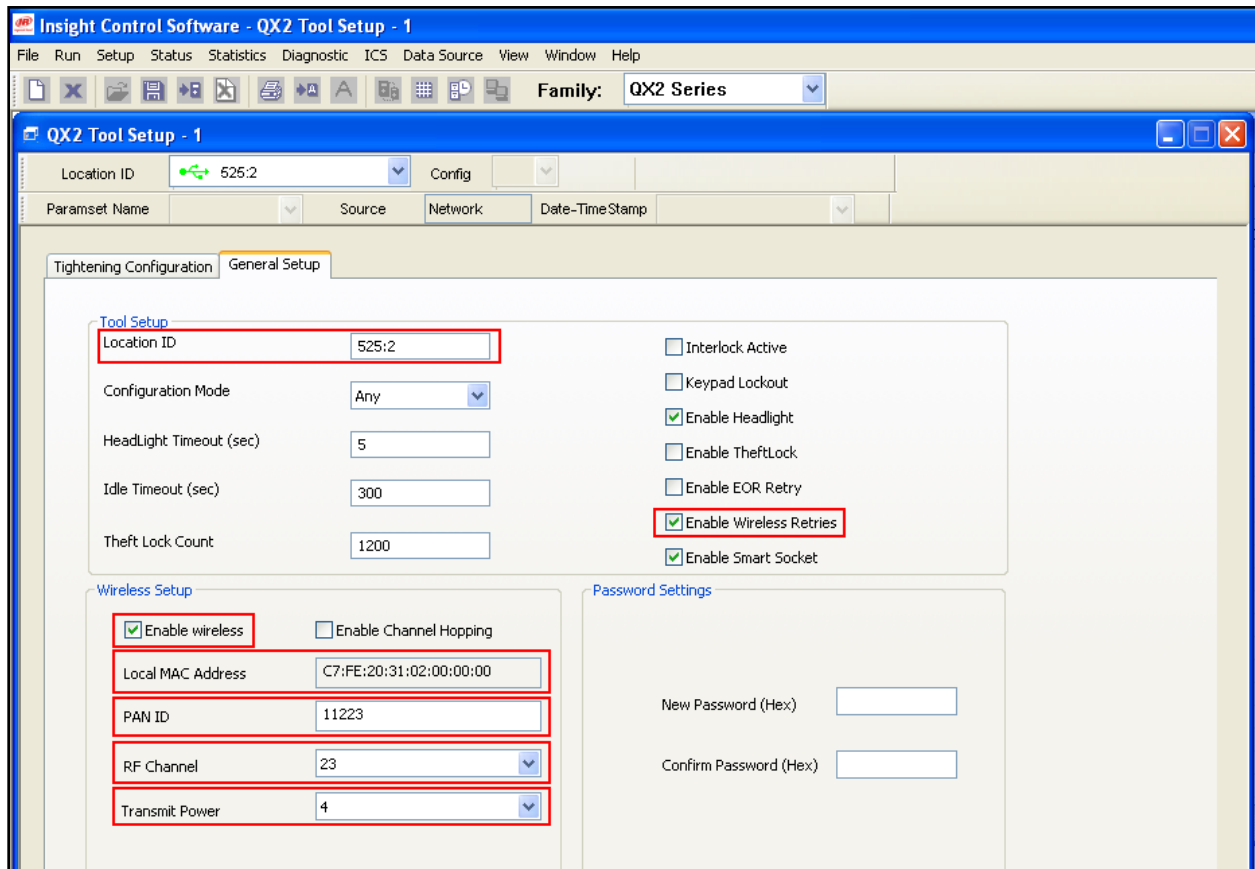
**Figure 2:** Setting up the connection between Clear Terminal and the PCM.

6. In the command line type nc in order to bring up your network connection settings. (if the first time you type nc it responds with unrecognized command just type it a second time)



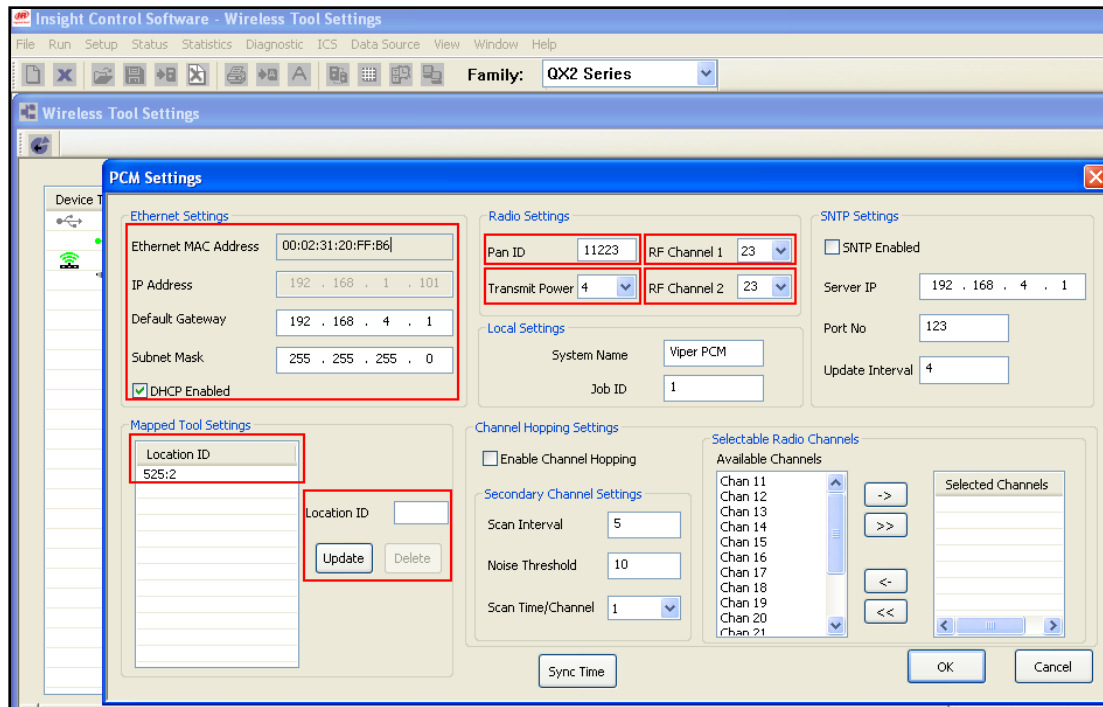
**Figure 3:** What the network settings should look like after you type nc <enter> into the command line.

7. Open the ICS software with the tool connected through USB cable, and set the Family setting to QX Series.
8. Select Setup → Tool Setup and the location ID of the tool you want to set up for wireless usage.
9. Select the general set up tab and note what is there for the; Location ID, Local MAC Address, PAN ID, RF Channel, and Transmit Power (Make sure Transmit Power is not 0). Also make sure that the boxes that say Enable Wireless and Enable Wireless Retries are selected.



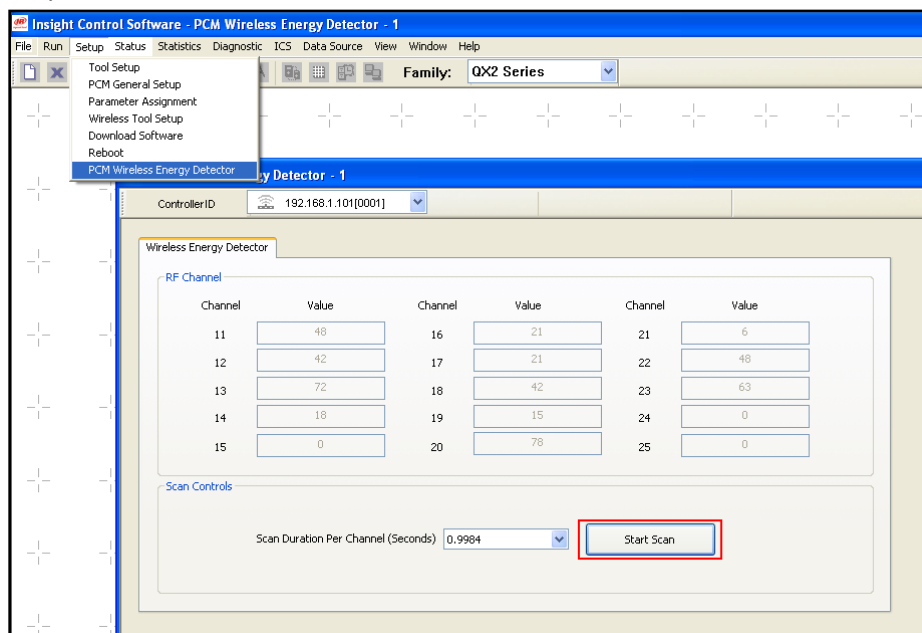
**Figure 4:** The items to note down for set 9 that will be used to set up the PCM.

10. Remove the USB cable from the tool. If ICS is communicating with the PCM, click on Setup → Wireless Tool Setup → then double click on the correct PCM IP. Another window will open, titled PCM Settings. (If ICS is not communicating with the PCM refer to page 22 about setting up the correct IP settings).
11. Now in this window, make sure that the Ethernet settings are correct and that the DHCP enabled box is selected.
12. Under radio settings you will type in the same values that you had for the tool in step 9. Under Mapped Tool Settings you want to type the Location ID in that you had from step 9, also. If you would like to set up channel hopping you can do so under the Channel Hopping Settings.



**Figure 5:** Setup-> Wireless Tool Setup-> double click PCM IP. This is where you enter all the radio settings found in step 9 and shown in Figure 4.

13. Select the ok button at the bottom of the window.
14. Now click on Setup → PCM General Setup and select the correct Controller ID.
15. Now your PCM is set up and to make sure it is running you can select Setup → PCM Wireless Energy Detector and then select the correct Controller ID and check to make sure that the RF channel you selected has a value.



**Figure 7:** the PCM Wireless Energy Detector

## Debug Notes

- If ICS and PCM are configured correctly for the network, but ICS does not communicate with the PCM:
- Try to ping the PCM from the host computer
- If it responds, Open ICS->Direct Controller Discovery and add the IP address of the PCM.
- Restart ICS. This must be done any time the host has a change of network settings
- Reboot PCM after any network settings changes

## Changing PCM Network Settings

These commands are used while in the Clear Terminal program.

- `nc i 192.168.4.13 <enter>` - changes the IP Address
- `nc p off <enter>` - changes the DHCP setting to off, (static IP Address)
- `nc p on <enter>` - changes the DHCP setting to on, (dynamic IP Address)
- `nc g 192.168.4.1 <enter>` - changes the Gateway Address
- `nc n 255.255.255.0 <enter>` - changes the Netmask
- `nc s <enter>` - saves changes. This must be done or the changes will be lost on reboot.

