

SolarTrak™ STNetPCI

SolarTrak Network PC Interface

Instructions

Required Accessories

You will need a DB-9 serial cable; male on one end and female on the other...

You may also need a USB-DB-9 serial converter like the one found at this link by CoolGear:

<http://www.coolgear.com/product/mini-usb-rs-232-serial-adapter-db-9-male>

There are others available but some don't work with this program for some reason.

Install Software

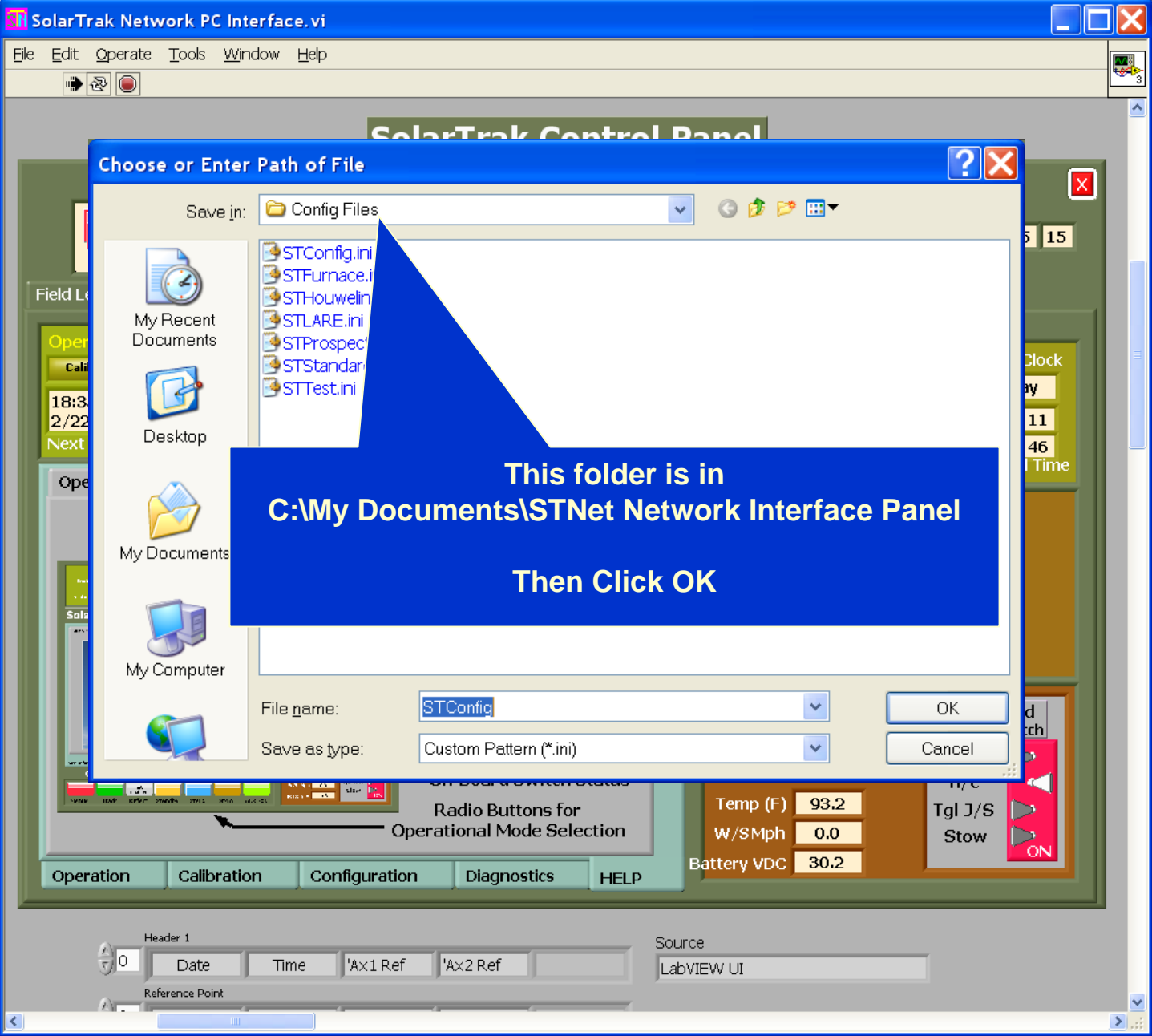
Win 7/10:

