Quick Start Guide

TC-Link® 2.4 GHz Wireless 6 Channel Thermocouple Node
Firmware Version 1.14 and higher
Software Version 3.24 and higher
Revised: 23 August 2010

Welcome

- Thank you for purchasing MicroStrain's TC-Link®.

Software Installation

- Place the TC-Link® CD in your CD-ROM drive and the installation menu will appear.
- Install the TC-Link® Node Monitor Software.
- If you have a USB or Analog Base Station, install the USB Base Station Driver. The driver is not required for the Serial Base Station.

Hardware Installation

- Install the antenna on the base station antenna connector. Tighten hand tight; do not over tighten.
- If you have a serial base station (see Figure 1), connect the RS-232 cable to a serial port on your PC and to the serial base station RS-232 connector. Connect the external power supply to the power connector on the serial base station and plug it into a proper power receptacle. Turn the serial base station power switch on and the green LED will illuminate indicating the base station is powered
- If you have a USB base station, plug the USB connector into any USB port on your PC. The blue LED will illuminate indicating the base station is powered.
- If you have an analog base station, connect the USB cable to any USB port on your PC and to the analog base station USB connector on the back panel. Connect the external power supply to the power connector on the back panel of the analog base station and plug it into a proper power receptacle. Depress the red power button on the front panel and the green LED will illuminate indicating the base station is powered.

USB **Serial** **Analog**

Figure 1

- Turn off the TC-Link® and connect the external power supply barrel connector into the TC-Link® and plug the cable into a proper power receptacle. The red LED to the left of the barrel connector will illuminate indicating that the internal battery is charging. When the red LED goes out and the green LED illuminates, full charge has been reached. Remove the power supply and turn the TC-Link® on. You will notice a momentary flashing of the green LED to the left of the switch indicating that the TC-Link® has booted up. The LED will begin to flash every 1 second which is the default sampling rate.

Software Operations

- Click the Windows Start. Click All Programs. Click MicroStrain. Click TC-Link® Node Monitor. Click TC-Link®- Node Monitor to launch the software.
- The Comm Port Setup screen will appear. See Figure 2.

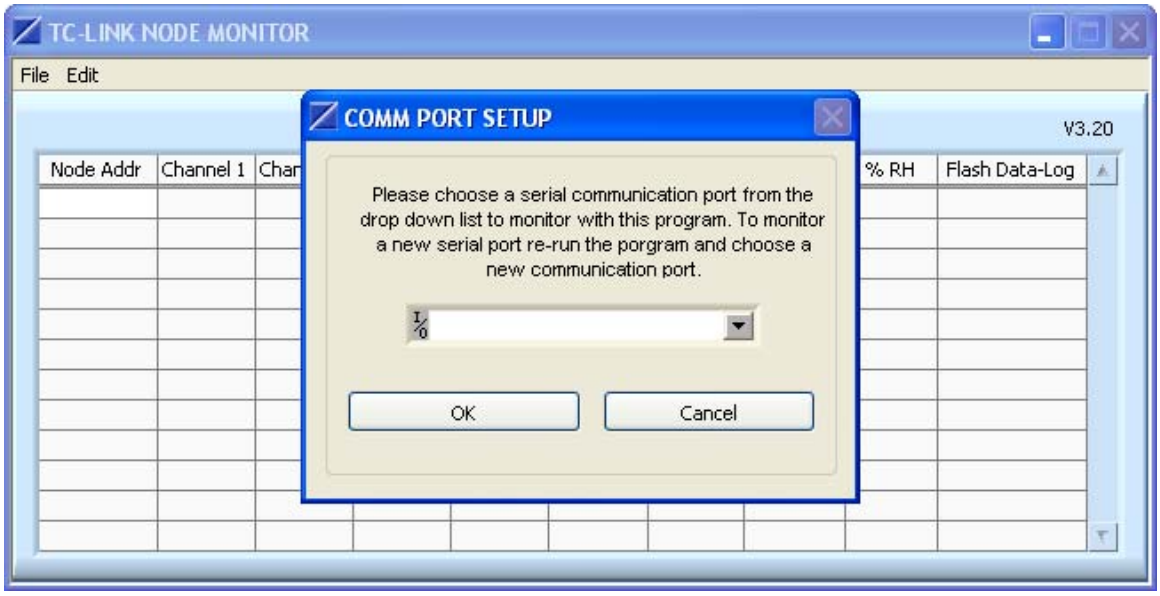

Figure 2

- If you have a USB base station or an analog base station: Click the Windows Start. Click Control Panel. Double-click System. Click the Hardware tab. Click Device Manager. Click the + sign to the left of Ports (COM&LPT). Find a device entitled "CP210x USB to UART Bridge Controller and note what comm port it has been assigned. This is the comm port that your base station is operating on. Click File and Exit to eliminate the Device Manager screen. Click OK to eliminate the System screen. Click File and Close to eliminate the Control Panel screen.
- If you have a serial base station: Determine in advance what comm port you have installed it on.
- Click the down arrow on the I/O drop-down box. Select the appropriate comm port. See Figure 3.