## Configuring PCM and Host PC on the network (if needed)

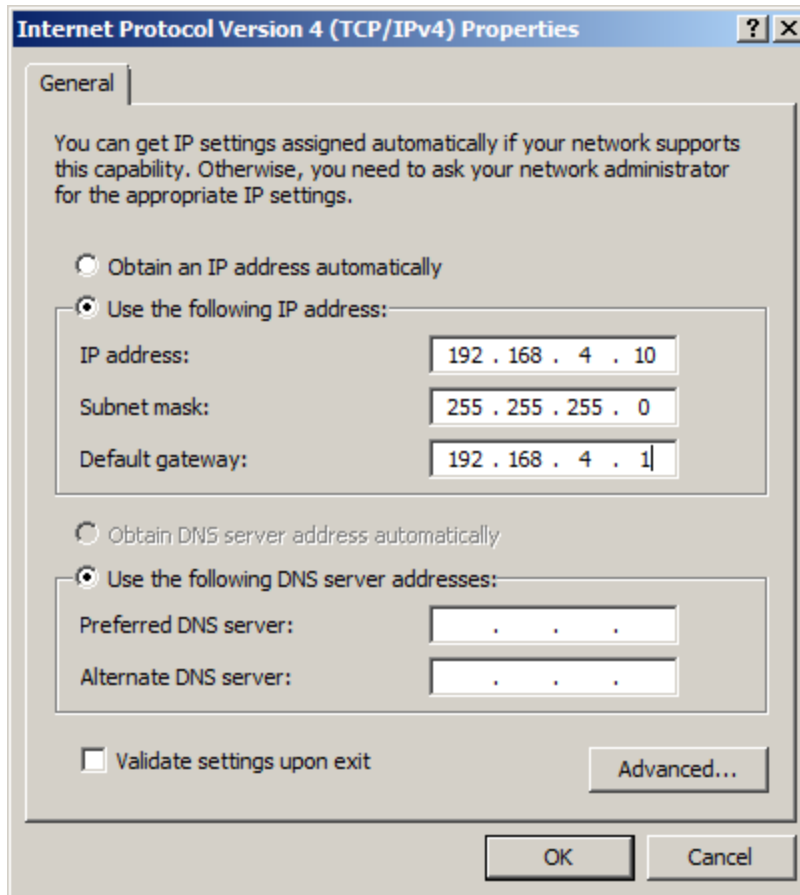
The PCM can be configured to use a cross-over cable by assigning a static IP address to both the PC and the PCM or by placing both the PCM and the PC on the local network using dynamic IP addressing. The PCM will be configured using the 'nc' command as described in 'Changing PCM Network Setting'.

## *Equipment Needed*

- Computer with current version of ICS
- Ethernet patch or crossover cable

## *Assigning a Static IP address to the PC Host*

Locate the TCP/IP properties in the control panel under the local network connections. Select 'Use the following IP address' and configure as below if using the crossover cable. If connecting to an existing local network, use values that are compatible with the network.



### ***Assigning a Static IP address to the PCM***

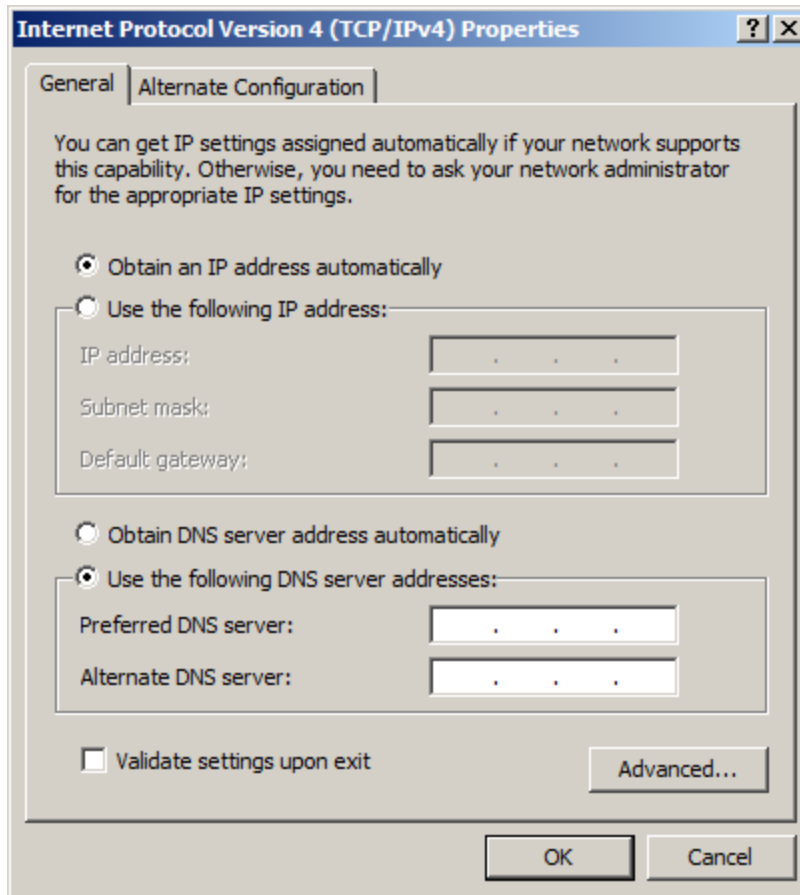
Using the 'nc' command, configure as follows. Making sure that the IP Address, Gateway address and Netmask match the network structure.

- DHCP - off
- Set subnet if different - ask
- Default Gateway should take on the form xxx.xxx.xxx.1. Where the x values match the IP Address
- If using crossover cable use IP :192.168.4.4, subnet and gateway as shown above

### ***Assigning a Dynamic IP address to the PC Host***

Locate the TCP/IP properties in the control panel under the local network connections. Select 'Obtain an IP address automatically' as below.





### ***Assigning a Dynamic IP address to the PCM***

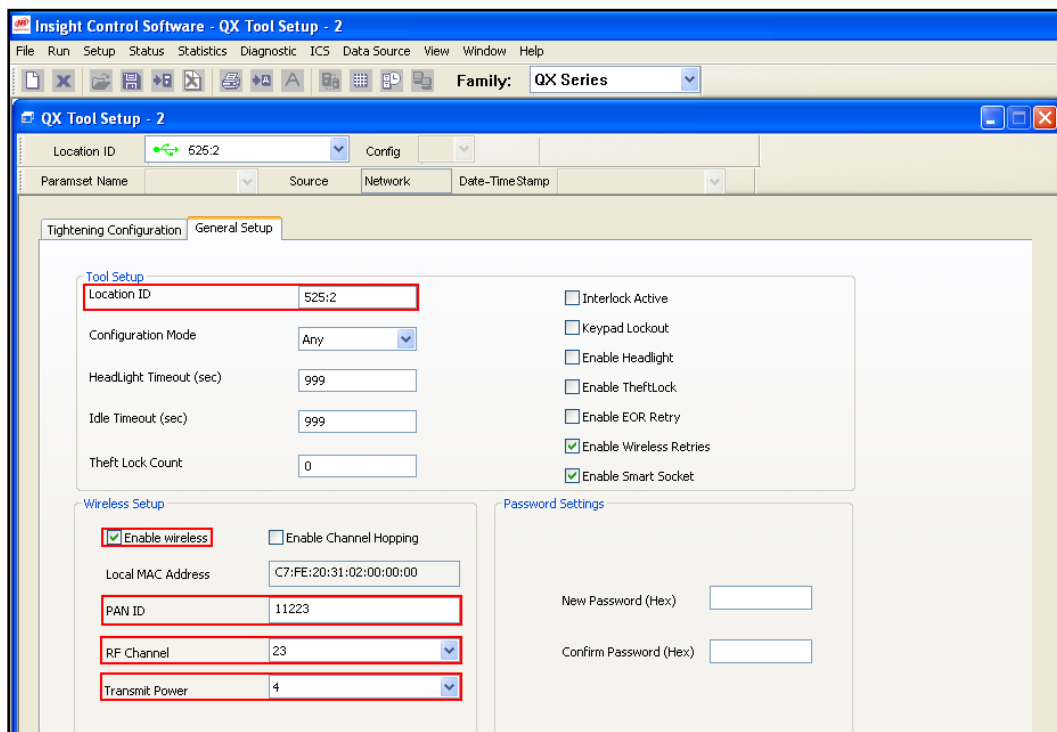
Using the 'nc' command, configure as follows. Making sure that the IP Address, Gateway address and Netmask match the network structure.

- DHCP - on
- Set subnet if different - ask
- Default Gateway should take on the form xxx.xxx.xxx.1. Where the x values match the IP Address.

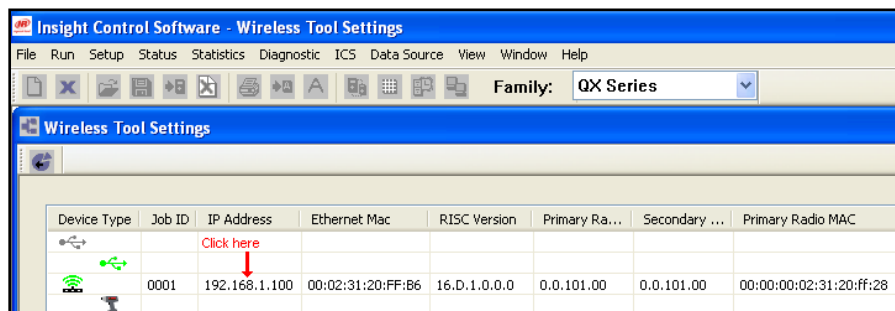
## How to connect your tool to your PCM

Connecting your tool to the PCM is one of the first things that you should do once your PCM is setup. The only things that are required for doing this are, a QXX series tool, ICS and a PCM. This “how to” will show you simple and easy steps to follow in order to connect your tool to your PCM.

1. Open up ICS and set the Family setting to QX Series.
2. Connect the tool to ICS via USB cable.
3. Open Setup → Tool Setup and select the location ID for the tool you want to connect.
4. Select the General Setup tab.
5. Here you will find/create the Location ID, the PAN ID, RF Channel, and Transmit Power. (memorize or write these values down, you will need them later)
6. On the same screen you will see a box that says “Enable Wireless,” check that box.



7. Close that window and open Setup → Wireless Tool Setup.
8. Find the correct PCM address and double click on that row.



9. This will open up another window that will be called IC-PCM-2 Settings.
10. Here, enter the values for your PAN ID, Transmit Power, and RF Channel as shown in the picture below.
11. Next, you have to “map” your tool to the PCM by entering your tool’s Location ID into the area surrounded by the blue box. After entering that number and selecting update, the Location ID will be shown in the area displayed by the red box that is to the left of the blue box.
12. Then hit the okay button at the bottom to update the PCM.