- <http://www.ni.com/download/labview-run-time-engine-2011/2536/en/>
- <http://www.ni.com/download/ni-visa-run-time-engine-5.3/3826/en/>
- [LabVIEW-based SolarTrak Network PC Interface Win 7/10 \(16 MB\)](#)

Win XP:

- <http://www.ni.com/download/labview-run-time-engine-8.2/679/en/>
- <http://www.ni.com/download/ni-visa-run-time-engine-4.2/832/en/>
- [LabVIEW-based SolarTrak Network PC Interface Win XP \(17 MB\)](#)
- Download and install both runtime components
- Download and unzip PC Interface software into 'My Documents' (creates folder)

Click STNet.exe to start



This folder is in
C:\My Documents\STNet Network Interface Panel
Then Click OK

Radio Buttons for Operational Mode Selection

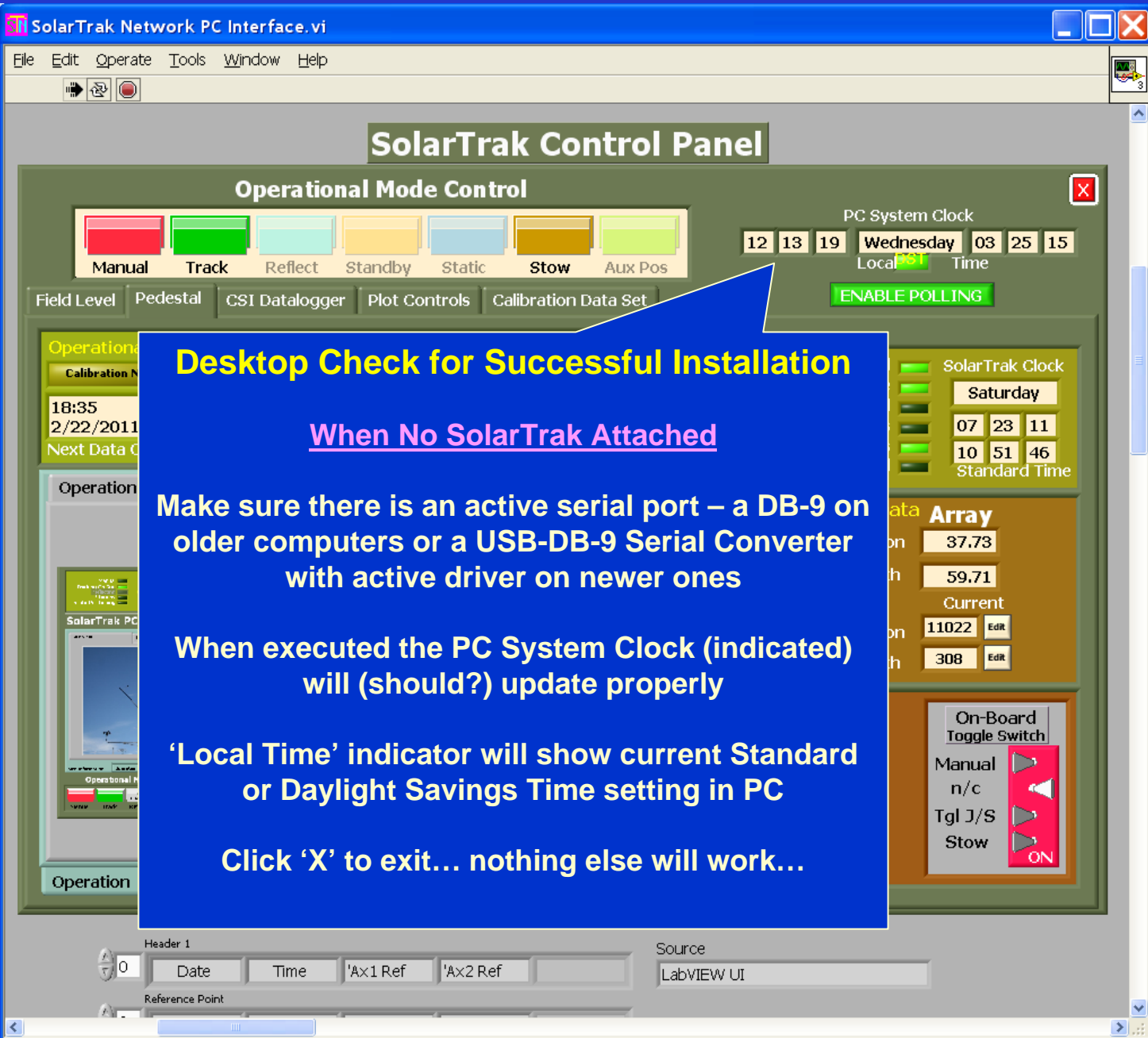
Temp (F)	93.2
W/SMph	0.0
Battery VDC	30.2