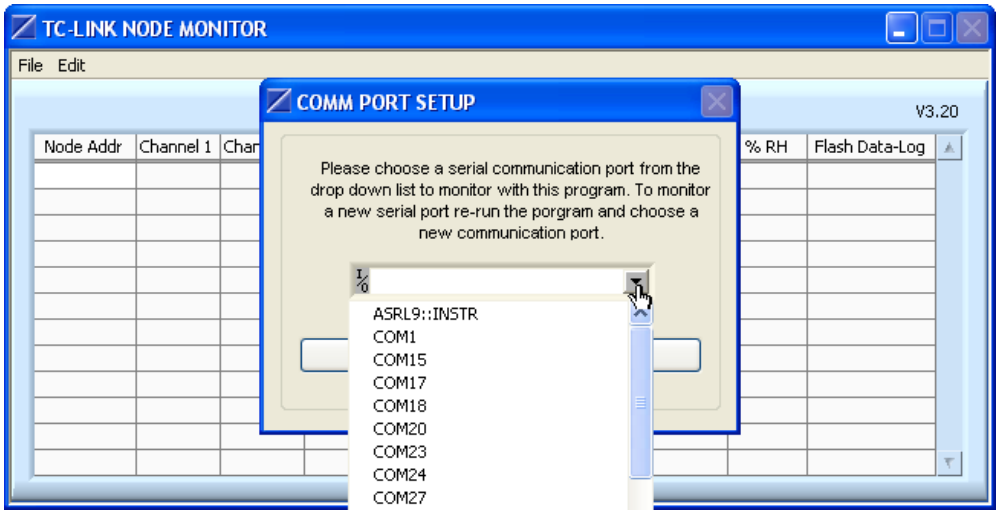

Figure 3

- Serial base station comm ports will read out as COM1 or COM 24 (for example). USB base station and analog base station ports will read out as ASRL9 (for example).
- Click OK and the Comm Port Setup screen will disappear.
- After a few moments, the TC-Link® data will begin displaying on the grid and refreshing it every 2 seconds. See Figure 4.
    - The node address will display (example: 78).
    - The 6 thermocouple channels will display; initially you will see channel 1 reported as 'Open' and channels 2 through 6 reported as '--'.
    - The internal Cold Junction Compensation (CJC) sensor temperature will display (example: 22.423 degrees C).
    - The Relative Humidity (%RH) will display if the option is installed (in our example we don't have the option installed and see '--'.
    - The Flash Data-Log will display (in our example datalogging is 'No' meaning not activated; 'Yes' indicates that datalogging is enabled).

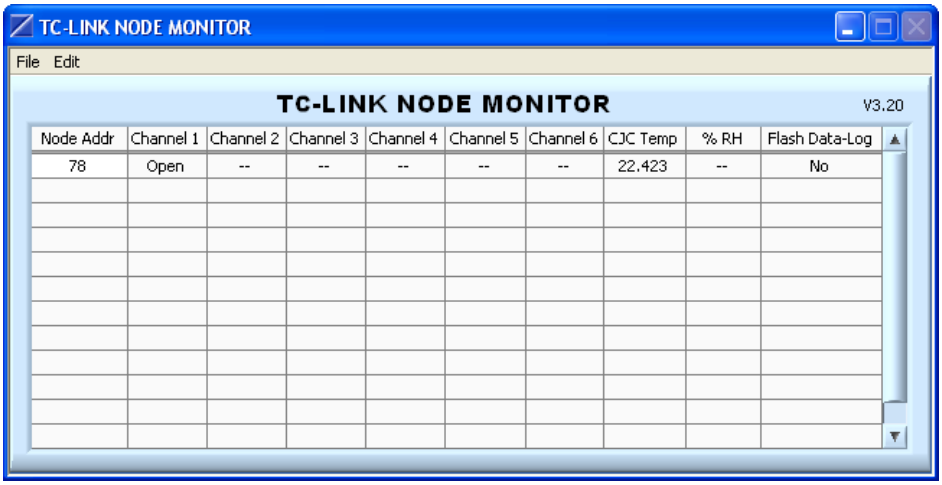

Figure 4

- Insert a thermocouple in the channel 1 connector. By default the TC-Link® is configured to measure J-type thermocouples on its 6 channels. Any thermocouple will read out, albeit inaccurately; a J-type will immediately read out accurately and display in °C.
- This indicates that the system is fully operational.
- Move your mouse pointer over the Node Address in the grid (78 in our Figure 4 example).
- Click the 78 and the Node #78 Real-Time Panel screen will appear with the Real-Time Graph tab in view. See Figure 5.