The screenshot shows the 'IC-PCM-2 Settings' window. The 'Radio Settings' section has 'Pan ID' set to 11223, 'Transmit Power' set to 4, 'RF Channel 1' set to 23, and 'RF Channel 2' set to 23. The 'Mapped Tool Settings' section shows a 'Location ID' of 525:2 with 'Update' and 'Delete' buttons. The 'Channel Hopping Settings' section has 'Enable Channel Hopping' unchecked, 'Secondary Channel Settings' checked, 'Scan Interval' set to 5, 'Noise Threshold' set to 10, and 'Scan Time/Channel' set to 1. The 'Selectable Radio Channels' section shows a list of available channels from Chan 11 to Chan 21 and an empty 'Selected Channels' list. At the bottom, there are 'Sync Time', 'OK', and 'Cancel' buttons.

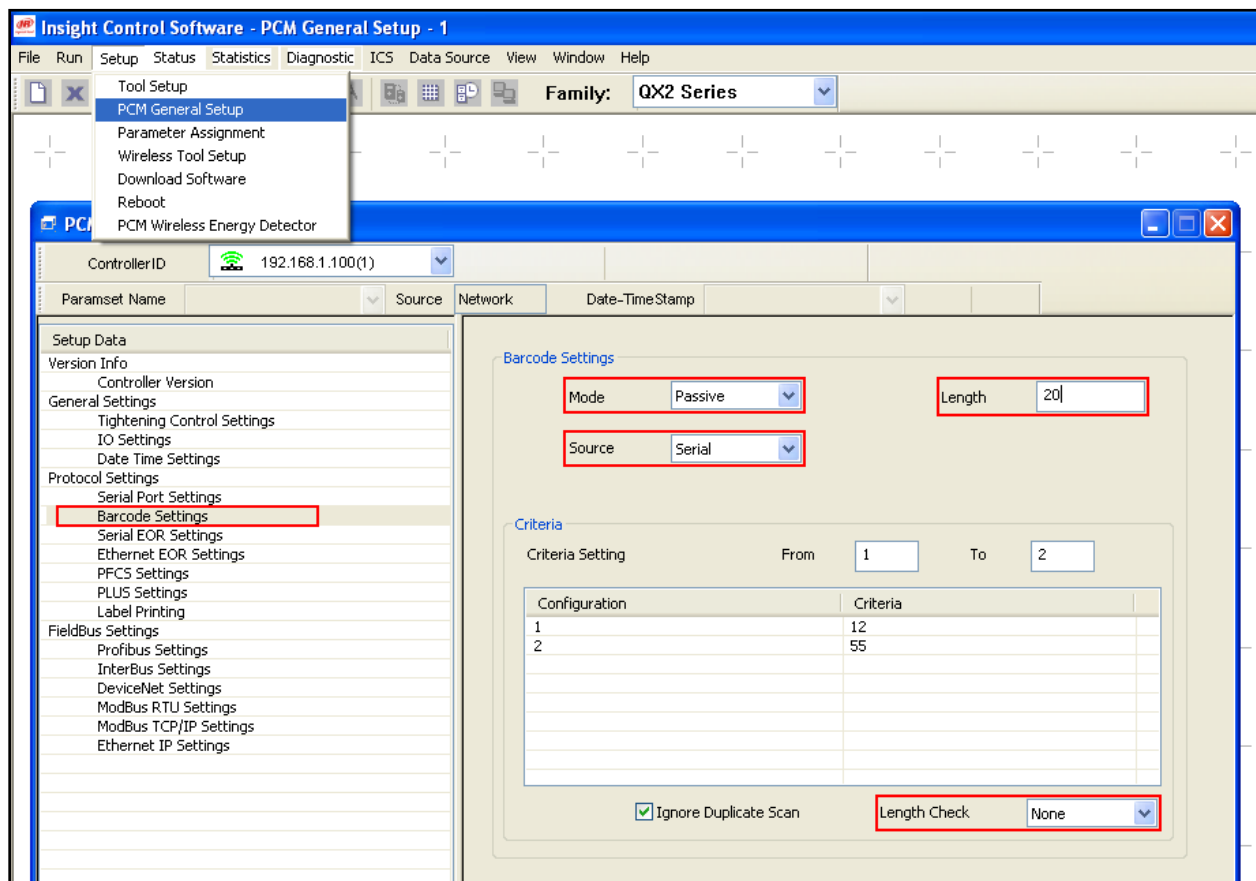
13. If the tool does not automatically connect with the PCM, unplug the tool’s battery and wait 5 seconds then plug it back in.
14. If that does not work unplug the PCM and wait 30 seconds, then plug it back in and wait for the PCM to reboot. Then turn on the tool.

Your tool should now be successfully connected to your PCM and will be ready for wireless commands.

## How to set up a Barcode Scanner

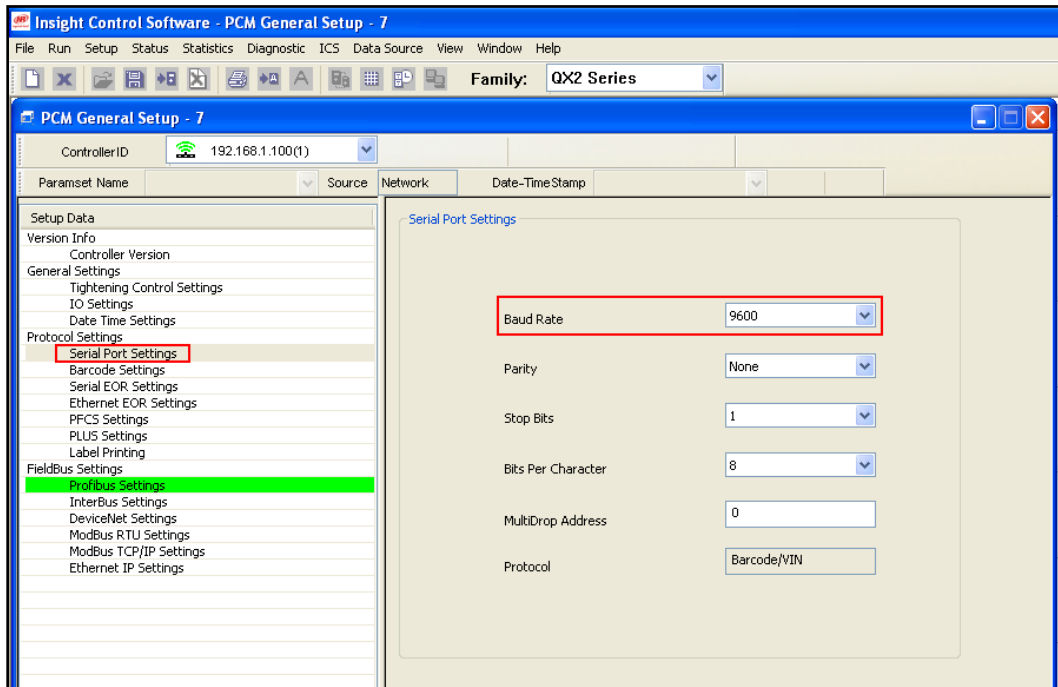
In order to set up the barcode scanner you are going to need 4 items. They are: the barcode scanner, the power cord, a PCM, and a computer that has the ICS software. The following are simple steps to help install the barcode scanner to your device. The barcode must be no prefix, no suffix, standard RS232 and sends a cr/lf at the end. It also must have its own power supply, a baud rate of 9600, 8 bit, and no parity.

1. Unplug the PCM and turn the DIP switch to off for number 1 and number 2, then plug the PCM back in.
2. Plug the barcode scanner into the Serial port on the side of the PCM.
3. Plug the barcode scanners power supply into the wall and into the barcode scanner.
4. Launch the ICS software.
5. Next change the Family setting to QX2 Series and click Setup → PCM General Setup, and select the correct Controller ID.
6. Now under “Setup Data”, “Protocol Settings” select “Barcode Settings.”
7. Now you change your settings to Passive or Active depending on what you will be using the Barcode Scanner for.
8. For “Source” select “Serial” if the Barcode scanner is connected using a serial cable, (which it must be).



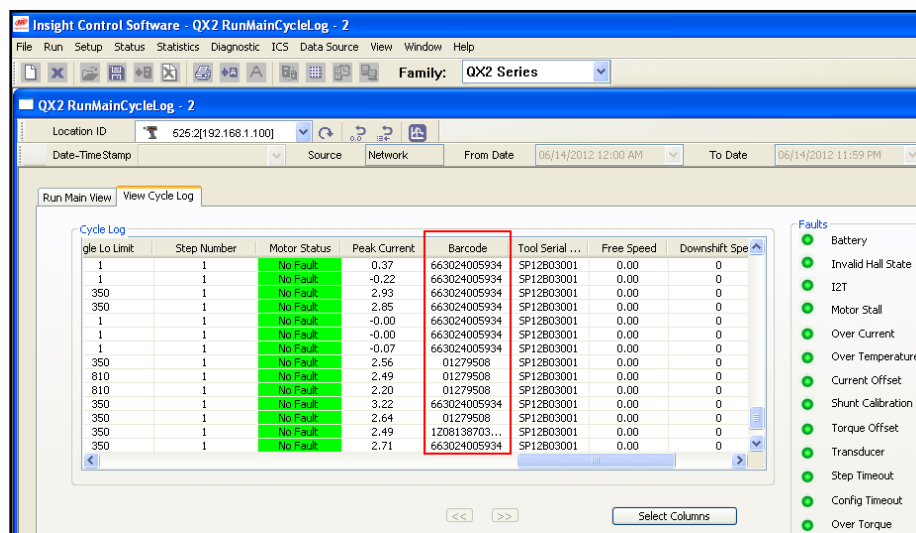
**Figure 1:** This is the screen where you select the Mode and Source for steps 7 and 8

9. Next, under protocol settings select serial port settings and set the baud rate to 9600.



**Figure 2:** Screen where you set your Baud Rate, step 9.

Now to check if your Barcode Scanner is working properly select Run-> Run Main Cycle Log then select the correct Location ID and click on View Cycle Log. In this screen you can scroll left and right, and up and down. If you scroll to the right you will see a tab that says "Barcode." Now scan a barcode and run the tool for a cycle, then hit the refresh button on this screen. You should see a barcode number appear for that cycle. If it appears than you set up the Barcode Scanner correctly.