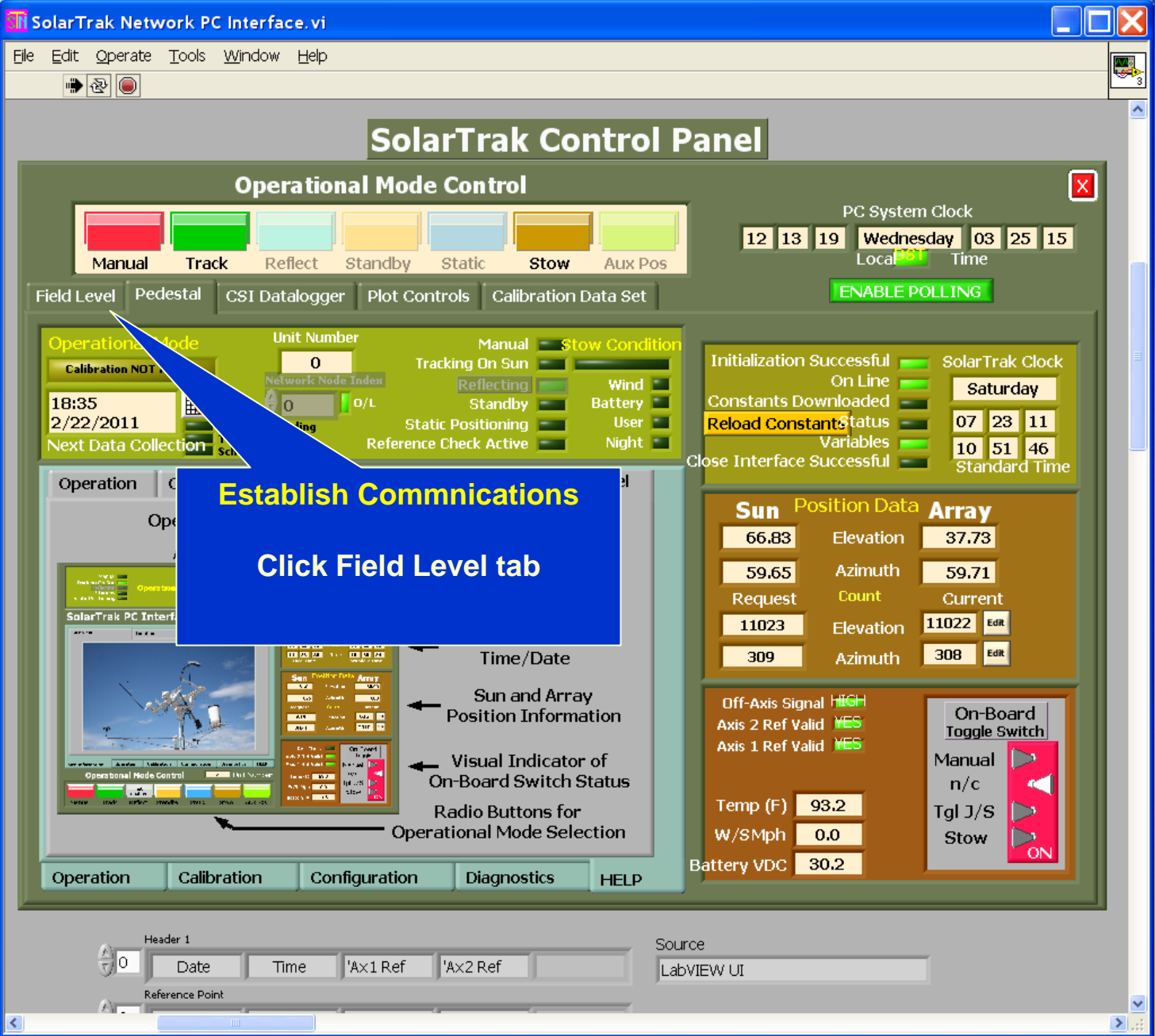
Tgl J/S Stow ON

Header 1

0	Date	Time	'Ax1 Ref	'Ax2 Ref	Source
					LabVIEW UI

Reference Point





Establish Communications
Click Field Level tab

- ← Time/Date
- ← Sun and Array Position Information
- ← Visual Indicator of On-Board Switch Status
- ← Radio Buttons for Operational Mode Selection

SolarTrak Control Panel

Operational Mode Control

Manual Track Reflect Standby Static Stow Aux Pos

PC System Clock
12 16 14 Wednesday 03 25 15
Local Time

ENABLE POLLING

Field Level Pedestal CSI Datalogger Plot Controls Calibration Data Set

Site View Set Time/Date Field Configuration Diagnostics



Click Field Configuration tab

Node Status

SEL	Node	O/L	H	M	S	T	R	S	M	E	N	O/TU/A
0	0	0	0	0	0	0	0	0	0	0	0	0

Header 1
0 Date Time 'Ax1 Ref' 'Ax2 Ref'