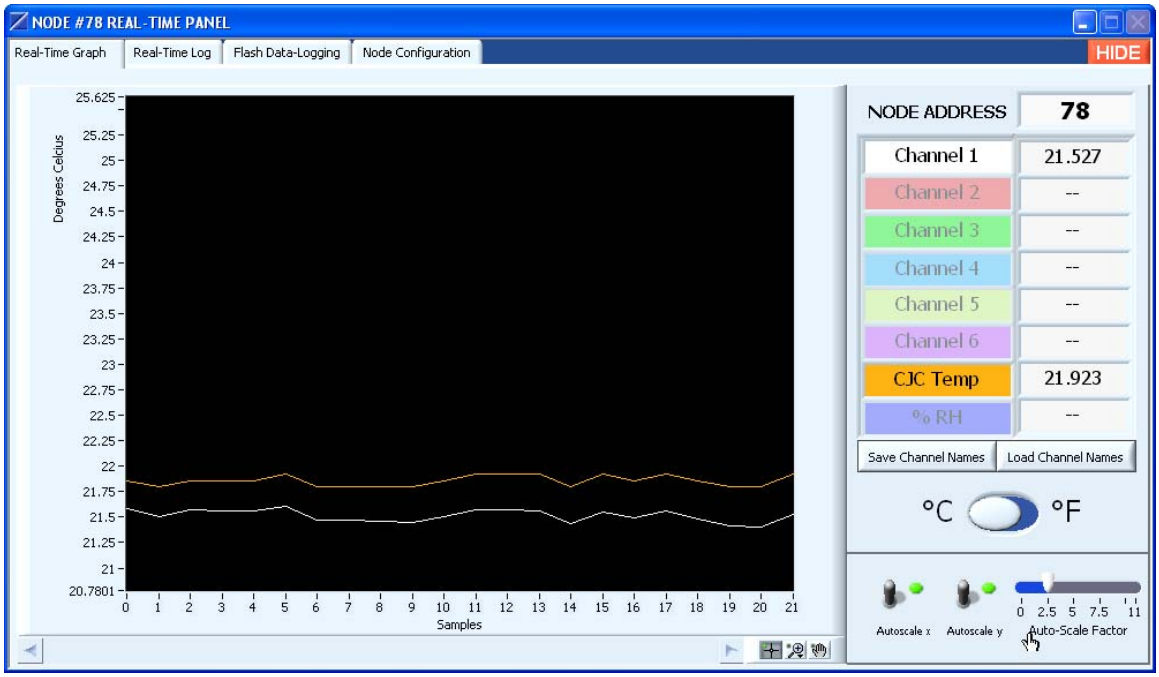

Figure 5

- The panel to the right displays the same information that was shown on the grid.
- The graph to the left displays the temperature in °C.
- Click the °C-°F button and the right hand panel will display in either °C or °F.
- Note: Auto-scaling controls are provided below the panel and zoom-pan controls are provided below the graph.
- Click the Hide button in the upper right screen to hide this panel. Click the Node Address on the grid and the panel will re-appear.
- Click the Node Configuration tab and the screen in Figure 6 will appear.