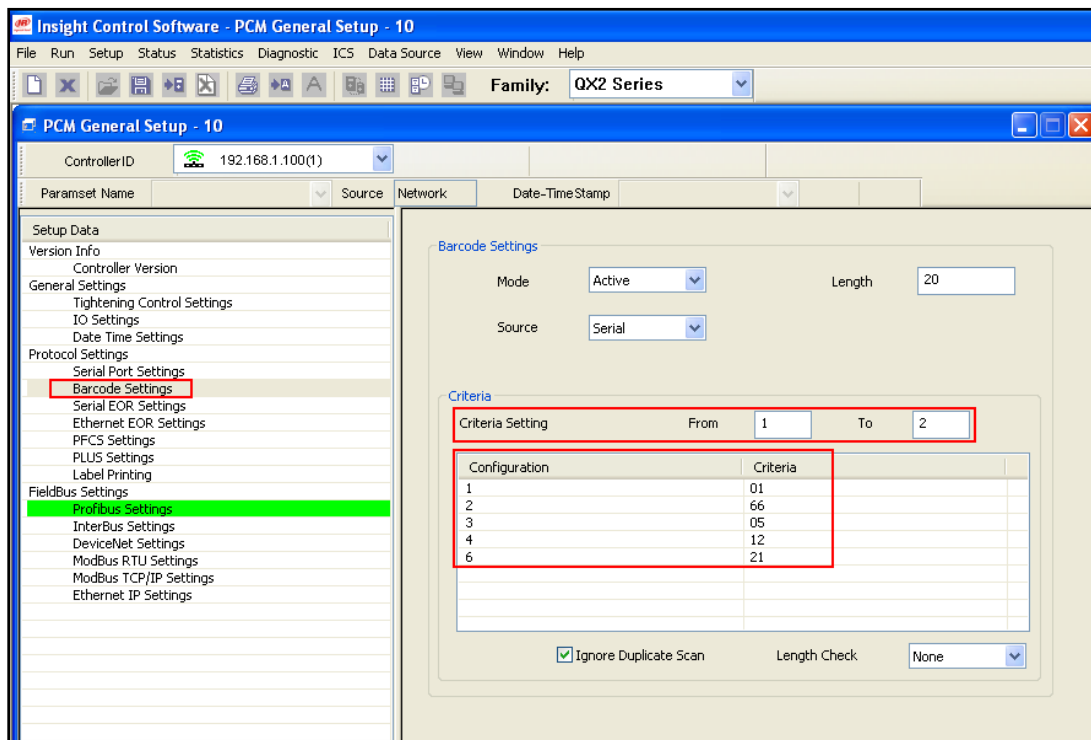


**Figure 3:** Where you check to make sure that your Barcode Scanner is working properly

## Configuration Criteria for Active Mode

There are many different features you can utilize with the barcode scanner. The main feature is making the Scanner either Passive or Active. If you have the scanner set as Passive, the barcode will be read and recorded for each cycle but will have no active role in the production line. On the other hand, if you set the Barcode Scanner to active it will play an active role in your production line. When the Scanner is set to active, it will read the barcode and tell the tool what configuration it should be on for that fastening. If the Barcode is programmed for configuration 3 and the tool is set on configuration 1 it will give you an error and not let you run the tool. If you set your Scanner to Active mode you must the Criteria for it to locate and use certain barcodes. To do this, follow these simple steps.

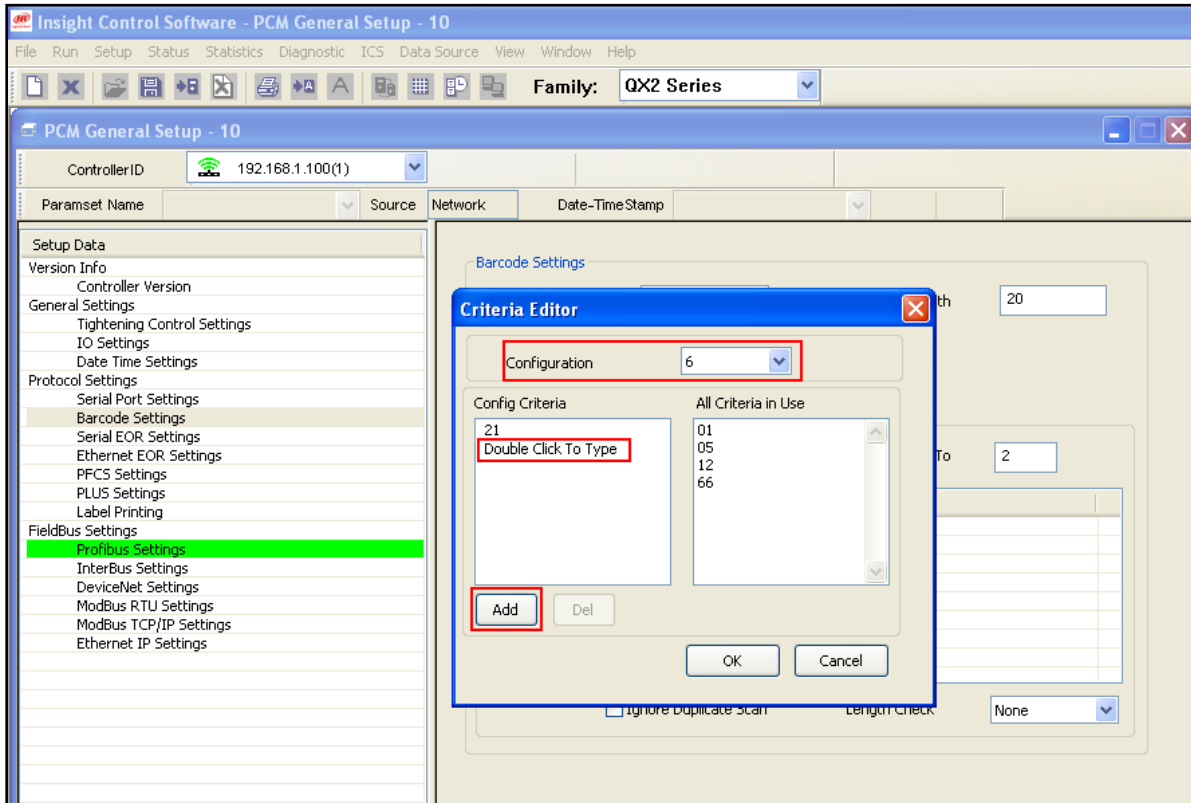
- a) Open PCM General Setup by going to Setup → PCM General Setup and select the correct Controller ID. Then under Protocol Settings go to Barcode Settings.
- b) Here you will find a Criteria configuration screen.



**Figure4:** This screen is where you set up and configure your criteria

- c) Set your Criteria Setting from 1 to (however many numbers you want the ICS software to use to recognize a barcode), for the simplicity of this How To I will use 2.
- d) Double click on the open screen which will bring up the "Criteria Editor"
- e) Then select the configuration you would like to program to a specific barcode by using the dropdown box.

- f) Next, Double click where it says “Double Click To Type” and type the first 2 numbers of the barcode that you want to set to that configuration. (if your second number in part c was something other than 2, you will have to type that amount of numbers)
- g) Click the Add button on the bottom of the screen and click the OK button.



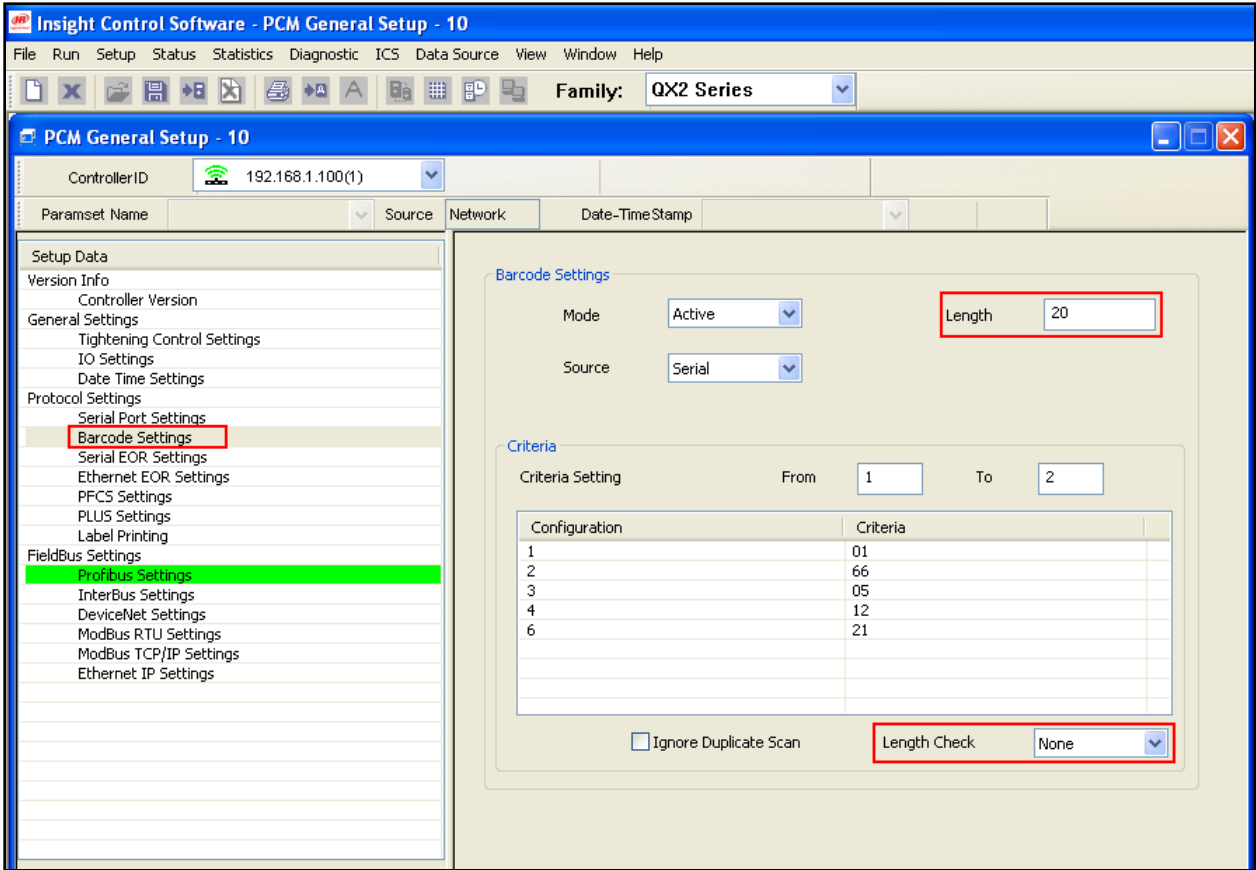
**Figure 5:** This Screen is where you add the Configuration Criteria

- h) Now you will see the different configurations corresponding to the first couple numbers of that barcode.

Now you can try to scan a barcode and use a different configuration to make sure that the tool stops you and gives you an error.