Reference Point

Source
LabVIEW UI

SolarTrak Control Panel

Operational Mode Control

Manual Track Reflect Standby Static Stow Aux Pos

PC System Clock

17 44 14 Wednesday 03 25 15
Local Time

ENABLE POLLING

Field Level Pedestal CSI Datalogger Plot Controls Calibration Data Set

Site View Set Time/Date Field Configuration Diagnostics

SolarTrak I/O Stream ASRL7::INSTR

If Network,
Look for Unit Number

2

Port Count Scan Comm Port Comm Scan Active Scanning Comm Port

0

Pick Comm Port

COM1

Reconnect Comm

Make sure serial cable is connected to the SolarTrak Then click the Blue button

Communications Network Addressing Site Definition

Save PCI Configuration Data to Disk

Header 1

0 Date Time 'Ax1 Ref 'Ax2 Ref

Source

LabVIEW UI

Reference Point

SolarTrak Control Panel

Operational Mode Control

Manual Track Refl

2. After 'Reconnect Successful'
Click 'Set Time/Date'

PC System Clock
11 Wednesday 03 25 15
Local Time
ENABLE POLLING

Field Level Pedestal CSI Data

Site View Set Time/Date Field Configuration Diagnostics

1. You should get this indication
that contact was made

SolarTrak I/O Stream ASRL19::INSTR

If Network, Look for Unit Number 2

Port Count/Scale 13