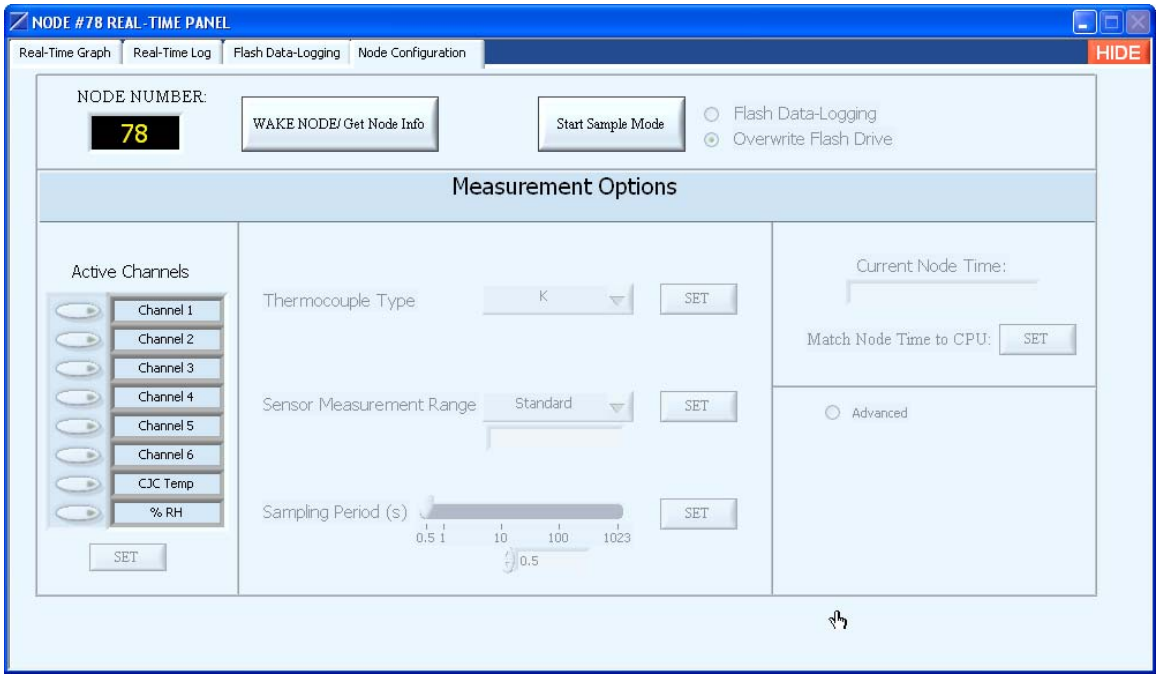

Figure 6

- In the Active Channels panel, you may wipe through the channel labels and replace them with labels to suit. The new labels will take immediate effect throughout the interface and may be saved and reloaded using the Save Channel Names and Load Channel Names buttons on the Real-Time Graph tab.
- Click the Wake Node/Get Node Info button and in a moment the TC-Link® will "awaken". Please note that the green LED to the left of the power switch will stop blipping every 1 second in favor of an on/off throb. The TC-Link® is now no longer sampling and transmitting data; it is in an idle state.
- The actual configuration (default from factory) of the TC-Link® is now reported. See Figure 7.
    - Channels 1 and the CJC Temp channel are enabled.
    - Thermocouple type is J.
    - Sensor Measurement Range is Standard.
    - Sampling Period is 1 Hz.
    - The Current Node Time (on-board clock) is given.