### Length Restrictions

Another feature that can be used is the ability to restrict the scanner to only working for Barcodes of a certain length. This feature allows you to select a certain length that the Scanner will recognize. Under the Length Check you can select from four different features such as: none, restrict, truncate left, or truncate right. If you select none, nothing will happen no matter how long the barcode string is. If you select restrict, it will only recognize barcodes that are the lengths that were placed in the Length box. The Truncate Left and Truncate Right feature do exactly what they say; they will only take the first set length of numbers or the last length of numbers.



**Figure 6:** These are the boxes that you use to control the length restrictions



### How to set up the Bit Box with a PCM

1. In order to set up the bit box you will need six items. You will need the 8 position Bit Box, the IC 19 Pin cable, a connection wire, a 24 volt power supply, a PCM or IC, and a computer that runs ICS software.
2. Make sure that the PCM is up and running. This is shown how to do in another “how to”.
3. Now, plug in the Bit Box by taking the female side of the IC 19 Pin cable and connecting it to the Bit Box. Next, take the 19 open wires and connect them to the PCM in the sequence described below.
  - a) First all the way to the left under the COM IN port, connect the yellow/brown wire.
  - b) Connect the pink/grey wire to the port that is third from the left, the 2-I-1 port.
  - c) Connect the red/blue wire to the port that is fourth from the left, the 2-I-2 port.
  - d) Connect the white/green wire to the port that is fifth from the left, the 2-I-3 port.
  - e) Connect the black wire to the port that is sixth from the left, the 2-I-4 port.
  - f) Connect the brown/green to the next port, the 2-I-5 port.
  - g) Connect the Pink wire to the next port, the 2-I-6 port.
  - h) Connect the white/yellow wire to the next port, the 2-I-7 port.
  - i) Connect the green wire to the next port, the 2-I-8 port.
  - j) Next, connect the blue wire to the +24 V DC port.
  - k) Connect the brown wire to the 1-O-1 port.
  - l) Connect the Orange wire to the 1-O-2 port.
  - m) Connect the grey/brown wire to the 1-O-3 port.
  - n) Connect the violet wire to the 1-O-4 port.
  - o) Connect the white wire to the 1-O-5 port.
  - p) Connect the red wire to the 1-O-6 port.
  - q) Connect the grey wire to the 1-O-7 port.
  - r) Connect the yellow wire to the 1-O-8 port.
  - s) The uncovered wire should be wrapped around the ground connector.
  - t) The tan wire is a spare so don't connect that to anything.
  - u) The -24 V DC port and the second COM IN port will be used later so leave them empty.
4. Connect the 24 Volt power supply from a wall outlet to the PCM by taking the positive wire and connecting it to the +24 V DC port along with the blue wire. And take the negative wire from the power supply and connect that to the second COM IN port that is empty.
5. Next take the connection wire and connect the -24 V DC port with the first COM IN port, the one that has the brow/yellow wire.

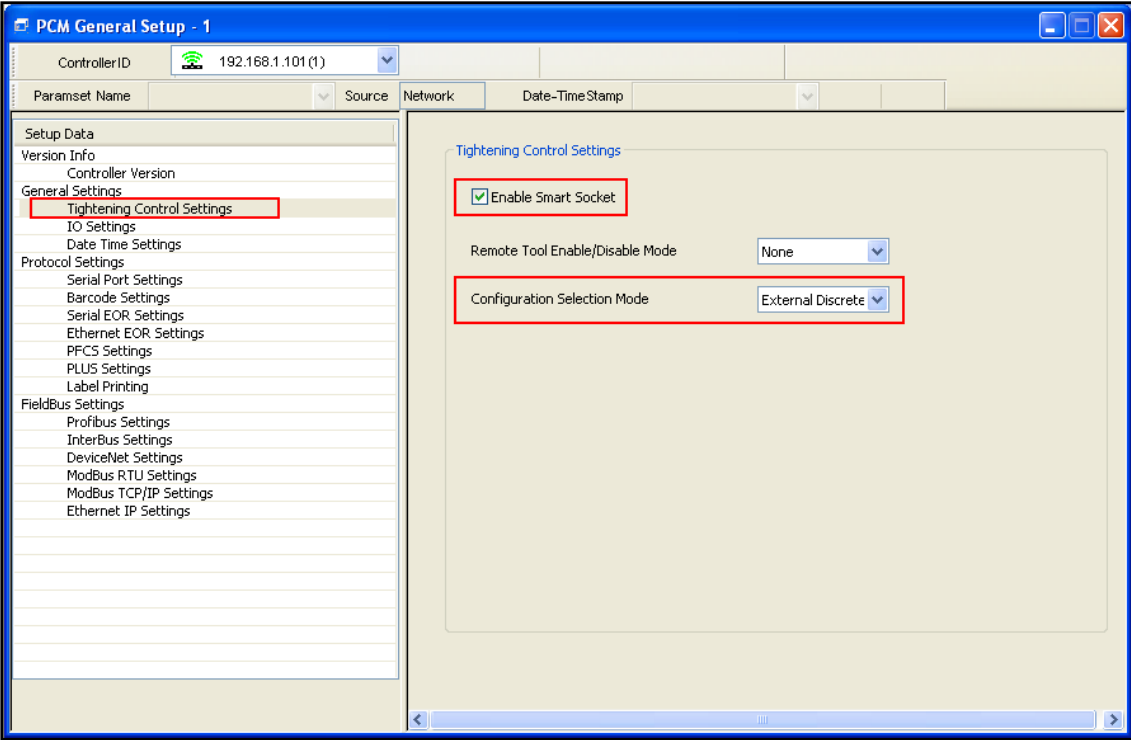
Now that your Bit Box is connected to the PCM, the only thing left to do is program ICS software to recognize this Bit Box.

1. First, open the ICS software and set the Family to QX2 series.
2. Next on the top bar select Setup-> PCM General Setup.
3. Next, select the correct controller ID.

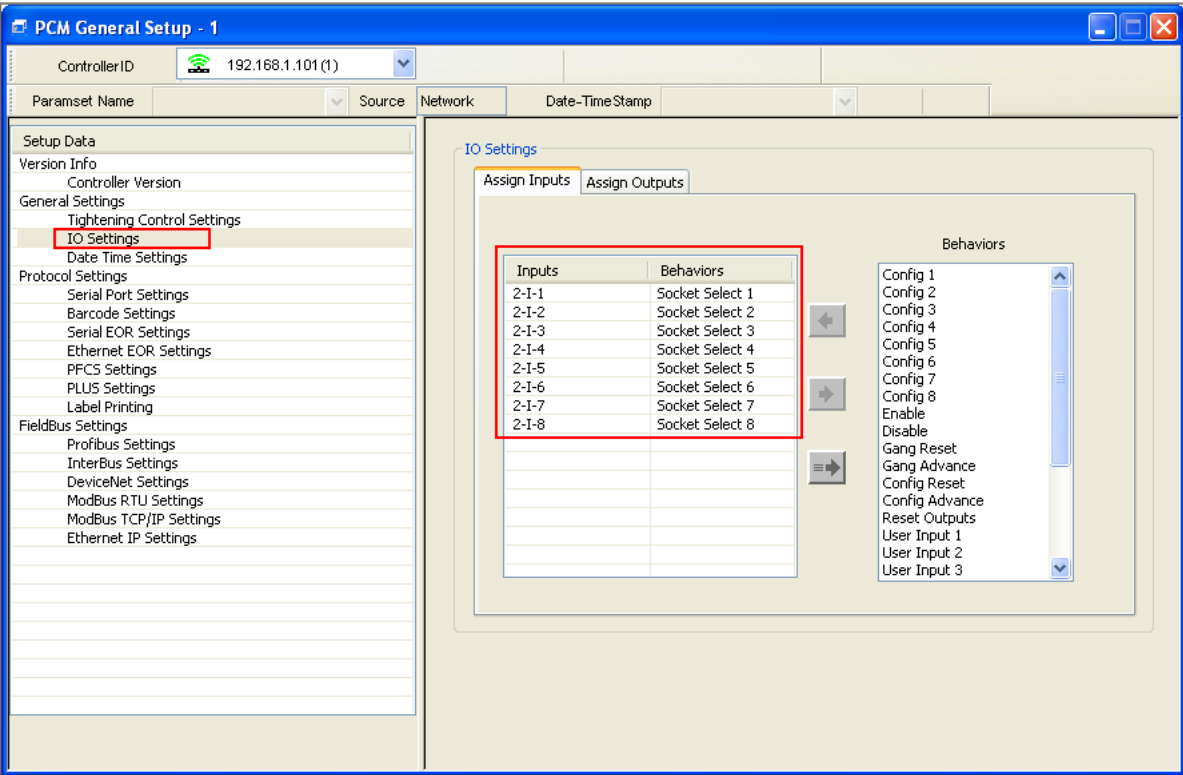
4. Under general settings select Tightening Control Settings and check the box that says Enable Smart Socket. Also where it says Configuration Selection Mode, select External Discrete.
5. Next, under General Settings select IO settings. Now under Assign Inputs, change input 2-I-1 to Socket Select 1, 2-I-2 to Socket Select 2,..., all the way up to 2-I-8 to Socket Select 8.
6. Now under Assign Outputs, change Output 1-O-1 to Socket Select 1, 1-O-2 to Socket Select 2,..., all the way up to 1-O-8 to Socket Select 8.
7. Now click the exit button and a screen should appear that asks if you want to send the data, click yes. Now a screen will tell you to reboot the PCM after 30 seconds. Wait 30 seconds and then unplug the PCM. Now wait another 30 and plug the PCM back in. (If ICS does not recognize the PCM right way, just exit out of the ICS software and then open it up again)
8. Now select Setup → Tool Setup and select the correct location ID.
9. Under the General setup tab, check the box that says Enable Smart Socket.
10. Now go back to the Tightening Configuration tab under Tool Setup, and choose a configuration. Now you will see a box that says Socket Selection on it and you can choose a number between 1 and 8. Pick whatever Socket you want and that will be the number on the box that corresponds to that configuration.
11. Now hit the send data button so that the tool is set up with the Bit Box and will only work if the correct bit is removed from the box. You should also see a green light for whatever configuration the tool is set on.

If you try to use the tool without having the bit removed from the box it will give you an error of F-03.