Pick Comm Port ASRL19: Reconnect Comm Error Reconnect Successful

Communications Network Addressing Site Definition

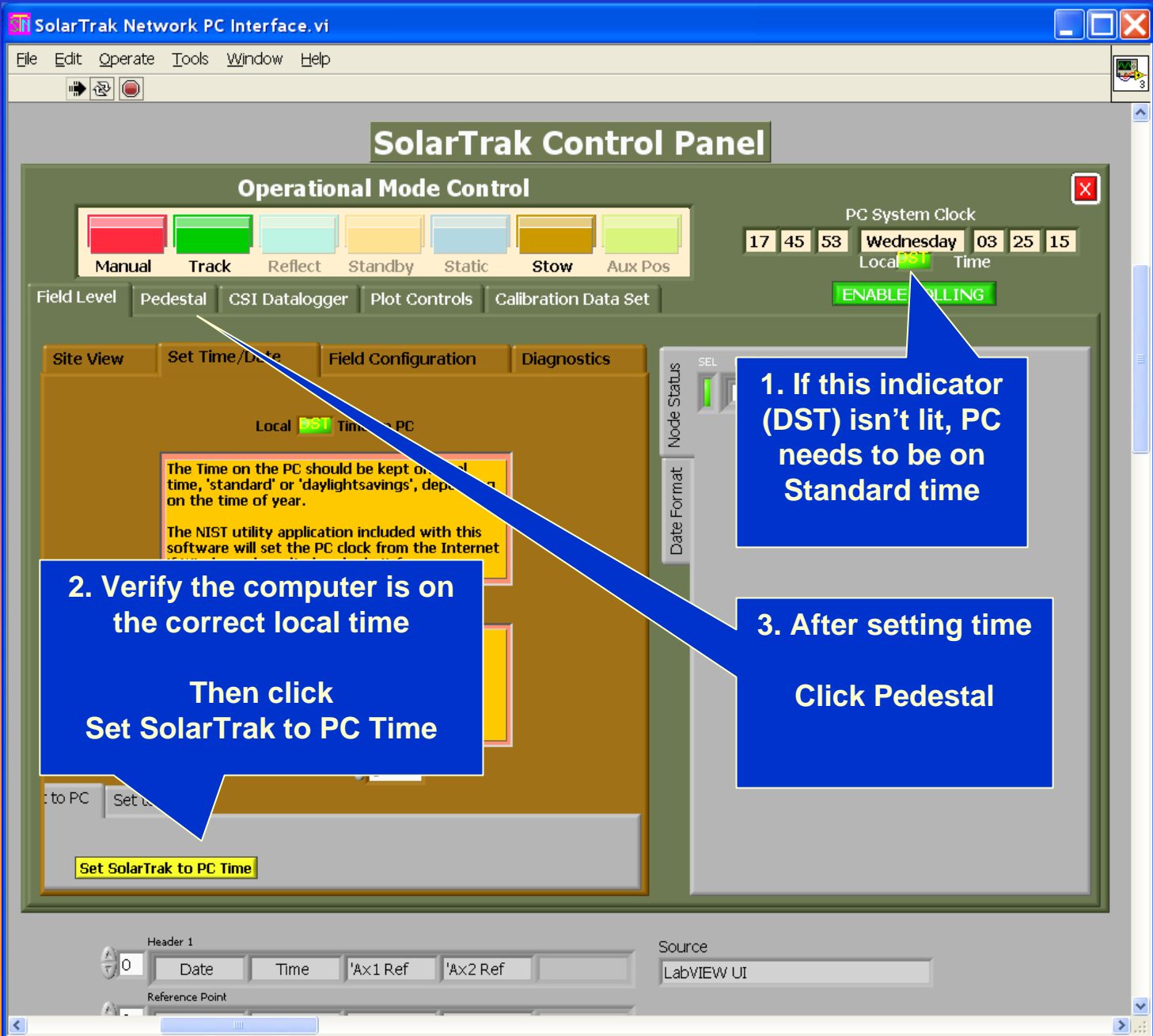
Save PCI Configuration Data to Disk

Node Status

SEL	Node	O/L	H	M	S	T	R	S	M	E	N	O/TU/A
0	0	0	0	0	0	0	0	0	0	0	0	0

Header 1 0 Date Time 'Ax1 Ref' 'Ax2 Ref' Source LabVIEW UI

Reference Point



SolarTrak Control Panel

Operational Mode Control

Manual Track Reflect Standby Static Stow Aux Pos

PC System Clock
 17 47 48 Wednesday 03 25 15
 Local Time

ENABLE POLLING

Field Level Pedestal CSI Datalogger Plot Controls Calibration Data Set

Operational Mode

Calibration NOT Active
 18:35
 2/22/2011
 Next Data Collection

Enable Polling Function to Update Screen Information
Click Enable Polling

On Line Successful SolarTrak Clock
 On Line Saturday
 Constants Downloaded
 Reload Constants Status 07 23 11
 Variables 10 51 46
 Interface Successful Standard Time

Operation Calibration

Operational Mode Information

- Program Execution Status and Control
- PC and SolarTrak Time/Date
- Sun and Array Position Information
- Visual Indicator of On-Board Switch Status
- Radio Buttons for Operational Mode Selection