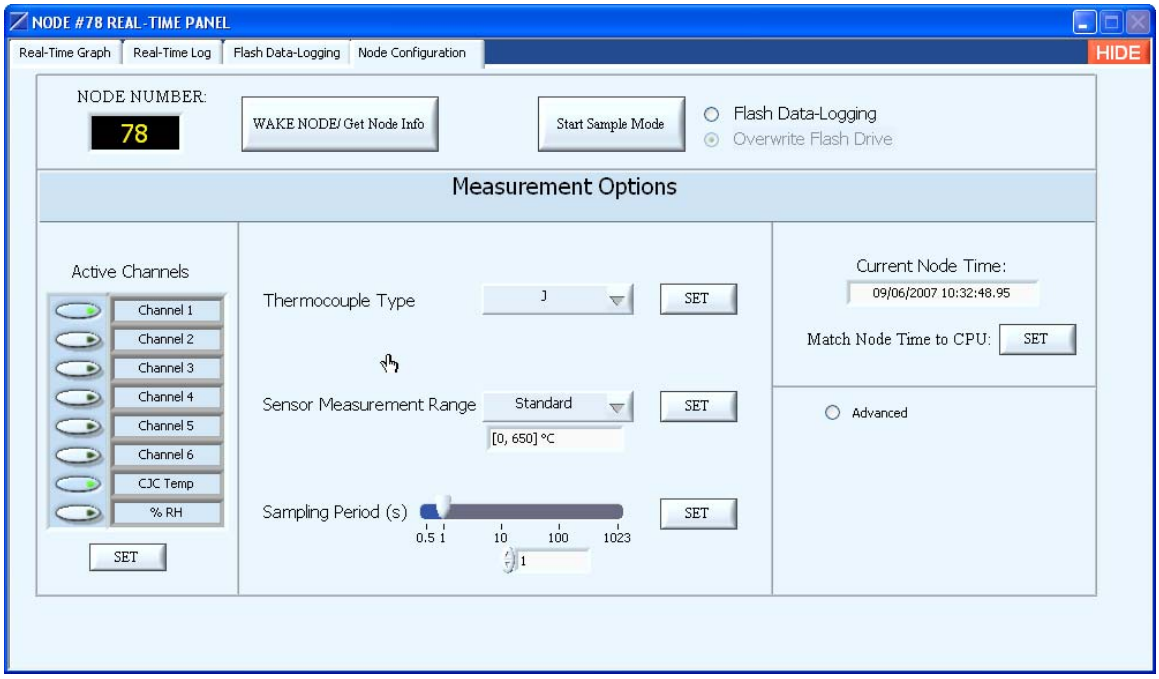

Figure 7

- In the Active Channels panel, click the buttons to the left of the channel labels to enable/disable channels. Click the Set button below to configure the TC-Link®.
- Click the Thermocouple Type drop-down box and select the thermocouple type that you will be using. Click the Set button to the right to configure the TC-Link®.
- Click the Sensor Measurement Range drop-down box and select the temperature range that you will be using. Click the Set button to the right to configure the TC-Link®.
- Click and slide the Sampling Period slider to adjust the sampling rate that you will be using. Click the Set button to the right to configure the TC-Link®.
- Click the Set button to the right of the Match Node Time to CPU label to configure the TC-Link® on-board clock.
- The Flash Data-Logging and Overwrite Flash Drive radio buttons allow you to configure a sampling session where 1) on-board datalogging commences at the beginning of the datalogging memory, or 2) on-board datalogging commences at the place in datalogging memory where the last datalogging session ended, or 3) no datalogging occurs. This configuration parameter is set when the Start Sample Mode button is clicked (and sampling is re-initiated). For our example, please enable Flash Data-Logging and enable Overwrite Flash Drive and we will commence datalogging at the beginning of the datalogging memory.
- Note: The Advanced radio button allows access to read and write the TC-Link®'s EEPROM. Please do not use this function without factory help. Unit failure may be caused which will require unwarranted return to the factory.
- After setting all parameters, click the Start Sample Mode button and the TC-Link® will begin sampling and transmitting data.
- Click the Real-Time Log tab and the screen in Figure 8 will appear.

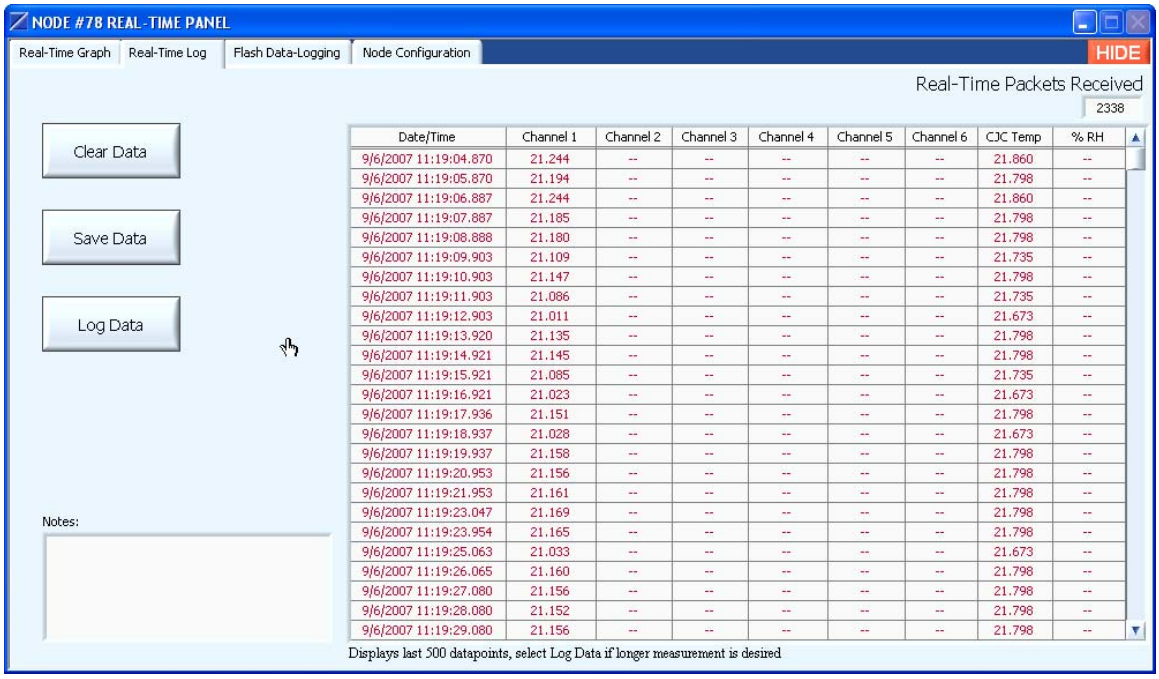

Figure 8

- The grid displays up to the last 500 data points received from the TC-Link®.
- Click the Save Data button and a Save File window appears. Enter a unique file name, click OK and the last 500 data points will be recorded in a CSV file.
- Notes can be added to the file header by filling in the Notes text box prior to clicking the Save Data button.
- Click the Log Data button and a Save File window appears. Enter a unique file name, click OK and data points will be continuously recorded in a CSV file.
- A Stop Logging button will appear and may be clicked when the Logging session is to be ended. A Samples Between Saves number scroll will appear and may be adjusted to set the number of samples captured before being written to file. Default is 10.
- Notes can be added to the file header by filling in the Notes text box prior to clicking the Log Data button.
- The Clear Data button may be clicked to clear the grid and the buffer of saved data points. Clear Data will automatically stop a Log Data session.
- Click the Flash Data-Logging tab and the screen in Figure 9 will appear.