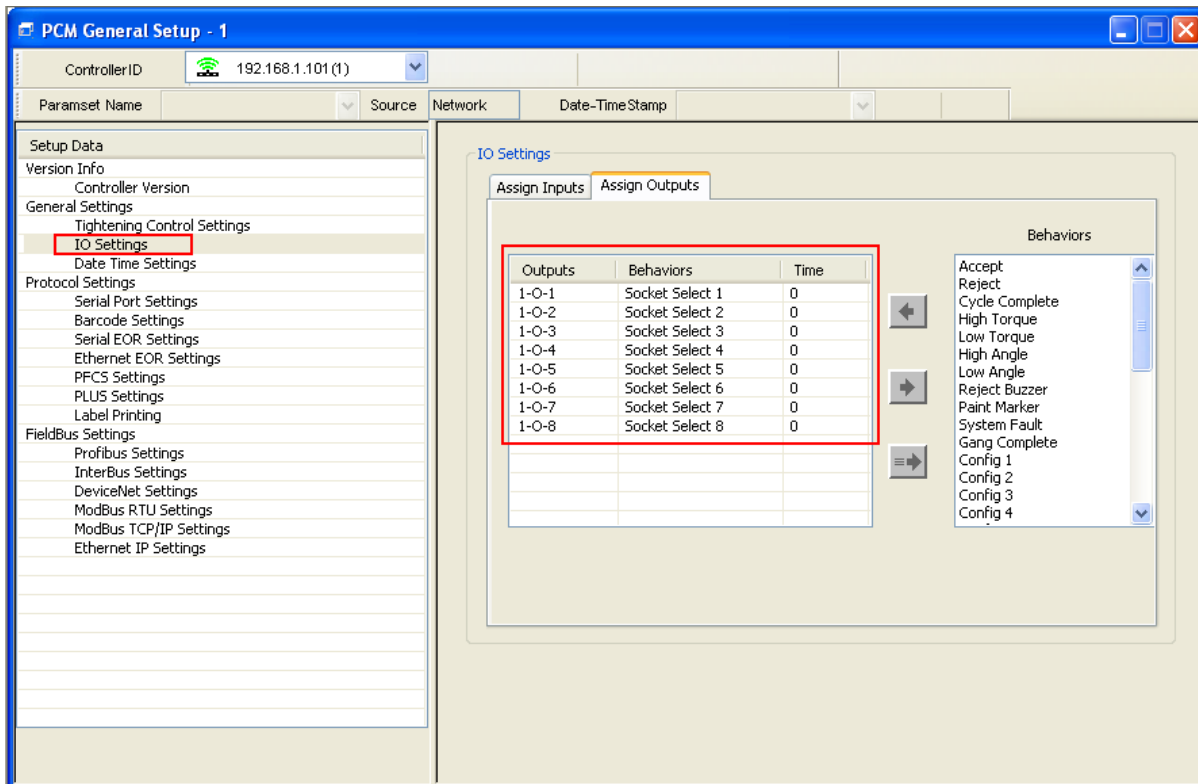
**The next pages are screen shots of what boxes you should be changing.**



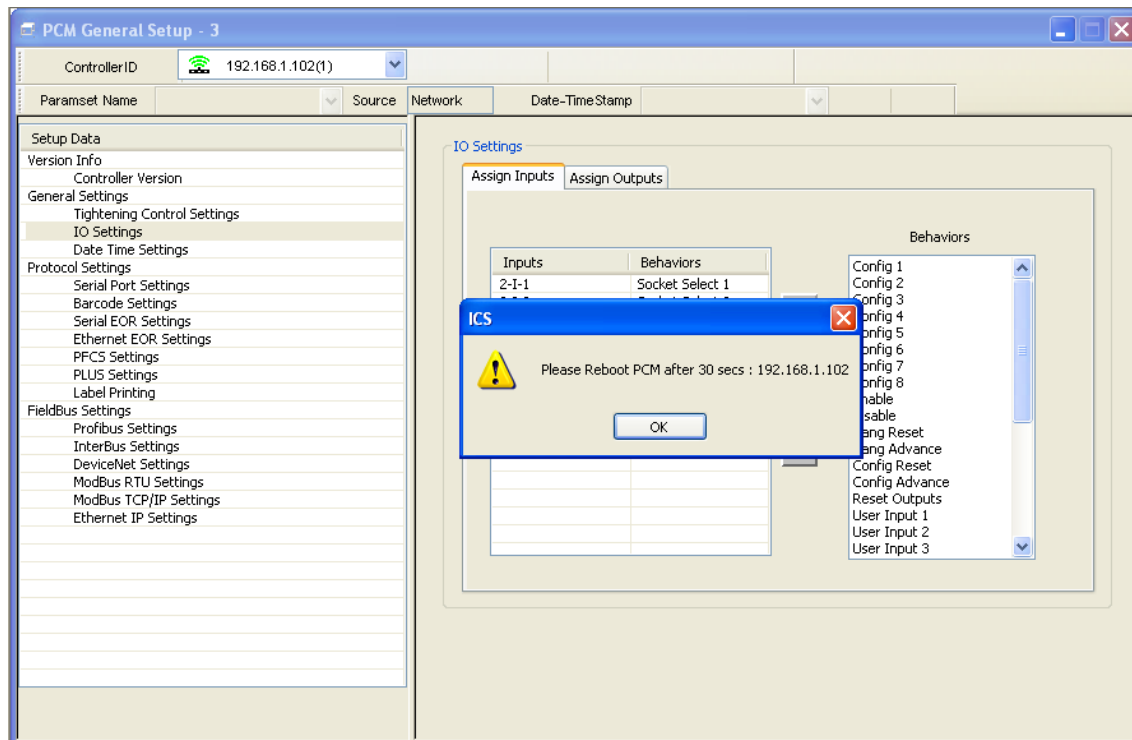
**Figure 1:** This picture goes along with step 4 of the programming section. It is where you Enable Smart Socket and the Configuration Selection Mode for the PCM.



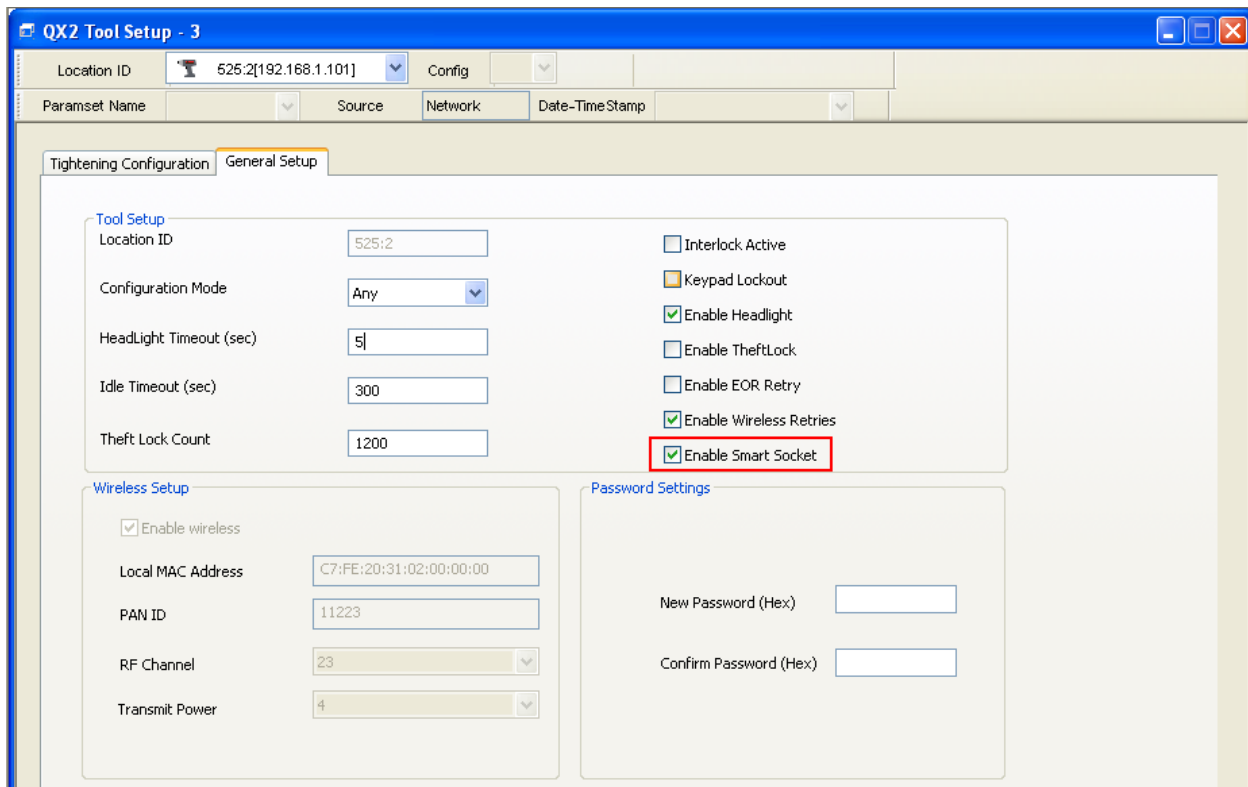
**Figure 2:** This is where you assign the inputs for the different input terminals.



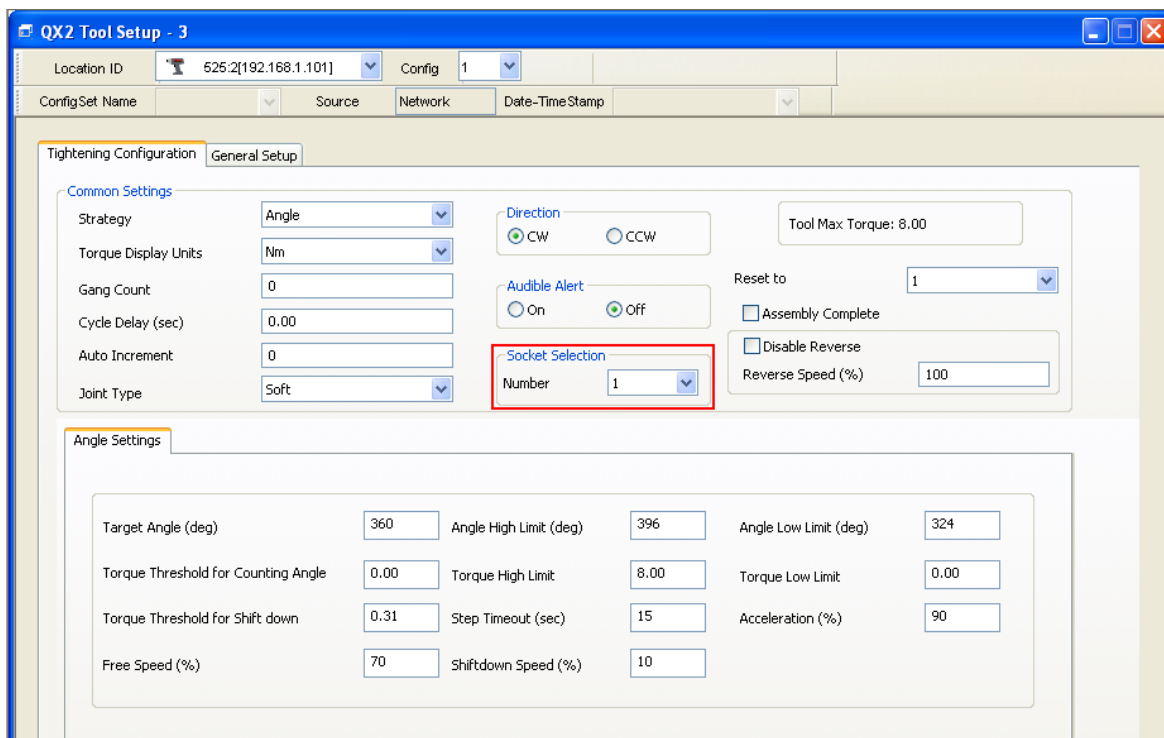
**Figure 3:** This is where you assign the outputs for the different output terminals.