Sun Position Data Array

66.83	Elevation	37.73
59.65	Azimuth	59.71
Request	Count	Current
11023	Elevation	11022 Edit
309	Azimuth	308 Edit

Off-Axis Signal HIGH
 Axis 2 Ref Valid YES
 Axis 1 Ref Valid YES

On-Board Toggle Switch

Manual n/c
 Tgl J/S
 Stow ON

Temp (F) 93.2
 W/SMph 0.0
 Battery VDC 30.2

Operation Calibration Configuration Diagnostics HELP

Header 1
 0 Date Time 'Ax1 Ref 'Ax2 Ref
 Reference Point

Source
 LabVIEW UI

SolarTrak Control Panel

Operational Mode Control

Manual Track Reflect Standby Static Stow Aux Pos

PC System Clock
 17 49 40 Wednesday 03 25 15
 Local Time

Field Level Pedestal CSI Datalogger Plot Controls Calibration Data Set

DISABLE POLLING

Operational Mode Unit Number 2 Manual **Stow Condition**
 Calibration NOT Active Tracking On Sun
 Network Node Index 0 Reflecting Wind
 Standby Battery
 Static Positioning User
 Night

Initialization Successful On Line SolarTrak Clock
 Constants Downloaded On Line Wednesday
 Reload Constants Status 03 25 15
 Variables 16 49 40
 Interface Successful Standard Time

1. Verify that Constants Download And clock is indicating correct SOLAR time

2. Verify that the 'Status' and 'Variables' lights begin alternating every few seconds

Axis 1 Coast Counts 0 Width-Spacng Ratio 0.65 Joy1N 10
 Axis 1 Switch ON 1 Full Deadband Mode ON Joy2P 20
 Axis 2 Deadband 3
 Axis 2 Coast Counts 0
 Axis 2 Switch ON 1

Sun Position Array
 -0.00 lon 90.00
 -0.00 lath 49.24
 Requested Current
 -1 Edit
 255 Edit

Temp (F) 68.0
 W/SMph 0.0
 Battery VDC 10.6

On-Board Toggle Switch
 Manual n/c
 Tgl J/S
 Stow ON

Geometry Drive Parameters Location Misc Parameters
 Operation Calibration Configuration Diagnostics HELP

Header 1 Source LabVIEW UI
 0 Date Time 'Ax1 Ref' 'Ax2 Ref'
 Reference Point

Parameter Template Operations

There are myriad tracking and system control configurations supported by the SolarTrak control technology. There are many settable values stored within the MCU computer chip that if slightly wrong, can produce improper operation.

When configuring and calibrating a new tracking control system, it may very well be necessary to set each one individually, and sometimes over and over, in order to accomplish the task, but once done, the entire parameter block can be copied and saved on disk or recovered from a disk file and uploaded to a SolarTrak MCU as a unit, without setting each individual parameter every time.

When storing individual parameters or changing operational values like an Angle-of-Incidence offset, the polling function should be enabled to allow updating the values after the change. Typically, the PC Interface places the controller in Manual Mode while it changes a parameter, then puts the controller back in whatever mode it had been in prior to the setting change.

The necessary efficiencies of field maintenance can require the replacement of electrical components that have failed, hopefully not the SolarTrak itself, but it is usually easier to replace an entire control box than to replace a solid state relay in the field.

The use of parameter template transfer makes this rather straight forward. In preparation to utilize the PC interface in this manner, templates should be downloaded from all active controllers and stored on disk as a data base.

When a controller must be replaced, temporarily power up the replacement and upload the appropriate template file for that unit before going into the field.

As a note though, in general, the SolarTrak MCU chip, containing all these parameters, is not damaged by any electrical incident that may occur, and can usually be removed from the old board and inserted in the new board without the need for all this computer stuff.

The following frames indicate first downloading and saving templates then retrieving and uploading them to the controllers. Polling should be disabled during this process to reduce communication complexity.