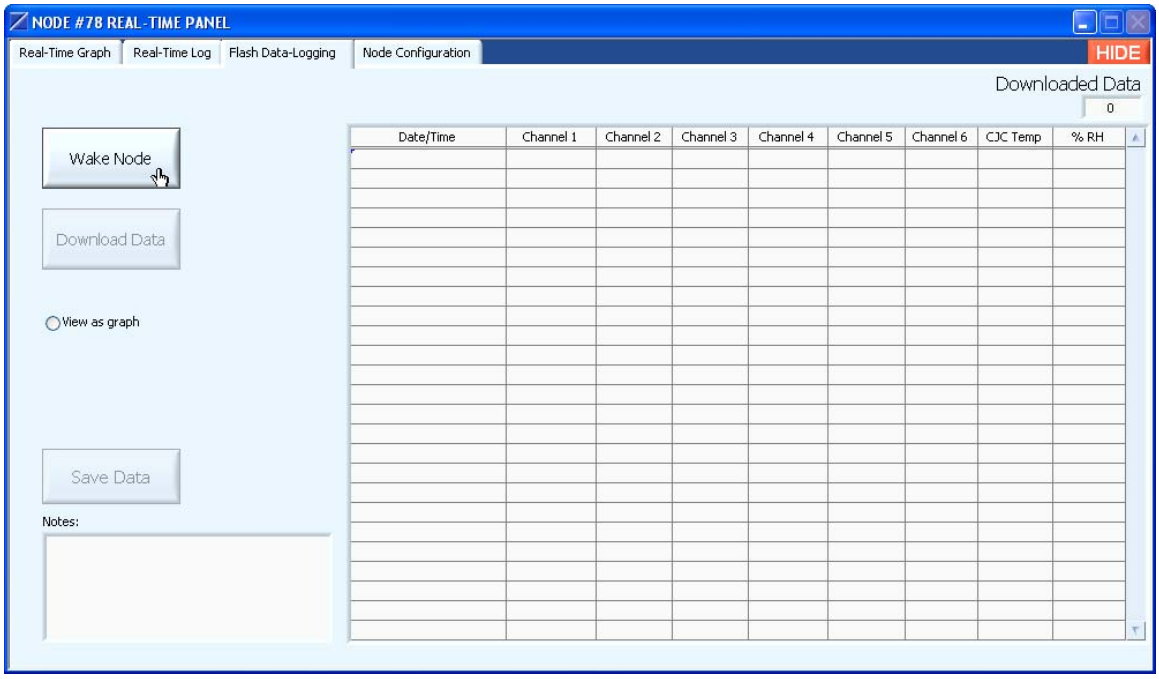

Figure 9

- Click the Wake Node button and in a moment the TC-Link® will "awaken".
- Click the Download Data button and the TC-Link® will download the data stored in its flash memory and display it on the grid. A progress bar will signal progress and completion. See Figure 10.

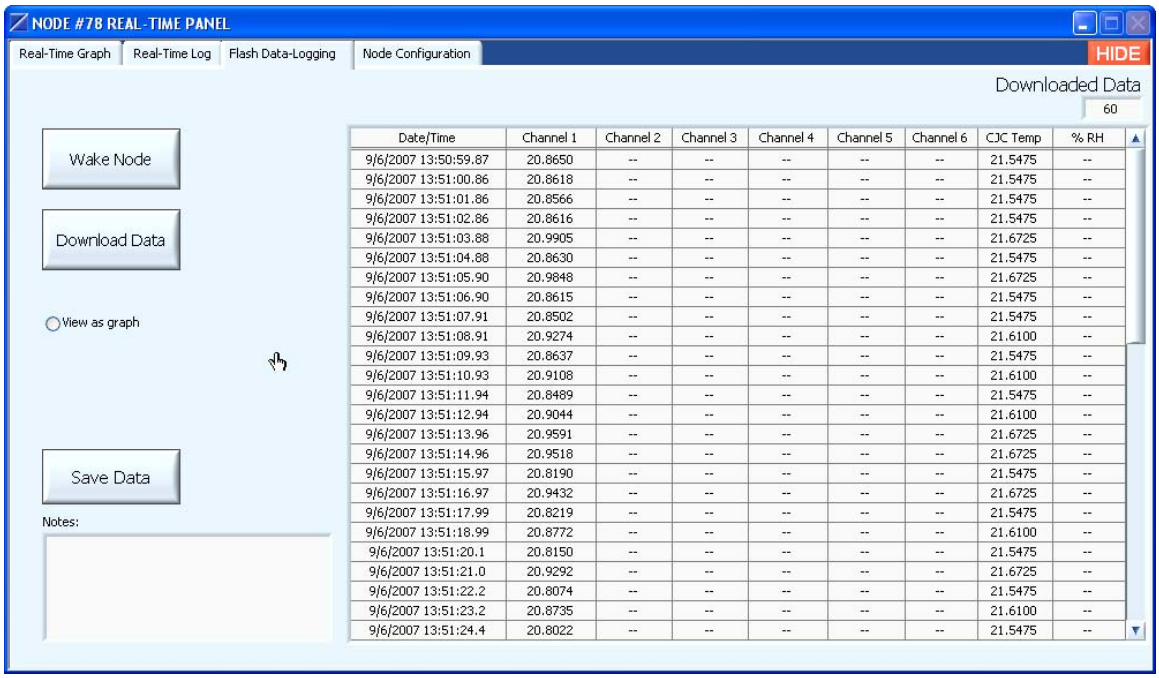

Figure 10

- Click the View As Graph radio button to display data as graph or grid.