**Figure 4:** After clicking okay wait 30 seconds to unplug your PCM, and then wait 30 seconds to plug it back in.



**Figure 5:** Here is where you Enable Smart Socket for the tool.



**Figure 6:** This is where you select which position on the Bit Box corresponds to the selected configuration.

### Difference between PCM EOR & ICDM EOR

The EOR outputs that are possible with the PCM are as follows.

The default EOR options are.

1. Cycle No	8. Torque Units	15. Torque Low Limit
2. Config No	9. Peak Angle	16. Angle High Limit
3. Date	10. Angle Result	17. Angle Low Limit
4. Time ID	11. Peak Current	18. Control Point
5. Cycle Result	12. Cycle Time	19. Barcode
6. Peak Torque	13. Strategy Type	
7. Torque Result	14. Torque High Limit	

The total amount of options that you can choose from includes the following.

1. Cycle No	20. Job ID	40. Peak Cut-In Torque
2. Config No	21. Powerhead Cycle No	41. Peak Prevailing Torque
3. Date	23. Spindle No	42. Avg Prevailing Torque
4. Time ID	24. Step No	43. Peak Drag torque
5. Cycle Result	25. Downshift Speed	44. Avg Drag Torque
6. Peak Torque	26. Free Speed	45. Total Gang Count
7. Torque Result	27. TR	46. Current Gang count
8. Torque Units	28. Dual Slope A High	47. Tool Serial Number
9. Peak Angle	29. Dual Slope A Low	48. Shutdown Code
10. Angle Result	30. Dual Slope B High	49. CP Result
11. Peak Current	31. Dual Slope B Low	50. Gradient Result
12. Cycle Time	32. Gradient High	51. Dual Slope A Result
13. Strategy Type	33. Gradient Low	52. Dual Slope B Result
14. Torque High Limit	34. Final Slope	53. Unusual Fault
15. Torque Low Limit	35. Torque At Seat	54. Motor Torque Constant Test
16. Angle High Limit	36. Angle At Seat	55. Free Speed test
17. Angle Low Limit	37. Min Drag Torque	56. Max Tool Speed
18. Control Point	38. Peak Slope	57. Total Angle
19. Barcode	39. Prevailing Torque Slope	

As you can see, there are many different options that can be chosen to be represented in the EOR data log. When you pick which options you would like the display will show the values for the options that were picked.

For the ICD/M the EOR options that are available are, for the most part, the same. There are a few minor changes between the two.

1. Controller	21. Control Point	41. Motor Torque Const. Test
2. Spindle No	22. Final Slope	42. Free Speed Reached
3. Cycle No	23. Torque At Seat	43. Angle Low Pass
4. Powerhead cycle No	24. Angle At Seat	44. Angle High Pass
5. Powerhead No	25. Minimum Drag Torque	45. Torque Low Pass
6. Configuration No	26. Peak Slope	46. Torque High Pass
7. Step No	27. Peak Cut In Torque	47. Cycle Pass Fail
8. Date/Time Of Cycle	28. Average Torque	48. Dual Slope A High Limit
9. Cycle Result	29. Barcode	49. Dual Slope A Low Limit
10. Peak Torque	30. Total Gang Count	50. Dual Slope B High Limit
11. Torque Result	31. Current Gang Count	51. Dual Slope B Low Limit
12. Peak Angle	32. Shutdown Code	52. Gradient High Limit
13. Angle Result	33. Step Type	53. Gradient Low Limit
14. Peak Current	34. Gradient Low Limit Result	54. Tare Compensation Enable
15. Cycle Time	35. Gradient High Limit Result	55. Torque Units
16. Strategy	36. Dual Slope B Low Result	56. Last Step
17. Torque High Limit	37. Dual Slope B High Result	57. Tool Serial No
18. Torque Low Limit	38. Dual Slope A Low Result	58. Plausibility High Status
19. Angle High Limit	39. Dual Slope A High Result	59. Plausibility Low Status
20. Angle Low Limit	40. Unusual Fault	60. Total Angle

With the default options set at

1. Controller	8. Date/Time Of Cycle	15. Cycle Time
2. Spindle No	9. Cycle Result	16. Strategy
3. Cycle No	10. Peak Torque	17. Torque High Limit
4. Powerhead Cycle No	11. Torque Result	18. Torque Low Limit
5. Powerhead No	12. Peak Angle	19. Angle High Limit
6. Configuration No	13. Angle Result	20. Angle Low Limit
7. Step No	14. Peak Current	21. Shutdown Code

## How to upgrade all of your software

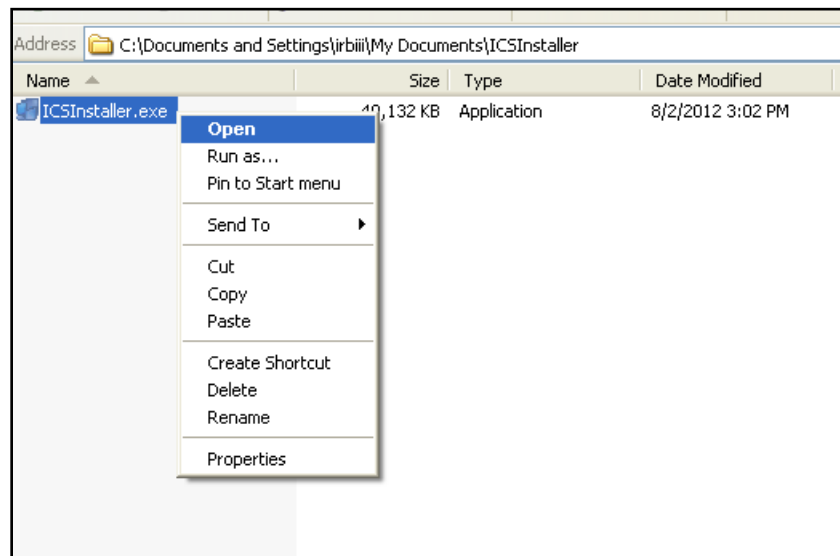
In order to upgrade the PCM, ICS and software on your QX series tool you must have access to our FTP site. This how to guide will show you the necessary steps to take with while installing new versions of all the upgradable software.

[ftp.irco.com](http://ftp.irco.com)

username: asSoftwareRead  
password: 4&4erum6?a

### Upgrading the ICS software

1. First go to our FTP site and login using the username and password that you have received.
2. From our FTP site, save the ICSInstaller.exe file located in the Viper MB1 directory. This is the formal release version.
3. Uninstall the current ICS software from your PC.
4. Delete the ICS folder from C:\ Program Files\ Ingersoll Rand Directory. DO NOT DELETE YOUR LICENSE FILE.
5. Run the ICSInstaller.exe file to install version 6.0.10.0 ICS.



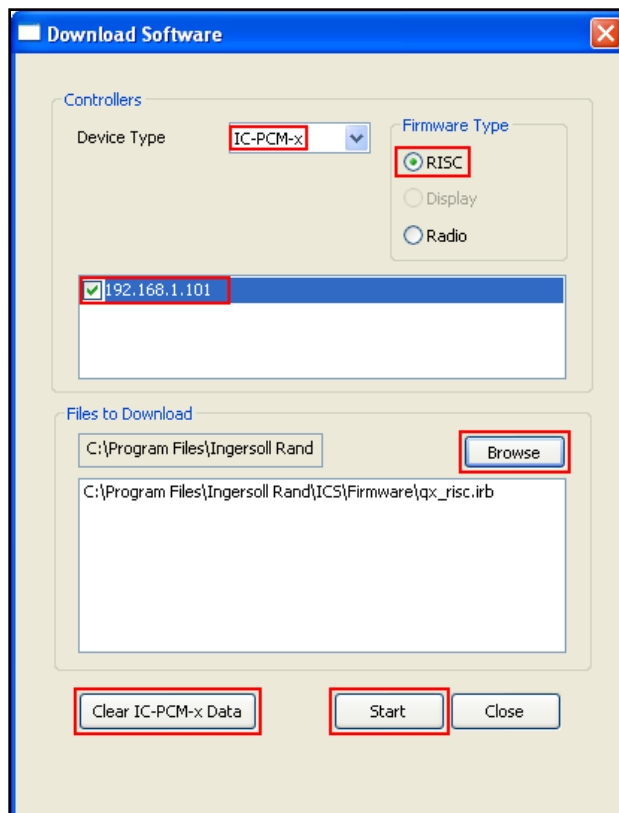
6. Go through all the necessary steps in the installation wizard.
7. Once it is done, when you open up ICS for the first time it will ask you for your license file. Use the same license file that you used for the last version of ICS.

### Upgrading the PCM version

1. After upgrading your ICS version, connect to the PCM. If unable to connect to the PCM, verify ICS adapter settings, PC Network settings, and PCM Network settings.



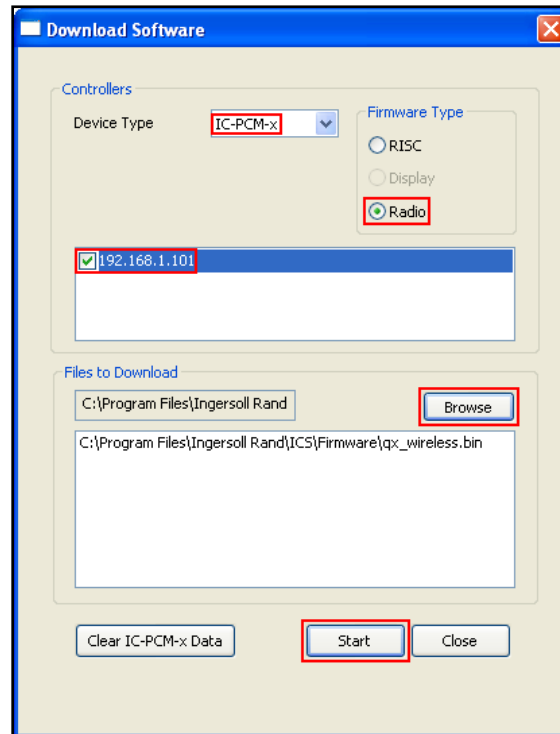
2. Once connected, go to the Setup → Download Software screen and select Device Type as IC-PCM-x.
3. Select Firmware Type as RISC
4. Select the correct PCM
5. Select “Clear IC-PCM-x Data”
6. Acknowledge the message “You are about to clear.....”
7. ICS then prompts with a message, “Please reboot PCM after 30 seconds...”. Acknowledge the message, but DO NOT REBOOT.
8. Select “Browse”
9. Select the qx\_risc.irb file.
10. Select “start” to begin the PCM RISC software download.
  - a. The PCM will reboot automatically when the download is complete. This can take up the 10 minutes. If the PCM does not reboot within 10 minutes, manually reboot.