Download Parameter Template

The screenshot displays the SolarTrak Network PC Interface.vi software. The main window is titled "SolarTrak Control Panel" and contains several sections:

- Operational Mode Control:** Includes a menu (File, Edit, View, Project, Operate, Tools, Window, Help), a status bar with icons, and a "Shopping Days 'Til Christmas" indicator showing 84 days. The PC System Clock shows 12:00:15 on Sunday, 10/01/17. A green "ENABLE POLLING" button is visible.
- Operational Mode:** Shows "Unit Number 22", "Manual" status, "Tracking On Sun" (Reflecting), and "Wind" status. A "Stow Condition" indicator is present.
- Operational Parameters:** A section for managing template files. It includes a "Template File" list with entries D014, B7FE, and 101. A "Transfer Progress" bar is shown. A "Download Template from CPU" button is highlighted with a green box.
- Sun Position Data Array:** A table showing solar position data:

Sun	Position Data	Array
17.23	Elevation	Inf
-20.51	Azimuth	0.00
Request	Count	Current
-1	Elevation	-1
-1	Azimuth	-1
- On-Board Toggle Switch:** A manual control section with a red toggle switch labeled "ON".

Three blue callout boxes provide instructions:

1. Verify that polling is Disabled after verifying good communications
2. Click – Download Template from CPU
3. The On Line light should remain green throughout this process and the Done light comes on when finished

The bottom of the window shows a navigation bar with tabs for "Operation", "Calibration", "Configuration", "Diagnostics", and "HELP". The system tray at the bottom left shows "My Computer" and a battery level indicator.

Save Parameter Template

The screenshot shows the SolarTrak Network PC Interface software. In the background, the 'Operational Mode Control' panel has a 'File-Template Control' section with a 'Save Template File to Disk' button highlighted. A blue callout box points to this button with the text: **1. Click – Save Template File to Disk**.

In the foreground, a 'Choose or Enter Path of File' dialog box is open. The 'Save in:' field is set to 'SolarTrak Network PC Interface Files'. The file list shows folders for 'Calibration Data', 'Config Files', 'EXE', 'JPEGs', and 'Template Files'. The 'Template Files' folder is selected, and a tooltip shows its size as 22.6 KB and lists files: 'AJS-1.TPL, EMC1.TPL, FLIP-2.tpl, HN-02.TPL, HN-03.TPL, ...'. A blue callout box points to the 'Template Files' folder with the text: **2. Navigate to 'Template Files' and save using an appropriate name... the extension 'TPL' is appended for you**.

The dialog box also shows the 'File name:' field and the 'Save as type:' dropdown set to 'Custom Pattern (*.tpl)'. The 'Open' and 'Cancel' buttons are visible at the bottom right.

Retrieve and Upload Parameter Template

The screenshot displays the SolarTrak Network PC Interface, a software application for controlling solar tracking systems. The main window is titled "SolarTrak Control Panel" and features several sections:

- Operational Mode Control:** A row of seven colored buttons labeled Manual (red), Track (green), Reflect (cyan), Standby (yellow), Static (blue), Stow (orange), and Aux Pos (light green).
- System Information:** Includes "Shopping Days 'Til Christmas" (84), "PC System Clock" (12:00:15), and "Local Time" (Sunday, 10:01:17).
- Operational Mode Section:** Shows "Unit Number" (22), "Manual" (Stow Condition), and "Tracking On Sun" (Reflecting). It also includes a "Schedule Pending" indicator and "Next Data Collection" time (18:35 on 2/22/2011).
- Operational Parameters and Template File:** A section with a "Start" button and a "File-Template Control" area containing four buttons: "Download Template from CPU", "Upload Template to CPU", "Get Template File from Disk", and "Save Template File to Disk". A "Done" button and a "Transfer Progress" bar are also present.
- Sun Position Data Array:** Displays "Elevation" (17.23), "Azimuth" (-20.51), and "Request Count" (0.00).
- System Status:** Includes "Initialization Successful", "On Line", "Constants Downloaded", and "Reload Constants Status".

Two blue callout boxes provide instructions:

- 1. Click – Get Template File from Disk**: A blue arrow points from this box to the "Get Template File from Disk" button in the Template File section.
- 2. Click – Upload Template to CPU**
Done light comes on when finished: A blue arrow points from this box to the "Upload Template to CPU" button in the Template File section.

The interface also shows various other controls like "ENABLE POLLING", "Manual ON", and "Toggle Switch" at the bottom.