- Click the Save Data button and a Save File window appears. Enter a unique file name, click OK and the downloaded data points will be recorded in a CSV file.
- Notes can be added to the file header by filling in the Notes text box prior to clicking the Save Data button.
- Note: Sampling may be re-initiated by clicking the Start Sample Mode button on the Node Configuration tab.

Main Screen Functions

- The Main screen provides management and recovery functions.
- See Figures 11 and 12.

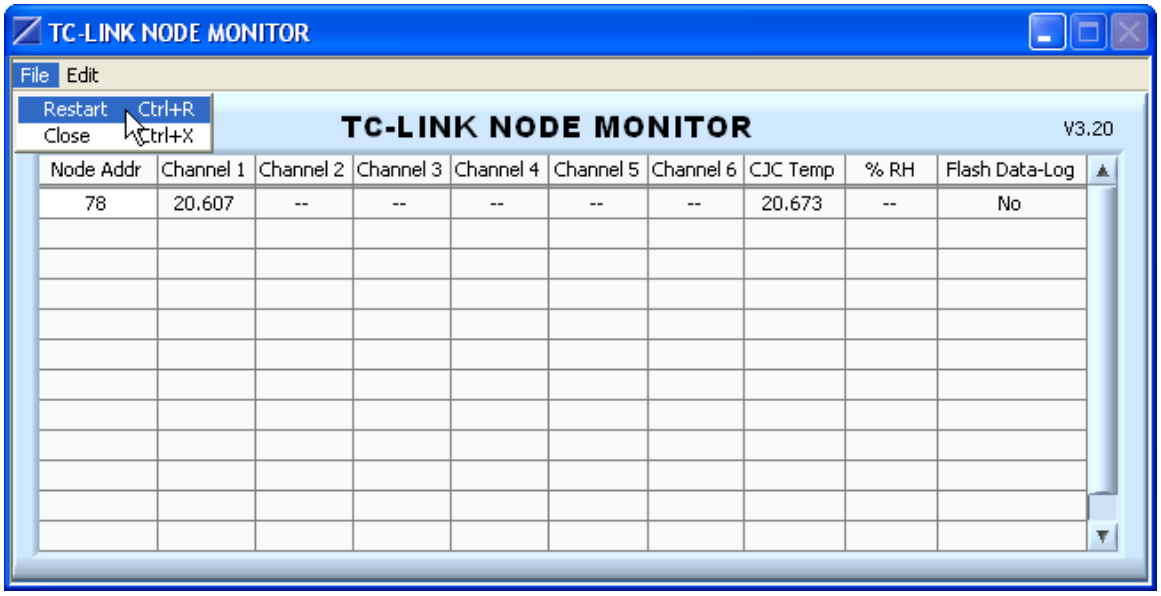

Figure 11

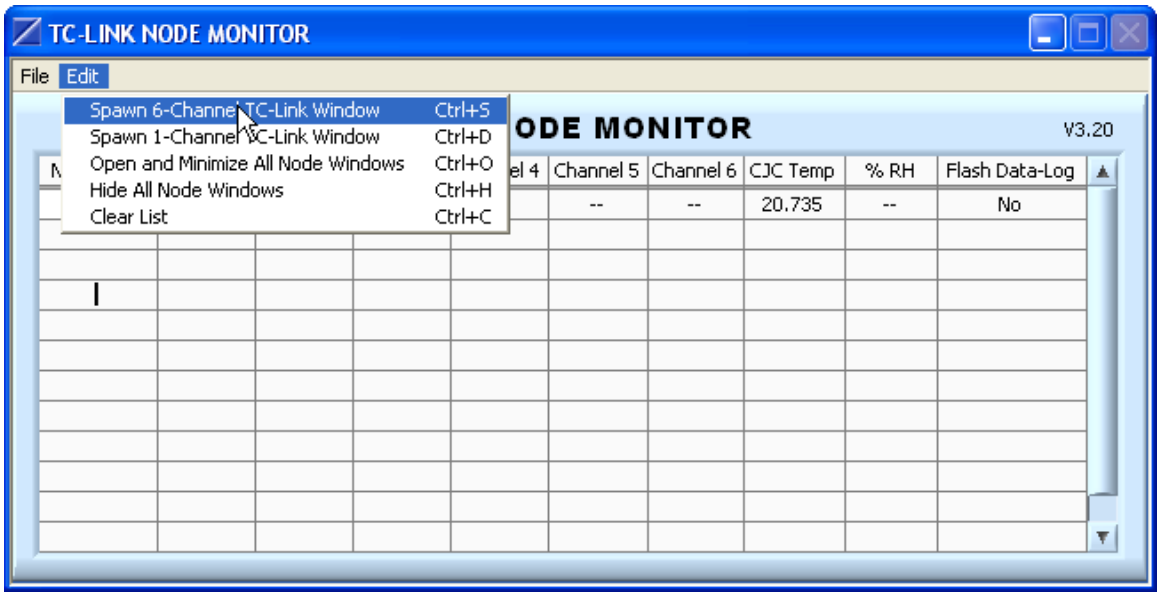

Figure 12

- Click the Restart menu item to erase all nodes, to select a new (or the same) base station and begin a new session.
- Click the Spawn 6-Channel TC-Link® Window menu item to begin sampling a node that is in idle mode and not displaying in the grid. A window will open and allow you to enter the Node Address. Click OK. The Node Address will appear in the grid. Click the Address and a Real-Time Panel will spawn. Go to the Node Configuration screen and click the Start Sample Mode button.
- Click the Open and Minimize All Node Windows menu item to view all Real-Time Panel screens at once.
- Click the Hide All Node Windows menu item to hide all Real-Time Panel screens.
- Click the Clear List menu item to erase all nodes from the grid and begin a refresh of the grid.

Analog Base Station Operation

- The Analog Base Station will support the individual channels of the 6-Channel TC-Link® through its analog backplane. This allows the user to connect analog acquisition equipment to the Analog Base Station and receive the thermocouple data arriving from the TC-Link® as analog data. By default the base station backplane is set to 0-3 volt output, representing the range of the particular thermocouple in use.