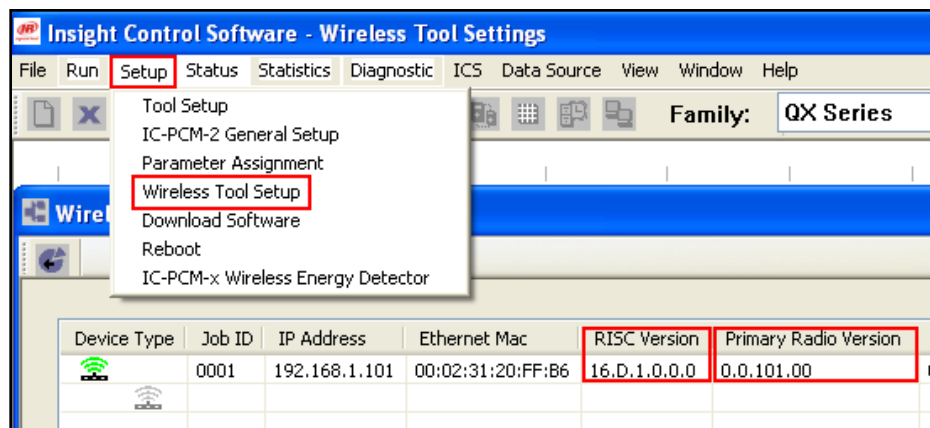
### **Upgrading the Radio**

1. After the software is upgraded and the PCM reconnects to ICS go to Setup → Download Software screen and select Device Type as IC-PCM-x.
2. Select Firmware type as Radio.
3. Select the correct PCM.
4. Select “Browse”.
5. Select the qx\_wireless.bin

6. Select “start to begin the PCM Radio firmware download.
7. Acknowledge the message, “you are about to download new software.....”.
8. The download process takes approximately 5 minutes.
  - a. The PCM will do a soft reboot when the download is complete. You will notice the “run” icon on the PCM flashing during the download, and it will be solid after the reboot. On ICS you will see a disconnect message in the message window and then a reconnect message once the PCM is back online. If the PCM does not reconnect within 5 minutes, manually reboot.

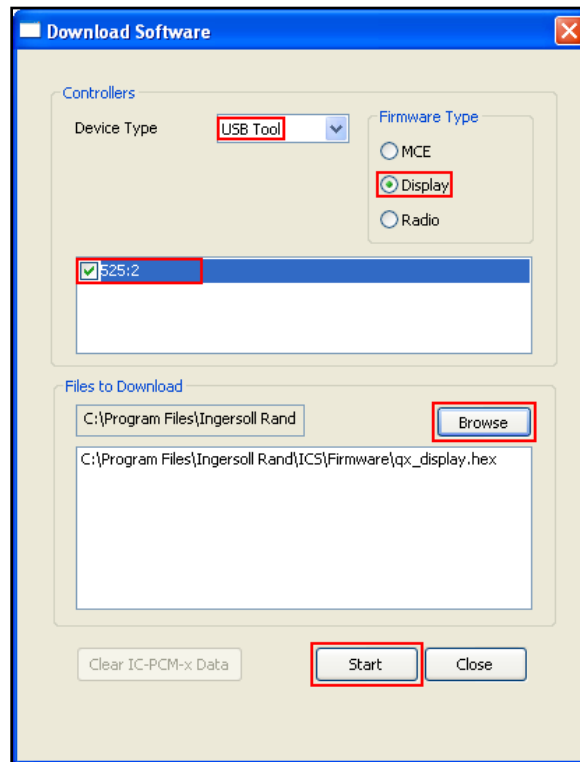


9. Open the Setup→ Wireless Tool Setup screen. Verify the PCM software Versions. RISC-16.D.1.0.0.0. Primary and secondary Radio- 0.0.101.00.



### Upgrading the firmware

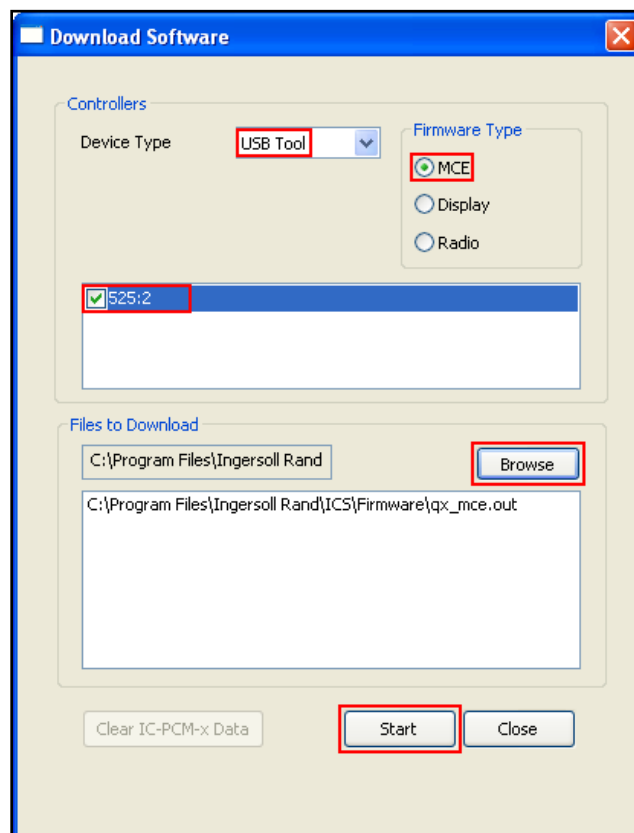
1. Connect the QX Series tool to the PC using a USB cable.
2. Open the Setup → Download Software screen and select Device Type as USB Tool.
3. Select Firmware Type as Display.
4. Select the connected USB Tool.
5. Select “Browse”.
6. Select the qx\_display.hex file.
7. Select “Start” to begin the download.
8. Acknowledge the message, “You are about to download new software...”.
9. When the download is complete ICS will prompt with a message, “Please restart the tool after 15 seconds.” Acknowledge the message.
  - a. The tool display will show the IR Logo screen and turn on all the LEDs during the 15 seconds, then will reset. Restart the tool (by unplugging and plugging in the battery) and reconnect the USB cable.
10. After restarting the tool, verify connection to ICS with a USB cable. Open the Setup → Download Software screen and select Device Type as USB Tool.



11. Select Firmware Type as MCE.
12. Select the connected USB Tool.
13. Select “Browse”.
14. Select qx\_mce.out file
  - a. NOTE: This procedure is valid for MB1 tools or newer. In the case of older tools (with RevJ power boards), when loading MCE software to the tool you should load version

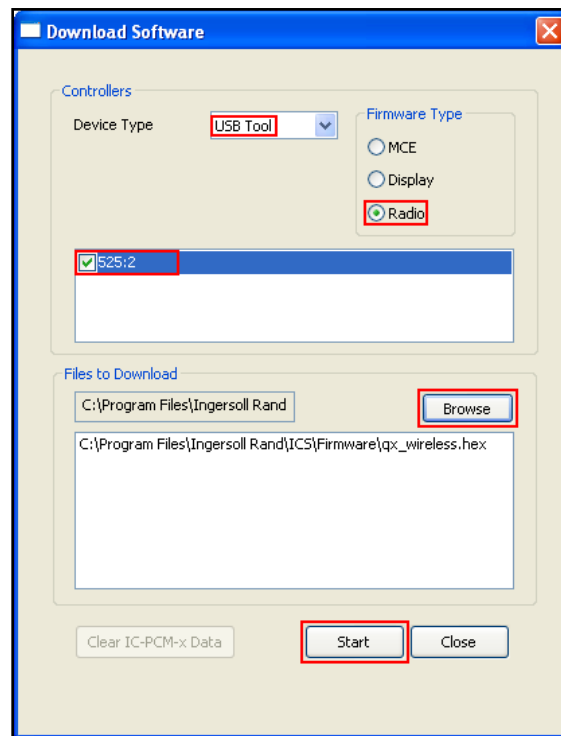
1.0.5.1. This version is located on the FTP site. When downloading make sure to “Browse” to the correct file location if version 1.0.5.1 is to be used.

15. Select “start” to begin the download.
16. Acknowledge the message, “You are about to download new software....”.
17. During the download process, ICS will prompt with a message “Wake up MCE (pull the trigger) then click okay”. Pull the trigger on the tool and then select OK.
18. ICS will prompt with a message, “Please restart the tool after 60 seconds.” Acknowledge the message.
  - a. The tool display will show the IR Logo screen and flash certain LEDs during the 60 seconds. The display will then give the error B-01. This indicates that the download was not successful. This is a known defect and will be addressed in a future release.
19. Repeat steps 33 through 40.
20. ICS will then prompt with a message, “Please restart the tool after 60 seconds.” Acknowledge the message.
  - a. The tool display will show the IR Logo screen and flash certain LEDs during the 60 seconds, then will reset. Restart the tool and reconnect the USB cable.



21. After restarting the tool, verify connection to ICS with a USB cable. Open the Setup → Download Software screen and select Device Type as USB.
22. Select Firmware Type as Radio.
23. Select the connected USB Tool.

24. Select "Browse".
25. Select the qx\_wireless.hex file.
26. Select "Start" to begin the download.
  - a. NOTE: There are no messages displayed on ICS during the process. This is a known defect that will be addressed in a future release (ICS remains on the Downloading screen and still shows the Progress as "Downloading" after the downloading is complete. Remove the USB cable. ICS shows the Progress as Fail, even though the download was successful). The sequence of events on the tool during the download process are:
    - i. After approximately 2 minutes the display will go blank and the LEDs will flicker.
    - ii. After approximately 6 more minutes the tool display will reset and LEDs will be off.
  - b. NOTE: The download will not be successful the first time. Restart the tool and open the Setup → Wireless Tool Setup screen. The tool Wireless Version is 0.0.0.0. This is a known defect and will be addressed in a future release.
27. Repeat steps 44 through 49.



28. When the download is complete restart the tool and reconnect the USB cable.
29. Open the Setup → Wireless Tool Setup screen.
30. Verify software versions.
  - a. Display – 2.0.5.0
  - b. MCE – 1.0.5.0 or 1.0.5.1

## c. Wireless – 0.0.1.0