- To enable the Analog Base Station backplane, follow these steps.
- Go to the Node Configuration tab.
- Click the Wake Node/Get Node Info button and in a moment the TC-Link® will "awaken". In addition, the Analog Base Station will be recognized by the software and the Analog Base Options tab will be presented.
- Click the Analog Base Options tab.
- Click the Get Values button and the current settings of the TC-Link® will be captured as shown in Figure 13.

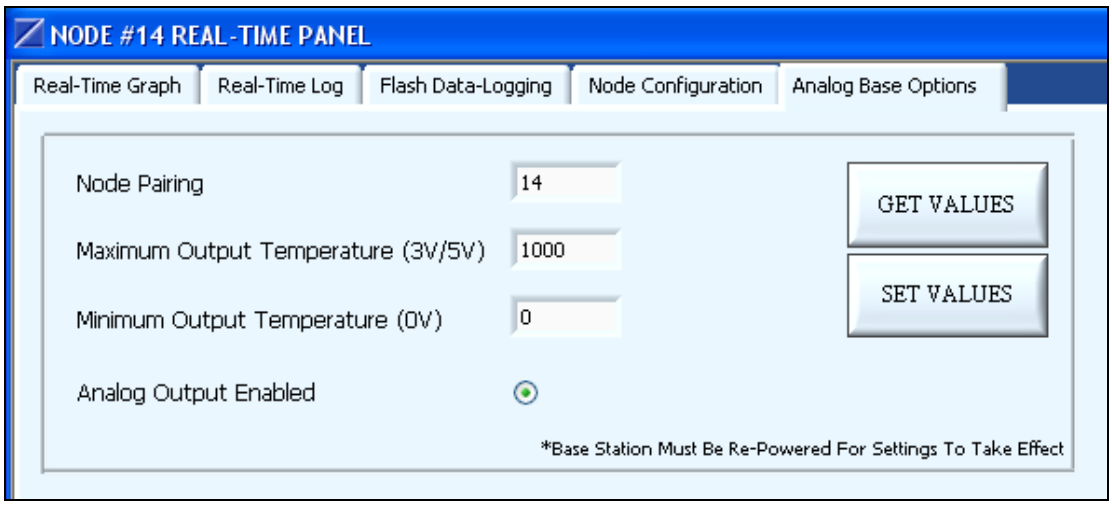

Figure 13

- By default, the values read out will be:
  - Node Pairing = 65535
  - Maximum Output Temperature (3V/5V) = NaN
  - Minimum Output Temperature (0V) = NaN
  - Analog Output Enabled = Off
- Set the values to suit your TC-Link® as follows:
  - Node Pairing = Your node's particular address, example shows 14.
  - Maximum Output Temperature (3V/5V) = Your thermocouple's upper range as selected on the Node Configuration tab, example shows 1000.
  - Minimum Output Temperature (0V) = Your thermocouple's lower range as selected on the Node Configuration tab, example shows 0.
  - Analog Output Enabled = On
- Click Set Values to make the new settings to the base station.
- Click the Node Configuration tab.
- Click Start Sample Mode.
- Cycle the power on the base station and the base station backplane output will now be available as you sample the TC-Link®.

Final Note
The TC-Link® will automatically revert to sampling mode 2 minutes after it is awakened. For example, if you are working the Node Configuration tab and the TC-Link® reverts to sampling mode, simply re-awaken the node to continue with configuration.

Congratulations!
You are off and running! Please read the TC-Link® users manual to learn more about using your TC-Link® successfully.